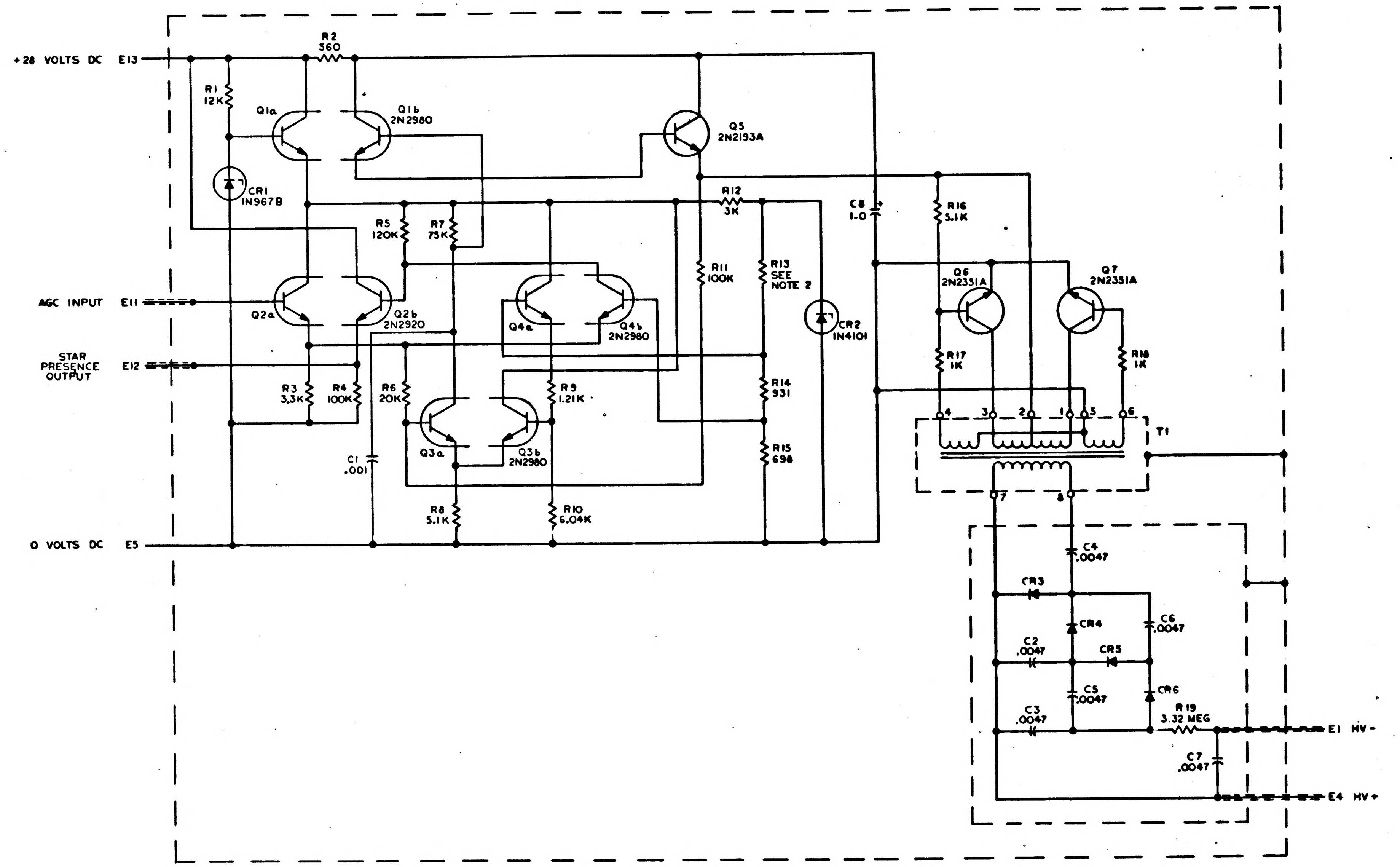
NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 22641

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23225			19 OCT '65	


+28 VOLTS DC E13
R1 12K
R2 560
Q1a
Q1b 2N2980
Q5 2N2193A
CR1 1N967B
R5 120K
R7 75K
R12 3K
C8 1.0 +
R16 5.1K
AGC INPUT E11
Q2a
Q2b 2N2920
Q4a
Q4b 2N2980
R11 100K
R13 SEE NOTE 2
CR2 1N4101
Q6 2N2351A
Q7 2N2351A
STAR PRESENCE OUTPUT E12
R3 3.3K
R4 100K
R6 20K
R9 1.21K
R14 931
R17 1K
R18 1K
4 3 2 1 5 6
T1
C1 .001
Q3a
Q3b 2N2980
R15 698
7 8
R8 5.1K
R10 6.04K
0 VOLTS DC E5
C4 .0047
CR3
CR4
C6 .0047
C2 .0047
CR5
C5 .0047
CR6
C3 .0047
R19 3.32 MEG
E1 HV-
C7 .0047
E4 HV+

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006777-24	CAPACITOR	.001	± 10%	100VDC
C2	1012041-3	↑	.0047	± 20%	4KVDC
C3	↑	│	.0047	± 20%	4KVDC
C4	│	│	.0047	± 20%	4KVDC
C5	│	│	.0047	± 20%	4KVDC
C6	↓	│	.0047	± 20%	4KVDC
C7	1012041-3	↓	.0047	± 20%	4KVDC
C8	1006755-69	CAPACITOR	1.0	± 10%	35 VDC
CR1	1010830-11	DIODE	1N967B	± 5%	18V
CR2	1012056-3	↑	1N4101	± 5%	8.2V
CR3	1012042	│	MC8489R		2KV
CR4	↑	│	MC8489R		2KV
CR5	↓	↓	MC8489R		2KV
CR6	1012042	DIODE	MC8489R		2KV
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010431	↑	2N2920		
Q3	1010652-3	│	2N2980		
Q4	1010652-3	│	2N2980		
Q5	1010398-1	│	2N2193A		
Q6	1010343-1	↓	2N2351A		
Q7	1010343-1	TRANSISTOR	2N2351A		
R1	1006750-58	RESISTOR	12K	± 2%	1/4 W
R2	1006760-26	↑	560	± 2%	1/2 W
R3	1006750-44	│	3.3K	± 2%	1/4 W
R4	1006750-80	│	100K	± 2%	1/4 W
R5	1006750-82	│	120K	± 2%	1/4 W
R6	1010364-501	│	20K	± 1%	1/8 W
R7	1006750-77	│	75K	± 2%	1/4 W
R8	1006750-49	│	5.1K	± 2%	1/4 W
R9	1010364-267	│	1.21K	± 1%	1/8 W
R10	1010364-401	│	6.04K	± 1%	1/8 W
R11	1010364-635	│	100K	± 1%	1/8 W
R12	1006750-43	│	3K	± 2%	1/4 W
R13	SEE NOTE 2	│		± 1%	1/8 W
R14	1010364-245	│	931	± 1%	1/8 W
R15	1010364-221	│	698	± 1%	1/8 W
R16	1006750-49	│	5.1K	± 2%	1/4 W
R17	1006750-32	│	1K	± 2%	1/4 W
R18	1006750-32	↓	1K	± 2%	1/4 W
R19	1010768-79	RESISTOR	3.32 MEG	± 1%	1/8 W
T1	1012148	TRANSFORMER			

R13	
PART NO	VALUE
1010364-291	1620
↑ -293	1650
│ -295	1690
│ -297	1740
│ -299	1780
│ -301	1820
│ -303	1870
│ -305	1910
│ -307	1960
│ -309	2000
│ -311	2050
│ -313	2100
│ -315	2150
│ -317	2210
│ -319	2260
│ -321	2320
│ -323	2370
│ -325	2430
│ -327	2490
│ -329	2550
│ -331	2610
│ -333	2670
↓ -335	2740
1010364-337	2800

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SELECT R13 FROM APPROPRIATE CHART.

REF DWG:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO. 2007175

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Hundertlied 9-17-65
CHECKED P.K. Kucharshi 9-19-65
APPROVED A.A. Kosmala 9-20-65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SCHEMATIC
POWER SUPPLY
(TRACKER)

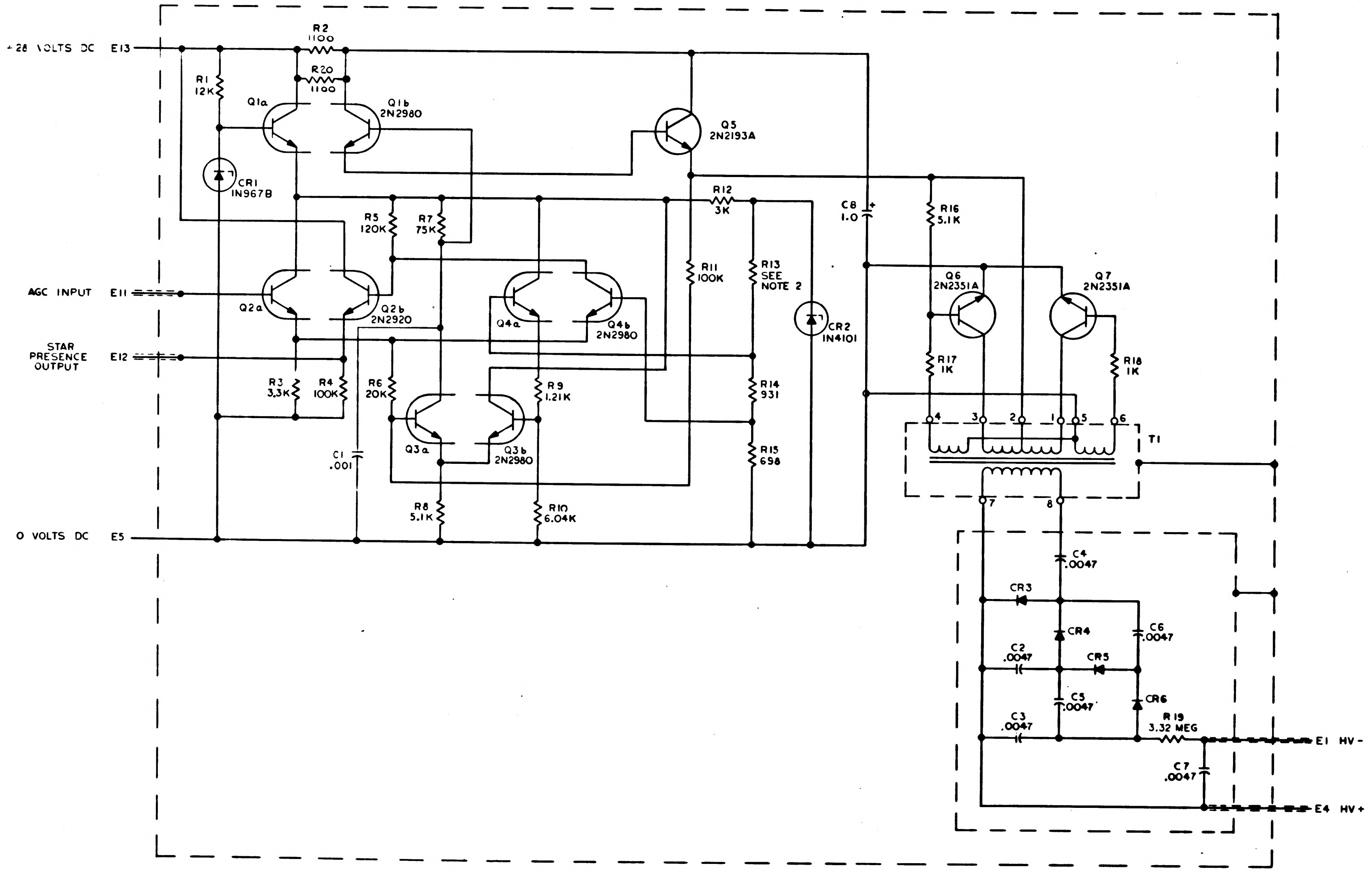
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010085
SCALE —
SHEET 1 OF 1

2010085 A

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 23225			4 Oct 65	
B		REVISED PER TDRR 23255				


+28 VOLTS DC E13
AGC INPUT E11
STAR PRESENCE OUTPUT E12
0 VOLTS DC E5
R1 12K
R2 1100
R20 1100
Q1a
Q1b 2N2980
Q5 2N2193A
CR1 1N967B
R12 3K
C8 1.0
R16 5.1K
R5 120K
R7 75K
R11 100K
R13 SEE NOTE 2
CR2 1N4101
Q6 2N2351A
Q7 2N2351A
Q2a
Q2b 2N2920
Q4a
Q4b 2N2980
R17 1K
R18 1K
R3 3.3K
R4 100K
R6 20K
R9 1.21K
R14 931
T1
C1 .001
Q3a
Q3b 2N2980
R15 698
R8 5.1K
R10 6.04K
C4 .0047
CR3
CR4
C6 .0047
C2 .0047
CR5
C5 .0047
CR6
C3 .0047
R19 3.32 MEG
E1 HV-
C7 .0047
E4 HV+

R13	
PART NO	VALUE
1010364-291	1620
↑ -293	1650
-295	1690
-297	1740
-299	1780
-301	1820
-303	1870
-305	1910
-307	1960
-309	2000
-311	2050
-313	2100
-315	2150
-317	2210
-319	2260
-321	2320
-323	2370
-325	2430
-327	2490
-329	2550
-331	2610
-333	2670
↓ -335	2740
1010364-337	2800

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SELECT R13 FROM APPROPRIATE CHART.

REF DWG:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO. 2007175

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006777-24	CAPACITOR	.001	±10%	100 VDC
C2	1012041-3	↑	.0047	±20%	4KVDC
C3	↑		.0047	±20%	4KVDC
C4			.0047	±20%	4KVDC
C5			.0047	±20%	4KVDC
C6	↓		.0047	±20%	4KVDC
C7	1012041-3	↓	.0047	±20%	4KVDC
C8	1006755-69	CAPACITOR	1.0	±10%	35 VDC
CR1	1010830-11	DIODE	1N967B	±5%	18V
CR2	1012056-3	↑	1N4099	±5%	6.8V
CR3	1012042		MC8489R		2KV
CR4	↑		MC8489R		2KV
CR5	↓	↓	MC8489R		2KV
CR6	1012042	DIODE	MC8489R		2KV
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010431	↑	2N2920		
Q3	1010652-3		2N2980		
Q4	1010652-3		2N2980		
Q5	1010398-1		2N2193A		
Q6	1010343-1	↓	2N2351A		
Q7	1010343-1	TRANSISTOR	2N2351A		
R1	1006750-58	RESISTOR	12K	±2%	1/4 W
R2	1006750-33	↑	1100	±2%	1/4 W
R3	1006750-44		3.3K	±2%	1/4 W
R4	1006750-80		100K	±2%	1/4 W
R5	1006750-82		120K	±2%	1/4 W
R6	1010364-501		20K	±1%	1/8 W
R7	1006750-77		75K	±2%	1/4 W
R8	1006750-49		5.1K	±2%	1/4 W
R9	1010364-267		1.21K	±1%	1/8 W
R10	1010364-401		6.04K	±1%	1/8 W
R11	1010364-635		100K	±1%	1/8 W
R12	1006750-43		3K	±2%	1/4 W
R13	SEE NOTE 2			±1%	1/8 W
R14	1010364-245		931	±1%	1/8 W
R15	1010364-221		698	±1%	1/8 W
R16	1006750-49		5.1K	±2%	1/4 W
R17	1006750-32		1K	±2%	1/4 W
R18	1006750-32	↓	1K	±2%	1/4 W
R19	1010768-79	RESISTOR	3.32 MEG	±1%	1/8 W
R20	1006750-33	RESISTOR	1100	±2%	1/4 W
T1	1012148	TRANSFORMER			

2010085 E

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Hinderliter 9-17-65
CHECKED 9-19-65
APPROVED 9-20-65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

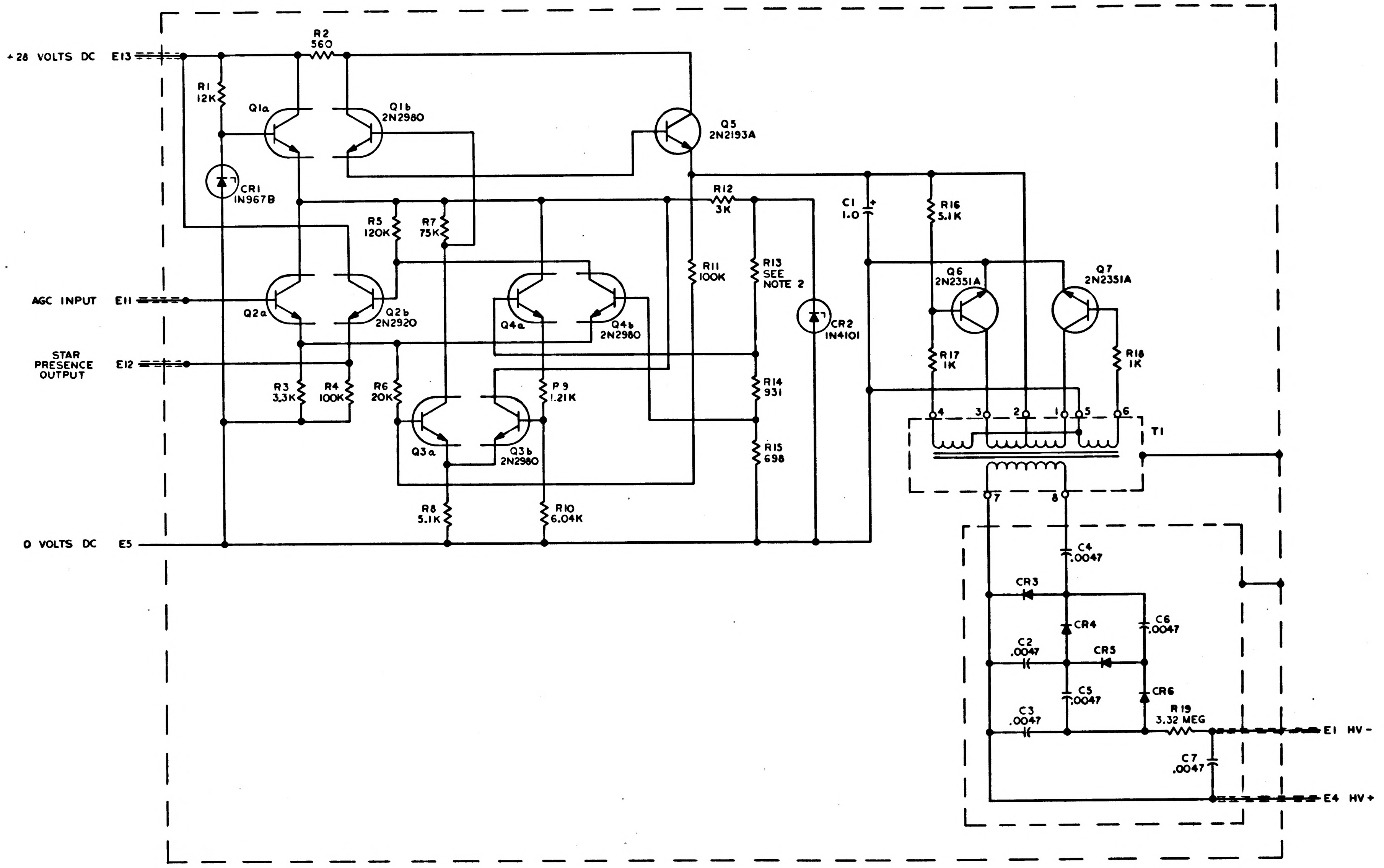
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
POWER SUPPLY
(TRACKER)

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010085
SCALE —
SHEET 1 OF

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 2264						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



+28 VOLTS DC E13
R2 560
R1 12K
Q1a
Q1b 2N2980
Q5 2N2193A
CR1 IN967B
R12 3K
C1 1.0
R16 5.1K
R5 120K
R7 75K
R11 100K
R13 SEE NOTE 2
CR2 IN4101
Q6 2N2351A
Q7 2N2351A
AGC INPUT E11
Q2a
Q2b 2N2920
Q4a
Q4b 2N2980
R17 1K
R18 1K
STAR PRESENCE OUTPUT E12
R3 3.3K
R4 100K
R6 20K
P9 1.21K
R14 931
4 3 2 1 5 6
T1
Q3a
Q3b 2N2980
R15 698
7 8
R8 5.1K
R10 6.04K
0 VOLTS DC E5
C4 .0047
CR3
CR4
C6 .0047
C2 .0047
CR5
C5 .0047
CR6
C3 .0047
R19 3.32 MEG
E1 HV-
C7 .0047
E4 HV+

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-69	CAPACITOR	1.0	± 10 %	35VDC
C2	1012041-3		.0047	± 20 %	4KVDC
C3			.0047	± 20 %	4KVDC
C4			.0047	± 20 %	4KVDC
C5			.0047	± 20 %	4KVDC
C6			.0047	± 20 %	4KVDC
C7	1012041-3	CAPACITOR	.0047	± 20 %	4KVDC
CR1	1010830-11	DIODE	IN967B	± 5 %	18V
CR2	1012056-3		IN4101	± 5 %	8.2V
CR3	1012042		MC8489R		2KV
CR4			MC8489R		2KV
CR5			MC8489R		2KV
CR6	1012042	DIODE	MC8489R		2KV
Q1	1010652-3	TRANSISTOR	2N2980		
Q2	1010431		2N2920		
Q3	1010652-3		2N2980		
Q4	1010652-3		2N2980		
Q5	1010398-1		2N2193A		
Q6	1010343-1		2N2351A		
Q7	1010343-1	TRANSISTOR	2N2351A		
R1	1006750-58	RESISTOR	12K	± 2 %	1/4 W
R2	1006760-26		560	± 2 %	1/2 W
R3	1006750-44		3.3K	± 2 %	1/4 W
R4	1006750-80		100K	± 2 %	1/4 W
R5	1006750-82		120K	± 2 %	1/4 W
R6	1010364-501		20K	± 1 %	1/8 W
R7	1006750-77		75K	± 2 %	1/4 W
R8	1006750-49		5.1K	± 2 %	1/4 W
R9	1010364-267		1.21K	± 1 %	1/8 W
R10	1010364-401		6.04K	± 1 %	1/8 W
R11	1010364-635		100K	± 1 %	1/8 W
R12	1006750-43		3K	± 2 %	1/4 W
R13	SEE NOTE 2			± 1 %	1/8 W
R14	1010364-245		931	± 1 %	1/8 W
R15	1010364-221		698	± 1 %	1/8 W
R16	1006750-49		5.1K	± 2 %	1/4 W
R17	1006750-32		1K	± 2 %	1/4 W
R18	1006750-32		1K	± 2 %	1/4 W
R19	1010768-79	RESISTOR	3.32 MEG	± 1 %	1/8 W
T1	1012148	TRANSFORMER			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SELECT R13 FROM APPROPRIATE CHART.

R13	
PART NO	VALUE
1010364-291	1620
-293	1650
-295	1690
-297	1740
-299	1780
-301	1820
-303	1870
-305	1910
-307	1960
-309	2000
-311	2050
-313	2100
-315	2150
-317	2210
-319	2260
-321	2320
-323	2370
-325	2430
-327	2490
-329	2550
-331	2610
-333	2670
-335	2740
1010364-337	2800

REF DWG:
POWER SUPPLY (TRACKER) ASSEMBLY
DWG NO

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9-17-65
CHECKED [illegible]
APPROVED 9-20-65
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

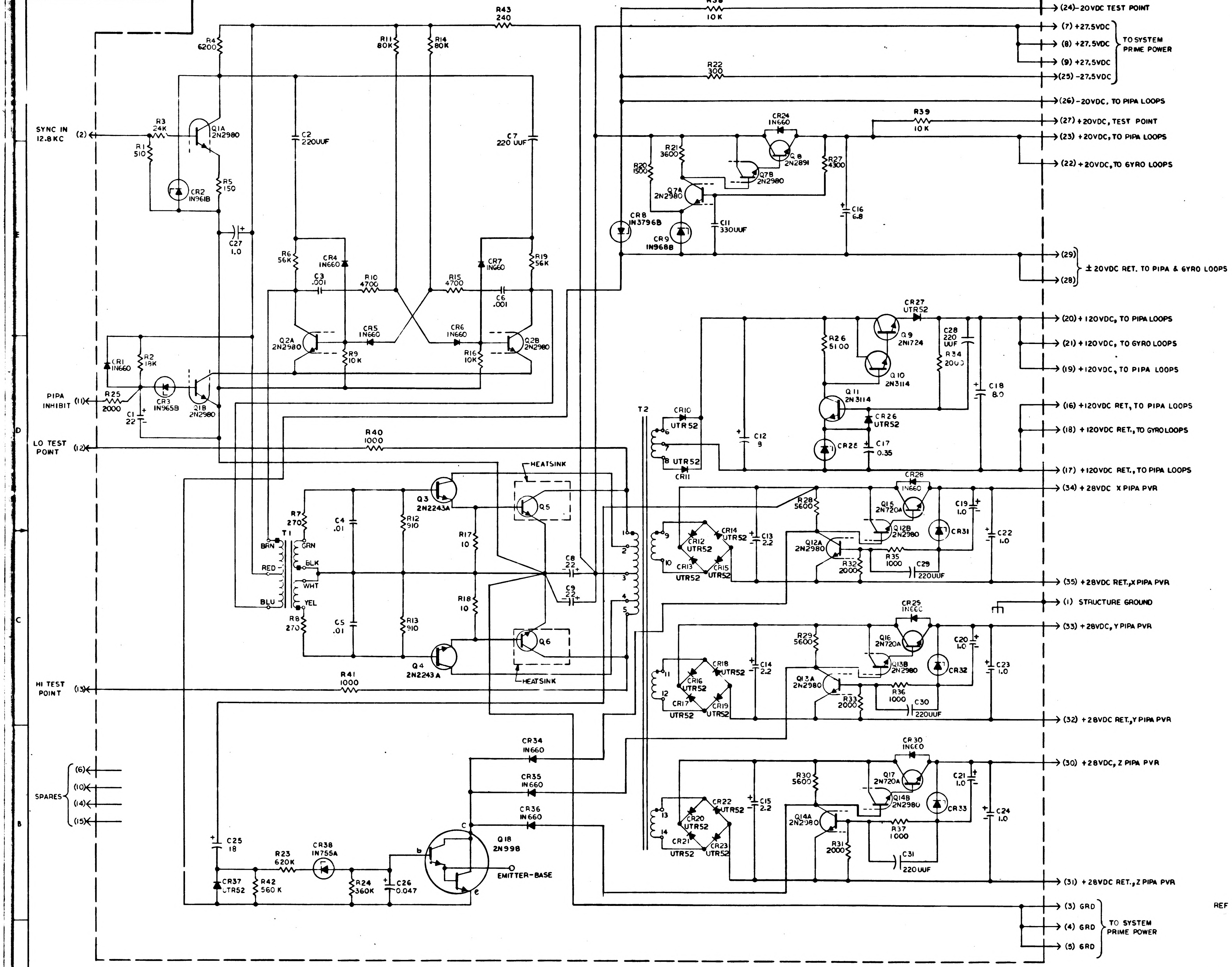
SCHEMATIC
POWER SUPPLY
(TRACKER)

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010085
SCALE —
SHEET 1 OF 1

2010085

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 25062			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	



6
5
4
3
2
1
F
E
D
C
B
A
SYNC IN 12.8 KC (2)
PIPA INHIBIT (11)
LO TEST POINT (12)
HI TEST POINT (13)
SPARES (6) (10) (14) (15)
R1 510
R2 18K
R3 24K
R4 6200
R5 150
R6 56K
R7 270
R8 270
R9 10K
R10 4700
R11 80K
R12 910
R13 910
R14 80K
R15 4700
R16 10K
R17 10
R18 10
R19 56K
R20 1500
R21 3600
R22 300
R23 620K
R24 360K
R25 2000
R26 5100
R27 4300
R28 5600
R29 5600
R30 5600
R31 2000
R32 2000
R33 2000
R34 2000
R35 1000
R36 1000
R37 1000
R38 10K
R39 10K
R40 1000
R41 1000
R42 560K
R43 240
C1 22
C2 220UUF
C3 .001
C4 .01
C5 .01
C6 .001
C7 220 UUF
C8 22
C9 22
C11 330UUF
C12 9
C13 2.2
C14 2.2
C15 2.2
C16 6.8
C17 0.35
C18 8.0
C19 1.0
C20 1.0
C21 1.0
C22 1.0
C23 1.0
C24 1.0
C25 18
C26 0.047
C27 1.0
C28 220 UUF
C29 220UUF
C30 220UUF
C31 220UUF
CR1 1N660
CR2 1N961B
CR3 1N965B
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N3796B
CR9 1N968B
CR10 UTR52
CR11 UTR52
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
CR16 UTR52
CR17 UTR52
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CR22 UTR52
CR23 UTR52
CR24 1N660
CR25 1N660
CR26 UTR52
CR27 UTR52
CR28 1N660
CR29 1N660
CR30 1N660
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CR32
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CR35 1N660
CR36 1N660
CR37 UTR52
CR38 1N755A
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N2243A
Q4 2N2243A
Q5
Q6
Q7A 2N2980
Q7B 2N2980
Q8 2N2891
Q9 2N1724
Q10 2N3114
Q11 2N3114
Q12A 2N2980
Q12B 2N2980
Q13A 2N2980
Q13B 2N2980
Q14A 2N2980
Q14B 2N2980
Q15 2N720A
Q16 2N720A
Q17 2N720A
Q18 2N998
b
c
e
EMITTER-BASE
HEATSINK
HEATSINK
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
T2
1 2 3 4 5 6 7 8 9 10 11 12 13 14
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
(33) +28VDC, Y PIPA PVR
(32) +28VDC RET., Y PIPA PVR
(30) +28VDC, Z PIPA PVR
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO 2007166

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

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APPROVAL 4 Jan 66
NASA APPROVAL
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MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO	SIZE	NASA DRAWING NO
80230	E	2010087
SCALE	WT	SHEET 1 OF 2

2010087 A

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REVISIONS 25543

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	– 62		18 K		
R3	– 65		24 K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56K		
R7	– 18		270		
R8	– 18		270		
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 1		10	± 1%	1/2 W
R18	1006802 – 1		10	± 1%	1/2 W
R19	1006750 – 74		56K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R23	1010369 – 100		620K	± 5%	1/8 W
R24	1010369 – 94		360K	± 5%	1/8W
R25	1006750 – 39		2000	± 2%	1/4W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	– 50		5600		
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	– 32		1000		
R37	– 32		1000		
R38	– 56		10K		
R39	– 56		10K		
R40	– 32		1000		
R41	1006750 – 32		1000	± 2%	1/4 W
R42	1010369 – 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 – 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 – 16		220UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	
C4	1006777 – 31		.01	± 10%	
C5	1006777 – 31		.01	± 10%	
C6	1010316 – 1		.001	± 1%	
C7	1006777 – 16		220UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C11	1006777 – 18		330UUF	± 10%	100V DC
C12	1010769 – 001		8.0	–15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	–15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118		1.0	± 10%	50V DC
C24	1006755 – 118		1.0	± 10%	50V DC
C25	1006755 – 133		18	± 10%	50VDC
C26	1006755 – 53		0.047	± 10%	35VDC
C27	1006755 – 69		1.0	± 10%	35VDC
C28	1006777 – 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 – 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 – 17	RESISTOR	240	± 2%	1/4W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 – 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 – 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1010830 – 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 – 29	ZENER		± 2%	27 VDC
CR32	1010830 – 29	ZENER		± 2%	27 VDC
CR33	1010830 – 29	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR52		
CR38	1010372 – 15	DIODE ZENER	IN755A		
Q1	1010652 – 1	TRANSISTOR	2N2980		
Q2	1010652 – 1		2N2980		
Q3	1010398 – 3		2N2243A		
Q4	1010398 – 3		2N2243A		
Q5	1010499 – 2		2N2634		
Q6	1010499 – 2		2N2634		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010273 – 1		2N1724		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	1010652 – 1		2N2980		
Q14	1010652 – 1		2N2980		
Q15	1010357 – 1		2N720A		
Q16	1010357 – 1		2N720A		
Q17	1010357 – 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 – 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

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DATE
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APPROVAL 4 Jan 66
NASA APPROVAL
MIT APPROVAL 4 Jan 68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

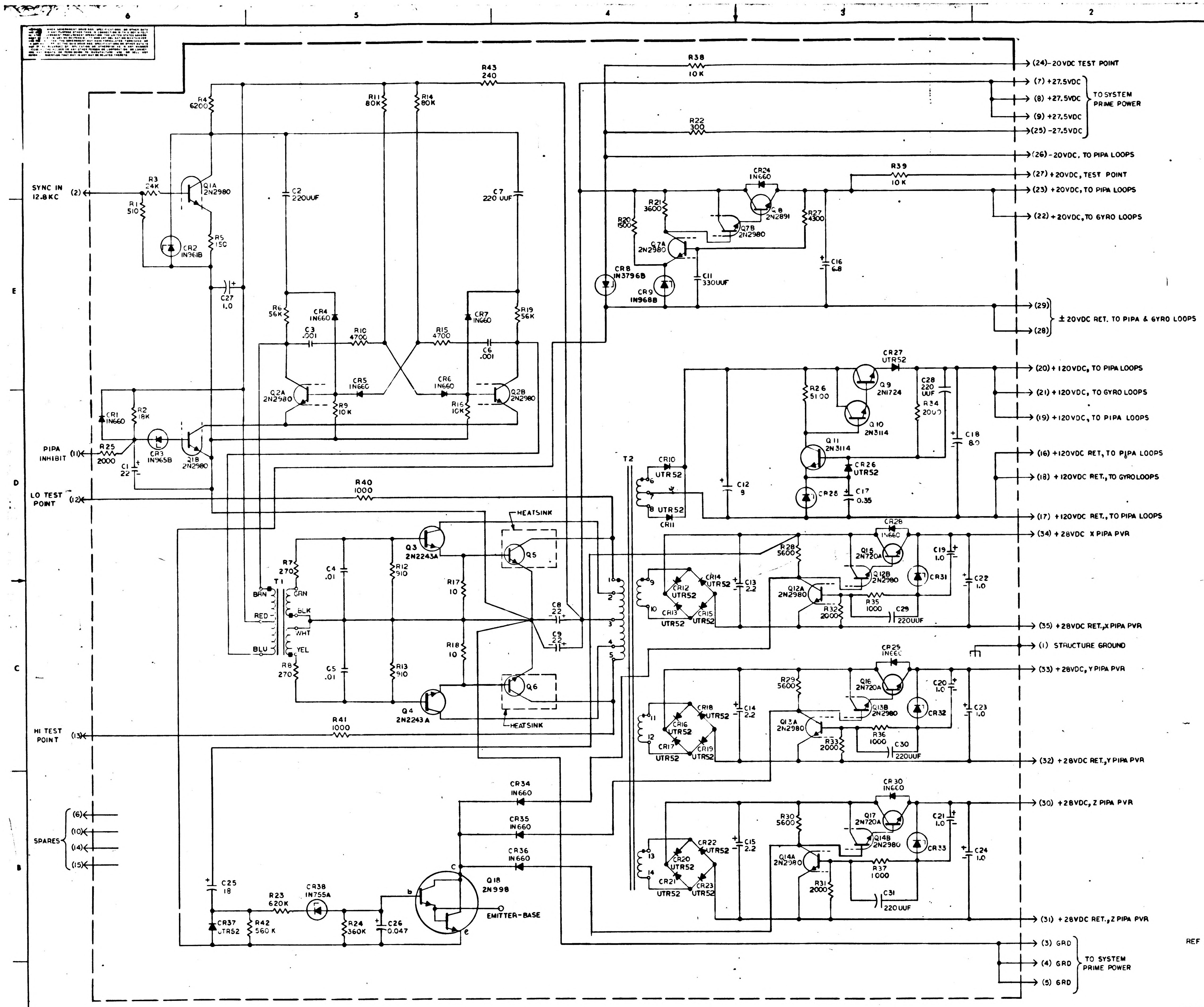
SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE —
WT —
SHEET 2 OF 2

2010087 A

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDPR 27169	23 MAR 66	PLP
B	REV STATUS CHANGED	13 JUL 66	J.G. J.E.G.

REVISIONS 25047



SYNC IN 12.8 KC (2)
R3 24K
R1 510
Q1A 2N2980
R4 6200
R5 150
CR2 IN961B
C27 1.0
R11 80K
R14 80K
R43 240
C2 220UUF
C7 220 UUF
R6 56K
CR4 IN660
C3 .001
R10 4700
R15 4700
CR7 IN660
R19 56K
C6 .001
Q2A 2N2980
CR5 IN660
R9 10K
CR6 IN660
R16 10K
Q2B 2N2980
CR1 IN660
R2 18K
PIPA INHIBIT (11)
R25 2000
CR3 IN965B
Q1B 2N2980
C1 22
LO TEST POINT (12)
R40 1000
HEATSINK
Q3 2N2243A
Q5
R7 270
C4 .01
R12 910
R17 10
T1
BRN
GRN
RED
BLK
WHT
YEL
BLU
C8 22
C9 22
R18 10
R8 270
C5 .01
R13 910
Q6
Q4 2N2243 A
HEATSINK
HI TEST POINT (13)
R41 1000
SPARES (6) (10) (14) (15)
CR34 IN660
CR35 IN660
CR36 IN660
C25 18
R23 620K
CR38 IN755A
Q18 2N998
b c e
EMITTER-BASE
CR37 UTR52
R42 560 K
R24 360K
C26 0.047
R38 10 K
(24)-20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
R22 300
(26) -20VDC, TO PIPA LOOPS
CR24 IN660
R39 10 K
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
R27 4300
Q7A 2N2980
CR8 IN3796B
CR9 IN968B
C11 330UUF
C16 6.8
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
CR27 UTR52
Q9 2N1724
R26 5100
C28 220 UUF
R34 2000
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
Q10 2N3114
Q11 2N3114
C18 8.0
T2
CR10 UTR52
CR26 UTR52
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
C12 9
CR28
C17 0.35
CR11 UTR52
(17) +120VDC RET., TO PIPA LOOPS
CR28 IN660
(34) +28VDC X PIPA PVR
R28 5600
Q15 2N720A
C19 1.0
CR12 UTR52
CR14 UTR52
C13 2.2
Q12B 2N2980
Q12A 2N2980
CR31
C22 1.0
CR13 UTR52
CR15 UTR52
R32 2000
R35 1000
C29 220UUF
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
CR29 IN660
(33) +28VDC, Y PIPA PVR
R29 5600
Q16 2N720A
C20 1.0
CR16 UTR52
CR18 UTR52
C14 2.2
Q13B 2N2980
Q13A 2N2980
CR32
C23 1.0
CR17 UTR52
CR19 UTR52
R33 2000
R36 1000
C30 220UUF
(32) +28VDC RET., Y PIPA PVR
CR30 IN660
(30) +28VDC, Z PIPA PVR
R30 5600
Q17 2N720A
C21 1.0
CR20 UTR52
CR22 UTR52
C15 2.2
Q14B 2N2980
Q14A 2N2980
CR33
C24 1.0
CR21 UTR52
CR23 UTR52
R31 2000
R37 1000
C31 220 UUF
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO. 2007166

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS
PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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APPROVAL
APPROVAL 4 Jan 66
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010087
SCALE
WT
SHEET 1 OF 2

2010087 B

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REVISIONS 25043

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	J.D
B	REVISED PER TDRR 29257	13 JUL 66	J. G. J.E.G

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 62		18 K		
R3	- 65		24 K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4 W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10 K		
R39	- 56		10 K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 - 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C11	1006777 - 18		330UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69		1.0	± 10%	35VDC
C28	1006777 - 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 - 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 - 17	RESISTOR	240	± 2%	1/4W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1008815-5	ZENER	IN961B	± 5%	10 VDC
CR3	1008815-9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1008815-12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR52		
CR27	1010497		UTR52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1008815-50	ZENER		± 2%	27 VDC
CR32	1008815-50	ZENER		± 2%	27 VDC
CR33	1008815-50	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR52		
CR38	1010372 - 15	DIODE ZENER	IN755A		
Q1	1010652 - 1	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243A		
Q4	1010398 - 3		2N2243A		
Q5	1010499 - 2		2N2634		
Q6	1010499 - 2		2N2634		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 1		2N1724		
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	1010652 - 1		2N2980		
Q14	1010652 - 1		2N2980		
Q15	1010357 - 1		2N720A		
Q16	1010357 - 1		2N720A		
Q17	1010357 - 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DWG NO CONTRACT
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APPROVAL 4Jan66
NASA APPROVAL
MIT APPROVAL 4 Jan 66

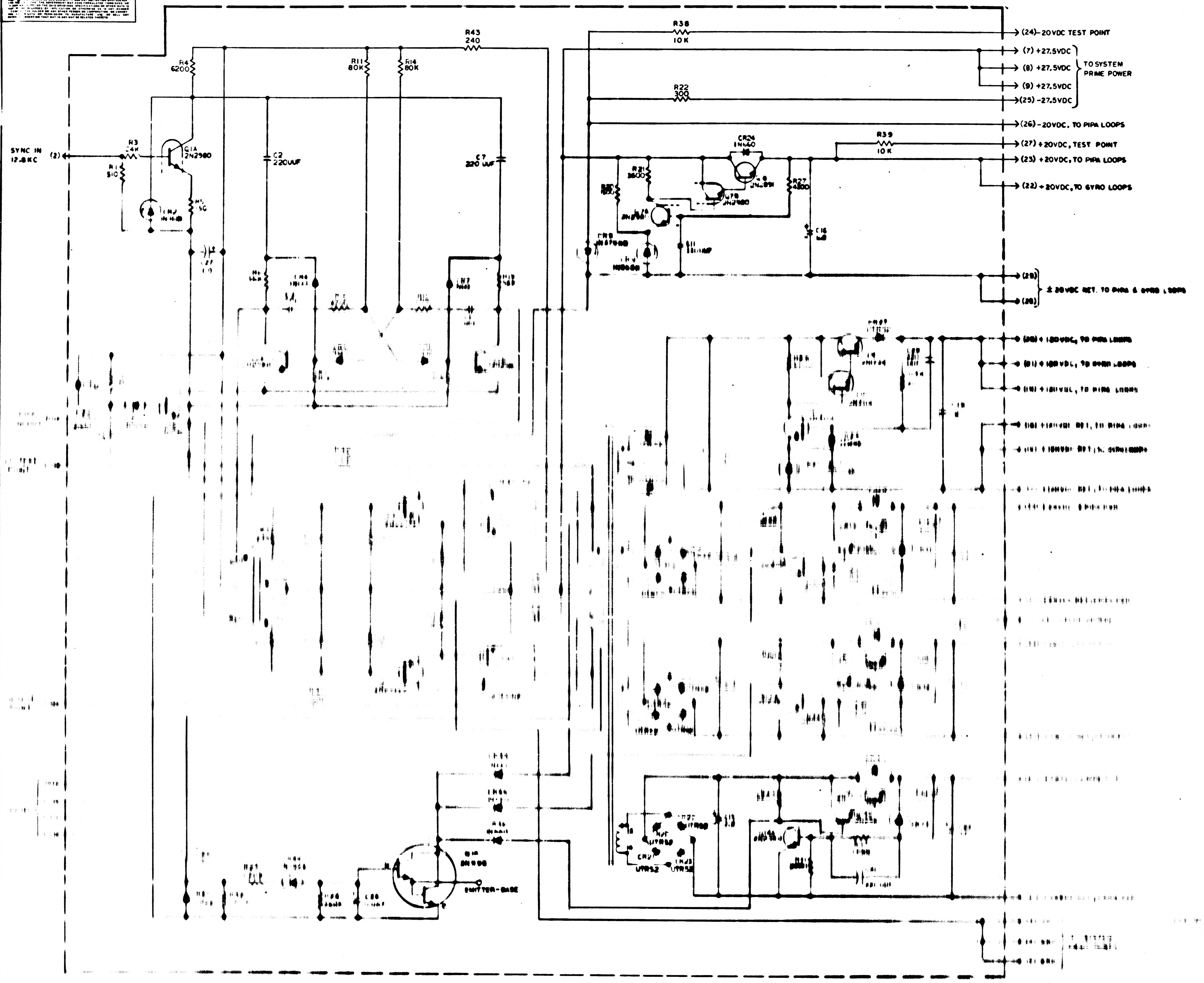
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230 | SIZE E | NASA DRAWING NO 2010087
SCALE | WT | SHEET 2 OF 2

2010087 B

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	RP
B	REV STATUS CHANGED	13 JUL 66	J.G. / J.E.G.
C	REVISED PER TDRR 30141	[illegible]	TAC


SYNC IN
12.8KC
(2)
R3
24K
R1
510
Q1A
2N2980
R4
6200
R5
150
R11
80K
R14
80K
R43
240
C2
220UUF
C7
220 UUF
R38
10K
R22
300
CR24
1N460
R21
3600
R27
4800
Q7B
2N2980
R39
10 K
C16
(24)-20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM
PRIME POWER
(26)-20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
± 20VDC RET. TO PIPA & GYRO LOOPS
EMITTER-BASE
CR21
UTR52
CR23
UTR52

[illegible]

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 2-043

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	
B	REVISED PER TDRR 29757	13 JUL 66	J. G.
C	REVISED PER TDRR 30141	JUL 66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	– 58		12K		
R3	– 65		24K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56K		
R7	– 18		270		
R8	– 18		270		
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 1		10	± 1%	1/2 W
R18	1006802 – 1		10	± 1%	1/2 W
R19	1006750 – 74		56K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R23	1010369 – 100		620K	± 5%	1/8 W
R24	1010369 – 94		330K	± 5%	1/8W
R25	1006750 – 39		2000	± 2%	1/4 W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	– 50		5600		
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	– 32		1000		
R37	– 32		1000		
R38	– 56		10K		
R39	– 56		10K		
R40	– 32		1000		
R41	1006750 – 32		1000	± 2%	1/4 W
R42	1010369 – 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 – 34	CAPACITOR	33	± 10%	20V DC
C2	1006777 – 16		220UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	
C4	1006777 – 31		.01	± 10%	
C5	1006777 – 31		.01	± 10%	
C6	1010316 – 1		.001	± 1%	
C7	1006777 – 16		220UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C11	1006777 – 18		330UUF	± 10%	100V DC
C12	1010769 – 001		8.0	-15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	-15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118		1.0	± 10%	50V DC
C24	1006755 – 118		1.0	± 10%	50V DC
C25	1006755 – 133		18	± 10%	50VDC
C26	1006755 – 53		0.047	± 10%	35VDC
C27	1006755 – 69		1.0	± 10%	35VDC
C28	1006777 – 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 – 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 – 17	RESISTOR	240	± 2%	1/4W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1008815-5	ZENER	IN961B	± 5%	10 VDC
CR3	1008815-9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1008815-12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1008815-50	ZENER		± 2%	27 VDC
CR32	1008815-50	ZENER		± 2%	27 VDC
CR33	1008815-50	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR52		
CR38	1010372-15	DIODE ZENER	IN755A		
Q1	1010652 – 3	TRANSISTOR	2N2980		
Q2	1010652 – 1		2N2980		
Q3	1010398 – 3		2N2243A		
Q4	1010398 – 3		2N2243A		
Q5	1010499 – 2		2N2634		
Q6	1010499 – 2		2N2634		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010273 – 1		2N1724		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	1010652 – 1		2N2980		
Q14	1010652 – 1		2N2980		
Q15	1010357 – 1		2N720A		
Q16	1010357 – 1		2N720A		
Q17	1010357 – 1		2N720A		
Q18	1010342	TRANSISTOR	2N918		
T1	1010315 – 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO. CONTRACT
DRAWN C. S. Alcock DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

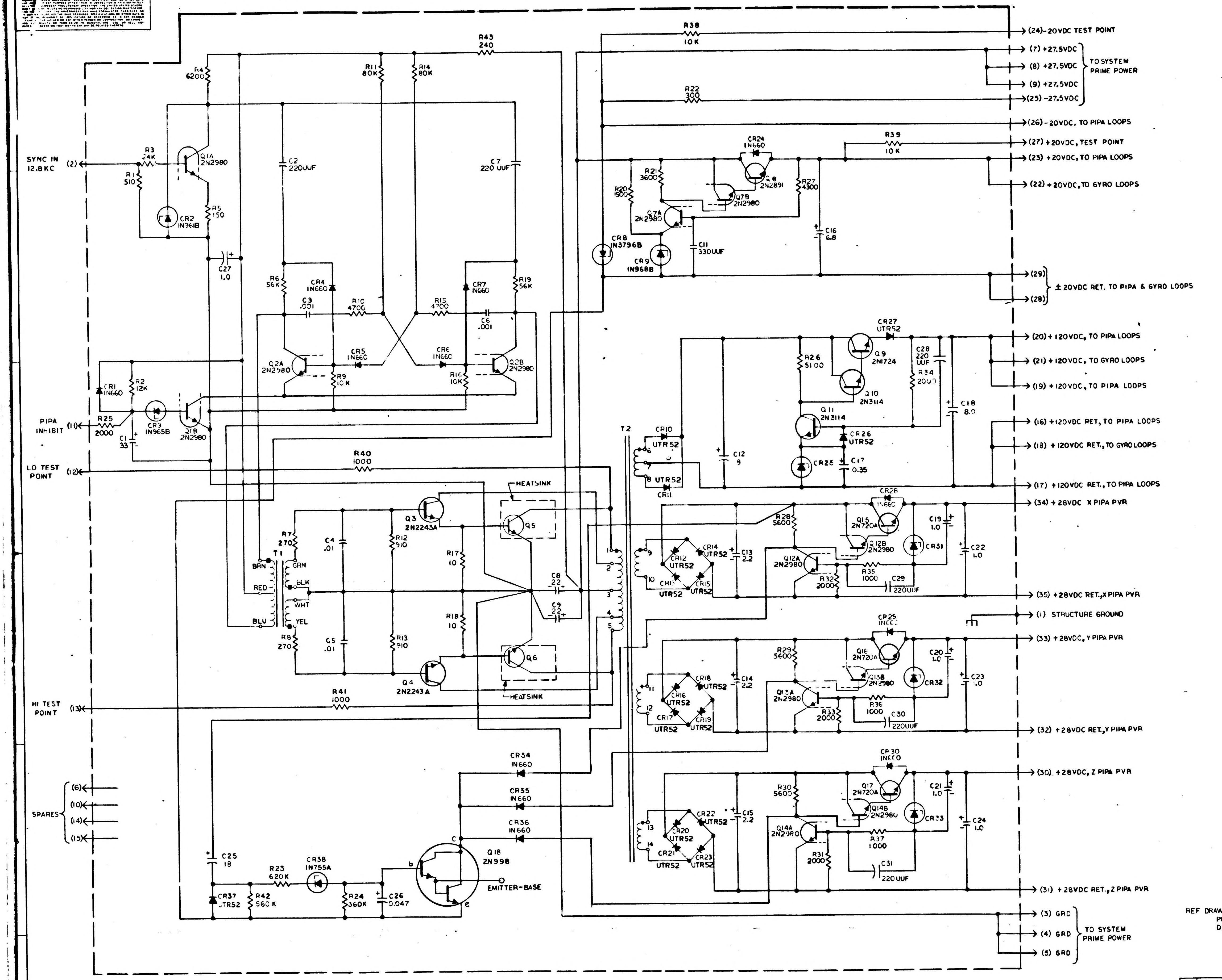
SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE
WT
SHEET 2 OF 2

[illegible] WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY [illegible] GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT [illegible] INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER [illegible] THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR [illegible] SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS [illegible] REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER [illegible] THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY [illegible] RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY [illegible] INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 25042

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	PLP
B	REV STATUS CHANGED	13 JUL 66	J.G. / J.E.G.
C	REVISED PER TDRR 30141	26 JUL 66	GWM / JAC
D	REVISION STATUS CHANGED	8 AUG 66	GWW / RLW


R43 240
R4 6200
R11 80K
R14 80K
SYNC IN 12.8KC (2)
R3 24K
R1 510
Q1A 2N2980
CR2 1N961B
R5 150
C27 1.0
C2 220UUF
C7 220 UUF
R6 56K
CR4 1N660
C3 .001
R10 4700
R15 4700
C6 .001
CR7 1N660
R19 56K
Q2A 2N2980
CR5 1N660
R9 10K
CR6 1N660
R16 10K
Q2B 2N2980
CR1 1N660
R2 12K
PIPA INHIBIT (11)
R25 2000
C1 33
CR3 1N965B
Q1B 2N2980
LO TEST POINT (12)
R40 1000
HEATSINK
Q3 2N2243A
Q5
R7 270
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
R8 270
C4 .01
C5 .01
R12 910
R13 910
R17 10
R18 10
C8 22
C9 22
Q4 2N2243A
Q6
HEATSINK
HI TEST POINT (13)
R41 1000
SPARES (6) (10) (14) (15)
CR34 1N660
CR35 1N660
CR36 1N660
C25 18
CR37 UTR52
R42 560K
R23 620K
CR38 1N755A
R24 360K
C26 0.047
b
c
e
Q18 2N998
EMITTER-BASE
R38 10K
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
R22 300
(26) -20VDC, TO PIPA LOOPS
CR24 1N660
R39 10K
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R27 4300
C16 6.8
C11 330UUF
CR8 1N3796B
CR9 1N968B
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
CR27 UTR52
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
R26 5100
Q9 2N1724
Q10 2N3114
C28 220 UUF
R34 2000
C18 8.0
Q11 2N3114
CR26 UTR52
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
T2
CR10 UTR52
CR11 UTR52
C12 9
CR25
C17 0.35
CR28 1N660
(34) +28VDC X PIPA PVR
R28 5600
Q15 2N720A
Q12B 2N2980
C19 1.0
CR31
C22 1.0
CR14 UTR52
CR12 UTR52
CR13 UTR52
CR15 UTR52
C13 2.2
Q12A 2N2980
R32 2000
R35 1000
C29 220UUF
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
CR29 1N660
(33) +28VDC, Y PIPA PVR
R29 5600
Q16 2N720A
Q13B 2N2980
C20 1.0
CR32
C23 1.0
CR18 UTR52
CR16 UTR52
CR17 UTR52
CR19 UTR52
C14 2.2
Q13A 2N2980
R33 2000
R36 1000
C30 220UUF
(32) +28VDC RET., Y PIPA PVR
CR30 1N660
(30) +28VDC, Z PIPA PVR
R30 5600
Q17 2N720A
Q14B 2N2980
C21 1.0
CR33
C24 1.0
CR22 UTR52
CR20 UTR52
CR21 UTR52
CR23 UTR52
C15 2.2
Q14A 2N2980
R31 2000
R37 1000
C31 220UUF
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO. 2007166

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4 UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 4 Jan 66
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010087
SCALE
WT
SHEET 1 OF 2

2010087 D

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REVISIONS 25043

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	JT
B	REVISED PER TDRR 29757	13 JUL 66	J.G. / J.E.G
C	REVISED PER TDRR 30141	26 JUL 66	GWM / JAC
D	REVISED PER TDRR 30367	8 AUG 66	GWW / RLW

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 58		12K		
R3	- 65		24K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4 W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10K		
R39	- 56		10K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 - 34	CAPACITOR	33	± 10%	20V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 134		22	± 10%	50V DC
C9	1006755 - 134		22	± 10%	50V DC
C11	1006777 - 18		330UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 118		1.0	± 10%	50V DC
C23	1006755 - 118		1.0	± 10%	50V DC
C24	1006755 - 118		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69		1.0	± 10%	35VDC
C28	1006777 - 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 - 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 - 17	RESISTOR	240	± 2%	1/4W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1008815-5	ZENER	IN961B	± 5%	10 VDC
CR3	1008815-9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1008815-12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1008815-50	ZENER		± 2%	27 VDC
CR32	1008815-50	ZENER		± 2%	27 VDC
CR33	1008815-50	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN755A		
Q1	1010652 - 3	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243A		
Q4	1010398 - 3		2N2243A		
Q5	1010499 - 2		2N2634		
Q6	1010499 - 2		2N2634		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 6		2N1724		
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	1010652 - 1		2N2980		
Q14	1010652 - 1		2N2980		
Q15	1010357 - 1		2N720A		
Q16	1010357 - 1		2N720A		
Q17	1010357 - 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1008902	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN
DATE
CHECKED
APPROVAL
APPROVAL 4 Jan 66
NASA APPROVAL
MIT APPROVAL 4 Jan 68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE —
WT —
SHEET 2 OF 2

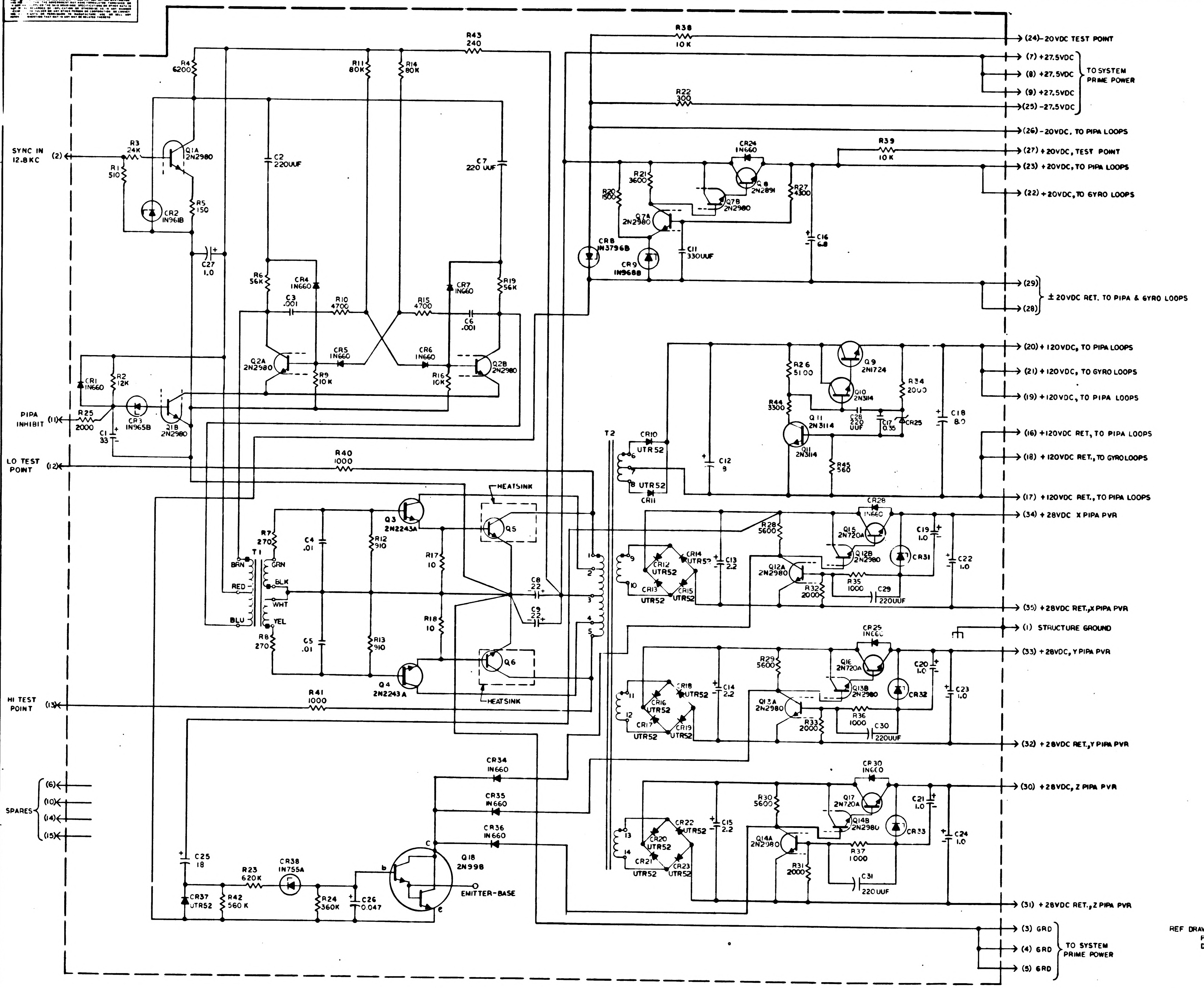
2010087 D

WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	RP
B	REV STATUS CHANGED	13 JUL 66	J.G. / J.E.G.
C	REVISED PER TDRR 30141	[illegible] JUL 66	JAC
D	REVISION STATUS CHANGED	[illegible] AUG 66	WW / RLW
E	REVISED PER TDRR 30372	[illegible] 66	WB / JI

(N)

(M)



6
5
4
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2
1
D
C
B
A
R43 240
R38 10K
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
R22 300
(26) -20VDC, TO PIPA LOOPS
R39 10K
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
R4 6200
R11 80K
R14 80K
SYNC IN 12.8KC (2)
R3 24K
Q1A 2N2980
R1 510
CR2 1N961B
R5 150
C2 220UUF
C7 220 UUF
C27 1.0
R6 56K
CR4 1N660
C3 .001
R10 4700
R15 4700
CR7 1N660
C6 .001
R19 56K
Q2A 2N2980
CR5 1N660
CR6 1N660
Q2B 2N2980
R9 10K
R16 10K
CR1 1N660
R2 12K
PIPA INHIBIT (11)
R25 2000
CR3 1N965B
Q1B 2N2980
C1 33
LO TEST POINT (12)
R40 1000
CR24 1N660
Q8 2N2891
R21 3600
R20 1500
Q7B 2N2980
Q7A 2N2980
R27 4300
CR8 1N3796B
CR9 1N968B
C11 330UUF
C16 6.8
Q9 2N1724
R26 5100
Q10 2N3114
R34 2000
R44 3300
Q11 2N3114
C28 220 UUF
C17 0.35
CR25
C18 8.0
R45 560
C12 9
T2
CR10 UTR52
UTR52 CR11
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
HEATSINK
Q3 2N2243A
Q5
R7 270
C4 .01
R12 910
T1
BRN
GRN
RED
BLK
WHT
BLU
YEL
R17 10
C8 .22
C9 .22
R18 10
R8 270
C5 .01
R13 910
Q4 2N2243 A
Q6
HEATSINK
R41 1000
HI TEST POINT (13)
CR28 1N660
(34) +28VDC X PIPA PVR
R28 5600
Q15 2N720A
Q12B 2N2980
C19 1.0
CR14 UTR52
CR12 UTR52
C13 2.2
Q12A 2N2980
CR31
C22 1.0
CR13 UTR52
CR15 UTR52
R32 2000
R35 1000
C29 220UUF
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
CR29 1N660
(33) +28VDC, Y PIPA PVR
R29 5600
Q16 2N720A
C20 1.0
CR18 UTR52
CR16 UTR52
C14 2.2
Q13B 2N2980
Q13A 2N2980
CR32
C23 1.0
R33 2000
R36 1000
C30 220UUF
CR17 UTR52
CR19 UTR52
(32) +28VDC RET., Y PIPA PVR
CR30 1N660
(30) +28VDC, Z PIPA PVR
R30 5600
Q17 2N720A
C21 1.0
CR22 UTR52
CR20 UTR52
C15 2.2
Q14B 2N2980
Q14A 2N2980
CR33
C24 1.0
R37 1000
R31 2000
C31 220UUF
CR21 UTR52
CR23 UTR52
(31) +28VDC RET., Z PIPA PVR
1
2
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11
12
13
14
CR34 1N660
CR35 1N660
CR36 1N660
SPARES (6) (10) (14) (15)
C25 18
R23 620K
CR38 1N755A
Q18 2N998
b
c
e
EMITTER-BASE
CR37 UTR52
R42 560 K
R24 360K
C26 0.047
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO 2007166

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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DO NOT SCALE THIS DRAWING
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DWG NO
CONTRACT
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible] JAN 66
APPROVAL [illegible] 4 Jan 66
NASA APPROVAL A. C. [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010087
SCALE —
WT —
SHEET 1 OF 2

2010087 E

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	
B	REVISED PER TDRR 29757	13 JUL 66	J. G.
C	REVISED PER TDRR 30141	[illegible]	
D	REVISED PER TDRR 30367	8 AUG [illegible]	
E	REVISED PER TDRR 30372	[illegible]	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	– 58		12K		
R3	– 65		24K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56K		
R7	– 18		270		
R8	– 18		270		
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 1		10	± 1%	1/2 W
R18	1006802 – 1		10	± 1%	1/2 W
R19	1006750 – 74		56K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R23	1010369 – 100		620K	± 5%	1/8 W
R24	1010369 – 94		360K	± 5%	1/8W
R25	1006750 – 39		2000	± 2%	1/4 W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	– 50		5600		
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	– 32		1000		
R37	– 32		1000		
R38	– 56		10K		
R39	– 56		10K		
R40	– 32		1000		
R41	1006750 – 32		1000	± 2%	1/4 W
R42	1010369 – 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 – 34	CAPACITOR	33	± 10%	20V DC
C2	1006777 – 16		220UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	
C4	1006777 – 31		.01	± 10%	
C5	1006777 – 31		.01	± 10%	
C6	1010316 – 1		.001	± 1%	
C7	1006777 – 16		220UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C11	1006777 – 18		330UUF	± 10%	100V DC
C12	1010769 – 001		8.0	-15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	-15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118		1.0	± 10%	50V DC
C24	1006755 – 118		1.0	± 10%	50V DC
C25	1006755 – 133		18	± 10%	50VDC
C26	1006755 – 53		0.047	± 10%	35VDC
C27	1006755 – 69		1.0	± 10%	35VDC
C28	1006777 – 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 – 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 – 17	RESISTOR	240	± 2%	1/4W
R44	1010604 – 38	RESISTOR	3300	± 1%	1W
R45	1006750 – 26	RESISTOR	560	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1008815-5	ZENER	IN961B	± 5%	10 VDC
CR3	1008815-9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1008815-12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	~~1010497~~		~~UTR 52~~		
CR27	~~1010497~~		~~UTR 52~~		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1008815-50	ZENER		± 2%	27 VDC
CR32	1008815-50	ZENER		± 2%	27 VDC
CR33	1008815-50	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN755A		
Q1	1010652 – 3	TRANSISTOR	2N2980		
Q2	1010652 – 1		2N2980		
Q3	1010398 – 3		2N2243A		
Q4	1010398 – 3		2N2243A		
Q5	1010499 – 2		2N2634		
Q6	1010499 – 2		2N2634		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010273 – 6		2N1724		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	1010652 – 1		2N2980		
Q14	1010652 – 1		2N2980		
Q15	1010357 – 1		2N720A		
Q16	1010357 – 1		2N720A		
Q17	1010357 – 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 – 2	TRANSFORMER			
T2	1008902	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
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DO NOT SCALE THIS DRAWING
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CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

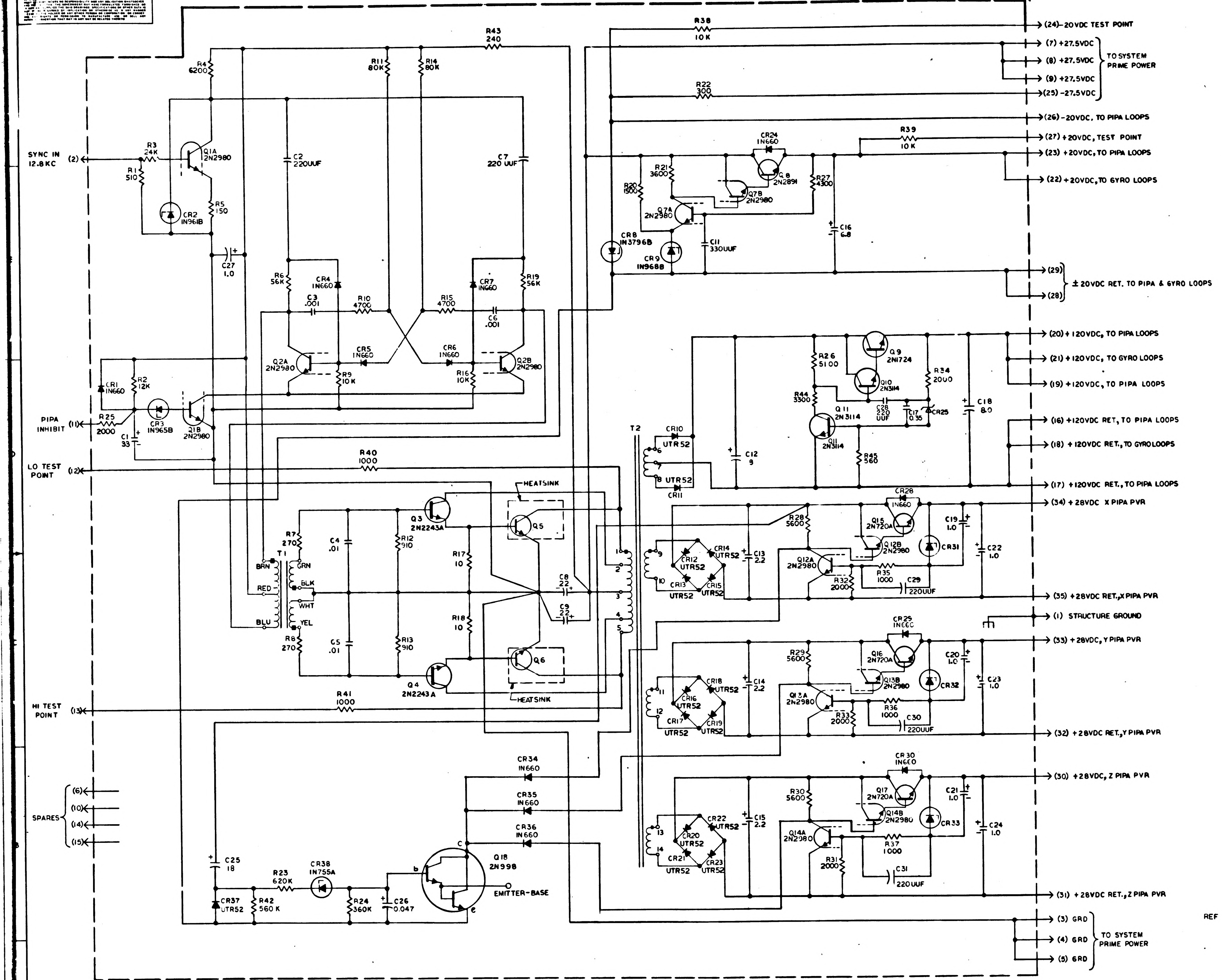
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE —
WT —
SHEET 2 OF 2

WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	
B	REV STATUS CHANGED	13 JUL 66	J.G. J.E.G.
C	REVISED PER TDRR 30141		WM JEC
D	REVISION STATUS CHANGED		WW RLW
E	REVISED PER TDRR 30372		JB
F	REVISION STATUS CHANGED	23	


6
5
4
3
2
1
SYNC IN 12.8KC (2)
PIPA INHIBIT (11)
LO TEST POINT (12)
HI TEST POINT (13)
SPARES (6) (10) (14) (15)
R1 510
R2 12K
R3 24K
R4 6200
R5 150
R6 56K
R7 270
R8 270
R9 10K
R10 4700
R11 80K
R12 910
R13 910
R14 80K
R15 4700
R16 10K
R17 10
R18 10
R19 56K
R20 1500
R21 3600
R22 300
R23 620K
R24 360K
R25 2000
R26 5100
R27 4300
R28 5600
R29 5600
R30 5600
R31 2000
R32 2000
R33 2000
R34 2000
R35 1000
R36 1000
R37 1000
R38 10K
R39 10K
R40 1000
R41 1000
R42 560K
R43 240
R44 3300
R45 560
C1 33
C2 220UUF
C3 .001
C4 .01
C5 .01
C6 .001
C7 220 UUF
C8 22
C9 22
C11 330UUF
C12 9
C13 2.2
C14 2.2
C15 2.2
C16 6.8
C17 0.35
C18 8.0
C19 1.0
C20 1.0
C21 1.0
C22 1.0
C23 1.0
C24 1.0
C25 18
C26 0.047
C27 1.0
C28 220 UUF
C29 220UUF
C30 220UUF
C31 220UUF
CR1 1N660
CR2 1N961B
CR3 1N965B
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N3796B
CR9 1N968B
CR10 UTR52
CR11 UTR52
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
CR24 1N660
CR25
CR28 1N660
CR29 1N660
CR30 1N660
CR31
CR32
CR33
CR34 1N660
CR35 1N660
CR36 1N660
CR37 UTR52
CR38 1N755A
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
Q3 2N2243A
Q4 2N2243A
Q5
Q6
Q7A 2N2980
Q7B 2N2980
Q8 2N2891
Q9 2N1724
Q10 2N3114
Q11 2N3114
Q12A 2N2980
Q12B 2N2980
Q13A 2N2980
Q13B 2N2980
Q14A 2N2980
Q14B 2N2980
Q15 2N720A
Q16 2N720A
Q17 2N720A
Q18 2N998
b
c
e
EMITTER-BASE
HEATSINK
HEATSINK
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
T2
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11
12
13
14
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
(20) +120VDC, TO PIPA LOOPS
(21) +120VDC, TO GYRO LOOPS
(19) +120VDC, TO PIPA LOOPS
(16) +120VDC RET., TO PIPA LOOPS
(18) +120VDC RET., TO GYRO LOOPS
(17) +120VDC RET., TO PIPA LOOPS
(34) +28VDC X PIPA PVR
(35) +28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
(33) +28VDC, Y PIPA PVR
(32) +28VDC RET., Y PIPA PVR
(30) +28VDC, Z PIPA PVR
(31) +28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO 2007166

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
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APPROVAL
APPROVAL 4 Jan 66
NASA APPROVAL A. C.
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO 80230
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NASA DRAWING NO 2010087
SCALE
WT
SHEET 1 OF 2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 27169	23 MAR 66	[illegible]
B	REVISED PER TDRR 29757	13 JUL 66	J. G. J. E. G
C	REVISED PER TDRR 30141	[illegible]	JAC
D	REVISED PER TDRR 30367	[illegible]	NN RLW
E	REVISED PER TDRR 30372	[illegible]	JB JT
F	REVISED PER TDRR 30675	[illegible]	JT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	± 2%	1/4 W
R2	- 58		12K		
R3	- 65		24K		
R4	- 51		6200		
R5	- 12		150		
R6	- 74		56K		
R7	- 18		270		
R8	- 18		270		
R9	1006750 - 56		10K	± 2%	1/4 W
R10	1010377 - 110		4700	± 1%	1/10 W
R11	1010377 - 314		80K	± 1%	1/10 W
R12	1006750 - 31		910	± 2%	1/4 W
R13	1006750 - 31		910	± 2%	1/4 W
R14	1010377 - 314		80K	± 1%	1/10 W
R15	1010377 - 110		4700	± 1%	1/10W
R16	1006750 - 56		10K	± 2%	1/4 W
R17	1006802 - 1		10	± 1%	1/2 W
R18	1006802 - 1		10	± 1%	1/2 W
R19	1006750 - 74		56K	± 2%	1/4 W
R20	1006750 - 36		1500	± 2%	1/4 W
R21	1006750 - 45		3600	± 2%	1/4 W
R22	1010604 - 37		300	± 1%	1 W
R23	1010369 - 100		620K	± 5%	1/8 W
R24	1010369 - 94		360K	± 5%	1/8W
R25	1006750 - 39		2000	± 2%	1/4 W
R26	1010389 - 73		5100	± 1%	3 W
R27	1006750 - 47		4300	± 2%	1/4 W
R28	- 50		5600		
R29	- 50		5600		
R30	- 50		5600		
R31	- 39		2000		
R32	- 39		2000		
R33	- 39		2000		
R34	- 39		2000		
R35	- 32		1000		
R36	- 32		1000		
R37	- 32		1000		
R38	- 56		10K		
R39	- 56		10K		
R40	- 32		1000		
R41	1006750 - 32		1000	± 2%	1/4 W
R42	1010369 - 99	RESISTOR	560K	± 5%	1/8 W
C1	1006755 - 34	CAPACITOR	33	± 10%	20V DC
C2	1006777 - 16		220UUF	± 10%	100V DC
C3	1010316 - 1		.001	± 1%	
C4	1006777 - 31		.01	± 10%	
C5	1006777 - 31		.01	± 10%	
C6	1010316 - 1		.001	± 1%	
C7	1006777 - 16		220UUF	± 10%	100V DC
C8	1006755 - 182		22	± 10%	50V DC
C9	1006755 - 182		22	± 10%	50V DC
C11	1006777 - 18		330UUF	± 10%	100V DC
C12	1010769 - 001		8.0	-15/+50%	270VDC
C13	1006755 - 122		2.2	± 10%	50V DC
C14	1006755 - 122		2.2	± 10%	50V DC
C15	1006755 - 122		2.2	± 10%	50V DC
C16	1006755 - 79		6.8	± 10%	35 V DC
C17	1010438 - 103		.35	± 20%	150V DC
C18	1010769 - 001		8.0	-15/+50%	270V DC
C19	1006755 - 69		1.0	± 10%	35V DC
C20	1006755 - 69		1.0	± 10%	35V DC
C21	1006755 - 69		1.0	± 10%	35V DC
C22	1006755 - 180		1.0	± 10%	50V DC
C23	1006755 - 180		1.0	± 10%	50V DC
C24	1006755 - 180		1.0	± 10%	50V DC
C25	1006755 - 133		18	± 10%	50VDC
C26	1006755 - 53		0.047	± 10%	35VDC
C27	1006755 - 69		1.0	± 10%	35VDC
C28	1006777 - 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 - 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 - 17	RESISTOR	240	± 2%	1/4W
R44	1010604 - 38	RESISTOR	3300	± 1%	1W
R45	1006750 - 26	RESISTOR	560	± 2%	1/4 W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1008815-5	ZENER	IN961B	± 5%	10 VDC
CR3	1008815-9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1008858-2	ZENER	IN3796B	± 5%	20 VDC
CR9	1008815-12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	~~1010497~~		~~UTR 52~~		
CR27	~~1010497~~		~~UTR 52~~		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1008815-50	ZENER		± 2%	27 VDC
CR32	1008815-50	ZENER		± 2%	27 VDC
CR33	1008815-50	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR 52		
CR38	1010372 - 15	DIODE ZENER	IN 755A		
Q1	1010652 - 3	TRANSISTOR	2N2980		
Q2	1010652 - 1		2N2980		
Q3	1010398 - 3		2N2243A		
Q4	1010398 - 3		2N2243A		
Q5	1010499 - 2		2N2634		
Q6	1010499 - 2		2N2634		
Q7	1010652 - 1		2N2980		
Q8	1010713 - 1		2N2891		
Q9	1010273 - 6		2N1724		
Q10	1010747 - 1		2N3114		
Q11	1010747 - 1		2N3114		
Q12	1010652 - 1		2N2980		
Q13	1010652 - 1		2N2980		
Q14	1010652 - 1		2N2980		
Q15	1010357 - 1		2N720A		
Q16	1010357 - 1		2N720A		
Q17	1010357 - 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 - 2	TRANSFORMER			
T2	1008902	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
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CONTRACT
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible] 4 Jan 66
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 4 Jan 68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO. 2010087
SCALE —
WT —
SHEET 2 OF 2

2010087

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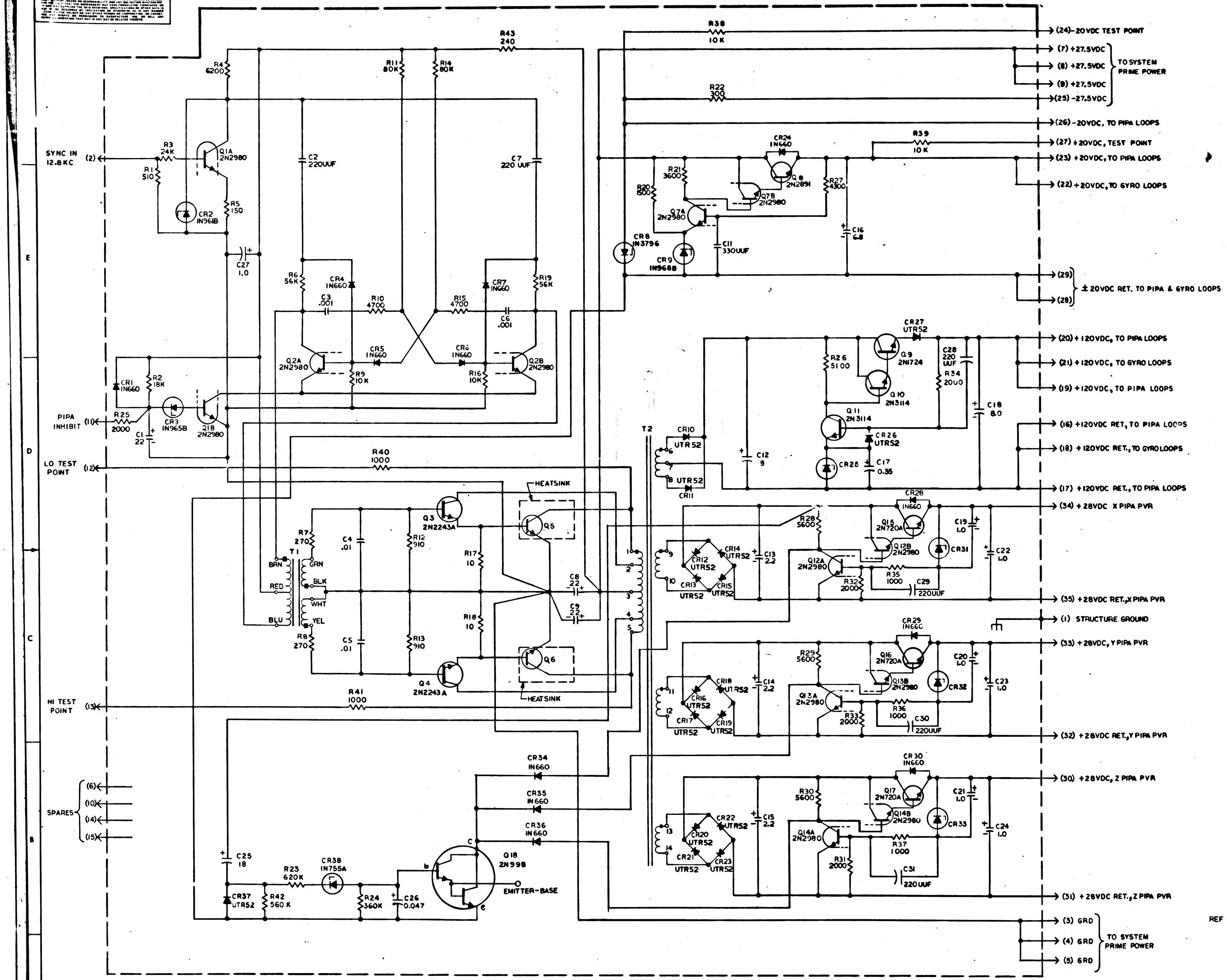
REVISIONS 25043

SYM	DESCRIPTION	DATE	APPROVAL


SYNC IN 12.8KC (2)
R3 24K
R1 510
Q1A 2N2980
R4 6200
R5 150
CR2 IN961B
C27 1.0
R43 240
R11 80K
R14 80K
C2 220UUF
C7 220 UUF
R6 56K
CR4 IN660
C3 .001
R10 4700
R15 4700
C6 .001
CR7 IN660
R19 56K
Q2A 2N2980
CR5 IN660
CR6 IN660
Q2B 2N2980
R9 10K
R16 10K
CR1 IN660
R2 18K
PIPA INHIBIT (11)
R25 2000
C1 22
CR3 IN965B
Q1B 2N2980
LO TEST POINT (12)
R40 1000
HEATSINK
Q3 2N2243A
Q5
R7 270
T1
BRN
RED
BLU
GRN
BLK
WHT
YEL
C4 .01
R12 910
R17 10
C8 22
C9 22
R18 10
R8 270
C5 .01
R13 910
Q4 2N2243A
Q6
HEATSINK
HI TEST POINT (13)
R41 1000
SPARES (6) (10) (14) (15)
CR34 IN660
CR35 IN660
CR36 IN660
C25 18
R23 620K
CR38 IN755A
CR37 UTR52
R42 560 K
R24 360K
C26 0.047
Q18 2N998
c
b
e
EMITTER-BASE
R38 10K
R22 300
CR24 IN660
R39 10K
R21 3600
R20 1500
Q8 2N2891
Q7B 2N2980
Q7A 2N2980
R27 4300
CR8 IN3796
CR9 IN968B
C11 330UUF
C16 6.8
T2
CR10 UTR52
6
7
8 UTR52
CR11
C12 9
CR27 UTR52
R26 5100
Q9 2N1724
Q10 2N3114
Q11 2N3114
CR26 UTR52
CR25
C17 0.35
C28 220 UUF
R34 2000
C18 8.0
1
2
3
4
5
9
10
CR12 UTR52
CR13 UTR52
CR14 UTR52
CR15 UTR52
C13 2.2
R28 5600
CR28 IN660
Q15 2N720A
Q12B 2N2980
Q12A 2N2980
R32 2000
R35 1000
C29 220UUF
CR31
C19 1.0
C22 1.0
11
12
CR16 UTR52
CR17 UTR52
CR18 UTR52
CR19 UTR52
C14 2.2
R29 5600
CR29 IN660
Q16 2N720A
Q13B 2N2980
Q13A 2N2980
R33 2000
R36 1000
C30 220UUF
CR32
C20 1.0
C23 1.0
13
14
CR20 UTR52
CR21 UTR52
CR22 UTR52
CR23 UTR52
C15 2.2
R30 5600
CR30 IN660
Q17 2N720A
Q14B 2N2980
Q14A 2N2980
R31 2000
R37 1000
C31 220UUF
CR33
C21 1.0
C24 1.0
(24) -20VDC TEST POINT
(7) +27.5VDC
(8) +27.5VDC
(9) +27.5VDC
(25) -27.5VDC
TO SYSTEM PRIME POWER
(26) -20VDC, TO PIPA LOOPS
(27) +20VDC, TEST POINT
(23) +20VDC, TO PIPA LOOPS
(22) +20VDC, TO GYRO LOOPS
(29)
(28)
± 20VDC RET. TO PIPA & GYRO LOOPS
(20) + 120VDC, TO PIPA LOOPS
(21) + 120VDC, TO GYRO LOOPS
(19) + 120VDC, TO PIPA LOOPS
(16) +120VDC RET, TO PIPA LOOPS
(18) + 120VDC RET., TO GYRO LOOPS
(17) + 120VDC RET., TO PIPA LOOPS
(34) + 28VDC X PIPA PVR
(35) + 28VDC RET., X PIPA PVR
(1) STRUCTURE GROUND
(33) + 28VDC, Y PIPA PVR
(32) + 28VDC RET., Y PIPA PVR
(30) + 28VDC, Z PIPA PVR
(31) + 28VDC RET., Z PIPA PVR
(3) GRD
(4) GRD
(5) GRD
TO SYSTEM PRIME POWER

REF DRAWING:
PULSE TORQUE POWER SUPPLY ASSEMBLY
DWG NO.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. UNLESS OTHERWISE SPECIFIED DIODES ARE UTR-52

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

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HOUSTON, TEXAS

SCHEMATIC, PULSE TORQUE POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE
WT
SHEET 1 OF 2

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SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 25043

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	± 2%	1/4 W
R2	– 62		18 K		
R3	– 65		24 K		
R4	– 51		6200		
R5	– 12		150		
R6	– 74		56K		
R7	– 18		270		
R8	– 18		270		
R9	1006750 – 56		10K	± 2%	1/4 W
R10	1010377 – 110		4700	± 1%	1/10 W
R11	1010377 – 314		80K	± 1%	1/10 W
R12	1006750 – 31		910	± 2%	1/4 W
R13	1006750 – 31		910	± 2%	1/4 W
R14	1010377 – 314		80K	± 1%	1/10 W
R15	1010377 – 110		4700	± 1%	1/10W
R16	1006750 – 56		10K	± 2%	1/4 W
R17	1006802 – 1		10	± 1%	1/2 W
R18	1006802 – 1		10	± 1%	1/2 W
R19	1006750 – 74		56 K	± 2%	1/4 W
R20	1006750 – 36		1500	± 2%	1/4 W
R21	1006750 – 45		3600	± 2%	1/4 W
R22	1010604 – 37		300	± 1%	1 W
R23	1010369 – 100		620K	± 5%	1/8 W
R24	1010369 – 94		360K	± 5%	1/8W
R25	1006750 – 39		2000	± 2%	1/4 W
R26	1010389 – 73		5100	± 1%	3 W
R27	1006750 – 47		4300	± 2%	1/4 W
R28	– 50		5600		
R29	– 50		5600		
R30	– 50		5600		
R31	– 39		2000		
R32	– 39		2000		
R33	– 39		2000		
R34	– 39		2000		
R35	– 32		1000		
R36	– 32		1000		
R37	– 32		1000		
R38	– 56		10 K		
R39	– 56		10 K		
R40	– 32		1000		
R41	1006750 – 32		1000	± 2%	1/4 W
R42	1010369 – 99	RESISTOR	560 K	± 5%	1/8 W
C1	1006755 – 85	CAPACITOR	22	± 10%	35 V DC
C2	1006777 – 16		220UUF	± 10%	100V DC
C3	1010316 – 1		.001	± 1%	
C4	1006777 – 31		.01	± 10%	
C5	1006777 – 31		.01	± 10%	
C6	1010316 – 1		.001	± 1%	
C7	1006777 – 16		220 UUF	± 10%	100V DC
C8	1006755 – 134		22	± 10%	50V DC
C9	1006755 – 134		22	± 10%	50V DC
C11	1006777 – 18		330UUF	± 10%	100V DC
C12	1010769 – 001		8.0	-15/+50%	270VDC
C13	1006755 – 122		2.2	± 10%	50V DC
C14	1006755 – 122		2.2	± 10%	50V DC
C15	1006755 – 122		2.2	± 10%	50V DC
C16	1006755 – 79		6.8	± 10%	35 V DC
C17	1010438 – 103		.35	± 20%	150V DC
C18	1010769 – 001		8.0	-15/+50%	270V DC
C19	1006755 – 69		1.0	± 10%	35V DC
C20	1006755 – 69		1.0	± 10%	35V DC
C21	1006755 – 69		1.0	± 10%	35V DC
C22	1006755 – 118		1.0	± 10%	50V DC
C23	1006755 – 118		1.0	± 10%	50V DC
C24	1006755 – 118		1.0	± 10%	[illegible]V DC
C25	1006755 – 133		18	± 10%	50VDC
C26	1006755 – 53		0.047	± 10%	35VDC
C27	1006755 – 69		1.0	± 10%	35VDC
C28	1006777 – 16		220UUF	± 10%	100VDC
C29					
C30					
C31	1006777 – 16	CAPACITOR	220UUF	± 10%	100VDC
R43	1006750 – 17	RESISTOR	240	± 2%	1/4W

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
CR1	1010385	DIODE	IN660		
CR2	1010830 – 5	ZENER	IN961B	± 5%	10 VDC
CR3	1010830 – 9	ZENER	IN965B	± 5%	15 VDC
CR4	1010385		IN660		
CR5	1010385		IN660		
CR6	1010385		IN660		
CR7	1010385		IN660		
CR8	1010831 – 1	ZENER	IN3796	± 5%	20 VDC
CR9	1010830 – 12	ZENER	IN968B	± 5%	20 VDC
CR10	1010497		UTR 52		
CR11					
CR12					
CR13					
CR14					
CR15					
CR16					
CR17					
CR18					
CR19					
CR20					
CR21					
CR22					
CR23	1010497		UTR 52		
CR24	1010385		IN660		
CR25	1010829-26	ZENER			
CR26	1010497		UTR 52		
CR27	1010497		UTR 52		
CR28	1010385		IN660		
CR29	1010385		IN660		
CR30	1010385		IN660		
CR31	1010830 – 28	ZENER		± 2%	27 VDC
CR32	1010830 – 28	ZENER		± 2%	27 VDC
CR33	1010830 – 28	ZENER		± 2%	27 VDC
CR34	1010385		IN660		
CR35	1010385		IN660		
CR36	1010385		IN660		
CR37	1010497		UTR52		
CR38	1010372 – 15	DIODE ZENER	IN755A		
Q1	1010652 – 1	TRANSISTOR	2N2980		
Q2	1010652 – 1		2N2980		
Q3	1010398 – 3		2N2243A		
Q4	1010398 – 3		2N2243A		
Q5	1010499 – 2		2N2634		
Q6	1010499 – 2		2N2634		
Q7	1010652 – 1		2N2980		
Q8	1010713 – 1		2N2891		
Q9	1010273 – 1		2N1724		
Q10	1010747 – 1		2N3114		
Q11	1010747 – 1		2N3114		
Q12	1010652 – 1		2N2980		
Q13	1010652 – 1		2N2980		
Q14	1010652 – 1		2N2980		
Q15	1010357 – 1		2N720A		
Q16	1010357 – 1		2N720A		
Q17	1010357 – 1		2N720A		
Q18	1010342	TRANSISTOR	2N998		
T1	1010315 – 2	TRANSFORMER			
T2	1010760	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

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INSTRUMENTATION LAB
Cambridge Mass
DRAWN DATE
CHECKED
APPROVAL
APPROVAL 4 Jan 66
NASA APPROVAL
MIT APPROVAL

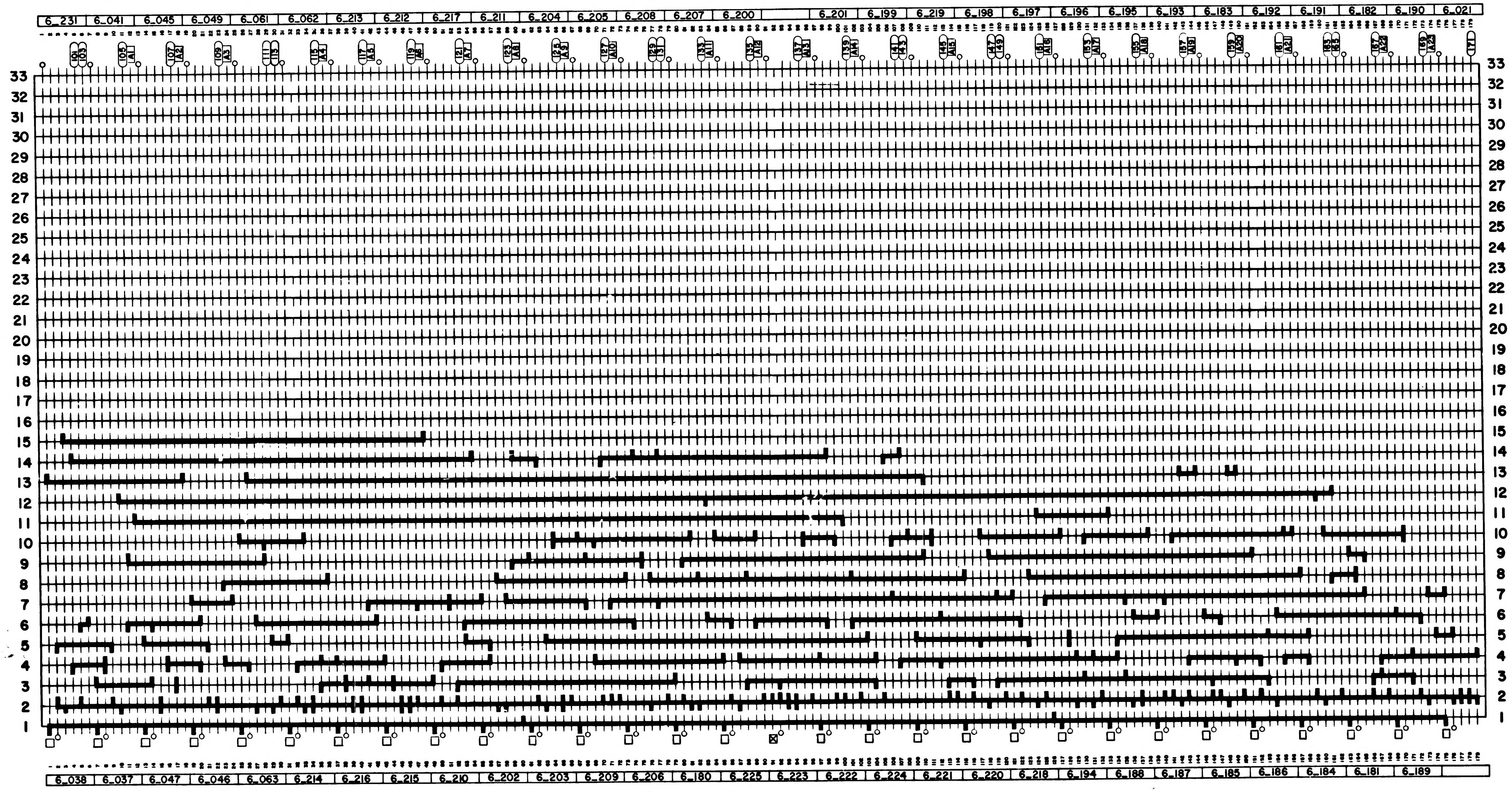
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
PULSE TORQUE
POWER SUPPLY

CODE IDENT NO. 80230
SIZE E
NASA DRAWING NO 2010087
SCALE —
WT —
SHEET 2 OF 2

2010087

REVISIONS 2035						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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6_223
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6_220
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6_188
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6_184
6_181
6_189

REF DWG:
1. LOGIC FLOW DIAGRAM 2010093

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ☐ DENOTES PIN 10 OF DUAL NOR GATE
3. ⚲ DENOTES OUTPUTS (PINS 1 & 9) OF DUAL NOR GATES
4. ▭ DENOTES INTER-QUADRANT CONNECTION WITHIN MODULE
5. (XXX) DENOTES MODULE PIN NUMBER
6. [XXXXX] DENOTES NOR GATE NUMBER
7. <0V> REPRESENTS CONNECTION TO 0VDC SIGNAL
8. <VCC> REPRESENTS CONNECTION TO POWER
9. ☒ DENOTES FAN-IN GATES
10. PIN 201 USED FOR CHASSIS GROUND ONLY

QUADRANT NO. 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE 4/24/6

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM
ERROR ANGLE CTR & LOGIC MODULE

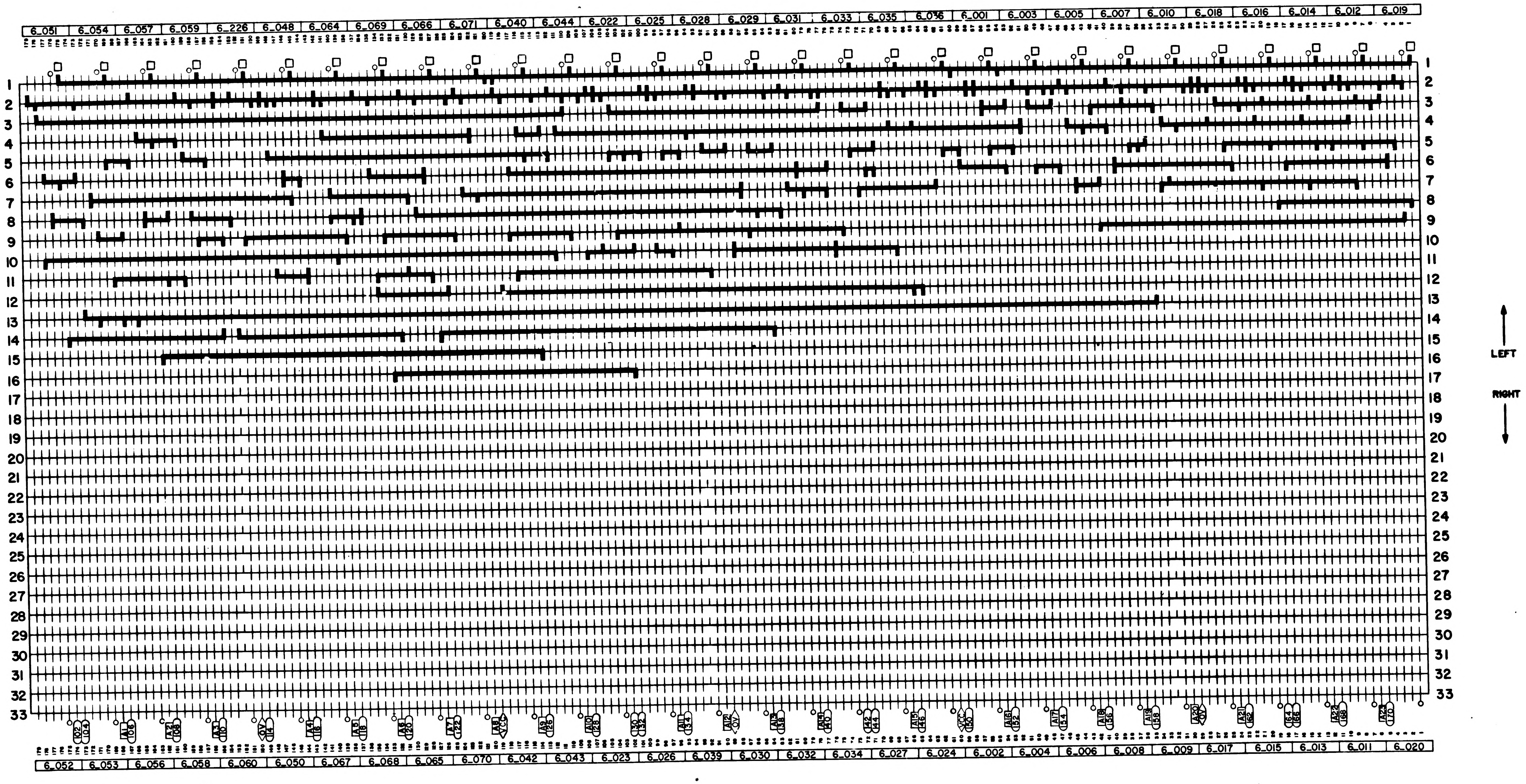
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010090
SCALE NONE		SHEET 1 OF 4

2010090

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20315

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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QUADRANT NO. 2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. Roney
CHECKED R. Lindstrom
APPROVED M.D. Bushman 2 June 65
APPROVED
APPROVED M I T W Kupfer
APPROVED M C
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

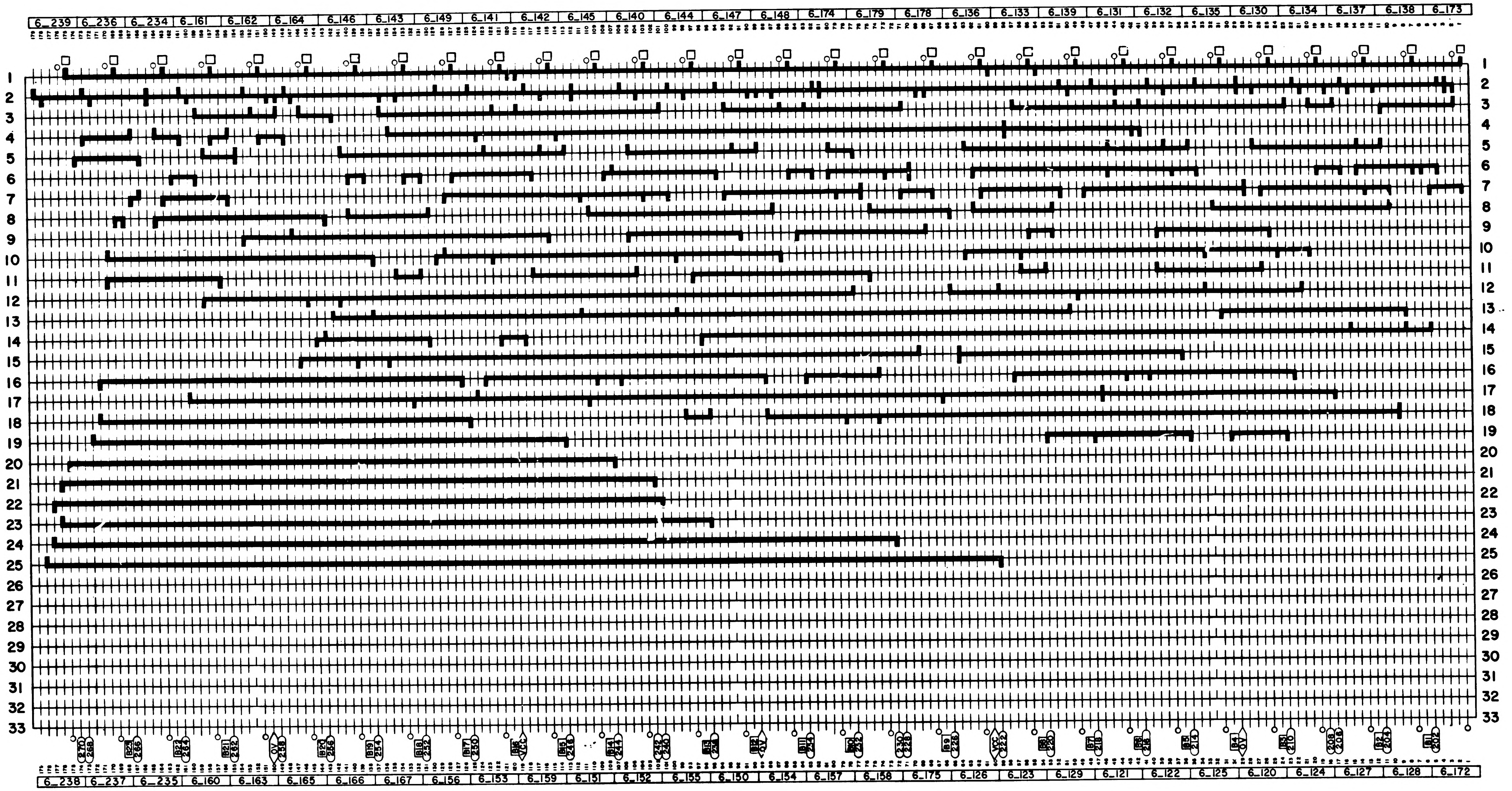
SIGNAL WIRING DIAGRAM
ERROR ANGLE CTR & LOGIC MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010090
SCALE
SHEET 2 OF 4

2010090

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS						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242 240
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B9 226
VCC 222
B8 220
B7 218
B6 216
B5 214
B4 0V
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B2 204
B1 202
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QUADRANT NO.3

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. Romey
CHECKED T. Lindstrom
APPROVED M.D. Brockman
APPROVED
APPROVED MIT W. Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

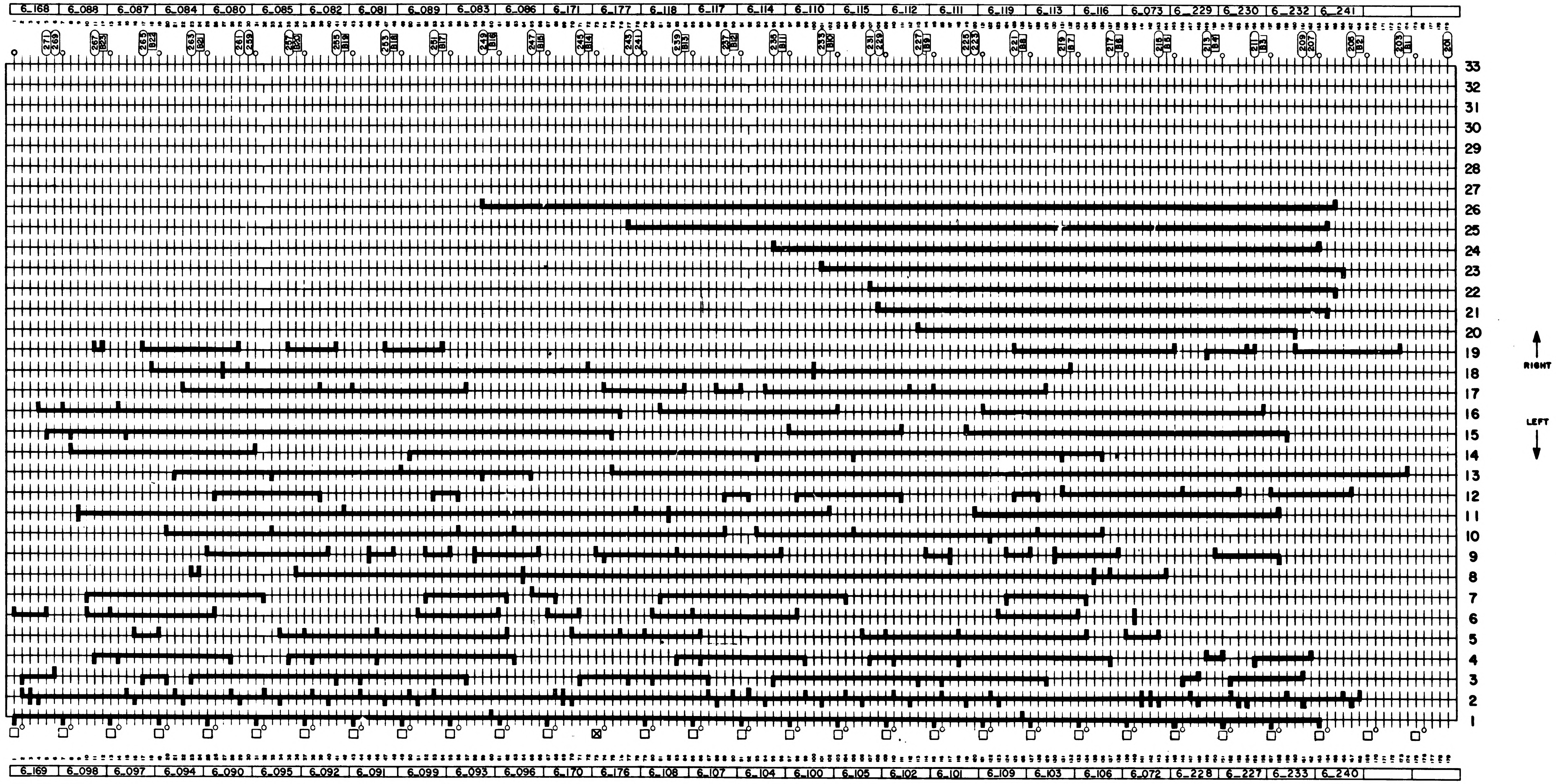
ERROR ANGLE CTR & LOGIC MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010090
SCALE NONE
SHEET 3 OF 4

MASTER

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20315						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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271 269 267 B23 265 B22 263 B21 261 259 257 B20 255 B19 253 B18 251 B17 249 B16 247 B15 245 B14 243 241 239 B13 237 B12 235 B11 233 B10 231 229 227 B9 225 223 221 B8 219 B7 217 B6 215 B5 213 B4 211 B3 209 207 205 B2 203 B1 201
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QUADRANT NO.4

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

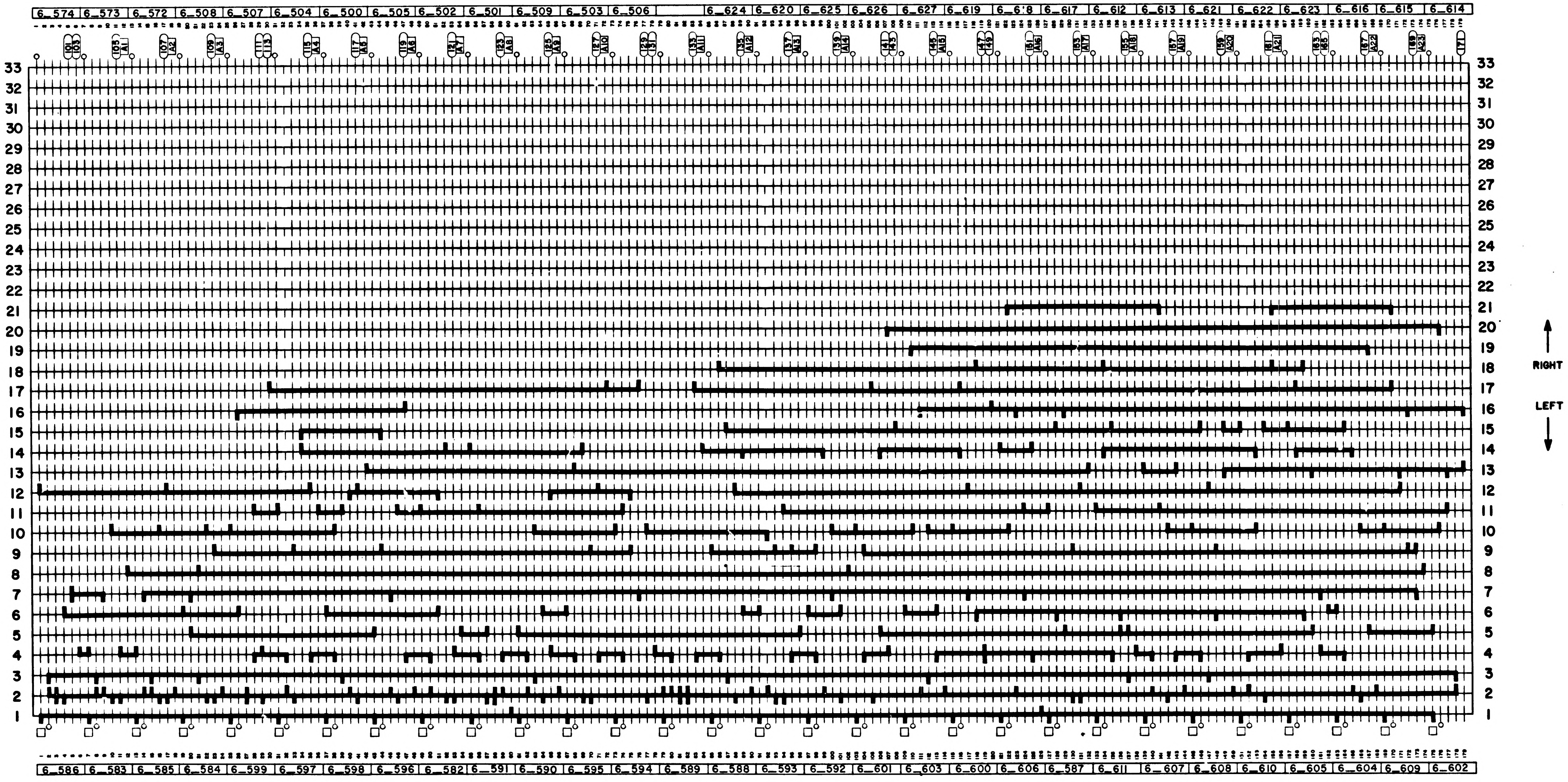
ERROR ANGLE CTR & LOGIC MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010090

SCALE NONE
SHEET 4 OF 4

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 203 5						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ☐ DENOTES PIN 10 OF DUAL NOR GATES
3. ⚲ DENOTES OUTPUTS (PINS 1 & 9) OF DUAL NOR GATES
4. ▭ DENOTES INTER-QUADRANT CONNECTION WITHIN MODULE
5. (XXX) DENOTES MODULE PIN NUMBERS
6. [XXXXX] DENOTES NOR GATE NUMBER
7. ⟨0V⟩ REPRESENTS CONNECTION TO 0VDC SIGNAL
8. ⟨VCC⟩ REPRESENTS CONNECTION TO POWER
9. PIN 201 USED FOR CHASSIS GROUND ONLY

REF DWG:
LOGIC FLOW DIAGRAM 2010094

QUADRANT NO. 1

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN
CHECKED A. Lindstrom
APPROVED M.D. Buchanan
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

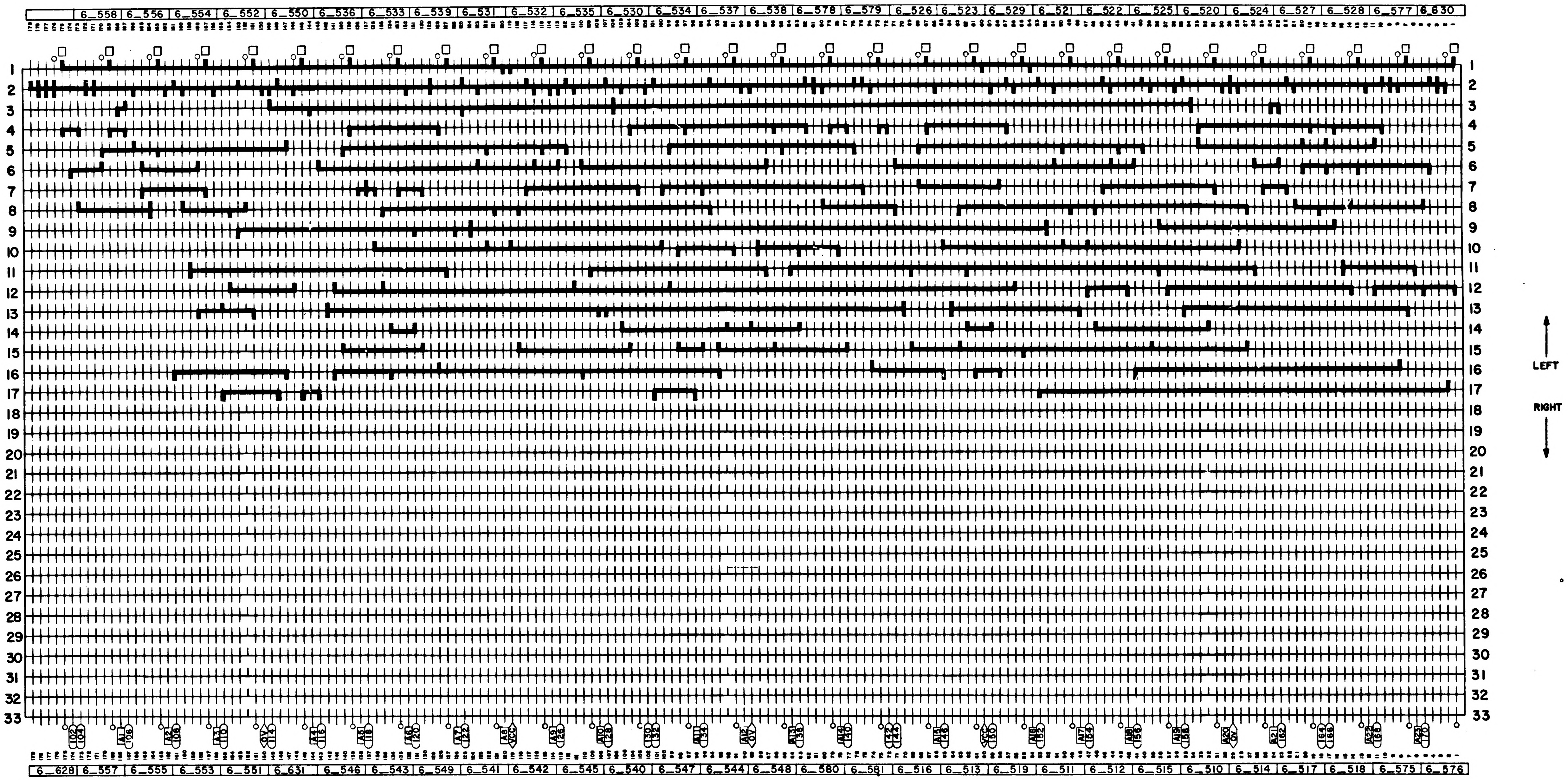
READ COUNTER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010091
SCALE NONE
SHEET 1 OF 4

2010091

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20315						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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QUADRANT NO. 2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Crowley 10 Oct 63
CHECKED A. Lindstrom 16 June 64
APPROVED W.D. Rainbow 21 June 64
APPROVED ___
APPROVED MIT W. Copps 22 June 64
APPROVED MSC 6/24/64
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

READ COUNTER

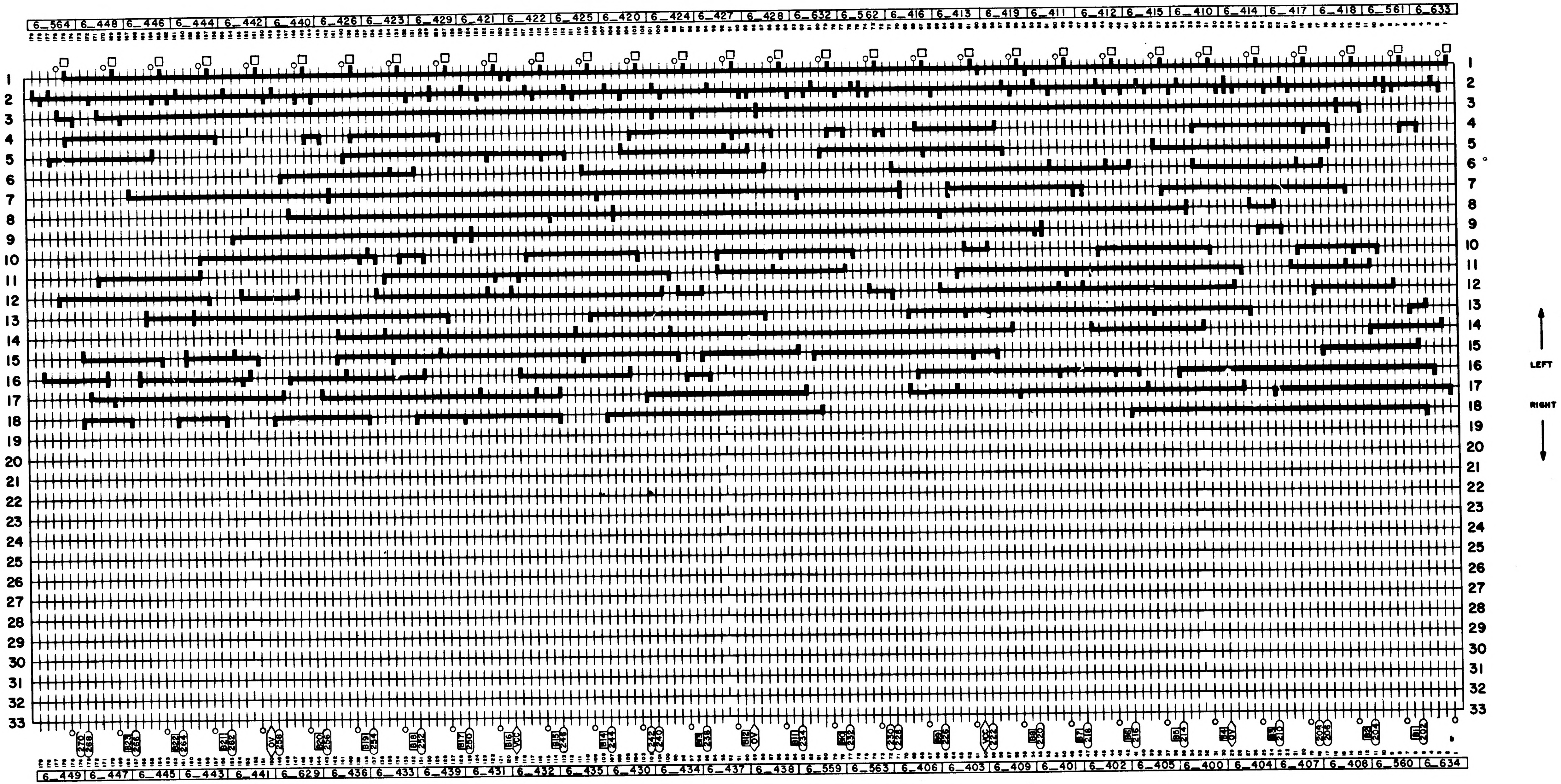
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010091
SCALE ___
SHEET 2 OF 4

2010091

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 20315

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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QUADRANT NO. 3

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. Roy
CHECKED A. Lindstrom
APPROVED M. Birnbaum
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

READ COUNTER

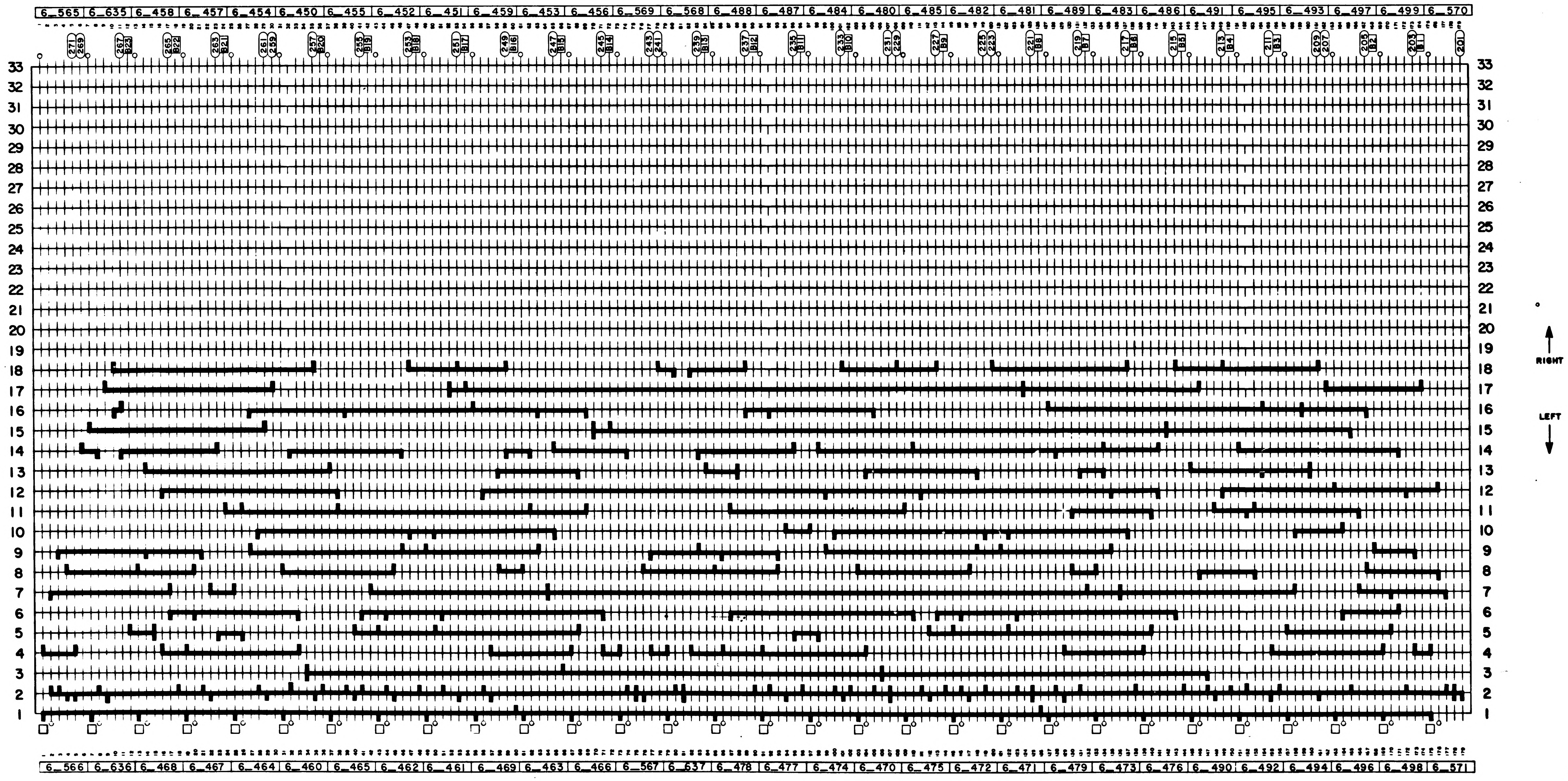
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010091
SCALE
SHEET 3 OF 4

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

6 5 4 3 2 1

REVISIONS 2C3.5

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
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QUADRANT NO. 4

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

READ COUNTER

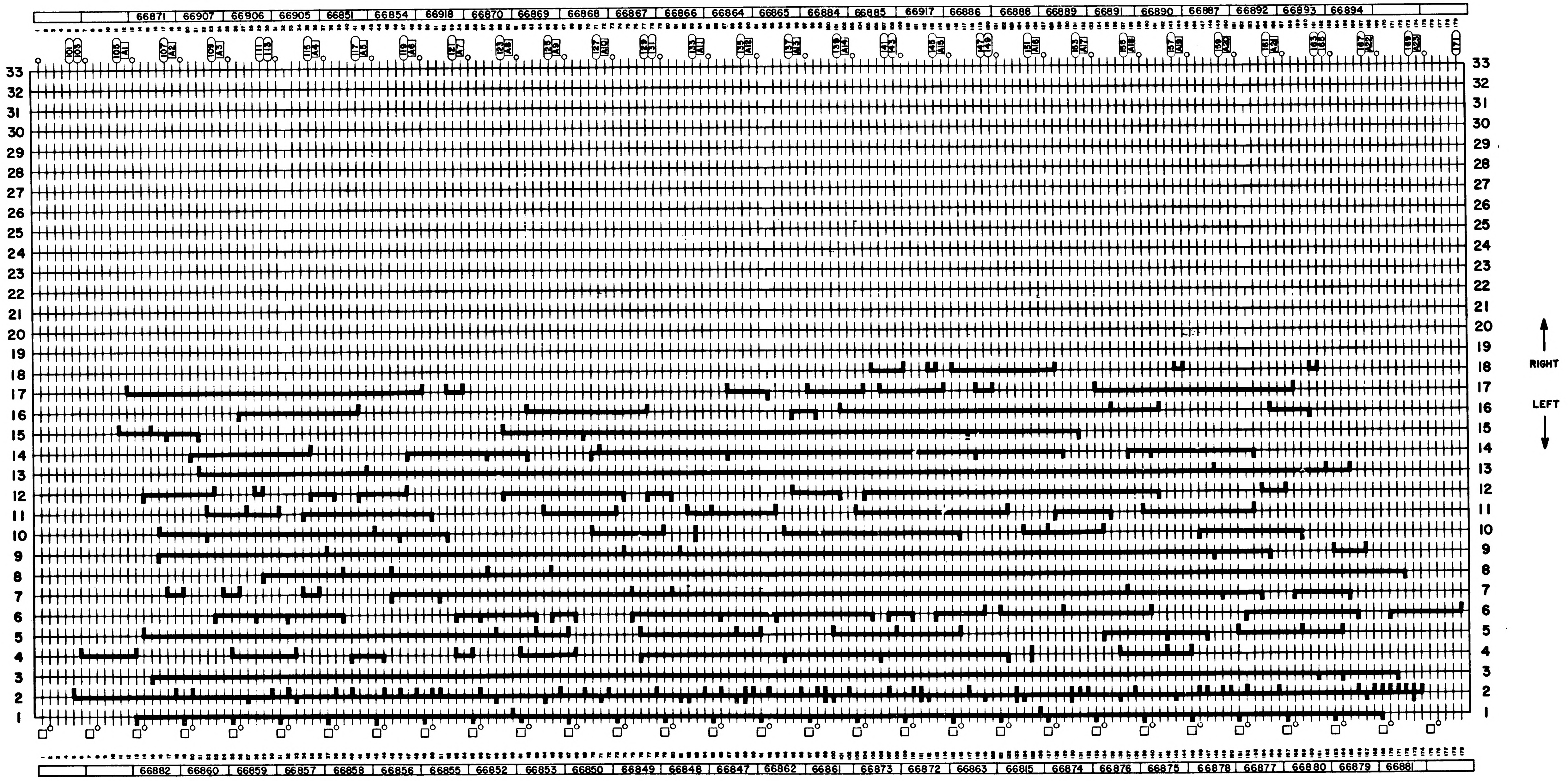
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010091

SCALE —— SHEET 4 OF 4

6 5 4 3 2 1

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 203.5						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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A23
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RIGHT
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66882
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66872
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66881

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ☐ DENOTES PIN 10 OF DUAL NOR GATE
3. —○ DENOTES OUTPUTS (PINS 1 & 9) OF DUAL NOR GATES
4. ▭ DENOTES INTER-QUADRANT CONNECTION WITHIN MODULE
5. (XXX) DENOTES MODULE PIN NUMBER
6. [XXXXX] DENOTES NOR GATE NUMBER
7. <0V> REPRESENTS CONNECTION TO 0VDC SIGNAL
8. <VCC> REPRESENTS CONNECTION TO POWER
9. PIN 201 USED FOR CHASSIS GROUND ONLY

QUADRANT NO. I

REF. DWG.

1. LOGIC FLOW DIAGRAM 2010095

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 9 JAN 65
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

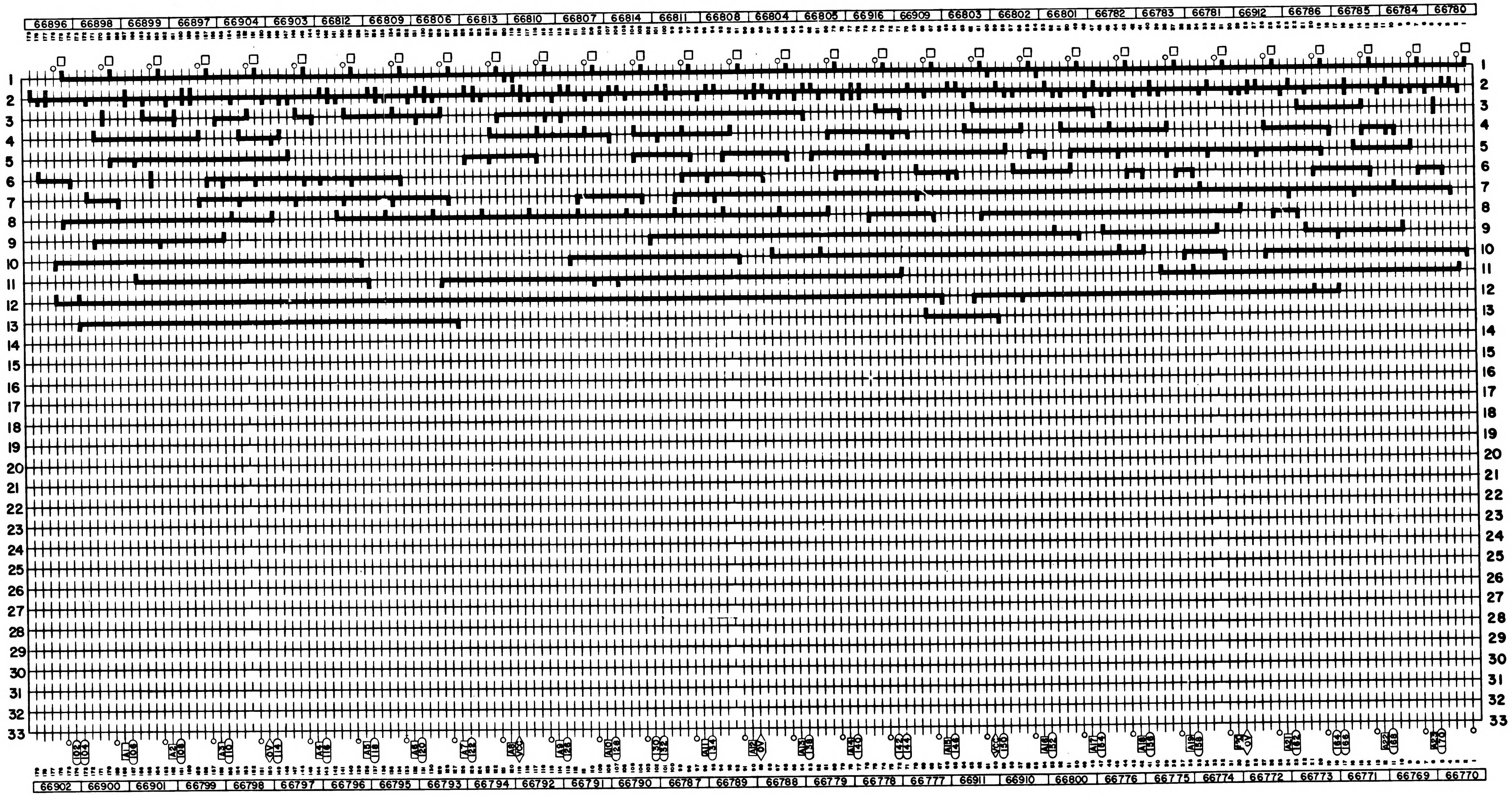
DIGITAL MODE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010092
SCALE NONE
SHEET 1 OF 4

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 203.5

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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66805
66916
66909
66803
66802
66801
66782
66783
66781
66912
66786
66785
66784
66780
LEFT
RIGHT
102 104
A1 106
A2 108
A3 110
0V 114
A4 116
A5 118
A6 120
A7 122
A8 VCC
A9 126
A10 128
130 132
A11 134
A12 0V
A13 138
A14 140
142 144
A15 146
VCC 150
A16 152
A17 154
A18 156
A19 158
F20 0V
A21 162
164 166
A22 168
A23 170
66902
66900
66901
66799
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66778
66777
66911
66910
66800
66776
66775
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66772
66773
66771
66769
66770

QUADRANT NO. 2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

DRAWN	J. Crosby	9 Jan 65
CHECKED	R. Lindstrom	16 June 65
APPROVED	MD Rosenbaum	21 June 65
APPROVED		
APPROVED MIT		22 June 65
APPROVED MSC		6/22/65
		DATE

SIGNAL WIRING DIAGRAM

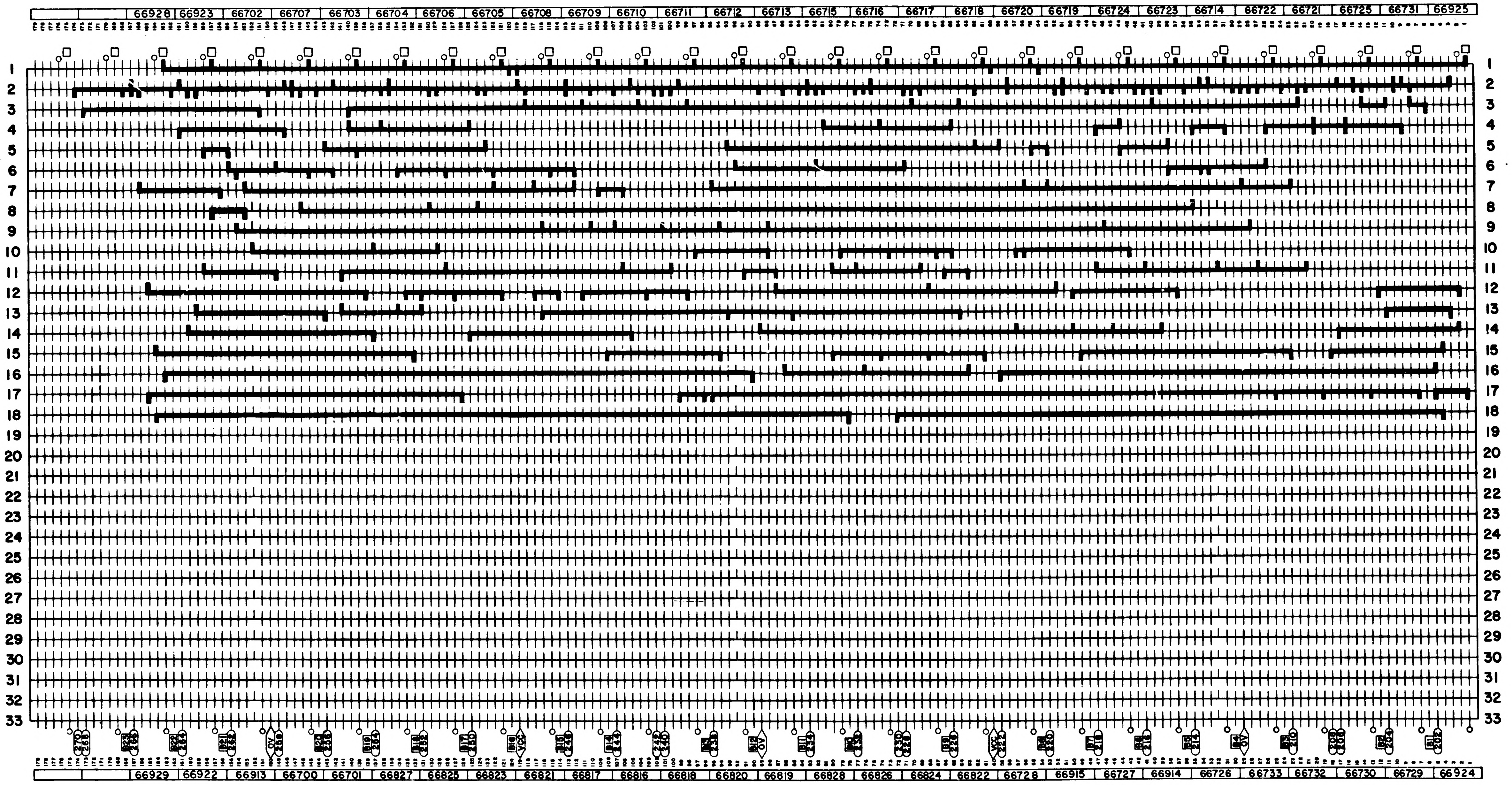
DIGITAL MODE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010092

SCALE ___ SHEET 2 OF 4

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 203 5						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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66722
66721
66725
66731
66925
LEFT
RIGHT
66929
66922
66913
66700
66701
66827
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66729
66924

QUADRANT NO. 3

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN J. Crowley 9 Jun 65
CHECKED A. Lindstrom
APPROVED W.D. Brinkmann
APPROVED
APPROVED MIT W Kupfer
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

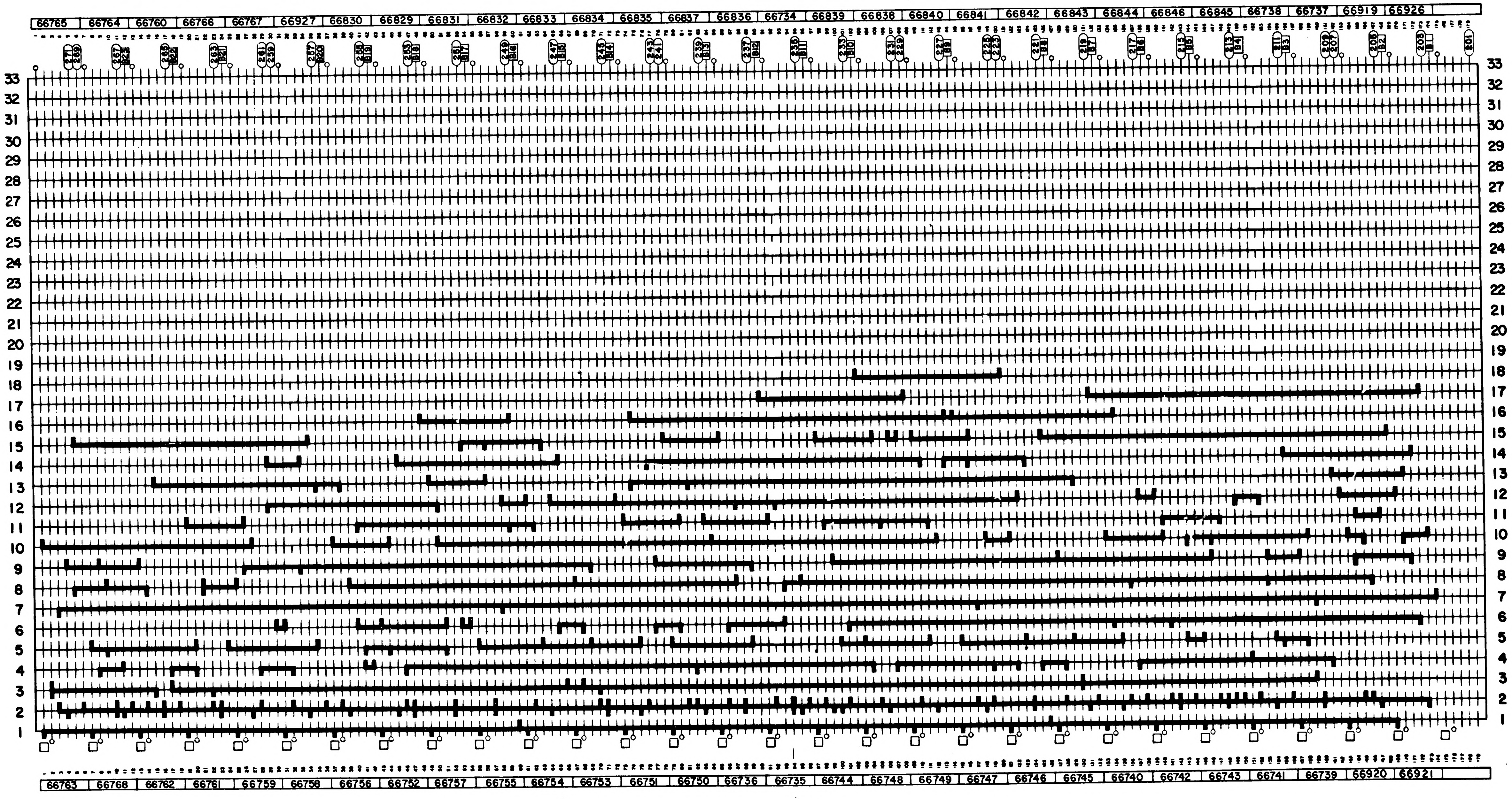
SIGNAL WIRING DIAGRAM
DIGITAL MODE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010092
SCALE
SHEET 3 OF 4

2010092

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 2C3.5						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED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QUADRANT NO. 4

MASTER

QTY REQD	PART OR IDENTIFYING NO	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Cassidy 9 Jun 65
CHECKED A. Pendleton 15 Jun 65
APPROVED M D Rosenbaum 21 Jun 65
APPROVED
APPROVED MIT W Kupfer 22 Jun 65
APPROVED MSC 4/21/
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL WIRING DIAGRAM

DIGITAL MODE

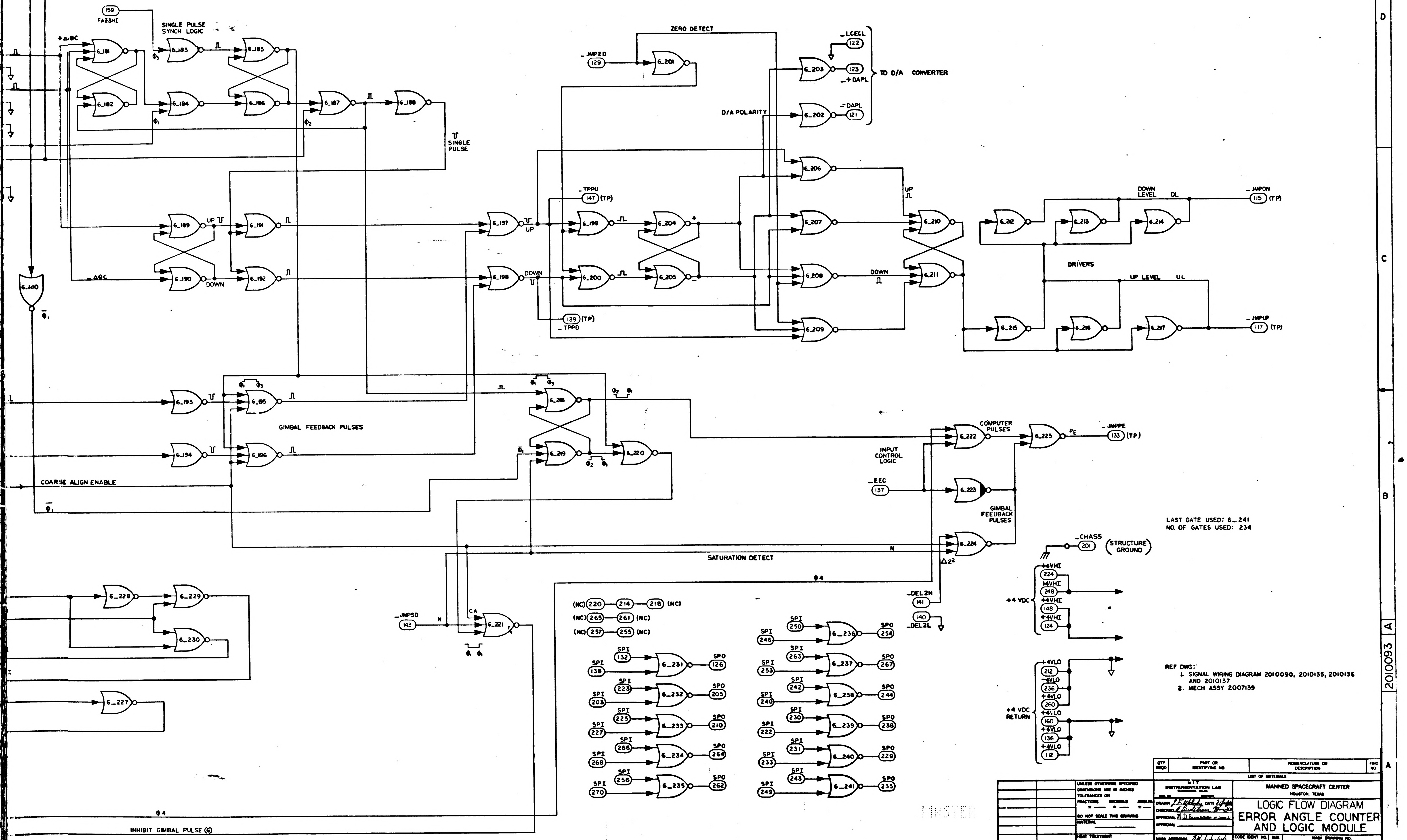
CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010092

SCALE
SHEET 4 OF 4

2010092

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 23351		

2010093 A



159
FA23HI
SINGLE PULSE SYNCH LOGIC
+ΔθC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
ϕ_3
ϕ_1
ϕ_2
SINGLE PULSE
ZERO DETECT
_JMPZD
129
6_201
_LCECL
122
6_203
123
_+DAPL
TO D/A CONVERTER
D/A POLARITY
6_202
_DAPL
121
6_206
6_207
6_208
6_209
_TPPU
147 (TP)
6_189
UP
6_191
6_197
UP
6_199
6_204
+
6_205
−
6_210
6_211
UP
DOWN
6_212
6_213
6_214
DOWN LEVEL
DL
_JMPDN
115 (TP)
DRIVERS
UP LEVEL
UL
6_215
6_216
6_217
_JMPUP
117 (TP)
_ΔθC
6_190
DOWN
6_192
6_198
DOWN
6_200
139 (TP)
_TPPD
6_180
$\overline{\phi}_1$
6_193
6_195
6_194
6_196
GIMBAL FEEDBACK PULSES
6_218
6_219
6_220
ϕ_1 ϕ_3
ϕ_2 ϕ_1
$\overline{\phi}_1$
COARSE ALIGN ENABLE
COMPUTER PULSES
6_222
6_225
P_E
_JMPPE
133 (TP)
INPUT CONTROL LOGIC
_EEC
137
6_223
GIMBAL FEEDBACK PULSES
6_224
N
SATURATION DETECT
$\Delta 2^2$
$\phi 4$
_CHASS
201
(STRUCTURE GROUND)
_DEL2H
141
140
_DEL2L
_JMPSD
143
N
CA
6_221
6_228
6_229
6_230
6_227
(NC) 220
214
218 (NC)
(NC) 265
261 (NC)
(NC) 257
255 (NC)
SPI 132
SPI 138
6_231
SPO 126
SPI 223
SPI 203
6_232
SPO 205
SPI 225
SPI 227
6_233
SPO 210
SPI 266
SPI 268
6_234
SPO 264
SPI 256
SPI 270
6_235
SPO 262
SPI 250
SPI 246
6_236
SPO 254
SPI 263
SPI 253
6_237
SPO 267
SPI 242
SPI 240
6_238
SPO 244
SPI 230
SPI 222
6_239
SPO 238
SPI 231
SPI 233
6_240
SPO 229
SPI 243
SPI 249
6_241
SPO 235
+4 VDC
+4VHI 224
+4VHI 248
+4VHI 148
+4VHI 124
+4 VDC RETURN
+4VLO 212
+4VLO 236
+4VLO 260
+4VLO 160
+4VLO 136
+4VLO 112
$\phi 4$
INHIBIT GIMBAL PULSE (G)

LAST GATE USED: 6_241
NO. OF GATES USED: 234

REF DWG:
1. SIGNAL WIRING DIAGRAM 2010090, 2010135, 2010136 AND 2010137
2. MECH ASSY 2007139

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J.F. Uhlik DATE 21
CHECKED A. Lindstrom
APPROVAL M.D. [illegible]
APPROVAL
NASA APPROVAL
MIT APPROVAL

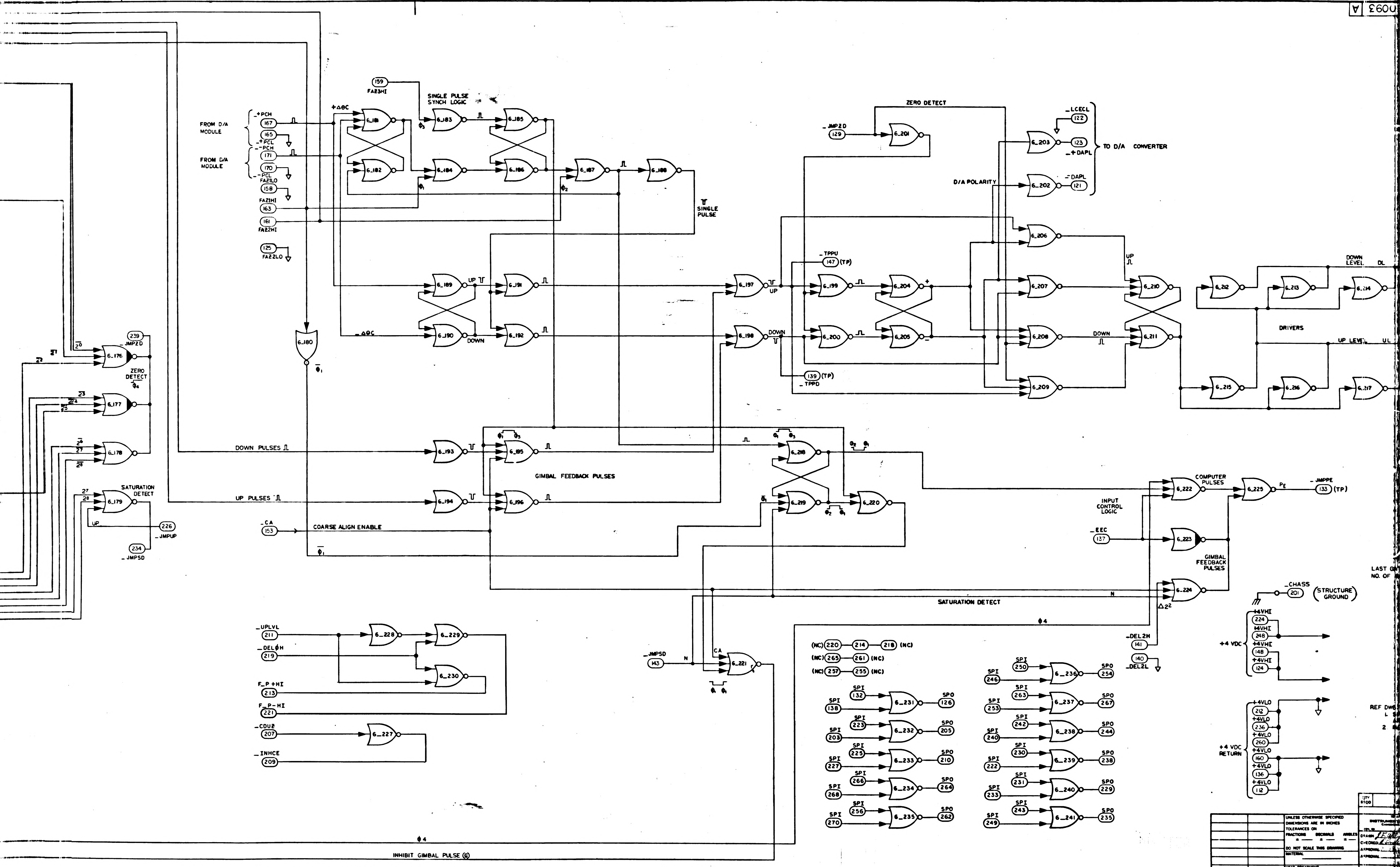
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC FLOW DIAGRAM
ERROR ANGLE COUNTER
AND LOGIC MODULE

CODE IDENT NO. 80230 | SIZE J | NASA DRAWING NO. 2010093
SCALE — | WT — | SHEET 1 OF 1

2010093 A

5H



FROM D/A MODULE
_+PCH 167
165
_+PCL
_-PCH 171
FROM D/A MODULE
170
_-PCL
FAZILO 158
FAZIHI 163
161 FAZ2HI
125 FAZ2LO
159 FAZ3HI
SINGLE PULSE SYNCH LOGIC
+ΔθC
_ΔθC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
SINGLE PULSE
6_180
6_189
6_190
6_191
6_192
UP
DOWN
6_176
6_177
6_178
6_179
239 _JMPZD
ZERO DETECT
SATURATION DETECT
226 _JMPUP
234 _JMPSD
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
GIMBAL FEEDBACK PULSES
_CA 153
COARSE ALIGN ENABLE
ZERO DETECT
_JMPZD 129
6_201
6_197
6_198
_TPPU 147 (TP)
139 (TP) _TPPD
6_199
6_200
6_204
6_205
_LCECL 122
123 _+DAPL
_-DAPL 121
TO D/A CONVERTER
D/A POLARITY
6_203
6_202
6_206
6_207
6_208
6_209
6_210
6_211
6_212
6_213
6_214
6_215
6_216
6_217
DOWN LEVEL DL
UP LEVEL UL
DRIVERS
6_218
6_219
6_220
6_221
6_222
6_223
6_224
6_225
COMPUTER PULSES
INPUT CONTROL LOGIC
_EEC 137
GIMBAL FEEDBACK PULSES
P_E
_JMPPE 133 (TP)
SATURATION DETECT
N
Δ2²
_CHASS 201 (STRUCTURE GROUND)
_DEL2H 141
140 _DEL2L
_JMPSD 143
CA
+4 VDC
+4VHI 224
+4VHI 248
+4VHI 148
124
+4 VDC RETURN
+4VLO 212
+4VLO 236
+4VLO 260
+4VLO 160
+4VLO 136
+4VLO 112
_UPLVL 211
_DELθH 219
F_P+HI 213
F_P-HI 221
_CDUZ 207
_INHCE 209
6_227
6_228
6_229
6_230
(NC) 220 214 218 (NC)
(NC) 265 261 (NC)
(NC) 257 255 (NC)
6_231
6_232
6_233
6_234
6_235
6_236
6_237
6_238
6_239
6_240
6_241
SPI
SPO
ϕ4
INHIBIT GIMBAL PULSE
LAST GATE USED
NO. OF GATES USED
REF DWG

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES

DO NOT SCALE THIS DRAWING

MATERIAL

HEAT TREATMENT

FINAL FINISH

NEXT ASSY USED ON

APPLICATION

DRAWN

CHECKED

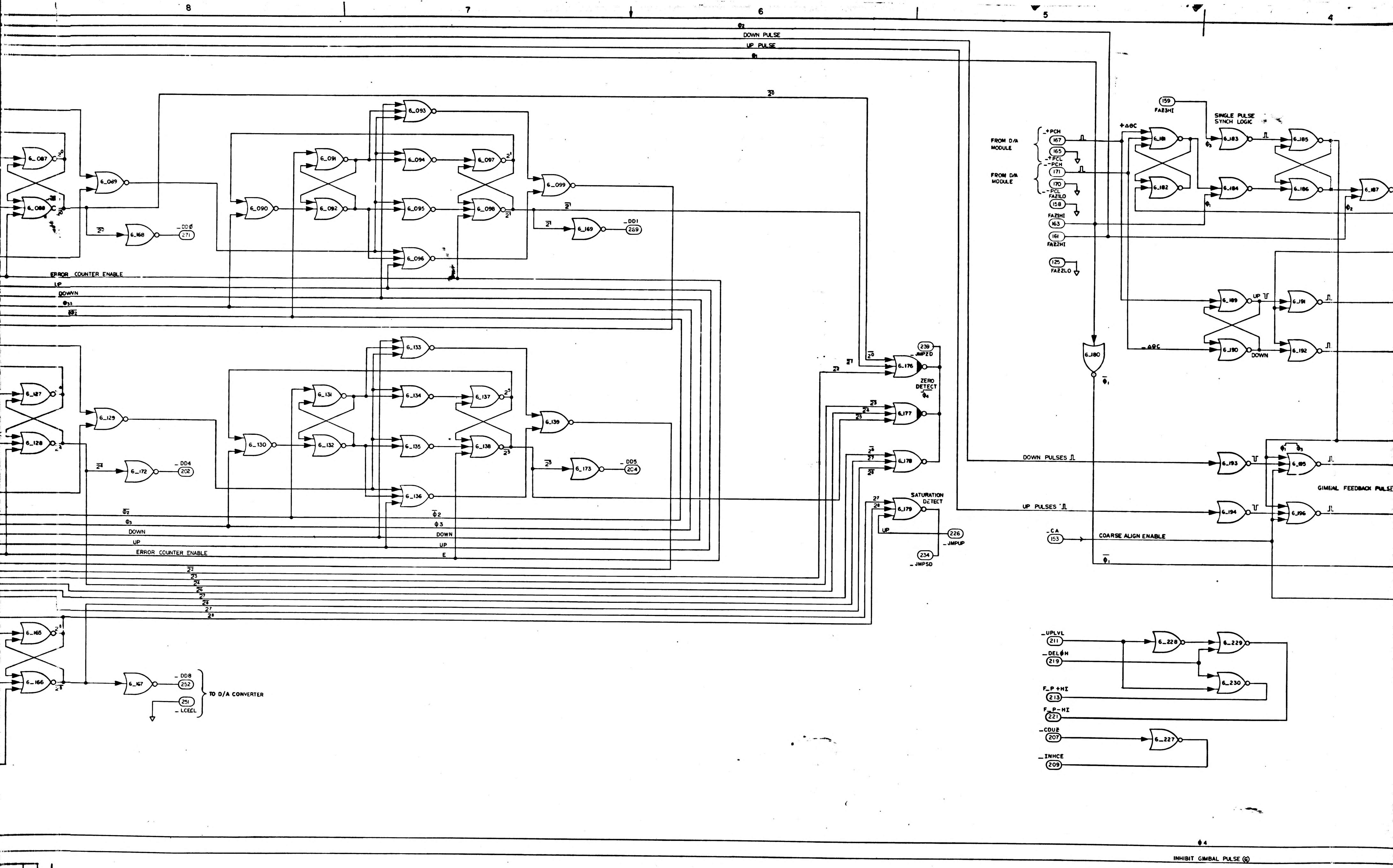
APPROVAL

NASA APPROVAL

1ST APPROVAL

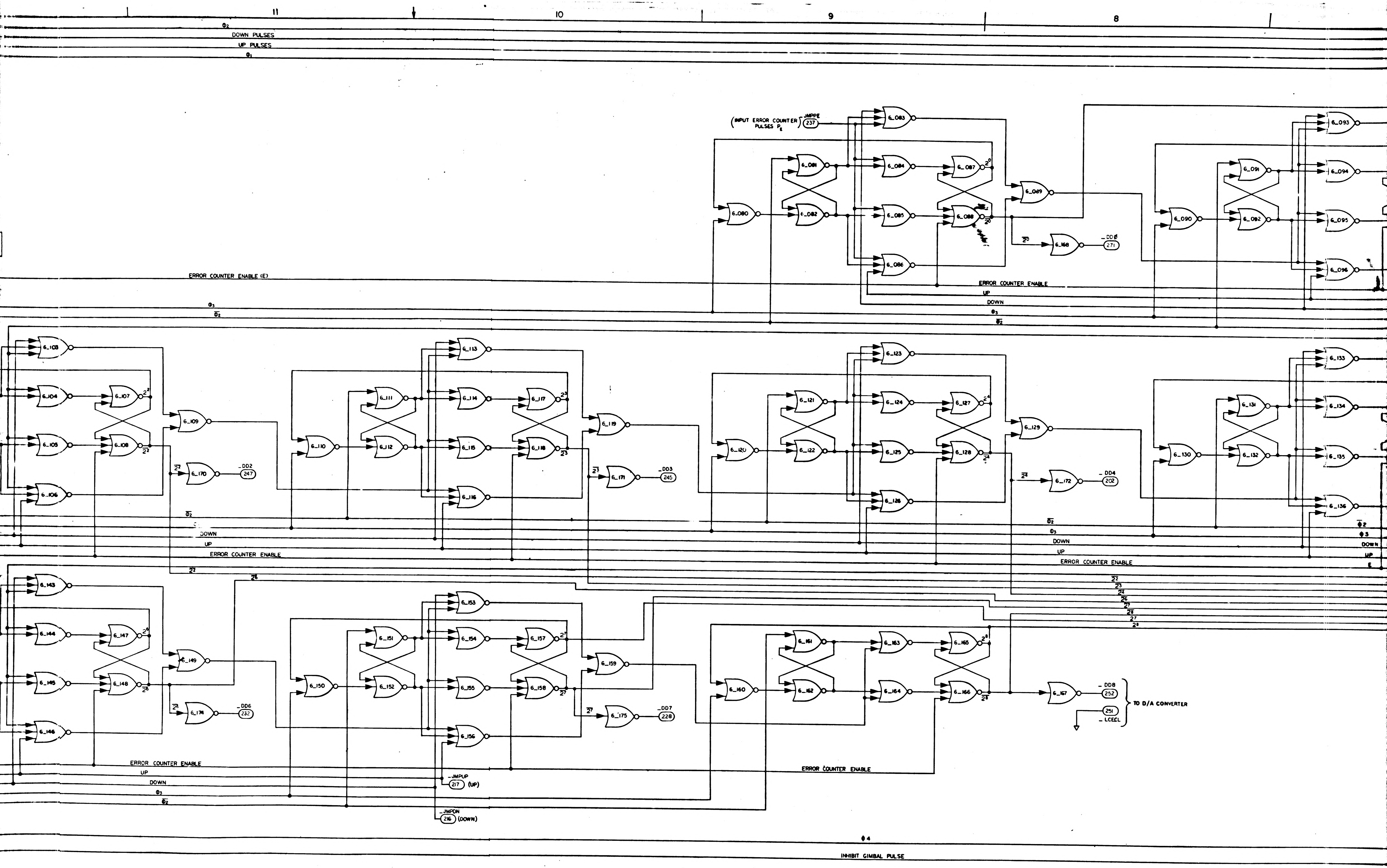
2010093 A

F-5


8
7
6
5
4
Φ2
DOWN PULSE
UP PULSE
Φ1
2⁰
6_087
6_088
6_089
6_168
- DD0
271
6_090
6_091
6_092
6_093
6_094
6_095
6_096
6_097
6_098
6_099
6_169
- DD1
269
ERROR COUNTER ENABLE
UP
DOWN
Φ33
Φ2
6_127
6_128
6_129
6_172
- DD4
202
6_130
6_131
6_132
6_133
6_134
6_135
6_136
6_137
6_138
6_139
6_173
- DD5
204
Φ2
Φ3
DOWN
UP
ERROR COUNTER ENABLE
E
6_165
6_166
6_167
- DD8
252
251
- LCECL
TO D/A CONVERTER
6_176
239
- JMPZD
ZERO DETECT
Φ4
6_177
6_178
6_179
SATURATION DETECT
UP
226
- JMPUP
234
- JMPSD
159
FA23HI
SINGLE PULSE SYNCH LOGIC
FROM D/A MODULE
- +PCH
167
165
- +PCL
- -PCH
171
170
- -PCL
FA21LO
158
FA21HI
163
161
FA22HI
125
FA22LO
+ΔθC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
Φ3
Φ1
Φ2
6_180
Φ1
6_189
6_190
UP
DOWN
6_191
6_192
- ΔθC
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
Φ1 Φ3
GIMBAL FEEDBACK PULSE
- CA
153
COARSE ALIGN ENABLE
Φ1
- UPLVL
211
- DELΦH
219
6_228
6_229
6_230
F_P +HI
213
F_P - HI
221
- CDU2
207
6_227
- INHCE
209
Φ4
INHIBIT GIMBAL PULSE (G)
A
8
7
6
5
4

2010093 A

F-4


11
10
9
8
Φ2
DOWN PULSES
UP PULSES
Φ1
(INPUT ERROR COUNTER PULSES PE)
JMPPE
237
6_080
6_081
6_082
6_083
6_084
6_085
6_086
6_087
6_088
6_089
6_090
6_091
6_092
6_093
6_094
6_095
6_096
2⁰
2̄⁰
6_168
DDØ
271
ERROR COUNTER ENABLE (E)
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ̄2
6_103
6_104
6_105
6_106
6_107
6_108
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6_110
6_111
6_112
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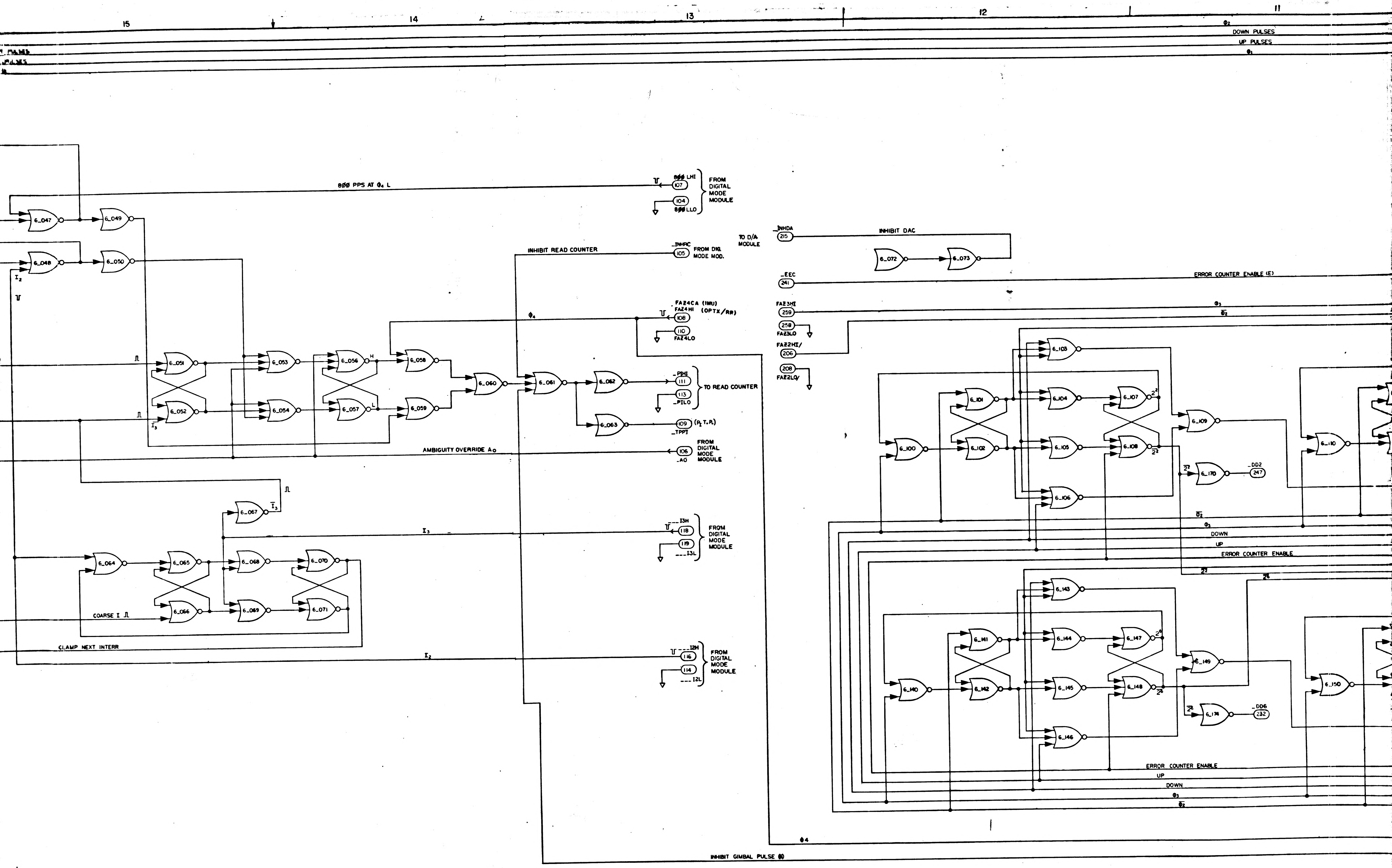
6_133
6_134
6_135
6_136
2²
2̄²
2³
2̄³
2⁴
2̄⁴
6_170
DD2
247
6_171
DD3
245
6_172
DD4
202
E
2̄²
2̄³
2̄⁴
2̄⁶
2̄⁷
2̄⁸
2⁷
2⁸
6_143
6_144
6_145
6_146
6_147
6_148
6_149
6_150
6_151
6_152
6_153
6_154
6_155
6_156
6_157
6_158
6_159
6_160
6_161
6_162
6_163
6_164
6_165
6_166
6_167
2⁶
2̄⁶
2⁷
2̄⁷
2⁸
2̄⁸
6_174
DD6
232
6_175
DD7
228
DD8
252
251
LCECL
TO D/A CONVERTER
JMPUP
217 (UP)
JMPDN
216 (DOWN)
Φ4
INHIBIT GIMBAL PULSE
11
10
9
8

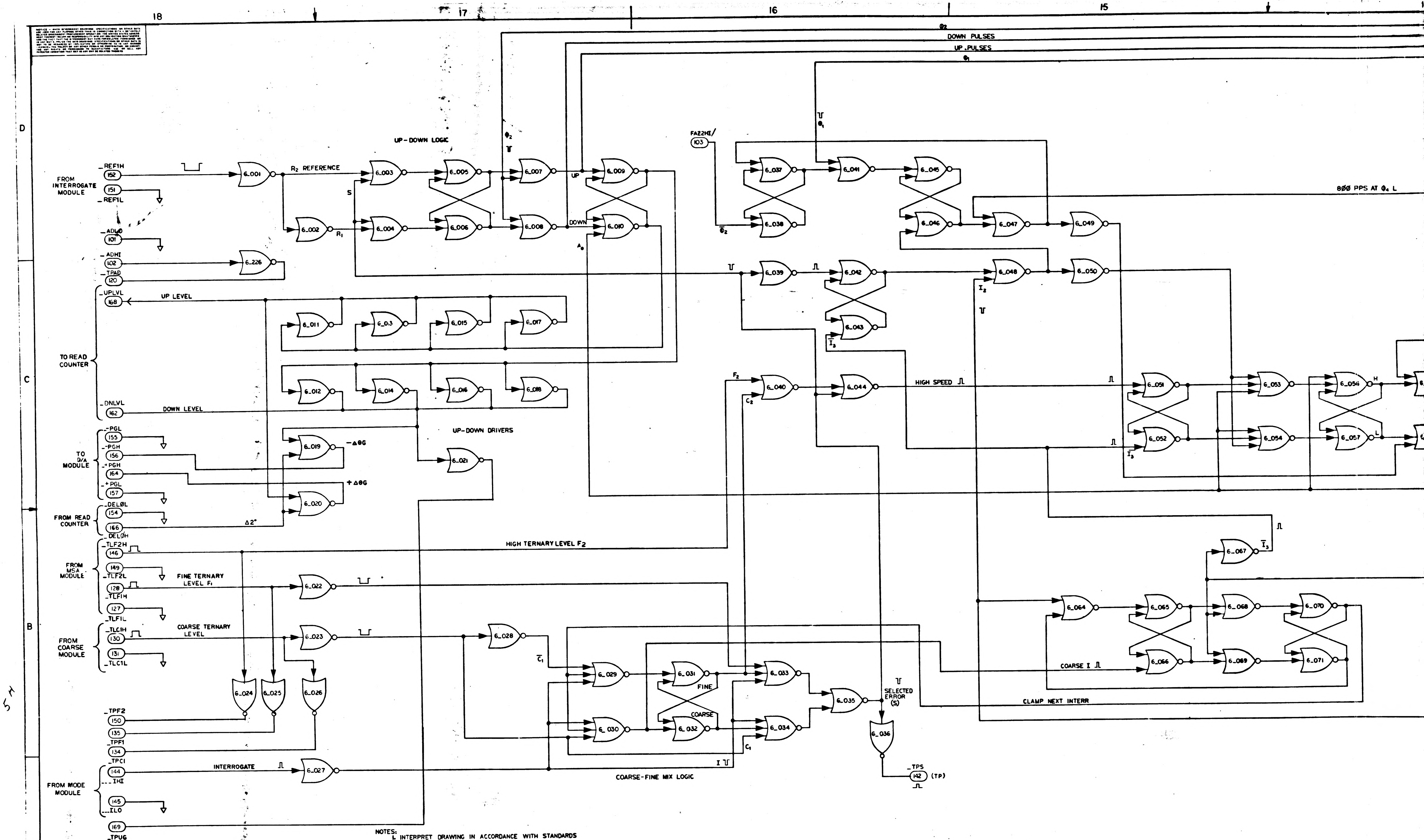
2010093 | A

F3


15
14
13
12
11
Φ2
DOWN PULSES
UP PULSES
Φ1
800 PPS AT Φ4 L
800 LHI
107
104
800 LLO
FROM DIGITAL MODE MODULE
6_047
6_049
6_048
6_050
I2
INHIBIT READ COUNTER
_INHRC
105
FROM DIG. MODE MOD.
TO D/A MODULE
_INHDA
215
INHIBIT DAC
6_072
6_073
_EEC
241
ERROR COUNTER ENABLE (E)
_FAZ4CA (IMU)
FAZ4HI (OPTX/RR)
108
110
FAZ4LO
Φ4
FAZ3HI
259
258
FAZ3LO
FAZ2HI/
206
208
FAZ2LO/
Φ3
Φ̄2
6_051
6_052
I3
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
6_061
6_062
6_063
_PIHI
111
113
_PILO
TO READ COUNTER
109
(R. T. P.)
_TPPT
AMBIGUITY OVERRIDE A0
106
_AO
FROM DIGITAL MODE MODULE
6_103
6_101
6_104
6_107
2²
6_100
6_102
6_105
6_108
2̄²
6_109
6_106
6_170
_DD2
247
6_110
Φ̄2
Φ3
DOWN
UP
ERROR COUNTER ENABLE
2²
2⁶
6_067
Ī3
I3
_I3H
118
119
_I3L
FROM DIGITAL MODE MODULE
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE I
CLAMP NEXT INTERR
I2
_I2H
116
114
_I2L
FROM DIGITAL MODE MODULE
6_143
6_141
6_144
6_147
2⁶
6_140
6_142
6_145
6_148
2̄⁶
6_149
6_146
6_174
_DD6
232
6_150
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ̄2
Φ4
INHIBIT GIMBAL PULSE (E)
15
14
13
12
11

2010093 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

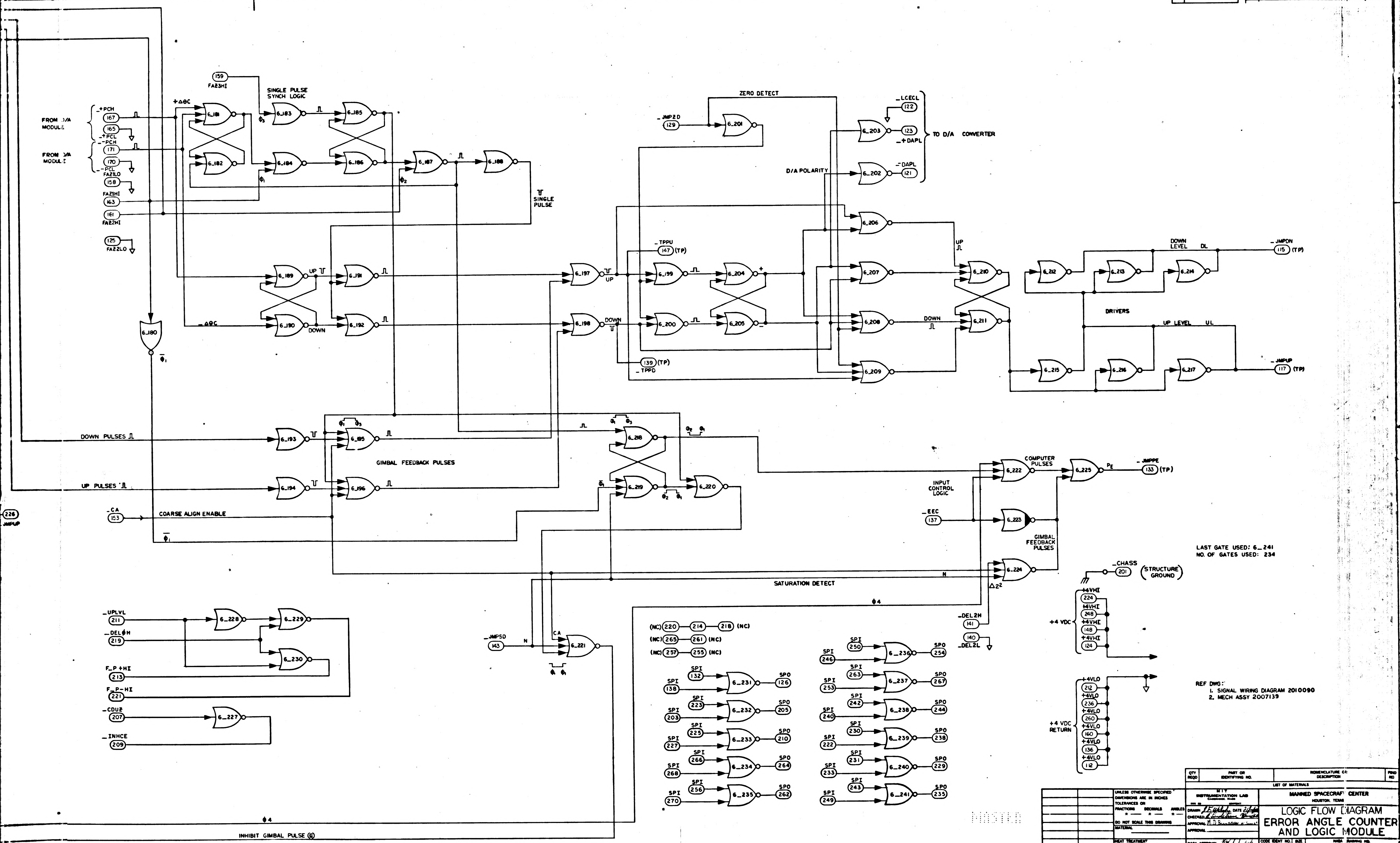

18
17
16
15
D
C
B
A
UP-DOWN LOGIC
FROM INTERROGATE MODULE
_REF1H
152
151
_REF1L
_ADLO
101
_ADHI
102
_TPAD
120
6_001
R2 REFERENCE
6_002
R1
S
6_003
6_004
6_005
6_006
Φ2
6_007
6_008
UP
DOWN
6_009
6_010
A0
6_226
TO READ COUNTER
_UPLVL
168
UP LEVEL
6_011
6_013
6_015
6_017
6_012
6_014
6_016
6_018
_DNLVL
162
DOWN LEVEL
UP-DOWN DRIVERS
TO D/A MODULE
_-PGL
155
_-PGH
156
_+PGH
164
_+PGL
157
6_019
-ΔθG
6_020
+ΔθG
6_021
FROM READ COUNTER
_DELØL
154
166
_DELØH
Δ2°
FROM MSA MODULE
_TLF2H
146
149
_TLF2L
128
_TLF1H
127
_TLF1L
HIGH TERNARY LEVEL F2
FINE TERNARY LEVEL F1
6_022
FROM COARSE MODULE
_TLC1H
130
131
_TLC1L
COARSE TERNARY LEVEL
6_023
6_028
C̄1
6_024
6_025
6_026
_TPF2
150
135
_TPF1
134
_TPC1
144
_IHI
145
_ILO
169
_TPUG
FROM MODE MODULE
INTERROGATE
6_027
6_029
6_030
6_031
6_032
FINE
COARSE
6_033
6_034
C1
I
6_035
6_036
SELECTED ERROR (S)
_TPS
142
(TP)
COARSE-FINE MIX LOGIC
Φ2
DOWN PULSES
UP PULSES
Φ1
FAZZHI/
103
Φ̄2
6_037
6_038
6_041
6_045
6_046
6_047
6_049
800 PPS AT Φ4 L
6_039
6_042
6_043
I3
6_048
6_050
I2
F2
C2
6_040
6_044
HIGH SPEED
6_051
6_052
I3
6_053
6_054
6_056
6_057
H
L
6_067
Ī3
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE I
CLAMP NEXT INTERR

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTIONS
3. DENOTES SINGLE MICRO-NOR GATE
4. DENOTES FAN-IN GATE
5. POWER CONNECTIONS TO GATES NOT SHOWN
6. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO +4V RETURN
7. ▽ INDICATES MODULE POWER BUSS +4V RETURN
8. XXX ⬭ (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

5H

2010093	A

18 17 16 15


FROM D/A MODULE
+PCH
167
165
+PCL
FROM D/A MODULE
-PCH
171
170
-PCL
FAZ1LO
158
FAZ1HI
163
161
FAZ2HI
125
FAZ2LO
159
FAZ3HI
+Δθc
SINGLE PULSE SYNCH LOGIC
6_181
6_182
6_183
6_184
6_185
6_186
6_187
6_188
φ3
φ1
φ2
SINGLE PULSE
6_189
6_190
6_191
6_192
UP
DOWN
-Δθc
6_180
φ1
ZERO DETECT
-JMPZD
129
6_201
D/A POLARITY
-LCECL
122
6_203
123
-+DAPL
6_202
-DAPL
121
TO D/A CONVERTER
6_197
6_198
UP
DOWN
-TPPU
147 (TP)
6_199
6_200
6_204
6_205
+
-
139 (TP)
-TPPD
6_206
6_207
6_208
6_209
UP
DOWN
6_210
6_211
6_212
6_213
6_214
DOWN LEVEL
DL
-JMPDN
115 (TP)
DRIVERS
UP LEVEL
UL
6_215
6_216
6_217
-JMPUP
117 (TP)
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
φ1 φ3
GIMBAL FEEDBACK PULSES
6_218
6_219
6_220
φ2 φ1
226
JMPUP
-CA
153
COARSE ALIGN ENABLE
φ1
INPUT CONTROL LOGIC
-EEC
137
COMPUTER PULSES
6_222
6_223
6_225
PE
-JMPPE
133 (TP)
GIMBAL FEEDBACK PULSES
6_224
N
SATURATION DETECT
Δ2²
φ4
-CHASS
201
(STRUCTURE GROUND)
-DEL2H
141
140
-DEL2L
+4 VDC
+4VHI
224
+4VHI
248
+4VHI
148
+4VHI
124
+4 VDC RETURN
+4VLO
212
+4VLO
236
+4VLO
260
+4VLO
160
+4VLO
136
+4VLO
112
-UPLVL
211
-DELφH
219
6_228
6_229
6_230
F_P+HI
213
F_P-HI
221
-CDU2
207
6_227
-INHCE
209
-JMPSD
143
N
CA
6_221
φ4 φ1
(NC) 220
214
218 (NC)
(NC) 265
261 (NC)
(NC) 257
255 (NC)
SPI 132
SPI 138
6_231
SPO 126
SPI 223
SPI 203
6_232
SPO 205
SPI 225
SPI 227
6_233
SPO 210
SPI 266
SPI 268
6_234
SPO 264
SPI 256
SPI 270
6_235
SPO 262
SPI 250
SPI 246
6_236
SPO 254
SPI 263
SPI 253
6_237
SPO 267
SPI 242
SPI 240
6_238
SPO 244
SPI 230
SPI 222
6_239
SPO 238
SPI 231
SPI 233
6_240
SPO 229
SPI 243
SPI 249
6_241
SPO 235
φ4
INHIBIT GIMBAL PULSE (G)
5
4
3
2
1
MASTER

LAST GATE USED: 6_241
NO. OF GATES USED: 234

REF DWG:
1. SIGNAL WIRING DIAGRAM 2010090
2. MECH ASSY 2007139

2010093

REVISIONS
SYM | DESCRIPTION | DATE | APPROVED

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

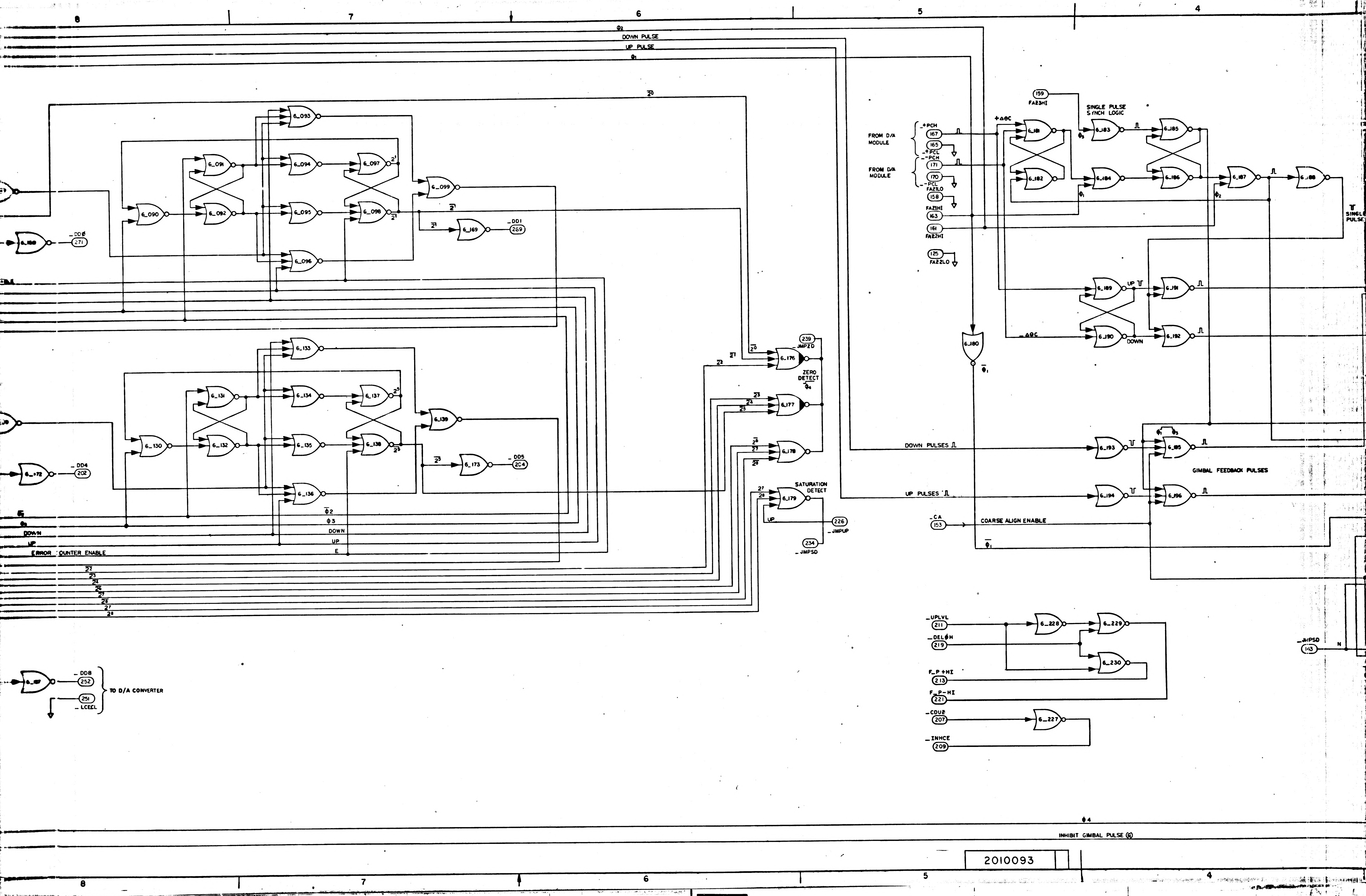
NEXT ASSY | USED ON
APPLICATION

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT
DRAWN J.F. Walsh DATE 21 Jul
CHECKED A. Lindstrom
APPROVAL M. D. Bungaller 21 June 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

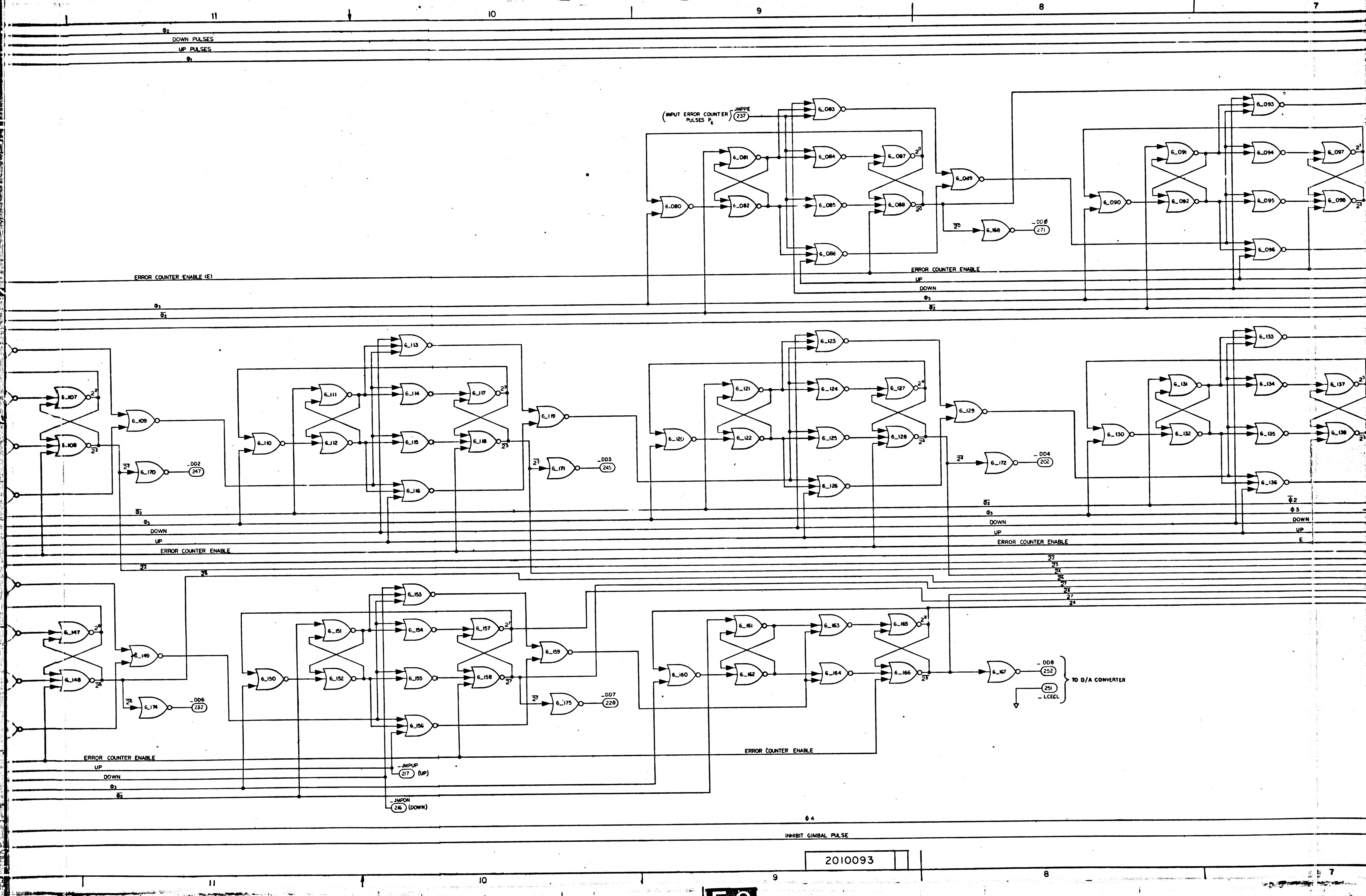
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC FLOW DIAGRAM ERROR ANGLE COUNTER AND LOGIC MODULE

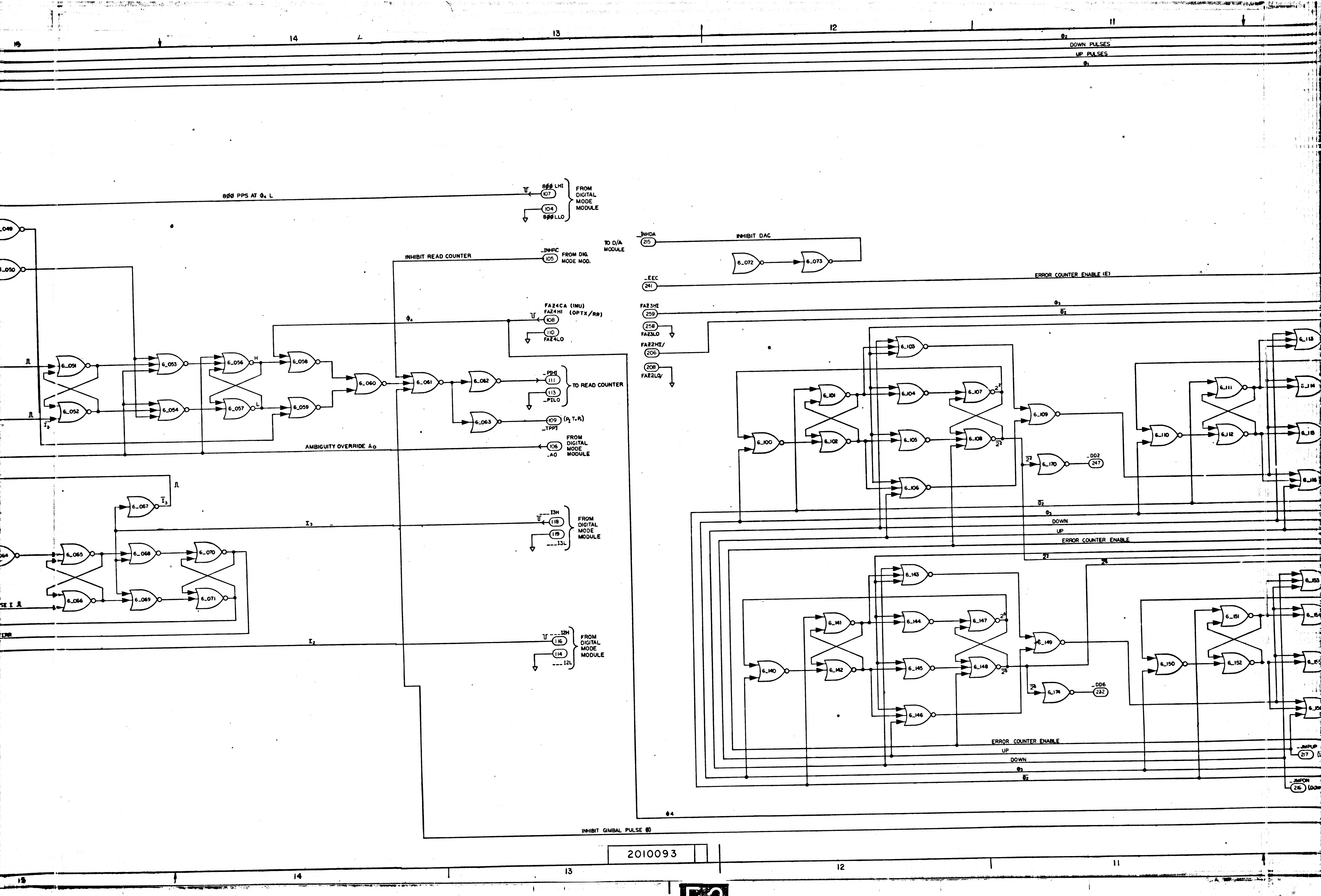
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010093
SCALE —
WT —
SHEET 1 OF 1


8
7
6
5
4
φ2
DOWN PULSE
UP PULSE
φ1
2̄0
6_093
6_091
6_094
6_097
6_092
6_095
6_098
6_090
6_096
6_099
6_169
_DD1
269
_DD0
271
6_133
6_131
6_134
6_137
6_130
6_132
6_135
6_138
6_136
6_139
6_173
_DD5
204
_DD4
202
6_172
φ̄2
φ3
DOWN
UP
E
ERROR COUNTER ENABLE
2̄2
2̄3
2̄4
2̄6
2̄7
2̄8
239
_JMPZD
6_176
ZERO DETECT
φ4
6_177
6_178
SATURATION DETECT
6_179
226
_JMPUP
234
_JMPSD
_DD8
252
251
_LCECL
TO D/A CONVERTER
FROM D/A MODULE
_+PCH
167
165
_+PCL
_-PCH
171
170
_-PCL
FAZ1LO
158
FAZ1HI
163
161
FAZ2HI
125
FAZ2LO
159
FAZ3HI
+ΔθC
6_181
6_182
SINGLE PULSE SYNCH LOGIC
6_183
6_184
6_185
6_186
6_187
6_188
φ3
φ1
φ2
SINGLE PULSE
6_189
6_190
UP
DOWN
6_191
6_192
_ΔθC
6_180
φ̄1
DOWN PULSES
UP PULSES
6_193
6_194
6_195
6_196
GIMBAL FEEDBACK PULSES
_CA
153
COARSE ALIGN ENABLE
_UPLVL
211
_DELφH
219
F_P+HI
213
F_P-HI
221
6_228
6_229
6_230
_CDUZ
207
_INHCE
209
6_227
_JMPSD
113
φ4
INHIBIT GIMBAL PULSE (G)

2010093


11
10
9
8
7
Φ2
DOWN PULSES
UP PULSES
Φ1
(INPUT ERROR COUNTER PULSES P_E)
JMPPE
237
6_080
6_081
6_082
6_083
6_084
6_085
6_086
6_087
6_088
6_089
6_090
6_091
6_092
6_093
6_094
6_095
6_096
6_097
6_098
6_168
-DD0
271
ERROR COUNTER ENABLE (E)
ERROR COUNTER ENABLE
UP
DOWN
Φ3
$\overline{\Phi 2}$
6_107
6_108
6_109
6_110
6_111
6_112
6_113
6_114
6_115
6_116
6_117
6_118
6_119
6_120
6_121
6_122
6_123
6_124
6_125
6_126
6_127
6_128
6_129
6_130
6_131
6_132
6_133
6_134
6_135
6_136
6_137
6_138
6_170
-DD2
247
6_171
-DD3
245
6_172
-DD4
202
E
6_147
6_148
6_149
6_150
6_151
6_152
6_153
6_154
6_155
6_156
6_157
6_158
6_159
6_160
6_161
6_162
6_163
6_164
6_165
6_166
6_167
6_174
6_175
-DD6
232
-DD7
228
-DD8
252
251
-LCECL
TO D/A CONVERTER
-JMPUP
217 (UP)
-JMPDN
216 (DOWN)
Φ4
INHIBIT GIMBAL PULSE

2010093


15
14
13
12
11
Φ2
DOWN PULSES
UP PULSES
Φ1
800 PPS AT Φ4 L
800 LHI
107
104
800LLO
FROM DIGITAL MODE MODULE
_INHRC
105
FROM DIG. MODE MOD.
INHIBIT READ COUNTER
TO D/A MODULE
_INHDA
215
INHIBIT DAC
6_072
6_073
_EEC
241
ERROR COUNTER ENABLE (E)
FAZ4CA (IMU)
FAZ4HI (OPTX/RR)
108
110
FAZ4LO
Φ4
FAZ3HI
259
258
FAZ3LO
FAZ2HI/
206
208
FAZ2LO/
Φ3
Φ2
_049
_050
6_051
6_052
6_053
6_054
6_056
6_057
H
L
6_058
6_059
6_060
6_061
6_062
6_063
_PIHI
111
113
_PILO
TO READ COUNTER
109
(PI T.P.)
_TPPI
AMBIGUITY OVERRIDE A0
106
_A0
FROM DIGITAL MODE MODULE
6_100
6_101
6_102
6_103
6_104
6_105
6_106
6_107
6_108
2^2
$\overline{2^2}$
6_109
6_170
_DD2
247
6_110
6_111
6_112
6_113
6_114
6_115
6_116
$\overline{I_3}$
6_067
I_3
13H
118
119
13L
FROM DIGITAL MODE MODULE
064
6_065
6_066
6_068
6_069
6_070
6_071
ERR
I_2
12H
116
114
12L
FROM DIGITAL MODE MODULE
Φ3
DOWN
UP
ERROR COUNTER ENABLE
$\overline{2^2}$
2^6
6_140
6_141
6_142
6_143
6_144
6_145
6_146
6_147
6_148
2^6
$\overline{2^6}$
6_149
6_174
_DD6
232
6_150
6_151
6_152
6_153
6_154
6_155
6_156
ERROR COUNTER ENABLE
UP
DOWN
Φ3
Φ2
_JMPUP
217
_JMPDN
216
(DOWN
Φ4
INHIBIT GIMBAL PULSE (E)
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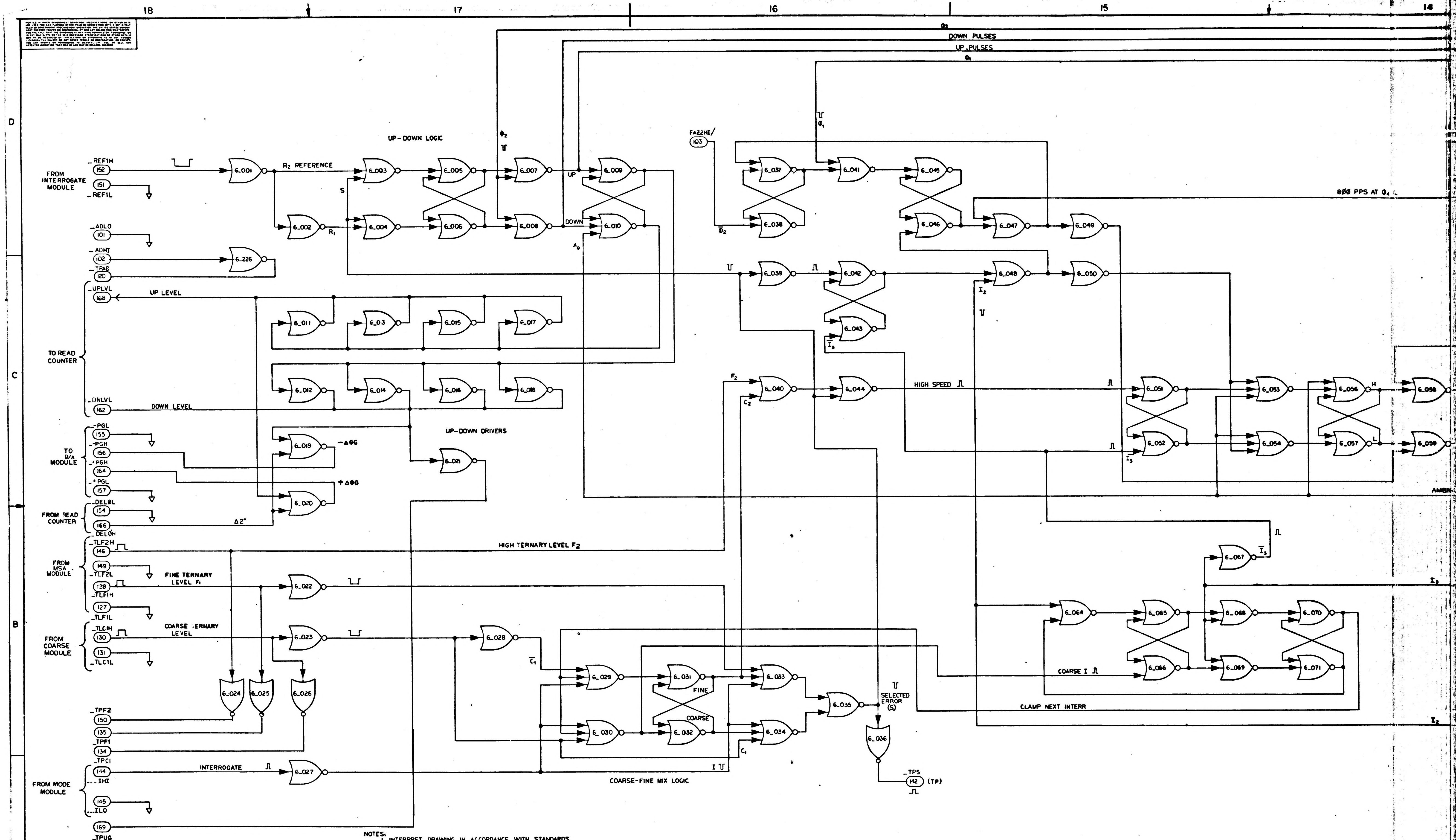
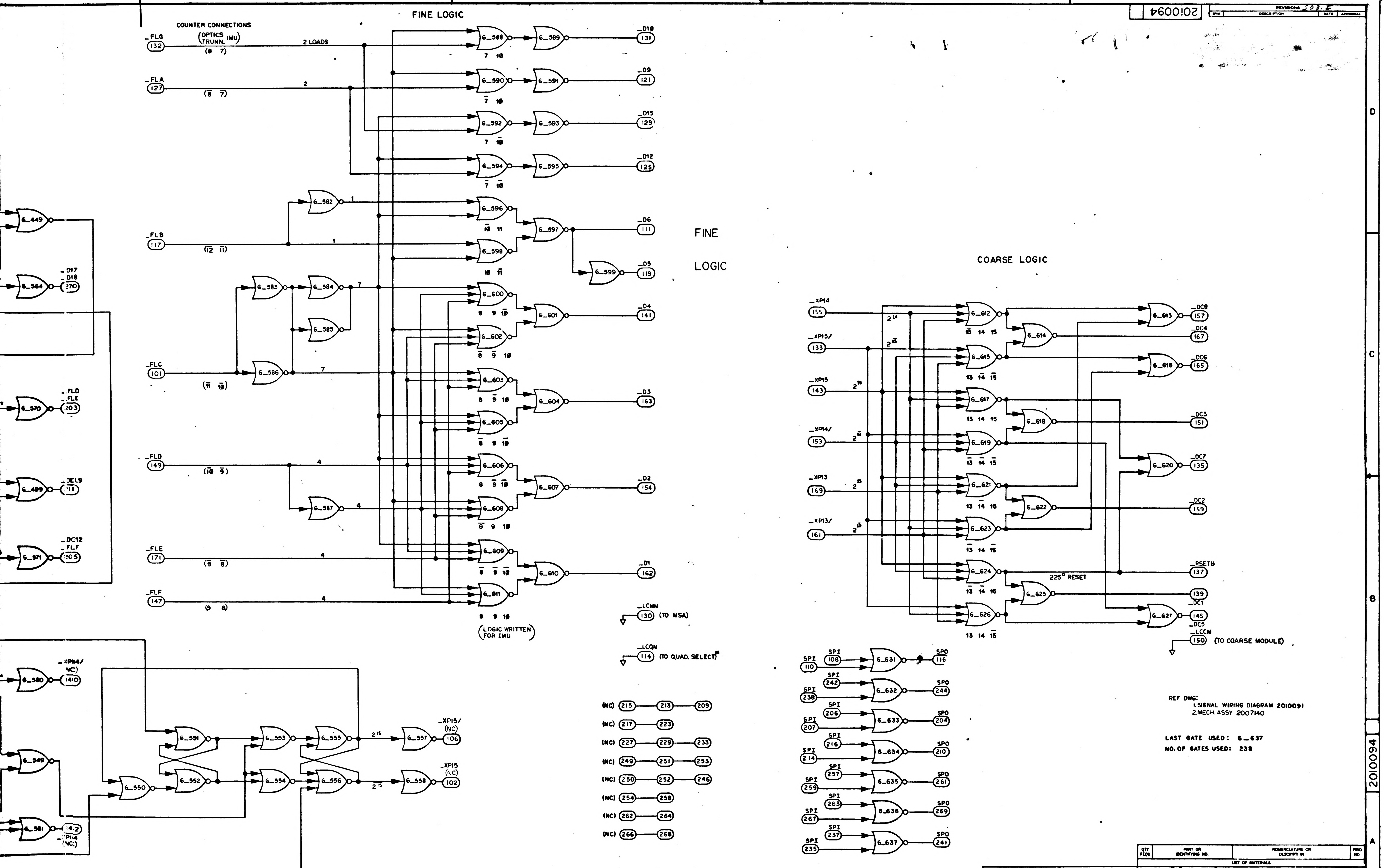
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO


18
17
16
15
14
D
C
B
A
Φ2
DOWN PULSES
UP PULSES
Φ1
UP-DOWN LOGIC
FROM INTERROGATE MODULE
_REF1H 152
151 _REF1L
6_001
R2 REFERENCE
S
6_002
R1
6_003
6_004
6_005
6_006
Φ2
6_007
6_008
UP
DOWN
A0
6_009
6_010
FA22HI/ 103
6_037
6_038
Φ̄2
Φ1
6_041
6_045
6_046
6_047
6_049
800 PPS AT Φ4
_ADLO 101
_ADHI 102
6_226
_TPAD 120
_UPLVL 168
UP LEVEL
6_011
6_013
6_015
6_017
TO READ COUNTER
6_012
6_014
6_016
6_018
_DNLVL 162
DOWN LEVEL
6_039
6_042
6_043
Ī3
6_048
I2
6_050
F2
C2
6_040
6_044
HIGH SPEED
6_051
6_052
Ī3
6_053
6_054
6_056
6_057
H
L
6_058
6_059
AMBIG
TO D/A MODULE
_-PGL 155
_-PGH 156
_+PGH 164
_+PGL 157
6_019
6_020
-ΔΘG
+ΔΘG
UP-DOWN DRIVERS
6_021
FROM READ COUNTER
_DELØL 154
166 _DELØH
Δ2°
FROM MSA MODULE
_TLF2H 146
HIGH TERNARY LEVEL F2
149 _TLF2L
FINE TERNARY LEVEL F1
128 _TLF1H
127 _TLF1L
6_022
FROM COARSE MODULE
_TLC1H 130
COARSE TERNARY LEVEL
131 _TLC1L
6_023
6_028
C̄1
6_029
6_030
6_031
6_032
FINE
COARSE
6_033
6_034
C1
6_035
SELECTED ERROR (S)
6_036
_TPS 142 (TP)
6_024
6_025
6_026
_TPF2 150
135
_TPF1 134
_TPC1 144
FROM MODE MODULE
_IHI
145 _ILO
169 _TPUG
INTERROGATE
6_027
I
COARSE-FINE MIX LOGIC
6_067
Ī3
I3
6_064
6_065
6_066
6_068
6_069
6_070
6_071
COARSE I
CLAMP NEXT INTERR
I2

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTIONS
3. DENOTES SINGLE MICRO-NOR GATE
4. DENOTES FAN-IN GATE
5. POWER CONNECTIONS TO GATES NOT SHOWN
6. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO +4V RETURN
7. ↓ INDICATES MODULE POWER BUSS +4V RETURN
8. XXX ⬭ (XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010093

5 H


FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG 132
2 LOADS
_FLA 127
_FLB 117
_FLC 101
_FLD 149
_FLE 171
_FLF 147
6_582
6_583
6_584
6_585
6_586
6_587
6_588
6_589
6_590
6_591
6_592
6_593
6_594
6_595
6_596
6_597
6_598
6_599
6_600
6_601
6_602
6_603
6_604
6_605
6_606
6_607
6_608
6_609
6_610
6_611
_D10 131
_D9 121
_D13 129
_D12 125
_D6 111
_D5 119
_D4 141
_D3 163
_D2 154
_D1 162
FINE
LOGIC
(LOGIC WRITTEN FOR IMU)
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
COARSE LOGIC
_XP14 155
_XP15/ 133
_XP15 143
_XP14/ 153
_XP13 169
_XP13/ 161
6_612
6_613
6_614
6_615
6_616
6_617
6_618
6_619
6_620
6_621
6_622
6_623
6_624
6_625
6_626
6_627
_DC8 157
_DC4 167
_DC6 165
_DC3 151
_DC7 135
_DC2 159
_RSETB 137
225° RESET
139
_DC1 145
_DC5
_LCCM 150 (TO COARSE MODULE)
6_449
6_564
_D17
_D18 270
6_570
_FLD
_FLE 203
6_499
_DEL9 218
6_571
_DC12
_FLF 205
6_580
_XP84/ (NC) 1410
6_549
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
6_558
6_581
_XP15/ (NC) 106
_XP15 (NC) 102
142
_XP14 (NC)
(NC) 215 213 209
(NC) 217 223
(NC) 227 229 233
(NC) 249 251 253
(NC) 250 252 246
(NC) 254 258
(NC) 262 264
(NC) 266 268
SPI 110 SPI 108 6_631 SPO 116
SPI 242 SPI 238 6_632 SPO 244
SPI 206 SPI 207 6_633 SPO 204
SPI 216 SPI 214 6_634 SPO 210
SPI 257 SPI 259 6_635 SPO 261
SPI 263 SPI 267 6_636 SPO 269
SPI 237 SPI 235 6_637 SPO 241
4
3
2
1
D
C
B
A

REF DWG:
1. SIGNAL WIRING DIAGRAM 2010091
2. MECH. ASSY 2007140

LAST GATE USED: 6_637
NO. OF GATES USED: 238

MASTER

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

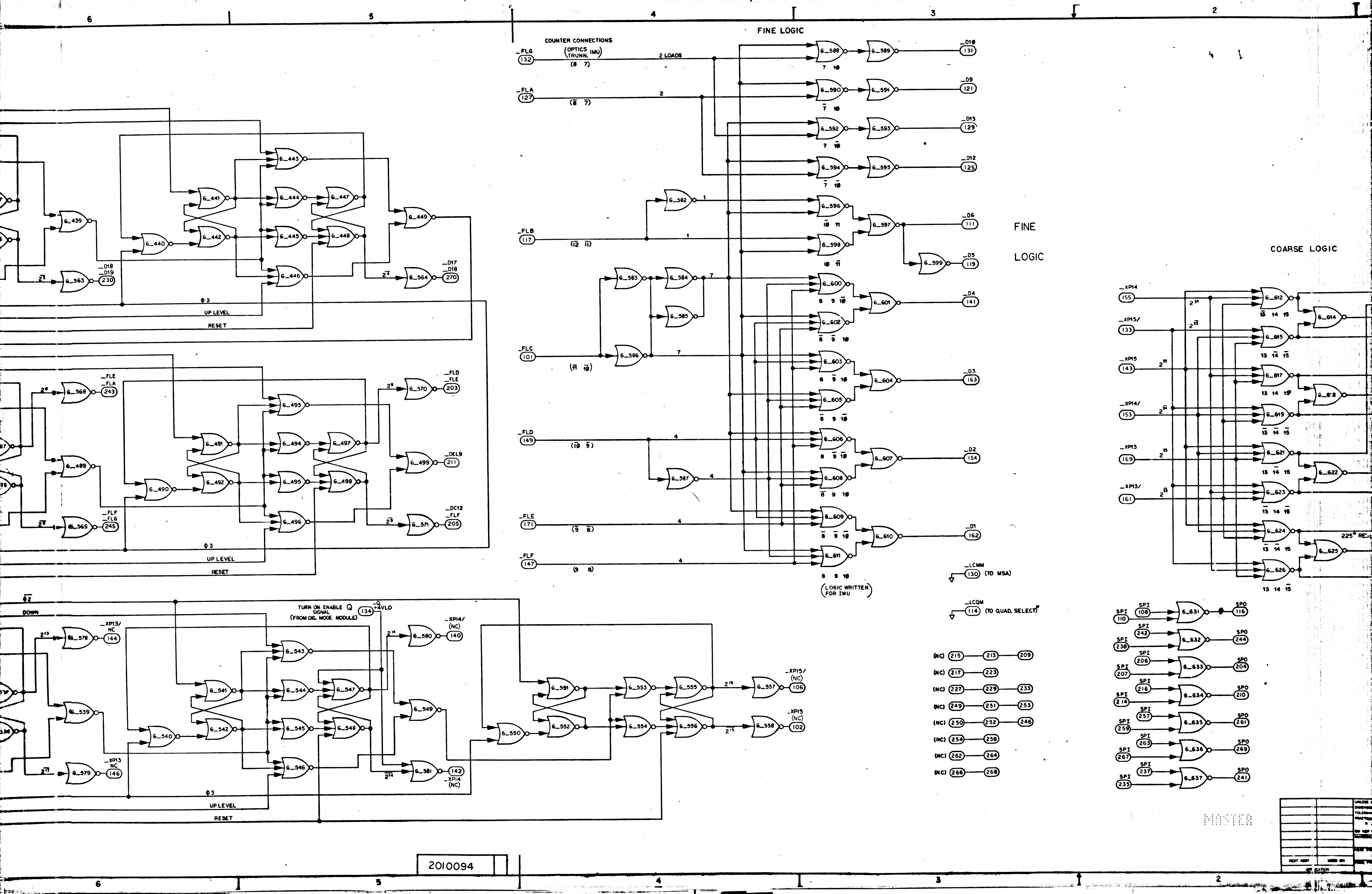
DRAWN Tony Bell DATE 22 Jun 65
CHECKED A. Pendleton 16 June 65
APPROVAL M.D. Rosenbaum 21 Jun 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 22 June 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC FLOW DIAGRAM
READ COUNTER MODULE

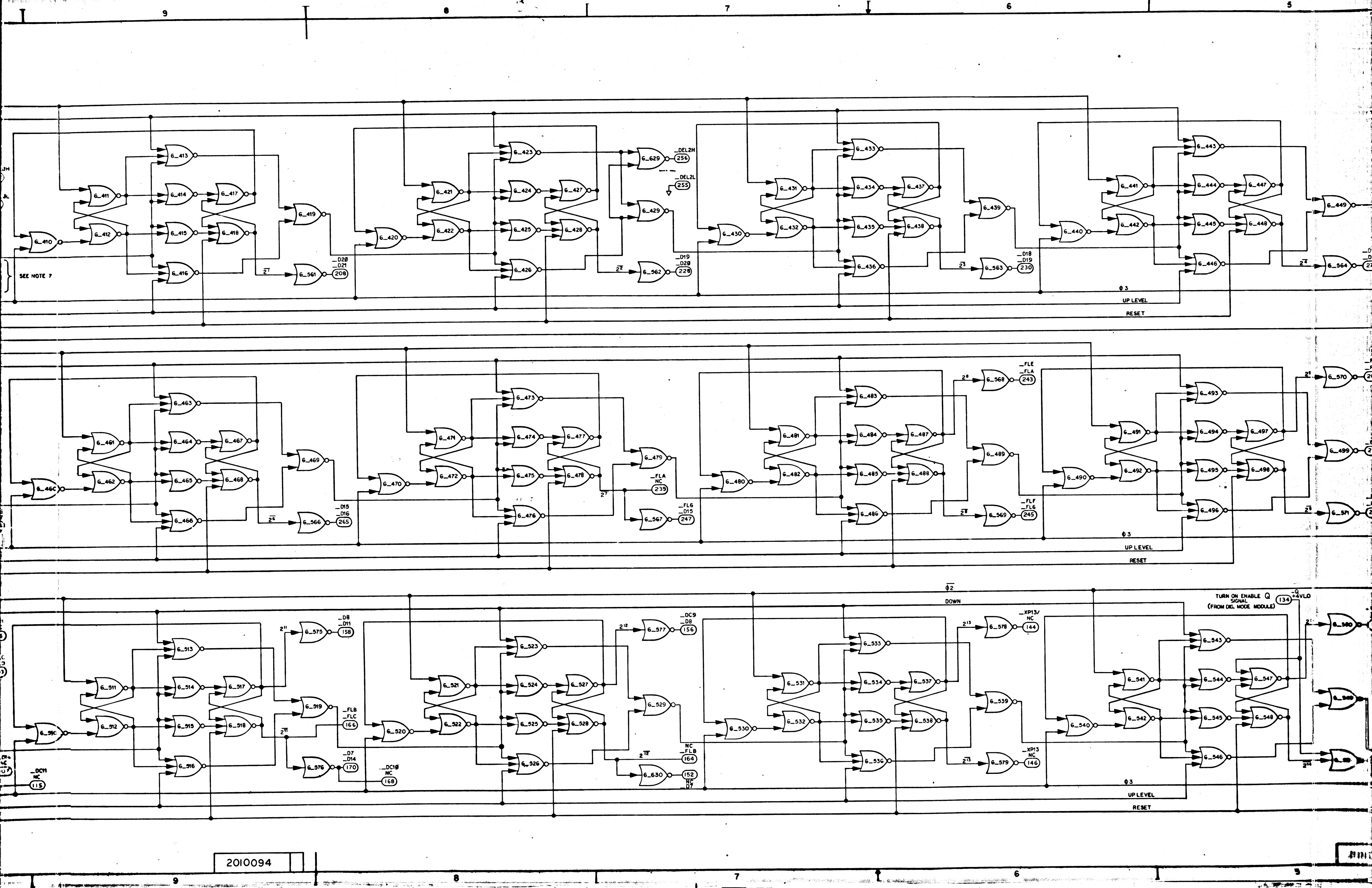
CODE IDENT NO. 80230 | SIZE J | NASA DRAWING NO. 2010094
SCALE NONE | WT | SHEET 1 OF 1

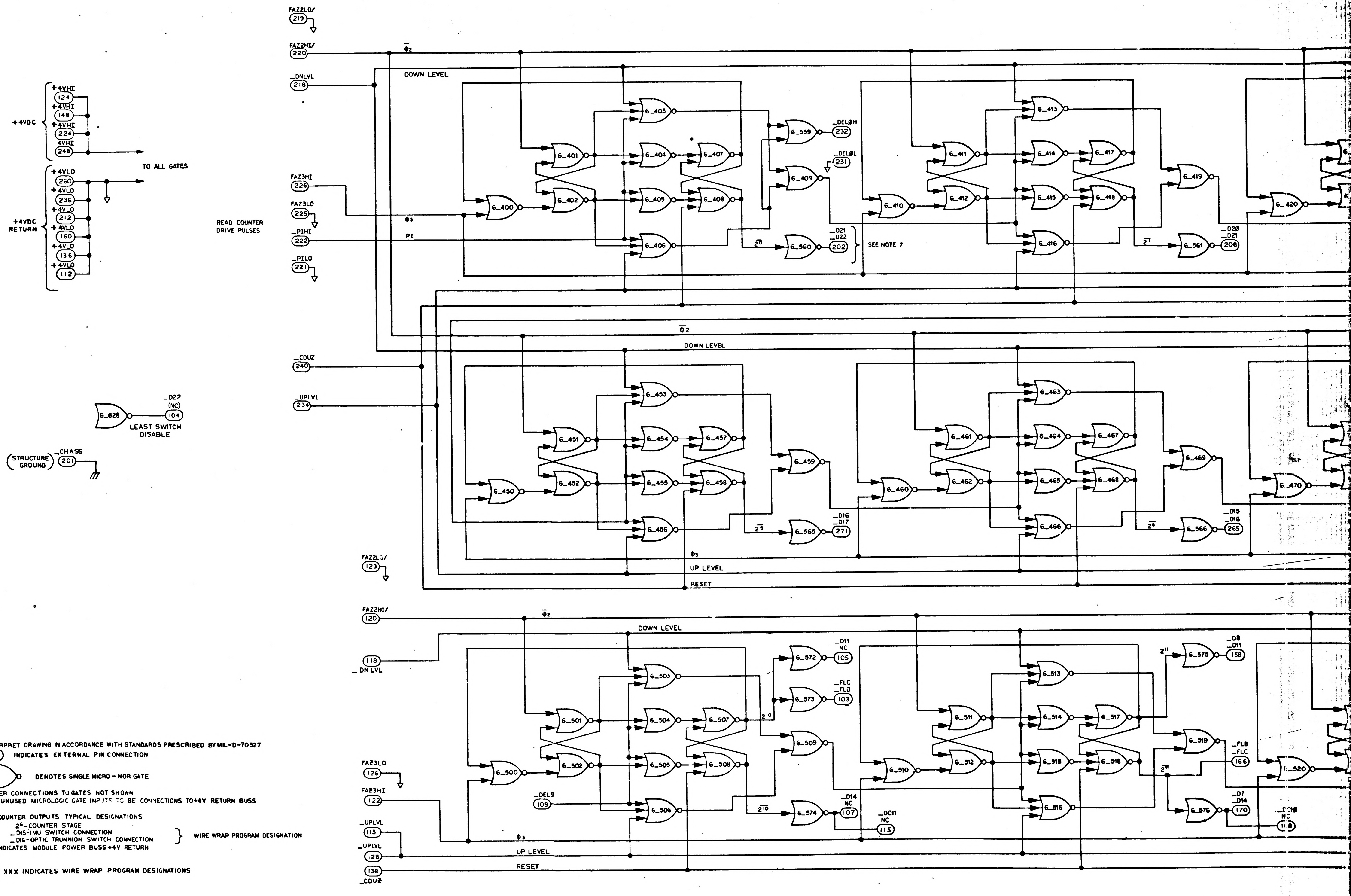
2010094


6
5
4
3
2
FINE LOGIC
COUNTER CONNECTIONS
(OPTICS TRUNN. IMU)
_FLG 132
(8 7)
2 LOADS
_FLA 127
(8 7)
_FLB 117
(12 11)
_FLC 101
(11 10)
_FLD 149
(10 5)
_FLE 171
(5 8)
_FLF 147
(9 8)
6_588
6_589
_D10 131
6_590
6_591
_D9 121
6_592
6_593
_D13 129
6_594
6_595
_D12 125
6_582
6_596
6_597
_D6 111
6_598
6_599
_D5 119
6_583
6_584
6_585
6_586
6_600
6_601
_D4 141
6_602
6_603
6_604
_D3 163
6_605
6_606
6_607
_D2 154
6_587
6_608
6_609
6_610
_D1 162
6_611
(LOGIC WRITTEN FOR IMU)
FINE
LOGIC
_LCMM 130 (TO MSA)
_LCQM 114 (TO QUAD. SELECT)
COARSE LOGIC
_XP14 155
_XP15/ 133
_XP15 143
_XP14/ 153
_XP13 169
_XP13/ 161
6_612
6_614
6_615
6_617
6_618
6_619
6_621
6_622
6_623
6_624
6_625
6_626
225° RES
13 14 15
SPI 110
SPI 108
6_631
SPO 116
SPI 238
SPI 242
6_632
SPO 244
SPI 207
SPI 206
6_633
SPO 204
SPI 214
SPI 216
6_634
SPO 210
SPI 259
SPI 257
6_635
SPO 261
SPI 267
SPI 263
6_636
SPO 269
SPI 235
SPI 237
6_637
SPO 241
(NC) 215 213 209
(NC) 217 223
(NC) 227 229 233
(NC) 249 251 253
(NC) 250 252 246
(NC) 254 258
(NC) 262 264
(NC) 266 268
6_439
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_563
_D18 _D19 230
6_564
_D17 _D18 270
Φ3
UP LEVEL
RESET
6_568
_FLE _FLA 243
6_570
_FLD _FLE 203
6_489
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
_DEL9 211
6_569
_FLF _FLG 245
6_571
_DC12 _FLF 205
Φ2
DOWN
6_578
_XP13/ NC 144
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE) 134
_Q +4VLO
6_580
_XP14/ (NC) 140
6_539
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_549
6_550
6_551
6_552
6_553
6_554
6_555
6_556
6_557
_XP15/ (NC) 106
6_558
_XP15 (NC) 102
6_579
_XP13 NC 146
6_581
142 _XP14 (NC)
MASTER
NEXT ASSY
USED ON
APPLICATION

2010094

F-3


9
8
7
6
5
SEE NOTE 7
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_561
_D20
_D21
208
6_420
6_421
6_422
6_423
6_424
6_425
6_426
6_427
6_428
6_629
_DEL2H
256
_DEL2L
255
6_429
6_562
_D19
_D20
228
6_430
6_431
6_432
6_433
6_434
6_435
6_436
6_437
6_438
6_439
6_563
_D18
_D19
230
6_440
6_441
6_442
6_443
6_444
6_445
6_446
6_447
6_448
6_449
6_564
ϕ 3
UP LEVEL
RESET
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_566
_D15
_D16
265
6_470
6_471
6_472
6_473
6_474
6_475
6_476
6_477
6_478
6_479
_FLA
NC
239
6_567
_FL6
_D15
247
6_480
6_481
6_482
6_483
6_484
6_485
6_486
6_487
6_488
6_489
6_568
_FLE
_FLA
243
6_569
_FLF
_FL6
245
6_490
6_491
6_492
6_493
6_494
6_495
6_496
6_497
6_498
6_499
6_570
6_571
$\overline{\phi 2}$
DOWN
TURN ON ENABLE Q SIGNAL (FROM DIG. MODE MODULE)
134
_Q
+4VLO
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
_FLB
_FLC
166
6_575
_D8
_D11
158
6_576
_D7
_D14
170
_DC10
NC
168
_DC11
NC
115
6_520
6_521
6_522
6_523
6_524
6_525
6_526
6_527
6_528
6_529
6_577
_DC9
_D8
156
NC
_FLB
164
6_630
152
NC
_D7
6_530
6_531
6_532
6_533
6_534
6_535
6_536
6_537
6_538
6_539
6_578
_XP13/
NC
144
6_579
_XP13
NC
146
6_540
6_541
6_542
6_543
6_544
6_545
6_546
6_547
6_548
6_580
6_581
2010094


+4VDC
+4VHI
124
148
224
248
TO ALL GATES
+4VDC RETURN
+4VLO
260
236
212
160
136
112
READ COUNTER DRIVE PULSES
FAZ2LO/
219
FAZ2HI/
220
_DNLVL
218
FAZ3HI
226
FAZ3LO
225
_PIHI
222
_PILO
221
$\overline{\phi}_2$
DOWN LEVEL
ϕ_3
PI
6_400
6_401
6_402
6_403
6_404
6_405
6_406
6_407
6_408
6_409
6_559
6_560
_DEL0H
232
_DEL0L
231
_D21
_D22
202
SEE NOTE 7
2^0
6_410
6_411
6_412
6_413
6_414
6_415
6_416
6_417
6_418
6_419
6_420
6_561
2^1
_D20
_D21
208
_CDUZ
240
_UPLVL
234
6_628
_D22
(NC)
104
LEAST SWITCH DISABLE
STRUCTURE GROUND
_CHASS
201
6_450
6_451
6_452
6_453
6_454
6_455
6_456
6_457
6_458
6_459
6_565
2^5
_D16
_D17
271
6_460
6_461
6_462
6_463
6_464
6_465
6_466
6_467
6_468
6_469
6_470
6_566
2^6
_D15
_D16
265
UP LEVEL
RESET
FAZ2LO/
123
FAZ2HI/
120
118
_DN LVL
FAZ3LO
126
FAZ3HI
122
_DEL9
109
_UPLVL
113
_UPLVL
128
138
_CDUZ
6_500
6_501
6_502
6_503
6_504
6_505
6_506
6_507
6_508
6_509
6_572
6_573
6_574
2^{10}
_D11
NC
105
_FLC
_FLD
103
_D14
NC
107
_DC11
NC
115
6_510
6_511
6_512
6_513
6_514
6_515
6_516
6_517
6_518
6_519
6_520
6_575
6_576
2^{11}
_D8
_D11
158
_FLB
_FLC
166
_D7
_D14
170
_DC16
NC
118
12
11
10
9
D
C
B
A

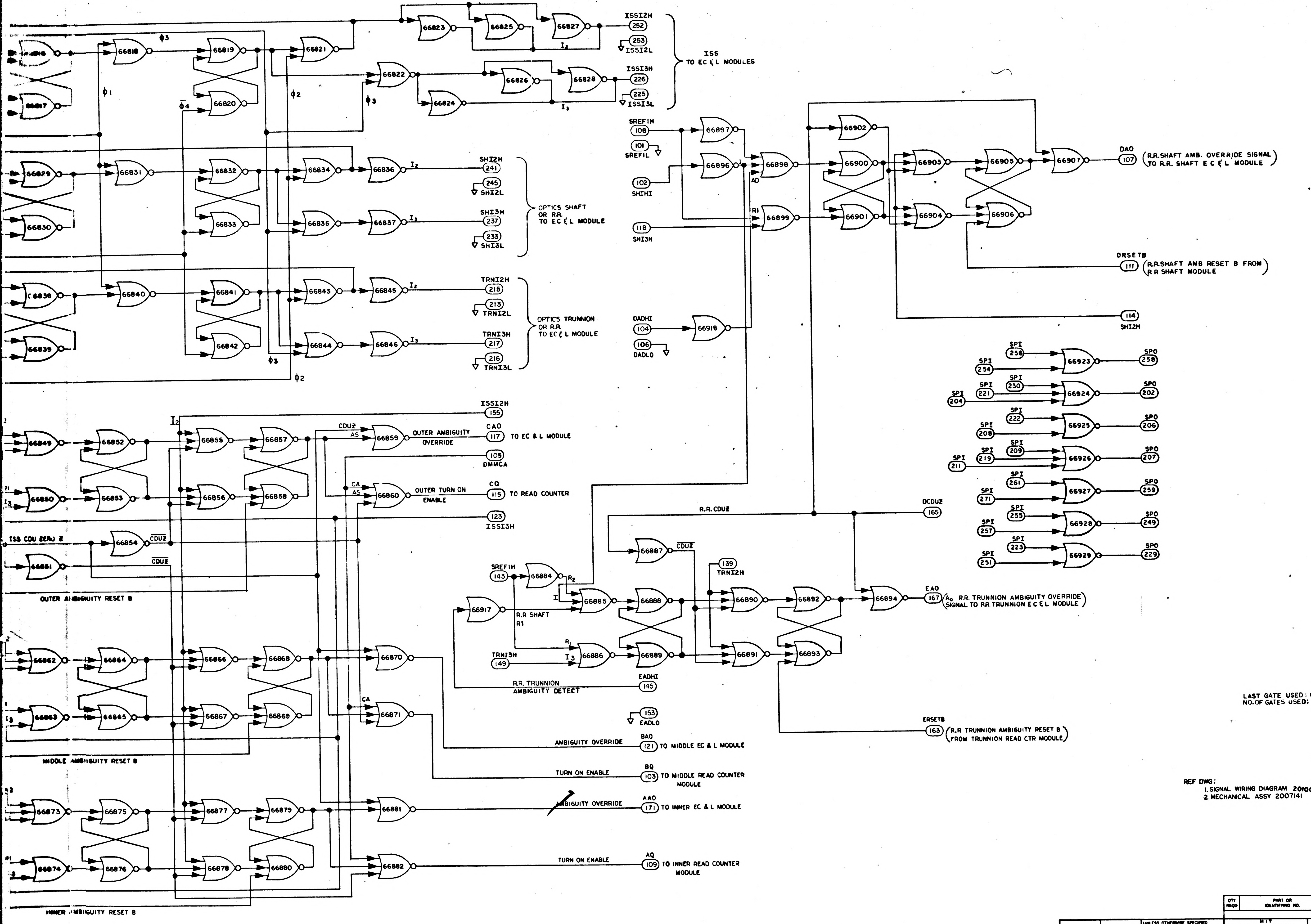
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. DENOTES SINGLE MICRO – NOR GATE
4. POWER CONNECTIONS TO GATES NOT SHOWN
5. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTIONS TO +4V RETURN BUSS
6. ON COUNTER OUTPUTS TYPICAL DESIGNATIONS
   2^6–COUNTER STAGE
   _D15–IMU SWITCH CONNECTION } WIRE WRAP PROGRAM DESIGNATION
   _D16–OPTIC TRUNNION SWITCH CONNECTION
7. ↓ INDICATES MODULE POWER BUSS +4V RETURN
8. XXX ⬭ XXX INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010094

2010095

REVISIONS 2-3 E



66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
ISSI2H 252
253 ISSI2L
ISSI3H 226
225 ISSI3L
ISS TO EC & L MODULES
φ1
φ2
φ3
φ4
I2
I3
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H 241
245 SHI2L
SHI3H 237
233 SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H 215
213 TRNI2L
TRNI3H 217
216 TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
SREFIH 108
101 SREFIL
102 SHIHI
118 SHI3H
66897
66896
66898
66899
AD
RI
66902
66900
66901
66903
66904
66905
66906
66907
DAO 107 (R.R. SHAFT AMB. OVERRIDE SIGNAL TO R.R. SHAFT EC & L MODULE)
DRSETB 111 (R.R. SHAFT AMB RESET B FROM R.R. SHAFT MODULE)
114 SHI2H
DADHI 104
106 DADLO
66918
SPI 256
SPI 254
66923
SPO 258
SPI 230
SPI 221
SPI 204
66924
SPO 202
SPI 222
SPI 208
66925
SPO 206
SPI 209
SPI 219
SPI 211
66926
SPO 207
SPI 261
SPI 271
66927
SPO 259
SPI 255
SPI 257
66928
SPO 249
SPI 223
SPI 251
66929
SPO 229
ISSI2H 155
66849
66850
66851
66852
66853
66854
66855
66856
66857
66858
CDUZ
AS
CA
66859
OUTER AMBIGUITY OVERRIDE
CAO 117 TO EC & L MODULE
105 DMMCA
66860
OUTER TURN ON ENABLE
CQ 115 TO READ COUNTER
123 ISSI3H
ISS CDU ZERO B
OUTER AMBIGUITY RESET B
R.R. CDUZ
DCDUZ 165
66887
CDUZ
SREFIH 143
66884
R2
I
66885
66917
R.R SHAFT R1
TRNI3H 149
R1
I3
66886
66888
66889
139 TRNI2H
66890
66891
66892
66893
66894
EAO 167 (A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO RR TRUNNION EC & L MODULE)
R.R. TRUNNION AMBIGUITY DETECT
EADHI 145
153 EADLO
ERSETB 163 (R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
AMBIGUITY OVERRIDE
BAO 121 TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ 103 TO MIDDLE READ COUNTER MODULE
MIDDLE AMBIGUITY RESET B
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO 171 TO INNER EC & L MODULE
TURN ON ENABLE
AQ 109 TO INNER READ COUNTER MODULE
INNER AMBIGUITY RESET B

LAST GATE USED: 66929
NO. OF GATES USED: 227

REF DWG:
1. SIGNAL WIRING DIAGRAM 2010092
2. MECHANICAL ASSY 2007141

2010095

4H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 2-21-65
CHECKED
APPROVAL M.D. Buchanan 21 Jan 65
APPROVAL
NASA APPROVAL
MIT APPROVAL 22 Jan 65

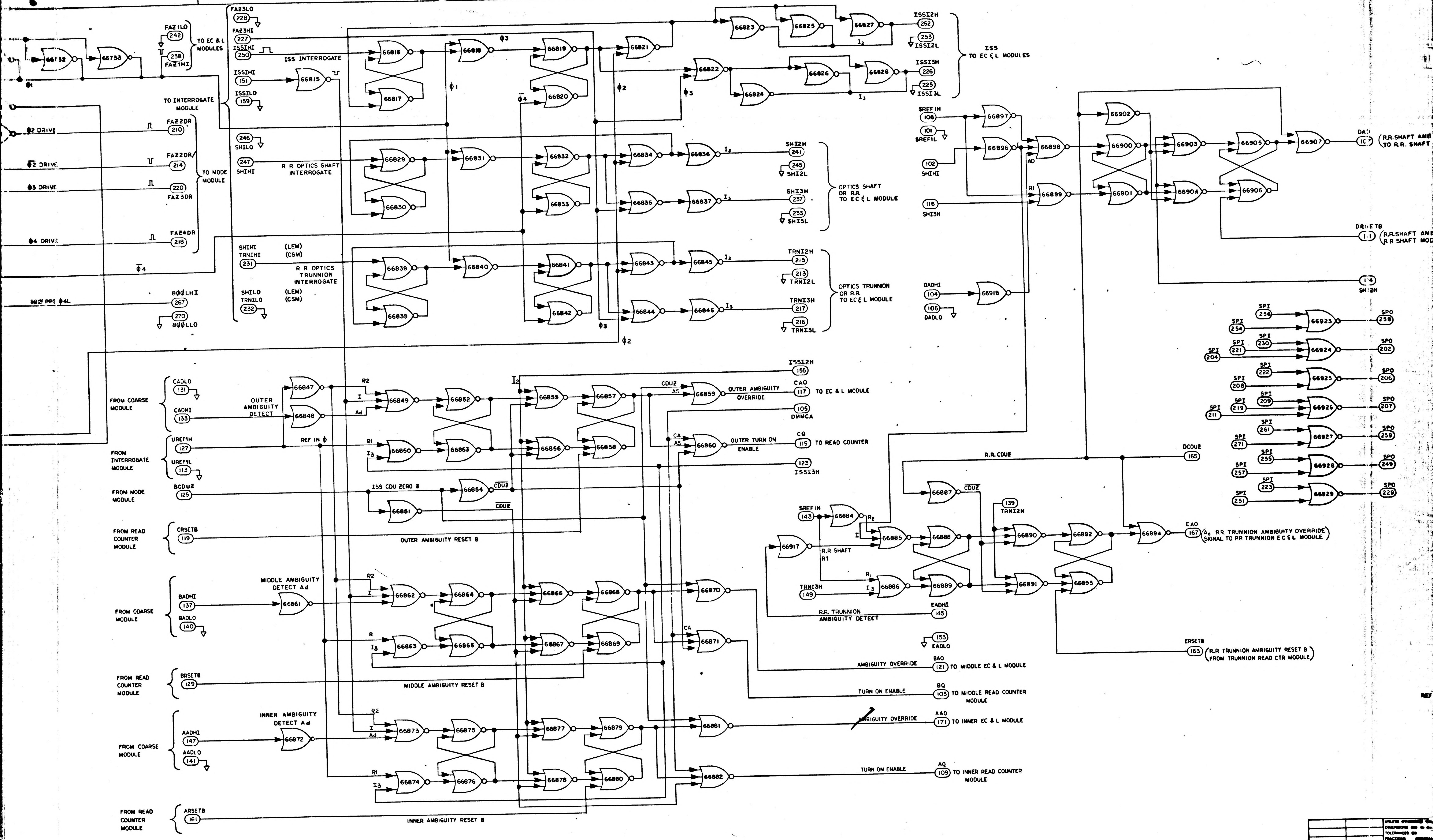
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LOGIC FLOW DIAGRAM DIGITAL MODE MODULE

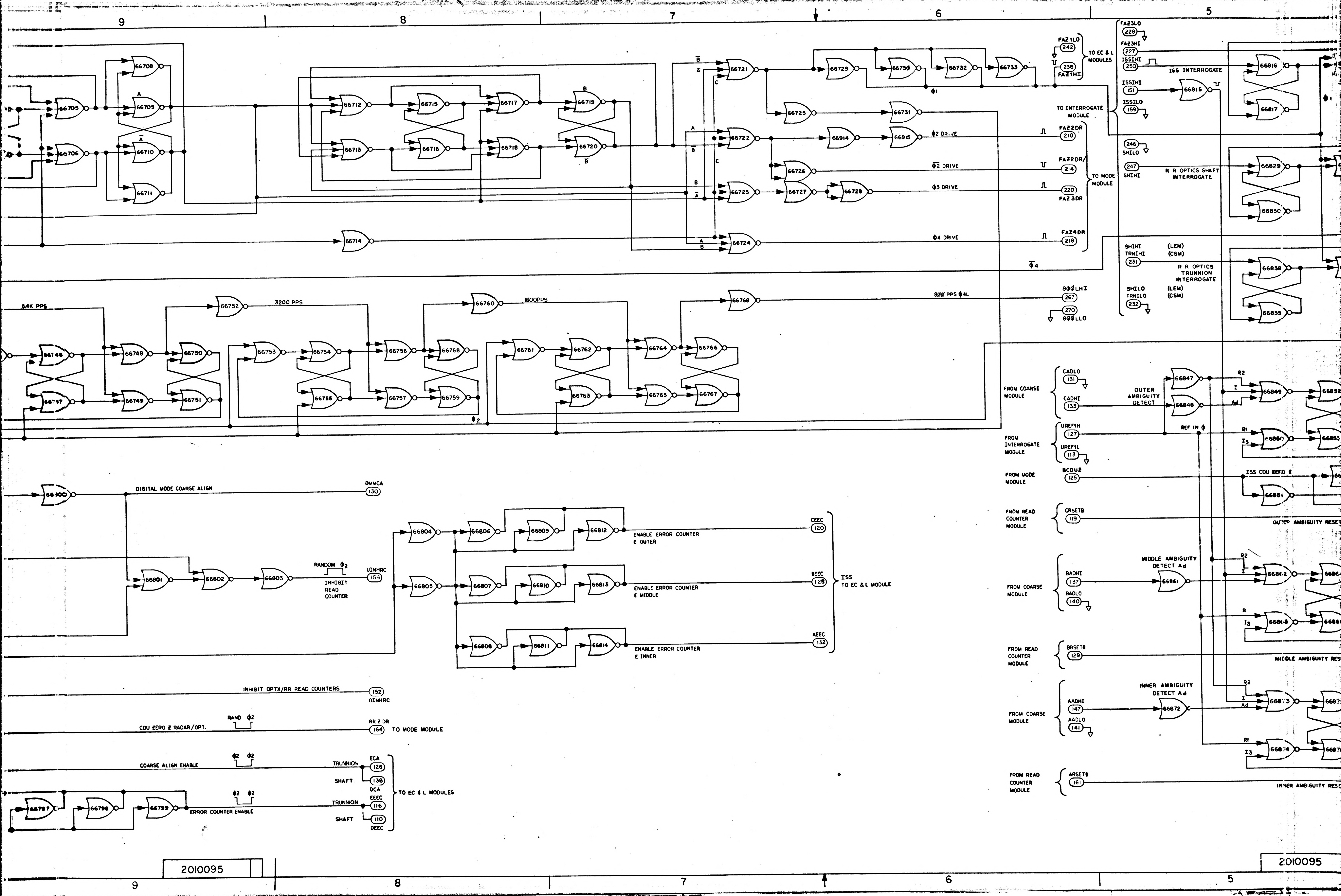
CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010095
SCALE NONE
WT
SHEET 1 OF 1

MASTER

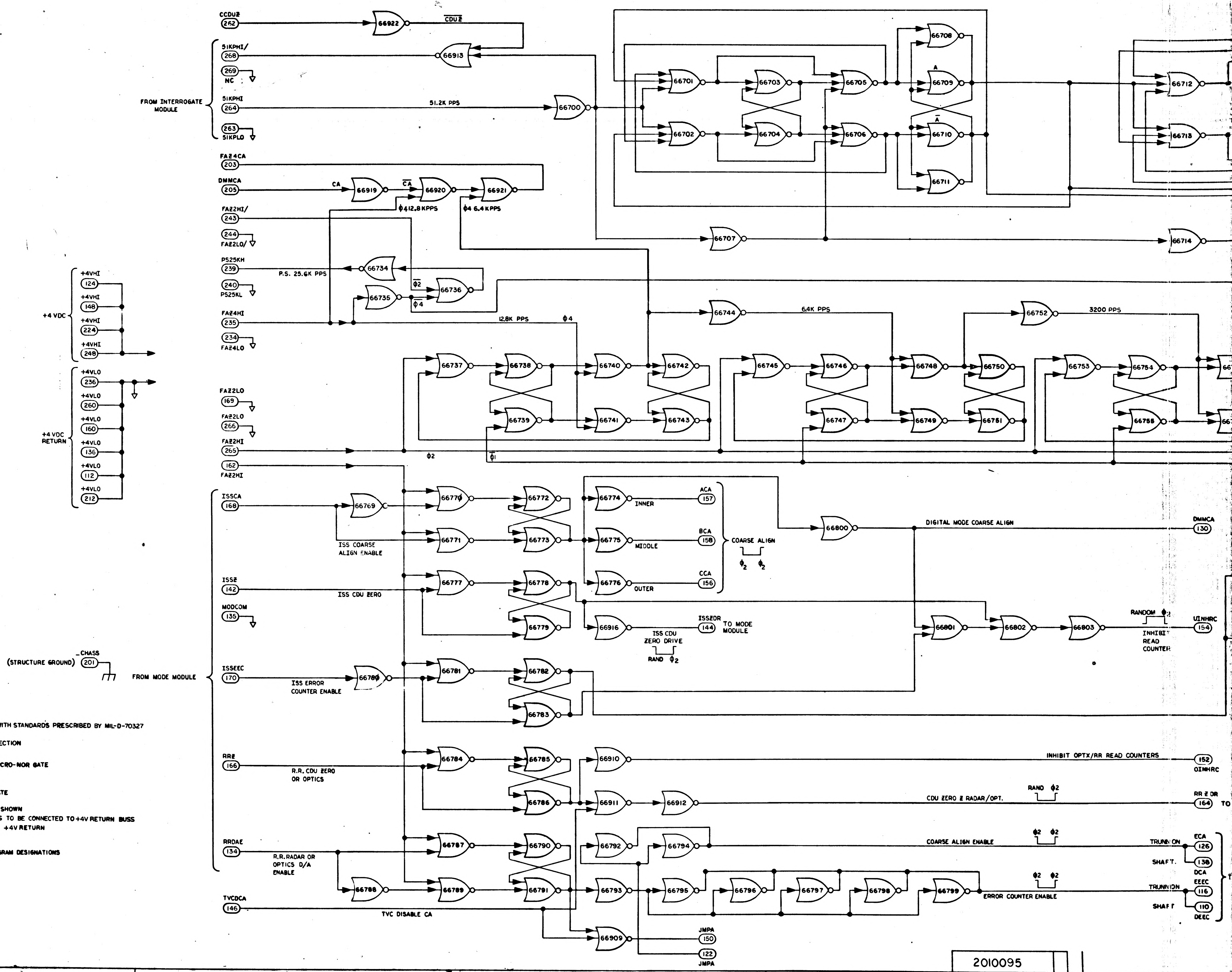
2010095


66732
66733
FAZ1LO 242
238 FAZ1HI
TO EC & L MODULES
TO INTERROGATE MODULE
φ2 DRIVE
FAZ2DR 210
φ̄2 DRIVE
FAZ2DR/ 214
φ3 DRIVE
220 FAZ3DR
TO MODE MODULE
φ4 DRIVE
FAZ4DR 218
φ̄4
800 PPS φ4L
800LHI 267
270 800LLO
FAZ3LO 228
FAZ3HI 227
ISSIHI 250
ISS INTERROGATE
ISSIHI 151
ISSILO 159
66815
66816
66817
66818
66819
66820
66821
66822
66823
66824
66825
66826
66827
66828
ISSI2H 252
253 ISSI2L
ISSI3H 226
225 ISSI3L
ISS TO EC & L MODULES
246 SHILO
247 SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
66831
66832
66833
66834
66835
66836
66837
SHI2H 241
245 SHI2L
SHI3H 237
233 SHI3L
OPTICS SHAFT OR R.R. TO EC & L MODULE
SHIHI (LEM)
TRNIHI (CSM) 231
R R OPTICS TRUNNION INTERROGATE
SHILO (LEM)
TRNILO (CSM) 232
66838
66839
66840
66841
66842
66843
66844
66845
66846
TRNI2H 215
213 TRNI2L
TRNI3H 217
216 TRNI3L
OPTICS TRUNNION OR R.R. TO EC & L MODULE
φ1
φ2
φ3
φ̄4
SREFIH 108
101 SREFIL
102 SHIHI
118 SHI3H
66896
66897
66898
66899
66900
66901
66902
66903
66904
66905
66906
66907
DAO 107 (R.R.SHAFT AMB TO R.R. SHAFT
DRSETB 111 (R.R.SHAFT AMB R R SHAFT MOD
114 SHI2H
DADHI 104
106 DADLO
66918
SPI 256
SPI 254
SPI 230
SPI 221
SPI 204
SPI 222
SPI 208
SPI 209
SPI 219
SPI 211
SPI 261
SPI 271
SPI 255
SPI 257
SPI 223
SPI 251
66923
66924
66925
66926
66927
66928
66929
SPO 258
SPO 202
SPO 206
SPO 207
SPO 259
SPO 249
SPO 229
FROM COARSE MODULE
CADLO 131
CADHI 133
OUTER AMBIGUITY DETECT
66847
66848
FROM INTERROGATE MODULE
UREFIH 127
UREFIL 113
REF IN φ
FROM MODE MODULE
BCDUZ 125
ISS CDU ZERO Z
FROM READ COUNTER MODULE
CRSETB 119
OUTER AMBIGUITY RESET B
R2
I
Ad
R1
I3
66849
66850
66851
66852
66853
66854
CDUZ
66855
66856
66857
66858
66859
66860
ISSI2H 155
CDUZ AS
OUTER AMBIGUITY OVERRIDE
CAO 117 TO EC & L MODULE
105 DMMCA
CA AS
OUTER TURN ON ENABLE
CQ 115 TO READ COUNTER
123 ISSI3H
R.R. CDUZ
DCDUZ 165
66887
139 TRNI2H
SREFIH 143
66884
66885
66886
66888
66889
66890
66891
66892
66893
66894
66917
R.R SHAFT R1
TRNI3H 149
R.R. TRUNNION AMBIGUITY DETECT
EADHI 145
153 EADLO
EAO 167 (A0 R.R. TRUNNION AMBIGUITY OVERRIDE SIGNAL TO RR TRUNNION EC & L MODULE)
ERSETB 163 (R.R TRUNNION AMBIGUITY RESET B FROM TRUNNION READ CTR MODULE)
FROM COARSE MODULE
BADHI 137
BADLO 140
MIDDLE AMBIGUITY DETECT Ad
66861
66862
66863
66864
66865
66866
66867
66868
66869
66870
66871
CA
FROM READ COUNTER MODULE
BRSETB 129
MIDDLE AMBIGUITY RESET B
AMBIGUITY OVERRIDE
BAO 121 TO MIDDLE EC & L MODULE
TURN ON ENABLE
BQ 103 TO MIDDLE READ COUNTER MODULE
FROM COARSE MODULE
AADHI 147
AADLO 141
INNER AMBIGUITY DETECT Ad
66872
66873
66874
66875
66876
66877
66878
66879
66880
66881
66882
AMBIGUITY OVERRIDE
AAO 171 TO INNER EC & L MODULE
TURN ON ENABLE
AQ 109 TO INNER READ COUNTER MODULE
FROM READ COUNTER MODULE
ARSETB 161
INNER AMBIGUITY RESET B

MASTER


9
8
7
6
5
66705
66706
66708
66709
66710
66711
A
Ā
66712
66713
66715
66716
66717
66718
66719
66720
B
B̄
66721
66722
66723
66724
66725
66726
66727
66728
66729
66730
66731
66732
66733
66914
66915
66714
φ1
φ2 DRIVE
φ̄2 DRIVE
φ3 DRIVE
φ4 DRIVE
φ̄4
FAZ1LO
242
238
FAZ1HI
TO EC & L MODULES
TO INTERROGATE MODULE
FAZ2DR
210
FAZ2DR/
214
220
FAZ3DR
FAZ4DR
218
TO MODE MODULE
FAZ3LO
228
FAZ3HI
227
ISSIHI
250
ISS INTERROGATE
ISSIHI
151
ISSILO
159
66815
66816
66817
246
SHILO
247
SHIHI
R R OPTICS SHAFT INTERROGATE
66829
66830
SHIHI
TRNIHI
(LEM)
(CSM)
231
R R OPTICS TRUNNION INTERROGATE
SHILO
TRNILO
232
66838
66839
64K PPS
66746
66747
66748
66749
66750
66751
66752
3200 PPS
66753
66754
66755
66756
66757
66758
66759
φ2
66760
1600PPS
66761
66762
66763
66764
66765
66766
66767
66768
800 PPS φ4L
800LHI
267
270
800LLO
FROM COARSE MODULE
CADLO
131
CADHI
133
OUTER AMBIGUITY DETECT
66847
66848
R2
I
Ad
66849
66852
FROM INTERROGATE MODULE
UREF1H
127
UREF1L
113
REF IN φ
R1
I3
66850
66853
FROM MODE MODULE
BCDUZ
125
ISS CDU ZERO Z
66851
FROM READ COUNTER MODULE
CRSETB
119
OUTER AMBIGUITY RESET
66800
DIGITAL MODE COARSE ALIGN
DMMCA
130
66801
66802
66803
RANDOM φ2
INHIBIT READ COUNTER
UINHRC
154
66804
66805
66806
66807
66808
66809
66810
66811
66812
66813
66814
ENABLE ERROR COUNTER E OUTER
ENABLE ERROR COUNTER E MIDDLE
ENABLE ERROR COUNTER E INNER
CEEC
120
BEEC
128
AEEC
132
ISS TO EC & L MODULE
MIDDLE AMBIGUITY DETECT Ad
FROM COARSE MODULE
BADHI
137
BADLO
140
66861
66862
66863
66864
FROM READ COUNTER MODULE
BRSETB
129
MIDDLE AMBIGUITY RESET
INHIBIT OPTX/RR READ COUNTERS
152
OINHRC
RAND φ2
CDU ZERO Z RADAR/OPT.
RR Z DR
164
TO MODE MODULE
INNER AMBIGUITY DETECT Ad
FROM COARSE MODULE
AADHI
147
AADLO
141
66872
66873
66874
FROM READ COUNTER MODULE
ARSETB
161
INNER AMBIGUITY RESET
φ2 φ2
COARSE ALIGN ENABLE
TRUNNION
SHAFT
ECA
126
138
DCA
66797
66798
66799
ERROR COUNTER ENABLE
EEEC
116
110
DEEC
TO EC & L MODULES
2010095
2010095

E-2


CCDUZ
262
66922
CDUZ
51KPHI/
268
66913
269
NC
FROM INTERROGATE MODULE
51KPHI
264
51.2K PPS
66700
263
51KPLO
66701
66702
66703
66704
66705
66706
66708
66709
66710
66711
A
66712
66713
66707
66714
FAZ4CA
203
DMMCA
205
CA
66919
66920
66921
ϕ4 12.8 KPPS
ϕ4 6.4 KPPS
FAZ2HI/
243
244
FAZ2LO/
PS25KH
239
P.S. 25.6K PPS
66734
240
PS25KL
66735
66736
ϕ2
ϕ4
FAZ4HI
235
234
FAZ4LO
12.8K PPS
6.4K PPS
66744
66752
3200 PPS
+4VHI
124
148
224
248
+4 VDC
+4VLO
236
260
160
136
112
212
+4 VDC RETURN
66737
66738
66739
66740
66741
66742
66743
66745
66746
66747
66748
66749
66750
66751
66753
66754
66755
FAZ2LO
169
266
FAZ2HI
265
162
ϕ1
ISSCA
168
66769
ISS COARSE ALIGN ENABLE
66770
66771
66772
66773
66774
66775
66776
INNER
MIDDLE
OUTER
ACA
157
BCA
158
CCA
156
COARSE ALIGN
ϕ2
66800
DIGITAL MODE COARSE ALIGN
DMMCA
130
ISSZ
142
ISS CDU ZERO
66777
66778
66779
MODCOM
135
66916
ISS CDU ZERO DRIVE
RAND ϕ2
ISSZOR
144
TO MODE MODULE
66801
66802
66803
RANDOM ϕ2
INHIBIT READ COUNTER
UINHRC
154
CHASS
(STRUCTURE GROUND)
201
FROM MODE MODULE
ISSEEC
170
ISS ERROR COUNTER ENABLE
66780
66781
66782
66783
RRZ
166
R.R. CDU ZERO OR OPTICS
66784
66785
66786
66910
INHIBIT OPTX/RR READ COUNTERS
152
OINHRC
66911
66912
CDU ZERO Z RADAR/OPT.
RAND ϕ2
RR Z OR
164
TO
RRDAE
134
R.R. RADAR OR OPTICS D/A ENABLE
66787
66788
66789
66790
66791
66792
66793
66794
66795
66796
66797
66798
66799
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE
ϕ2 ϕ2
TRUNNION
SHAFT
ECA
126
138
DCA
EEEC
116
110
DEEC
TVCDCA
146
TVC DISABLE CA
66909
JMPA
150
122

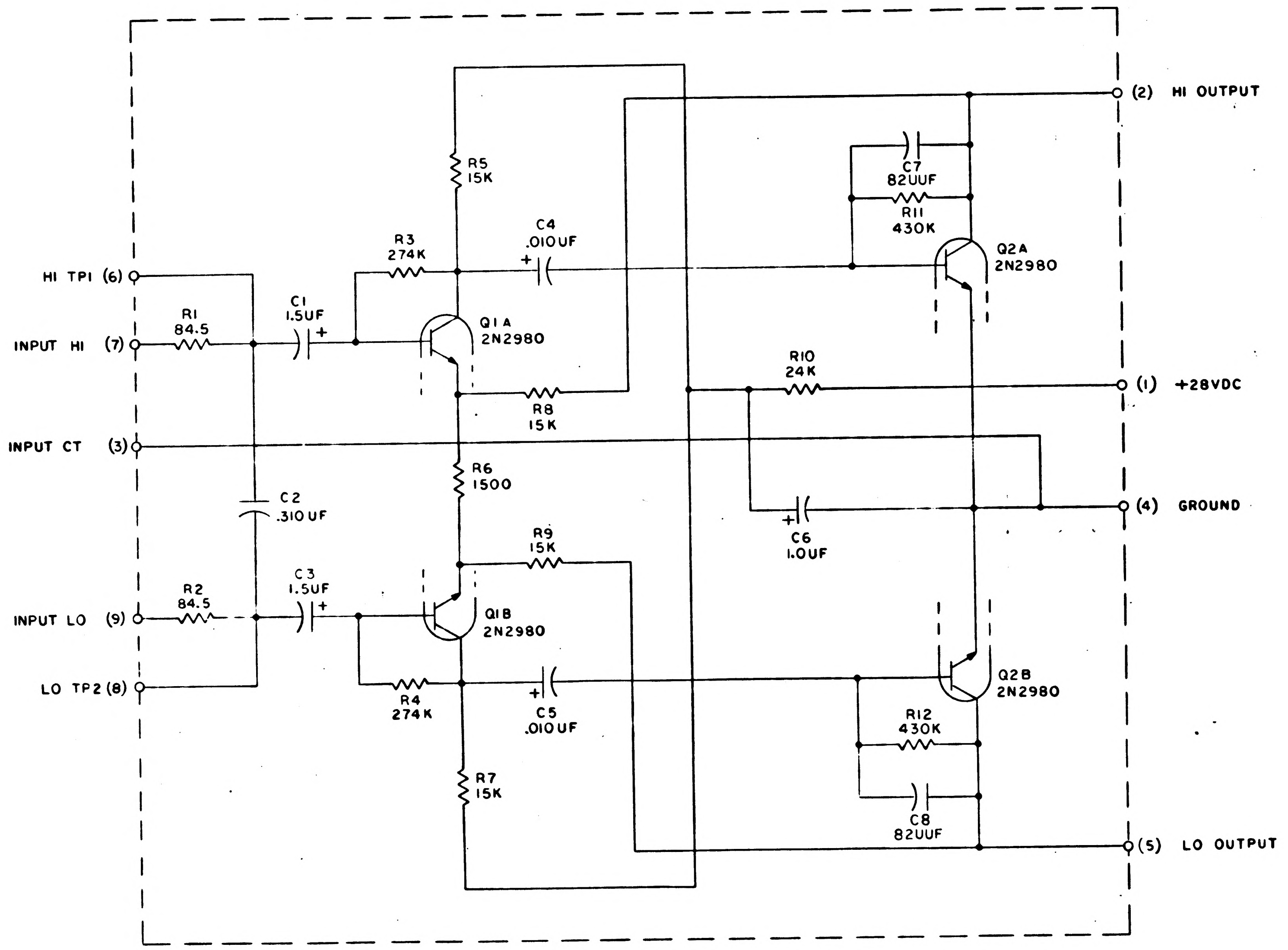
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ⬭ INDICATES EXTERNAL PIN CONNECTION
3. —DENOTES SINGLE MICRO-NOR GATE
4. —DENOTES FAN-IN GATE
5. POWER CONNECTIONS TO GATES NOT SHOWN
6. ALL UNUSED MICROLOGIC GATE INPUTS TO BE CONNECTED TO +4V RETURN BUSS
7. ⏚ INDICATES MODULE POWER BUS +4V RETURN
8. ⬭(XXX) INDICATES WIRE WRAP PROGRAM DESIGNATIONS

2010095

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS 26426

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 29760	27 JUN-66	B. / JRC



HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
C4 .010UF
C5 .010UF
Q1A 2N2980
Q1B 2N2980
C7 82UUF
R11 430K
Q2A 2N2980
R12 430K
C8 82UUF
Q2B 2N2980
R10 24K
C6 1.0UF
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1008848-001	CAPACITOR	.310UF	±1%	30V
C3	1006755-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5%	35V
C5			.010UF	MATCH	35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1008900-004	CAPACITOR	82UUF	±1%	100V
C8			82UUF		100V
Q1	1010652-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± # DECIMALS ± # ANGLES ± #
DO NOT SCALE THIS DRAWING
MATERIAL #
HEAT TREATMENT #
FINAL FINISH #

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN P.J. Butaley DATE 2/3/66
CHECKED
APPROVAL P J Lynch 2-11-66
APPROVAL 2-14-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

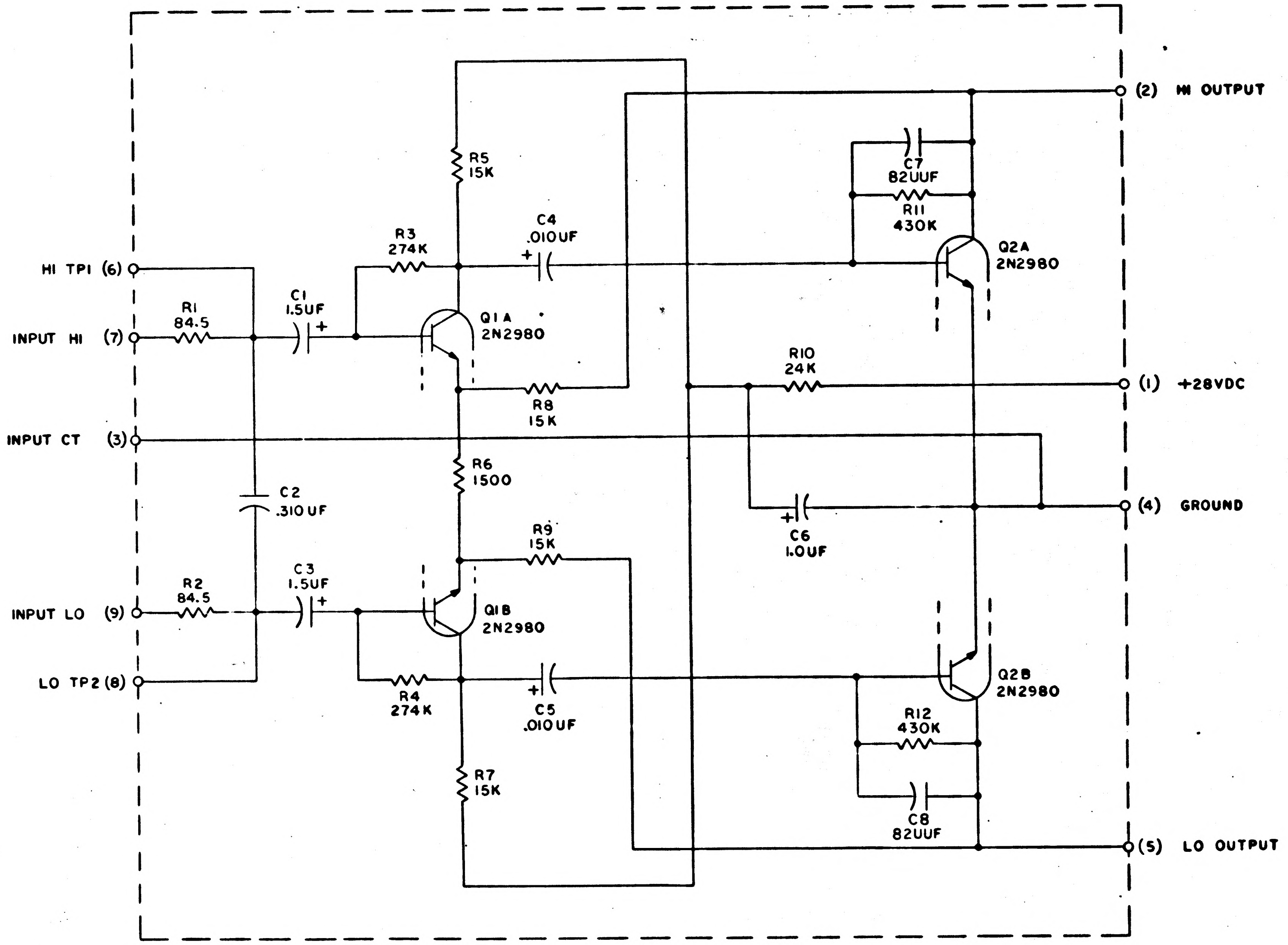
SCHEMATIC
PIP PREAMP

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010096
SCALE —
WT
SHEET 1 OF 1

2010096 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26426			
SYM	DESCRIPTION	DATE	APPROVAL


HI TP1 (6)
INPUT HI (7)
INPUT CT (3)
INPUT LO (9)
LO TP2 (8)
R1 84.5
R2 84.5
C1 1.5UF
C2 .310UF
C3 1.5UF
R3 274K
R4 274K
R5 15K
R6 1500
R7 15K
R8 15K
R9 15K
R10 24K
R11 430K
R12 430K
C4 .010UF
C5 .010UF
C6 1.0UF
C7 82UUF
C8 82UUF
Q1A 2N2980
Q1B 2N2980
Q2A 2N2980
Q2B 2N2980
(2) HI OUTPUT
(1) +28VDC
(4) GROUND
(5) LO OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010311-23	RESISTOR	84.5	±1%	1/10W
R2	1010311-23		84.5	±1%	1/10W
R3	1010969-360		274K	±1%	1/4W
R4	1010969-360		274K	±1%	1/4W
R5	1006750-60		15K	±2%	1/4W
R6	1010311-143		1500	±1%	1/10W
R7	1006750-60		15K	±2%	1/4W
R8	1010311-239		15K	±1%	1/10W
R9	1010311-239		15K	±1%	1/10W
R10	1006750-65		24K	±2%	1/4W
R11	1010369-96		430K	±5%	1/8W
R12	1010369-96	RESISTOR	430K	±5%	1/8W
C1	1006755-71	CAPACITOR	1.5UF	±10%	35V
C2	1008848-001	CAPACITOR	.310UF	±1%	30V
C3	1006755-71	CAPACITOR	1.5UF	±5%	35V
C4	1008830-45	CAPACITOR MATCHED PAIR	.010UF	±5% MATCH	35V
C5			.010UF		35V
C6	1010393-029	CAPACITOR	1.0UF	±10%	50V
C7	1010359-32	CAPACITOR MATCHED PAIR	82UUF	±5% MATCH	200V
C8			82UUF		200V
Q1	1010552-1	TRANSISTOR	2N2980		
Q2	1010652-1	TRANSISTOR	2N2980		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. RESISTOR VALUES ARE EXPRESSED IN OHMS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN P.J. Butaley DATE 2/3/66
CHECKED
APPROVAL P.J. Lynch 2-11-66
APPROVAL J. Salam 2-14-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
PIP PREAMP

CODE IDENT NO. —
SIZE D
NASA DRAWING NO. 2010096
SCALE —
WT
SHEET 1 OF 1

2010096

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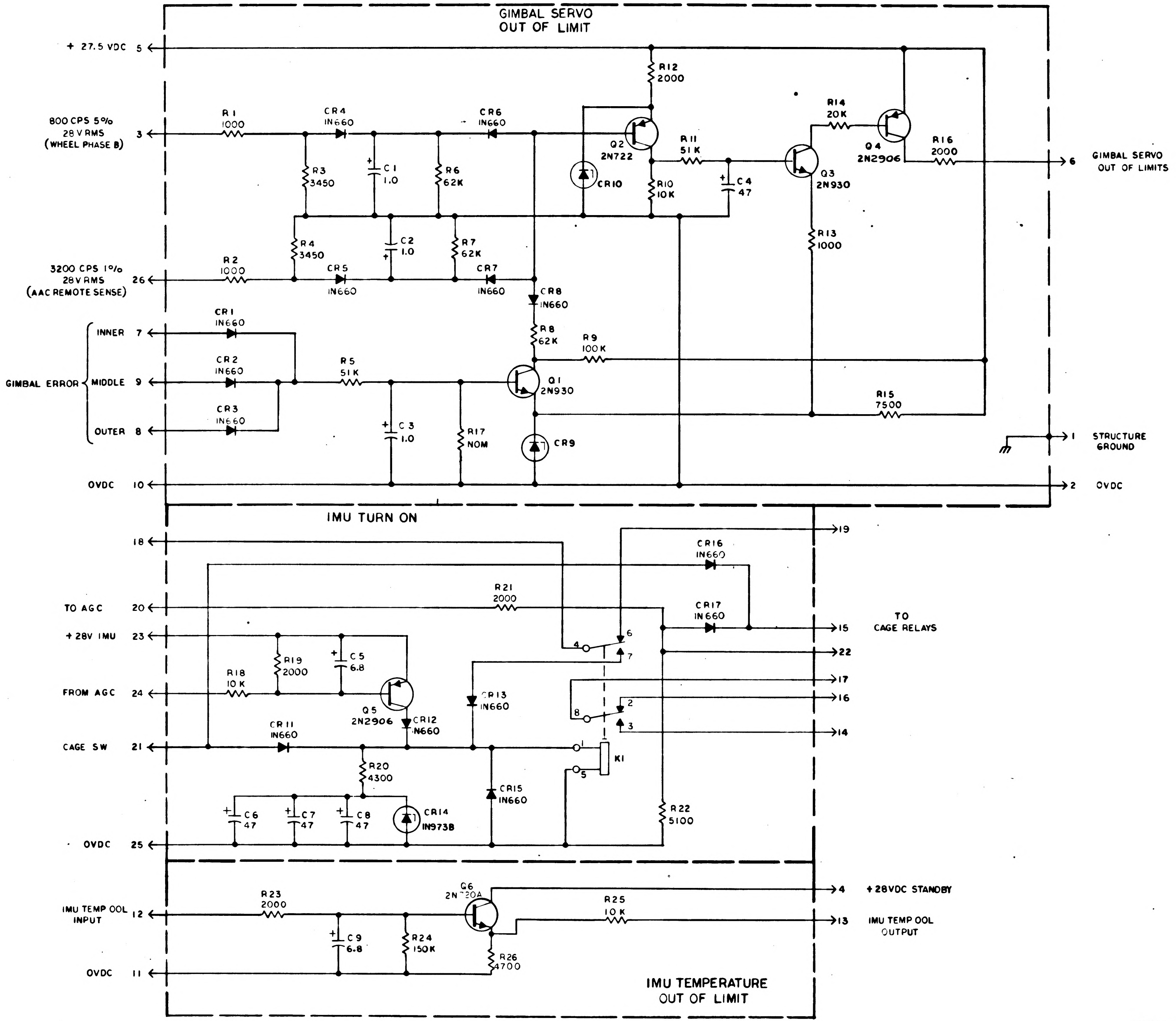
REVISIONS 20603

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 29825.	JAC		7 JULY 66	


GIMBAL SERVO
OUT OF LIMIT
+ 27.5 VDC 5
800 CPS 5%
28 V RMS
(WHEEL PHASE B) 3
3200 CPS 1%
28 V RMS
(AAC REMOTE SENSE) 26
GIMBAL ERROR
INNER 7
MIDDLE 9
OUTER 8
OVDC 10
R1 1000
R2 1000
R3 3450
R4 3450
R5 51K
R6 62K
R7 62K
R8 62K
R9 100K
R10 10K
R11 51K
R12 2000
R13 1000
R14 20K
R15 7500
R16 2000
R17 NOM
C1 1.0
C2 1.0
C3 1.0
C4 47
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9
CR10
Q1 2N930
Q2 2N722
Q3 2N930
Q4 2N2906
6 GIMBAL SERVO OUT OF LIMITS
1 STRUCTURE GROUND
2 OVDC
IMU TURN ON
18
TO AGC 20
+ 28V IMU 23
FROM AGC 24
CAGE SW 21
OVDC 25
R18 10K
R19 2000
R20 4300
R21 2000
R22 5100
C5 6.8
C6 47
C7 47
C8 47
CR11 IN660
CR12 IN660
CR13 IN660
CR14 IN973B
CR15 IN660
CR16 IN660
CR17 IN660
Q5 2N2906
K1
1
2
3
4
5
6
7
8
19
15
22
17
16
14
TO CAGE RELAYS
IMU TEMP OOL INPUT 12
OVDC 11
R23 2000
R24 150K
R25 10K
R26 4700
C9 6.8
Q6 2N720A
4 +28VDC STANDBY
13 IMU TEMP OOL OUTPUT
IMU TEMPERATURE
OUT OF LIMIT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 32	RESISTOR	1000	± 2%	1/4 W
R2	- 32		1000		
R3	- 128		3450		
R4	- 128		3450		
R5	- 73		51K		
R6	- 75		62K		
R7	- 75		62K		
R8	- 75		62K		
R9	- 80		100K		
R10	- 56		10K		
R11	1006750 - 73		51K		1/4 W
R12	1006760 - 39		2000		1/2 W
R13	1006750 - 32		1000		1/4 W
R14	1006750 - 63		20K		1/4 W
R15	1006750 - 53		7500		1/4 W
R16	1006760 - 39		2000	± 2%	1/2 W
R17	SEE NOTE 2		NOM	± 5%	1/8 W
R18	1006750 - 56		10K	± 2%	1/4 W
R19	- 39		2000		
R20	- 47		4300		
R21	- 39		2000		
R22	- 49		5100		
R23	- 39		2000		
R24	- 84		150K		
R25	- 56		10K		
R26	1006750 - 48	RESISTOR	4700	± 2%	1/4 W
C1	1006755 - 118	CAPACITOR	1.0	±10%	50VDC
C2	- 118		1.0		50
C3	- 118		1.0		50
C4	- 89		47		35
C5	- 79		6.8		
C6	- 89		47		
C7	- 89		47		
C8	- 89		47		
C9	1006755 - 79	CAPACITOR	6.8	± 10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8	1010385		IN660		
CR9	010372 - 11	ZENER			
CR10	1008815 - 9	ZENER	IN965B		
CR11	1010385		IN660		
CR12	1010365		IN660		
CR13	1010385		IN660		
CR14	1008815 - 17	ZENER	IN973B		
CR15	1010385		IN660		
CR16	1010385		IN660		
CR17	1010385	DIODE	IN660		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	1010285		2N722		
Q3	1010397 - 1		2N930		
Q4	1008814 - 1		2N2906		
Q5	1008814 - 1		2N2906		
Q6	1010357 - 1	TRANSISTOR	2N720A		
K1	1010353 - 7	RELAY			

CIRCUIT TITLE	SIGNATURE
GIMBAL SERVO OUT OF LIMIT	2/5/66
IMU TURN ON	John H Parker
IMU TEMPERATURE OUT OF LIMIT	

REF DWG:
IMU AUXILIARY ASSY
DWG NO. 2007217

R17	
PART NO.	VALUE
1010369 - 93	330K
- 94	360K
- 95	390K
- 96	430K
- 97	470K
- 98	510K
- 99	560K
- 100	620K
- 101	680K
- 102	750K
- 103	820K
- 104	910K
- 105	1MEG
1010369 - 106	1.1MEG

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R17 PER APPLICABLE P.S. FROM APPROPRIATE CHART

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED SEE ABOVE —
APPROVED SEE ABOVE —
APPROVED MIT 3 Feb 66
APPROVED MSC
DATE

SCHEMATIC
IMU AUXILIARY

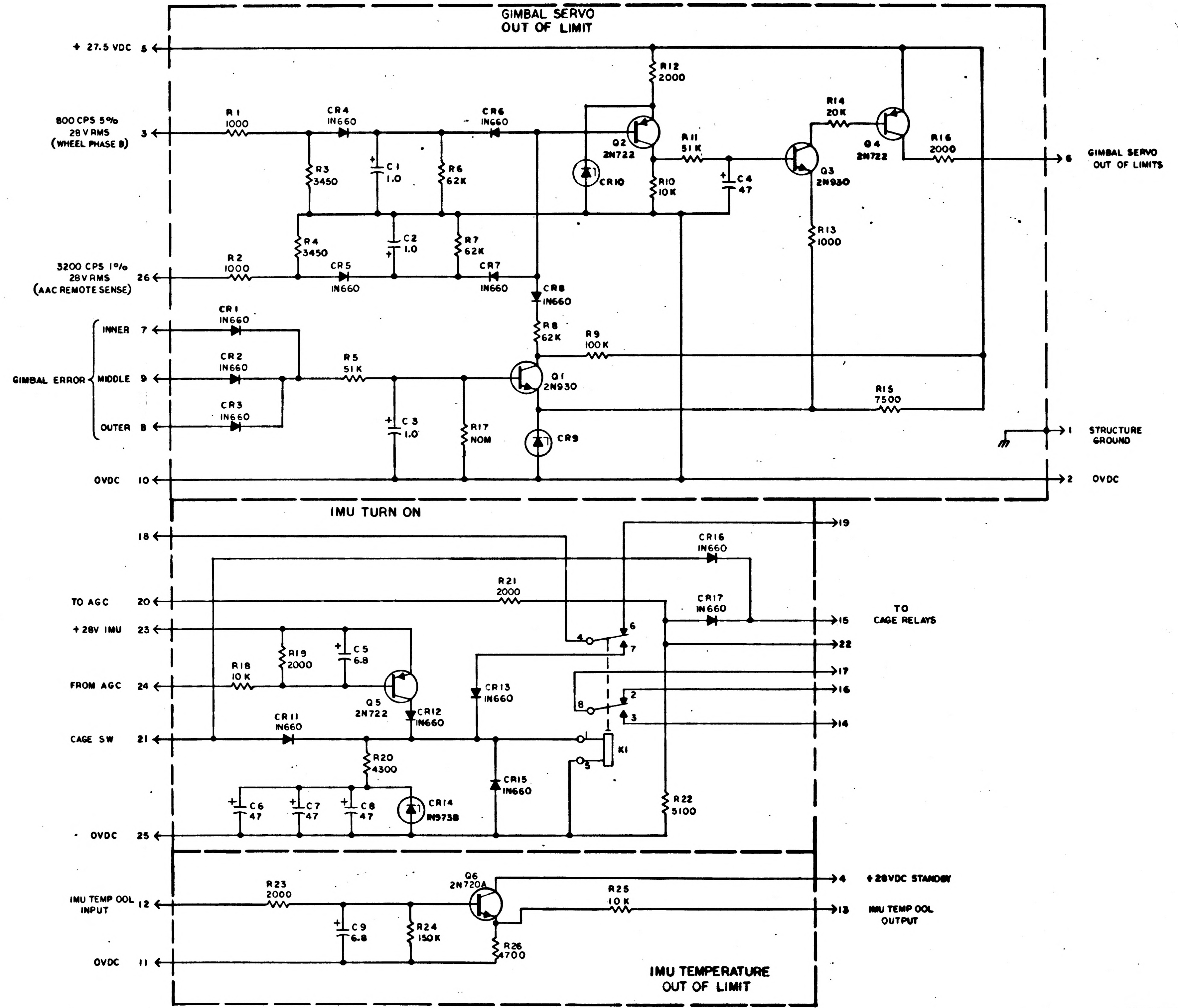
CODE IDENT NO 80230
SIZE E
DRAWING NO 2010097
SCALE —
SHEET 1 OF 1

2010097 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 26603

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED


GIMBAL SERVO OUT OF LIMIT
+ 27.5 VDC 5
800 CPS 5%
28 V RMS
(WHEEL PHASE B) 3
3200 CPS 1%
28V RMS
(AAC REMOTE SENSE) 26
GIMBAL ERROR
INNER 7
MIDDLE 9
OUTER 8
OVDC 10
R1 1000
R2 1000
R3 3450
R4 3450
R5 51K
R6 62K
R7 62K
R8 62K
R9 100K
R10 10K
R11 51K
R12 2000
R13 1000
R14 20K
R15 7500
R16 2000
R17 NOM
C1 1.0
C2 1.0
C3 1.0
C4 47
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
CR9
CR10
Q1 2N930
Q2 2N722
Q3 2N930
Q4 2N722
6 GIMBAL SERVO OUT OF LIMITS
1 STRUCTURE GROUND
2 OVDC
IMU TURN ON
18
TO AGC 20
+28V IMU 23
FROM AGC 24
CAGE SW 21
OVDC 25
R18 10K
R19 2000
R20 4300
R21 2000
R22 5100
C5 6.8
C6 47
C7 47
C8 47
Q5 2N722
CR11 IN660
CR12 IN660
CR13 IN660
CR14 IN973B
CR15 IN660
CR16 IN660
CR17 IN660
K1
19
15 TO CAGE RELAYS
22
17
16
14
IMU TEMP OOL INPUT 12
OVDC 11
R23 2000
R24 150K
R25 10K
R26 4700
C9 6.8
Q6 2N720A
4 +28VDC STANDBY
13 IMU TEMP OOL OUTPUT
IMU TEMPERATURE OUT OF LIMIT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 32	RESISTOR	1000	±2%	1/4 W
R2	– 32		1000		
R3	– 128		3450		
R4	– 128		3450		
R5	– 73		51K		
R6	– 75		62K		
R7	– 75		62K		
R8	– 75		62K		
R9	– 80		100K		
R10	– 56		10 K		
R11	1006750 – 73		51 K		1/4 W
R12	1006760 – 39		2000		1/2 W
R13	1006750 – 32		1000		1/4 W
R14	1006750 – 63		20K		1/4 W
R15	1006750 – 53		7500		1/4 W
R16	1006760 – 39		2000	± 2%	1/2 W
R17	SEE NOTE 2		NOM	± 5%	1/8 W
R18	1006750 – 56		10K	± 2%	1/4 W
R19	– 39		2000		
R20	– 47		4300		
R21	– 39		2000		
R22	– 49		5100		
R23	– 39		2000		
R24	– 84		150K		
R25	– 56		10 K		
R26	1006750 – 48	RESISTOR	4700	± 2%	1/4 W
C1	1006755 – 118	CAPACITOR	1.0	±10%	50VDC
C2	– 118		1.0		50
C3	– 118		1.0		50
C4	– 89		47		35
C5	– 79		6.8		
C6	– 89		47		
C7	– 89		47		
C8	– 89		47		
C9	1006755 – 79	CAPACITOR	6.8	± 10%	35VDC
CR1	1010385	DIODE	IN660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8	1010385		IN660		
CR9	1010372 – 11	ZENER			
CR10	1010830 – 9	ZENER	IN965B		
CR11	1010385		IN660		
CR12	1010385		IN660		
CR13	1010385		IN660		
CR14	1010830 – 17	ZENER	IN973B		
CR15	1010385		IN660		
CR16	1010385		IN660		
CR17	1010385	DIODE	IN660		
Q1	1010397 – 1	TRANSISTOR	2N930		
Q2	1010285		2N722		
Q3	1010397 – 1		2N930		
Q4	1010285		2N722		
Q5	1010285		2N722		
Q6	1010 357 – 1	TRANSISTOR	2N720A		
K1	1010353 – 7	RELAY			

R17	
PART NO.	VALUE
1010369 – 93	330 K
– 94	360 K
– 95	390 K
– 96	430 K
– 97	470 K
– 98	510 K
– 99	560 K
– 100	620 K
– 101	680 K
– 102	750 K
– 103	820 K
– 104	910 K
– 105	1 MEG
1010369 – 106	1.1 MEG

CIRCUIT TITLE	SIGNATURE
GIMBAL SERVO OUT OF LIMIT	A. Penchuk 2/15/66
IMU TURN ON	John H. Barker 15-Feb-66
IMU TEMPERATURE OUT OF LIMIT	[illegible]

REF DWG:
IMU AUXILIARY ASSY
DWG NO. 2007217

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R17 PER APPLICABLE P.S. FROM APPROPRIATE CHART

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

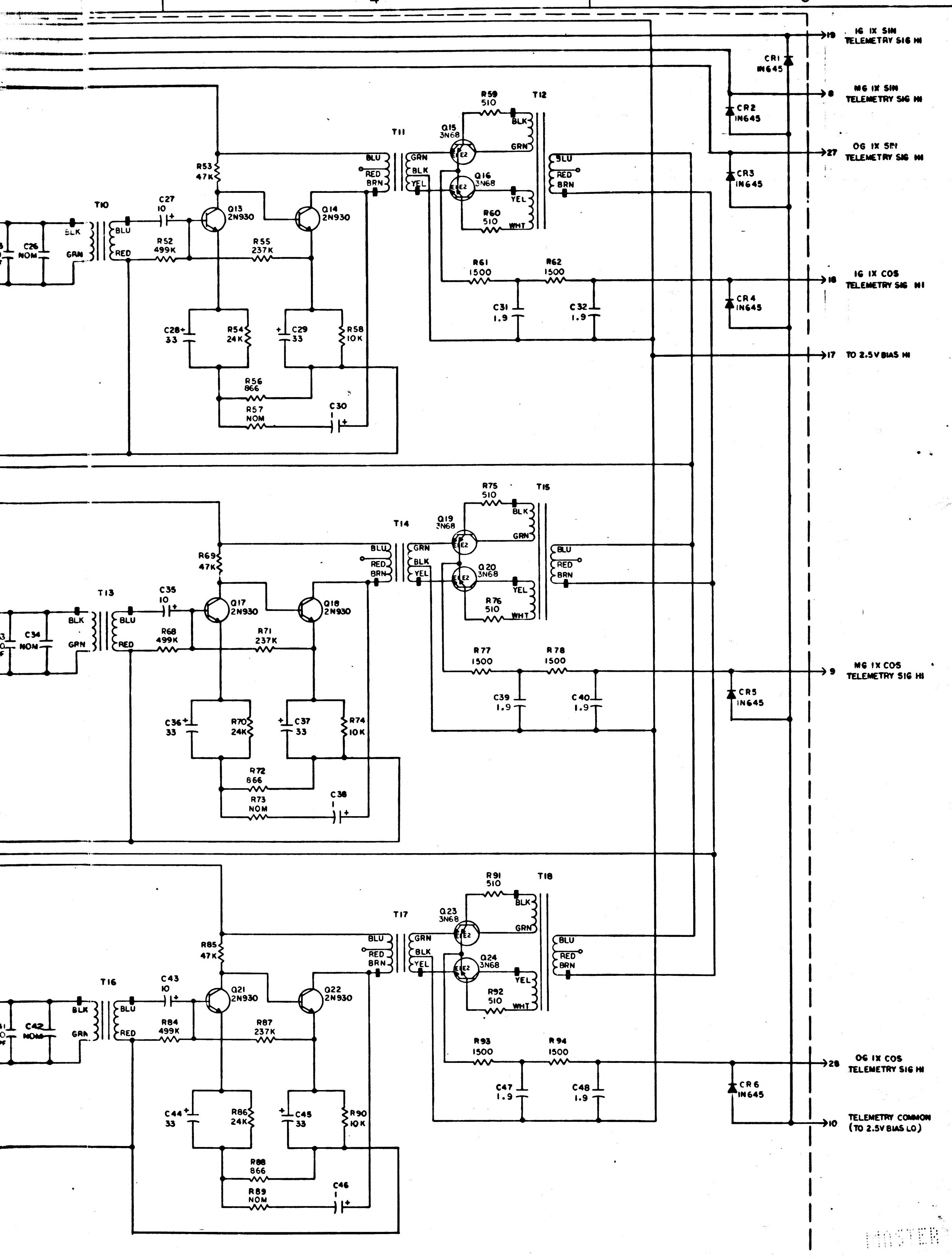
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN [illegible] 9/28/[illegible]
CHECKED [illegible] 15 Feb 66
APPROVED SEE ABOVE —
APPROVED SEE ABOVE —
APPROVED MIT [illegible] 23 Feb 66
APPROVED MSC A. C. METZGER
DATE

SCHEMATIC
IMU AUXILIARY

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010097
SCALE —
SHEET 1 OF 1

2010097



IG 1X SIN TELEMETRY SIG HI
19
MG 1X SIN TELEMETRY SIG HI
8
OG 1X SIN TELEMETRY SIG HI
27
IG 1X COS TELEMETRY SIG HI
18
TO 2.5V BIAS HI
17
MG 1X COS TELEMETRY SIG HI
9
OG 1X COS TELEMETRY SIG HI
28
TELEMETRY COMMON (TO 2.5V BIAS LO)
10
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
T10
T11
T12
T13
T14
T15
T16
T17
T18
Q13 2N930
Q14 2N930
Q15 3N68
Q16 3N68
Q17 2N930
Q18 2N930
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
C26 NOM
C27 10
C28 33
C29 33
C30
C31 1.9
C32 1.9
C34 NOM
C35 10
C36 33
C37 33
C38
C39 1.9
C40 1.9
C42 NOM
C43 10
C44 33
C45 33
C46
C47 1.9
C48 1.9
R52 499K
R53 47K
R54 24K
R55 237K
R56 866
R57 NOM
R58 10K
R59 510
R60 510
R61 1500
R62 1500
R68 499K
R69 47K
R70 24K
R71 237K
R72 866
R73 NOM
R74 10K
R75 510
R76 510
R77 1500
R78 1500
R84 499K
R85 47K
R86 24K
R87 237K
R88 866
R89 NOM
R90 10K
R91 510
R92 510
R93 1500
R94 1500
BLU
RED
BRN
GRN
BLK
YEL
WHT
E1
E2
4
3
2010120 A

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	SEE NOTE 4		NOM	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	SEE NOTE 4		NOM	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	SEE NOTE 4		NOM	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	SEE NOTE 4		NOM	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10 W
R73	SEE NOTE 4		NOM	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	SEE NOTE 4		NOM	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-19	CAPACITOR	1200PF	±2%	300 VDC
C2	SEE NOTE 4		NOM	±2%	
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-19		1200PF	±2%	300 VDC
C10	SEE NOTE 4		NOM	±2%	—
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-19		1200PF	±2%	300 VDC
C18	SEE NOTE 4		NOM	±2%	—
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-19		1200PF	±2%	300 VDC
C26	SEE NOTE 4		NOM	±2%	—
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-19		1200PF	±2%	300 VDC
C34	SEE NOTE 4		NOM	±2%	—
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-19		1200PF	±2%	300 VDC
C42	SEE NOTE 4		NOM	±2%	—
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

R9 R25, R41, R57, R73, R89

PART NO.	VALUE
1010311-296	59.0 K
-297	60.4 K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8 K
-304	71.5 K
-305	73.2 K
-306	75.0 K
-307	76.8 K
-308	78.7 K
-309	80.6 K
-310	82.5 K
-311	84.5 K
-312	86.6 K
-313	88.7 K
1010311-314	90.9 K

C2, C10, C18, C26, C34, C42

PART NO.	VALUE	RATING
1010410-1	220PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	
-11	560	300 VDC
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200PF	

REVISIONS 2454

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 26029	4 Feb 66	[illegible]

REF DWG:
SIGNAL CONDITIONER ASSEMBLY
GIMBAL RESOLVER
DWG NO. 2007230

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Di Leo DATE 4 OCT 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC SIGNAL CONDITIONER, GIMBAL RESOLVER

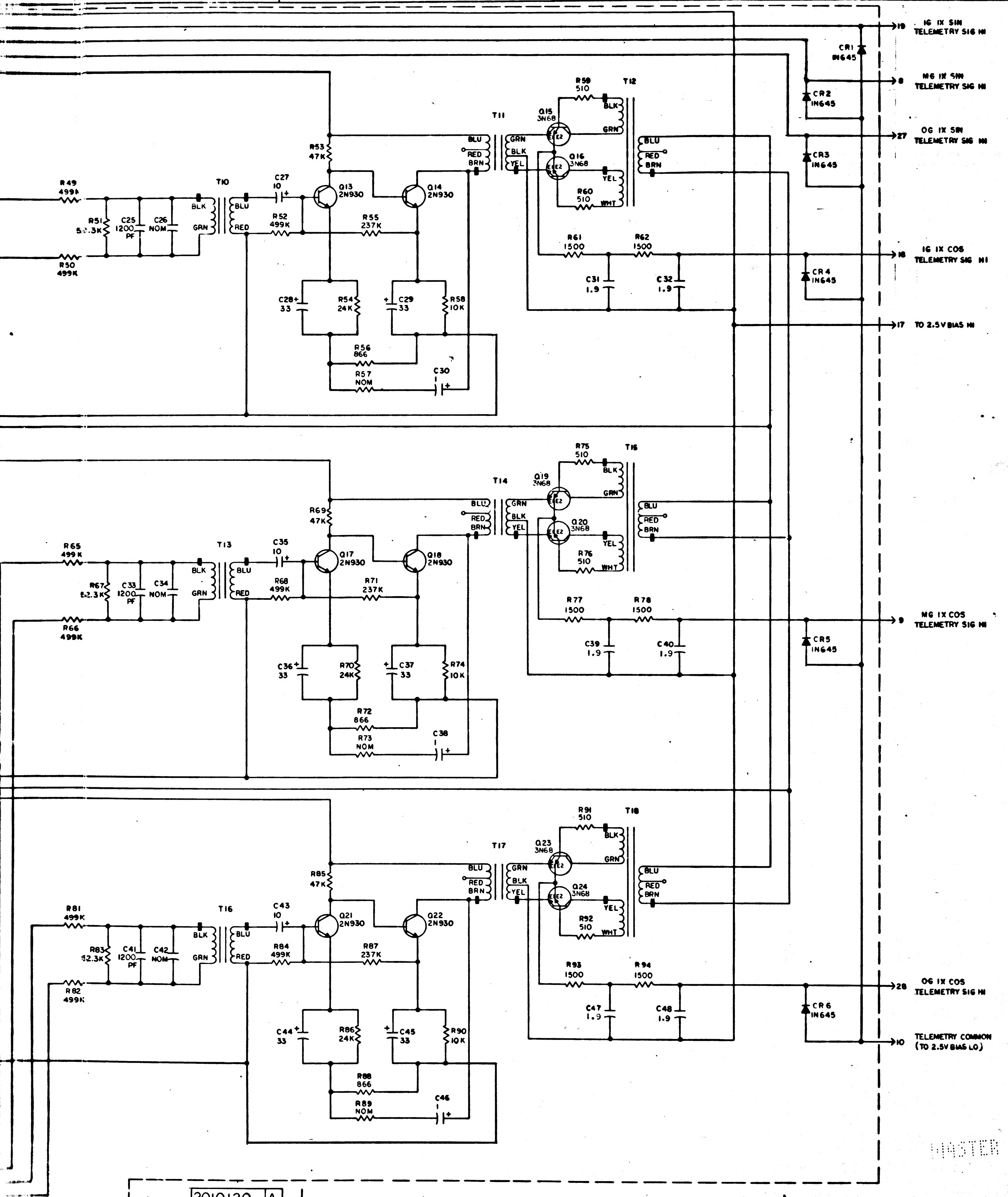
CODE IDENT NO 80230
SIZE J
NASA DRAWING NO. 2010120
SCALE —
WT —
SHEET 1 OF 1

2010120 A

F3

MASTER

3H


19 IG IX SIN TELEMETRY SIG HI
8 MG IX SIN TELEMETRY SIG HI
27 OG IX SIN TELEMETRY SIG HI
18 IG IX COS TELEMETRY SIG HI
17 TO 2.5V BIAS HI
9 MG IX COS TELEMETRY SIG HI
28 OG IX COS TELEMETRY SIG HI
10 TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
T10
T11
T12
T13
T14
T15
T16
T17
T18
Q13 2N930
Q14 2N930
Q15 3N68
Q16 3N68
Q17 2N930
Q18 2N930
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
R49 499K
R50 499K
R51 52.3K
C25 1200 PF
C26 NOM
C27 10
R52 499K
R53 47K
R55 237K
R54 24K
R56 866
R57 NOM
R58 10K
C28 33
C29 33
C30 1
R59 510
R60 510
R61 1500
R62 1500
C31 1.9
C32 1.9
R65 499K
R66 499K
R67 52.3K
C33 1200 PF
C34 NOM
C35 10
R68 499K
R69 47K
R71 237K
R70 24K
R72 866
R73 NOM
R74 10K
C36 33
C37 33
C38 1
R75 510
R76 510
R77 1500
R78 1500
C39 1.9
C40 1.9
R81 499K
R82 499K
R83 52.3K
C41 1200 PF
C42 NOM
C43 10
R84 499K
R85 47K
R87 237K
R86 24K
R88 866
R89 NOM
R90 10K
C44 33
C45 33
C46 1
R91 510
R92 510
R93 1500
R94 1500
C47 1.9
C48 1.9
BLK
GRN
BLU
RED
BRN
YEL
WHT
2010120 A

REVISIONS		
SYM	DESCRIPTION	DATE
A	REVISED PER TDRR 26029	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	SEE NOTE 4		NOM	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47 K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	SEE NOTE 4		NOM	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	SEE NOTE 4		NOM	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	SEE NOTE 4		NOM	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10 W
R73	SEE NOTE 4		NOM	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	SEE NOTE 4		NOM	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-19	CAPACITOR	1200PF	±2%	300 VDC
C2	SEE NOTE 4		NOM	±2%	
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-19		1200PF	± 2%	300 VDC
C10	SEE NOTE 4		NOM	± 2%	——
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-19		1200PF	± 2%	300 VDC
C18	SEE NOTE 4		NOM	± 2%	——
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-19		1200PF	± 2%	300 VDC
C26	SEE NOTE 4		NOM	± 2%	——
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-19		1200PF	± 2%	300 VDC
C34	SEE NOTE 4		NOM	± 2%	——
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-19		1200PF	± 2%	300 VDC
C42	SEE NOTE 4		NOM	± 2%	——
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

R9, R25, R41, R57, R73, R89	
PART NO.	VALUE
1010311-296	59.0 K
-297	60.4 K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8 K
-304	71.5 K
-305	73.2 K
-306	75.0 K
-307	76.8 K
-308	78.7 K
-309	80.6 K
-310	82.5 K
-311	84.5 K
-312	86.6 K
-313	88.7 K
1010311-314	90.9 K

C2, C10, C18, C26, C34, C42		
PART NO.	VALUE	RATING
1010410-1	220PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	
-11	560	300 VDC
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200PF	

REF DWG:
SIGNAL CONDITIONER ASSEMBL
GIMBAL RESOLVER
DWG NO. 2007230

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

F-2

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Q. D. Leo DATE 4 OCT 65
CHECKED 8 Nov 65
APPROVAL 23 Nov 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC SIGNAL CONDITIONER, GIMBAL RESOLVER

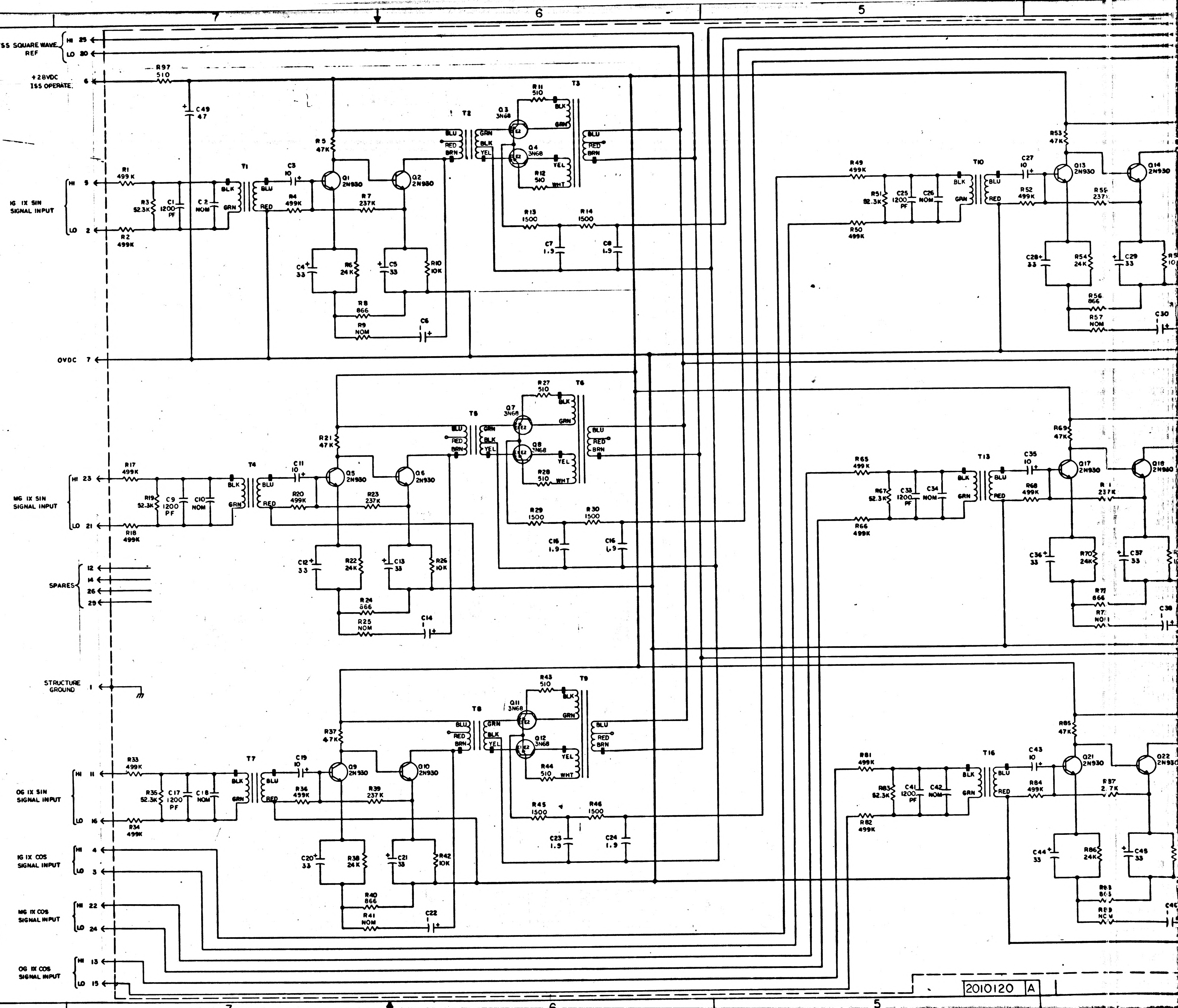
CODE IDENT NO	SIZE	NASA DRAWING NO.
80230	J	2010120

SCALE — WT — SHEET 1 OF 1

2010120 A

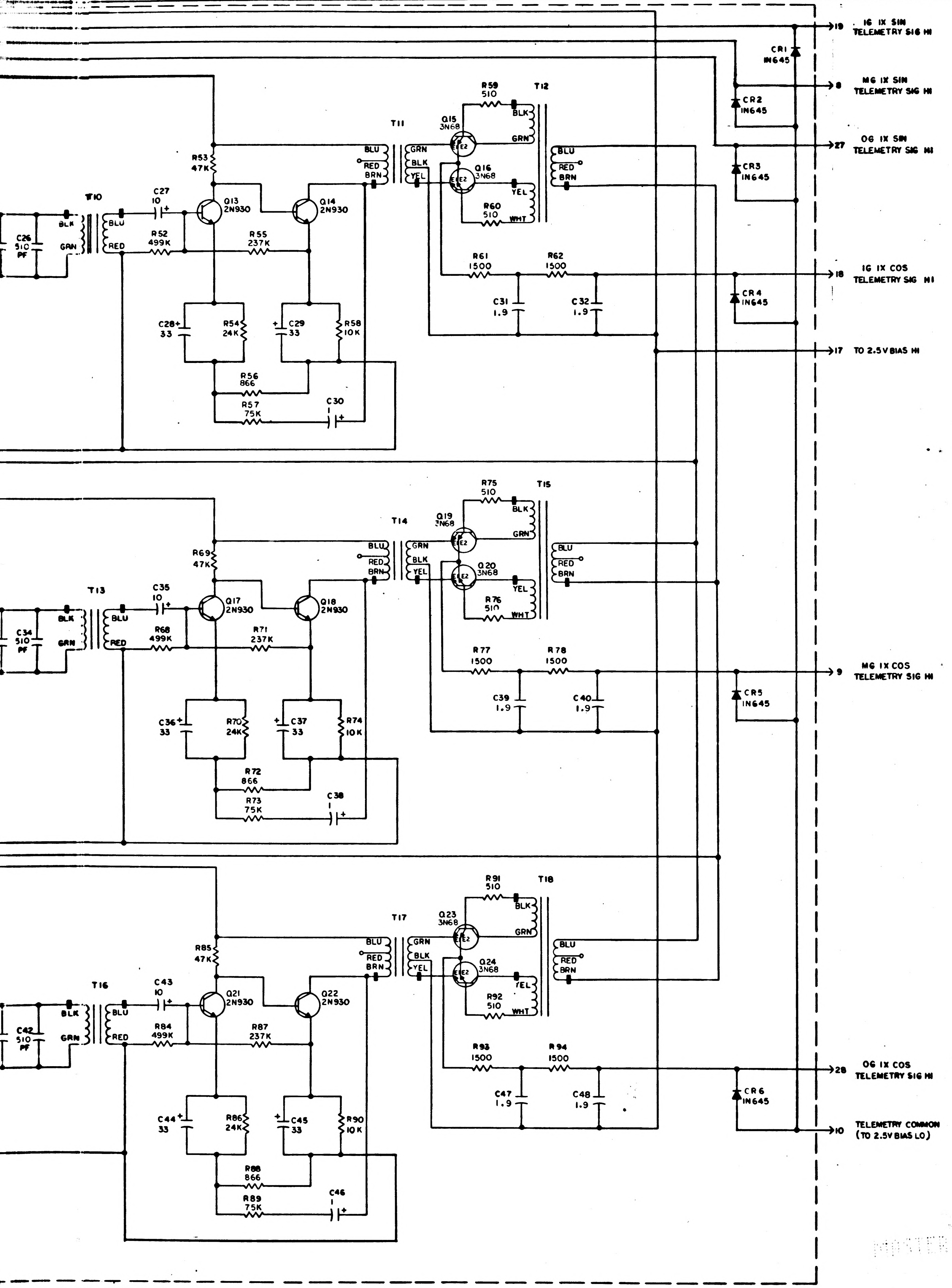
3H

F-1



8
7
6
5
D
C
B
A
I S S SQUARE WAVE REF
HI 25
LO 20
+28VDC I S S OPERATE 6
R97 510
C49 47
IG IX SIN SIGNAL INPUT
HI 5
LO 2
R1 499K
R2 499K
R3 52.3K
C1 1200 PF
C2 NOM
T1
BLK
GRN
BLU
RED
C3 10
R4 499K
R5 47K
Q1 2N930
Q2 2N930
R7 237K
C4 33
R6 24K
C5 33
R10 10K
R8 866
R9 NOM
C6
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R11 510
R12 510
T3
WHT
R13 1500
R14 1500
C7 1.9
C8 1.9
OVDC 7
MG IX SIN SIGNAL INPUT
HI 23
LO 21
R17 499K
R18 499K
R19 52.3K
C9 1200 PF
C10 NOM
T4
C11 10
R20 499K
R21 47K
Q5 2N930
Q6 2N930
R23 237K
C12 33
R22 24K
C13 33
R26 10K
R24 866
R25 NOM
C14
T5
Q7 3N68
Q8 3N68
R27 510
R28 510
T6
R29 1500
R30 1500
C15 1.9
C16 1.9
SPARES
12
14
26
29
STRUCTURE GROUND 1
OG IX SIN SIGNAL INPUT
HI 11
LO 16
R33 499K
R34 499K
R35 52.3K
C17 1200 PF
C18 NOM
T7
C19 10
R36 499K
R37 47K
Q9 2N930
Q10 2N930
R39 237K
C20 33
R38 24K
C21 33
R42 10K
R40 866
R41 NOM
C22
T8
Q11 3N68
Q12 3N68
R43 510
R44 510
T9
R45 1500
R46 1500
C23 1.9
C24 1.9
IG IX COS SIGNAL INPUT
HI 4
LO 3
MG IX COS SIGNAL INPUT
HI 22
LO 24
OG IX COS SIGNAL INPUT
HI 13
LO 15
R49 499K
R50 499K
R51 52.3K
C25 1200 PF
C26 NOM
T10
C27 10
R52 499K
R53 47K
Q13 2N930
Q14 2N930
R55 237
C28 33
R54 24K
C29 33
R56 866
R57 NOM
C30
R65 499K
R66 499K
R67 52.3K
C33 1200 PF
C34 NOM
T13
C35 10
R68 499K
R69 47K
Q17 2N930
Q18 2N930
237K
C36 33
R70 24K
C37 33
866
C38
R81 499K
R82 499K
R83 52.3K
C41 1200 PF
C42 NOM
T16
C43 10
R84 499K
R85 47K
Q21 2N930
Q22 2N930
R87 2.7K
C44 33
R86 24K
C45 33
2010120 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R9, R25, R41, R57, R73, R89, C2, C10, C18, C26, C34 & C42 PER APPLICABLE P.S. FROM APPROPRIATE CHART



19 16 1X SIN TELEMETRY SIG HI
8 MG 1X SIN TELEMETRY SIG HI
27 OG 1X SIN TELEMETRY SIG HI
18 IG 1X COS TELEMETRY SIG HI
17 TO 2.5V BIAS HI
9 MG 1X COS TELEMETRY SIG HI
28 OG 1X COS TELEMETRY SIG HI
10 TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 1N645
CR2 1N645
CR3 1N645
CR4 1N645
CR5 1N645
CR6 1N645
T10
T11
T12
T13
T14
T15
T16
T17
T18
C26 510 PF
C34 510 PF
C42 510 PF
C27 10
C35 10
C43 10
Q13 2N930
Q14 2N930
Q15 3N68
Q16 3N68
Q17 2N930
Q18 2N930
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
R52 499K
R53 47K
R54 24K
R55 237K
R56 866
R57 75K
R58 10K
R59 510
R60 510
R61 1500
R62 1500
R68 499K
R69 47K
R70 24K
R71 237K
R72 866
R73 75K
R74 10K
R75 510
R76 510
R77 1500
R78 1500
R84 499K
R85 47K
R86 24K
R87 237K
R88 866
R89 75K
R90 10K
R91 510
R92 510
R93 1500
R94 1500
C28 33
C29 33
C30 1
C31 1.9
C32 1.9
C36 33
C37 33
C38 1
C39 1.9
C40 1.9
C44 33
C45 33
C46 1
C47 1.9
C48 1.9
BLU
RED
BRN
GRN
BLK
YEL
WHT

REVISIONS 24543			
SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 26029	11Feb66	
B	REVISED PER TDRR 27173	3/17/66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	1010311-306		75 K	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
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R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	1010311-306		75 K	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
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R30	1006750-36		1500	±2%	1/4 W
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R34	1010364-769		499 K	±1%	1/8 W
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R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	1010311-306		75K	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	1010311-306		75K	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10W
R68	1010364-769		499 K	±1%	1/8 W
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R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10W
R73	1010311-306		75K	±1%	1/10W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
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R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	1010311-306		75K	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-18	CAPACITOR	1100PF	±2%	300 VDC
C2	1010410-10		510 PF	±2%	500 VDC
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-18		1100PF	±2%	300 VDC
C10	1010410-10		510 PF	±2%	500 VDC
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-18		1100PF	±2%	300 VDC
C18	1010410-10		510 PF	±2%	500 VDC
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-18		1100PF	±2%	300 VDC
C26	1010410-10		510 PF	±2%	500 VDC
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-18		1100PF	±2%	300 VDC
C34	1010410-10		510 PF	±2%	500 VDC
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-18		1100PF	±2%	300 VDC
C42	1010410-10		510 PF	±2%	500 VDC
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

REF DWG:
SIGNAL CONDITIONER ASSEMBLY
GIMBAL RESOLVER
DWG NO. 2007230

3H

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

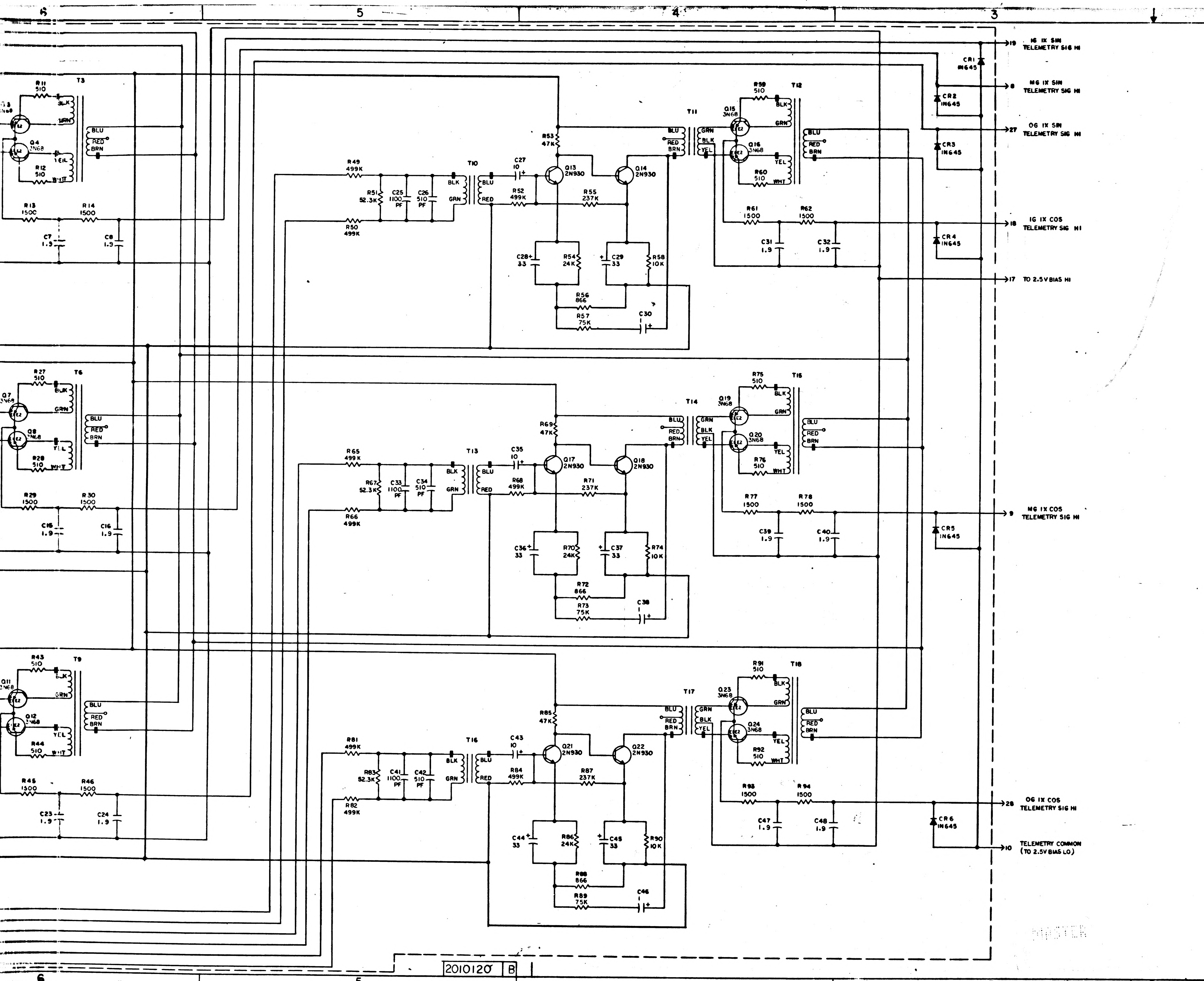
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO / CONTRACT
DRAWN R. Di Leo DATE 4 OCT 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL L. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC
SIGNAL CONDITIONER, GIMBAL RESOLVER

CODE IDENT NO 80230 | SIZE J | NASA DRAWING NO. 2010120
SCALE — | WT — | SHEET 1 OF 1

2010120 B


6
5
4
3
2
T3
R11 510
Q3 3N68
Q4 3N68
BLK
GRN
YEL
WHT
BLU
RED
BRN
R12 510
R13 1500
R14 1500
C7 1.9
C8 1.9
R49 499K
R50 499K
R51 52.3K
C25 1100 PF
C26 510 PF
T10
C27 10
R52 499K
R53 47K
Q13 2N930
Q14 2N930
R55 237K
C28 33
R54 24K
C29 33
R58 10K
R56 866
R57 75K
C30
T11
T12
R59 510
Q15 3N68
Q16 3N68
R60 510
R61 1500
R62 1500
C31 1.9
C32 1.9
CR1 1N645
CR2 1N645
CR3 1N645
CR4 1N645
19 IG 1X SIN TELEMETRY SIG HI
8 MG 1X SIN TELEMETRY SIG HI
27 OG 1X SIN TELEMETRY SIG HI
18 IG 1X COS TELEMETRY SIG HI
17 TO 2.5V BIAS HI
T6
R27 510
Q7 3N68
Q8 3N68
R28 510
R29 1500
R30 1500
C15 1.9
C16 1.9
R65 499K
R66 499K
R67 52.3K
C33 1100 PF
C34 510 PF
T13
C35 10
R68 499K
R69 47K
Q17 2N930
Q18 2N930
R71 237K
C36 33
R70 24K
C37 33
R74 10K
R72 866
R73 75K
C38
T14
T15
R75 510
Q19 3N68
Q20 3N68
R76 510
R77 1500
R78 1500
C39 1.9
C40 1.9
CR5 1N645
9 MG 1X COS TELEMETRY SIG HI
T9
R43 510
Q11 3N68
Q12 3N68
R44 510
R45 1500
R46 1500
C23 1.9
C24 1.9
R81 499K
R82 499K
R83 52.3K
C41 1100 PF
C42 510 PF
T16
C43 10
R84 499K
R85 47K
Q21 2N930
Q22 2N930
R87 237K
C44 33
R86 24K
C45 33
R90 10K
R88 866
R89 75K
C46
T17
T18
R91 510
Q23 3N68
Q24 3N68
R92 510
R93 1500
R94 1500
C47 1.9
C48 1.9
CR6 1N645
28 OG 1X COS TELEMETRY SIG HI
10 TELEMETRY COMMON (TO 2.5V BIAS LO)

2010120 B

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	1010311-306		75 K	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47 K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	1010311-306		75 K	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	1010311-306		75 K	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	1010311-306		75 K	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10 W
R73	1010311-306		75 K	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	1010311-306		75 K	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-18	CAPACITOR	1100PF	±2%	300 VDC
C2	1010410-10		510 PF	±2%	500 VDC
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRI
C4	1006 55-34	CAPACI
C5	1006 55-34	
C6	1006 55-69	
C7	1010 79-16	
C8	1010 79-16	
C9	1010 10-19	
C10	1010 10-10	
C11	1006 55-31	
C12	1006 55-34	
C13	1006 55-34	
C14	1006 55-69	
C15	1010 79-16	
C16	1010 79-16	
C17	1010 10-18	
C18	10 0 0-10	
C19	1006 55-31	
C20	1006 55-34	
C21	1006 55-34	
C22	1006 55-69	
C23	1010 79-16	
C24	1010 79-16	
C25	1010 10-18	
C26	1010 10-10	
C27	1006 55-31	
C28	1006 55-34	
C29	1006 55-34	
C30	1006 55-69	
C31	1010 79-16	
C32	1010 79-16	
C33	1010 10-18	
C34	1010 10-10	
C35	1006 55-31	
C36	1006 55-34	
C37	1006 55-34	
C38	1006 55-69	
C39	1010 79-16	
C40	1010 79-16	
C41	1010 10-18	
C42	1010 110-10	
C43	1006 55-31	
C44	1006 55-34	
C45	1006 55-34	
C46	1006 55-69	
C47	1010 79-16	
C48	1010 79-16	
C49	1006 55-89	CAPACITOR
T1	1006 832	TRANSFORME
T2	1006 342	
T3	1010 123	
T4	10 832	
T5	1006 842	
T6	1010 123	
T7	1006 832	
T8	1006 842	
T9	1010 123	
T10	1006 832	
T11	100 842	
T12	1010 123	
T13	100 832	
T14	1006 342	
T15	1010 123	
T16	1006 832	
T17	1006 842	
T18	1010 123	TRANSFORMER
Q1	1010 97-1	TRANSISTOR
Q2	1010 97-1	TRANSISTOR
Q3	1010 67	CHOPPER
Q4	1010 67	CHOPPER
Q5	1010 97-1	TRANSISTOR
Q6	1010 97-1	TRANSISTOR
Q7	1010 67	CHOPPER
Q8	1010 67	CHOPPER
Q9	1010 97-1	TRANSISTOR
Q10	1010 97-1	TRANSISTOR
Q11	1010 67	CHOPPER
Q12	1010 67	CHOPPER
Q13	1010 97-1	TRANSISTOR
Q14	1010 97-1	TRANSISTOR
Q15	1010 67	CHOPPER
Q16	1010 67	CHOPPER
Q17	1010 97-1	TRANSISTOR
Q18	1010 97-1	TRANSISTOR
Q19	1010 67	CHOPPER
Q20	1010 67	CHOPPER
Q21	1010 97-1	TRANSISTOR
Q22	1010 97-1	TRANSISTOR
Q23	1010 67	CHOPPER
Q24	1010 67	CHOPPER
CR1	1010 137-001	DIODE
CR2	-001	
CR3	-001	
CR4	-001	
CR5	-001	
CR6	1010 37-001	DIODE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIF
DIMENSIONS ARE IN INCHE
TOLERANCES ON
FRACTIONS DECIMALS
DO NOT SCALE THIS DRAW
MATERIAL
HEAT TREATMENT
FINAL FINISH

E-2

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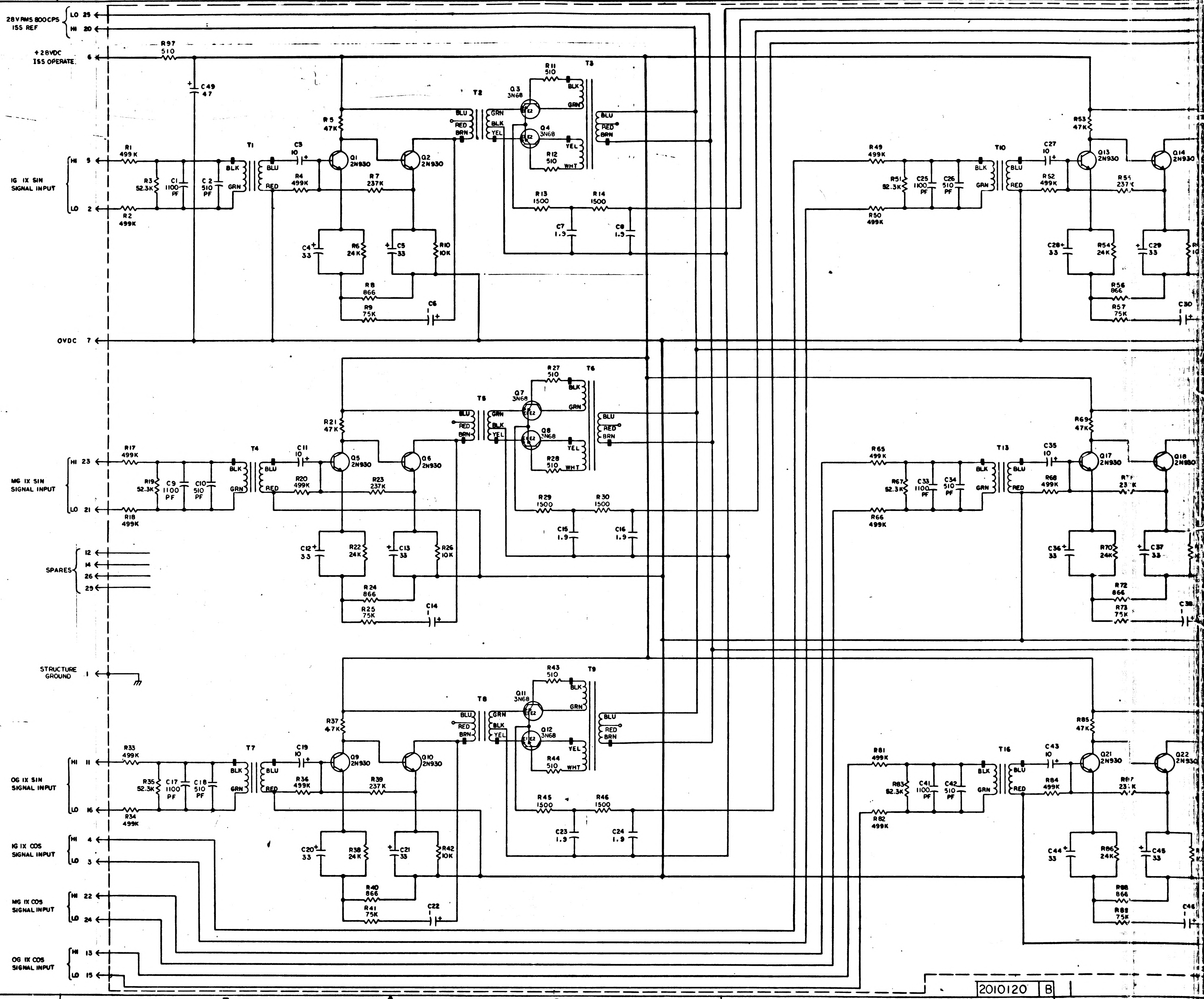
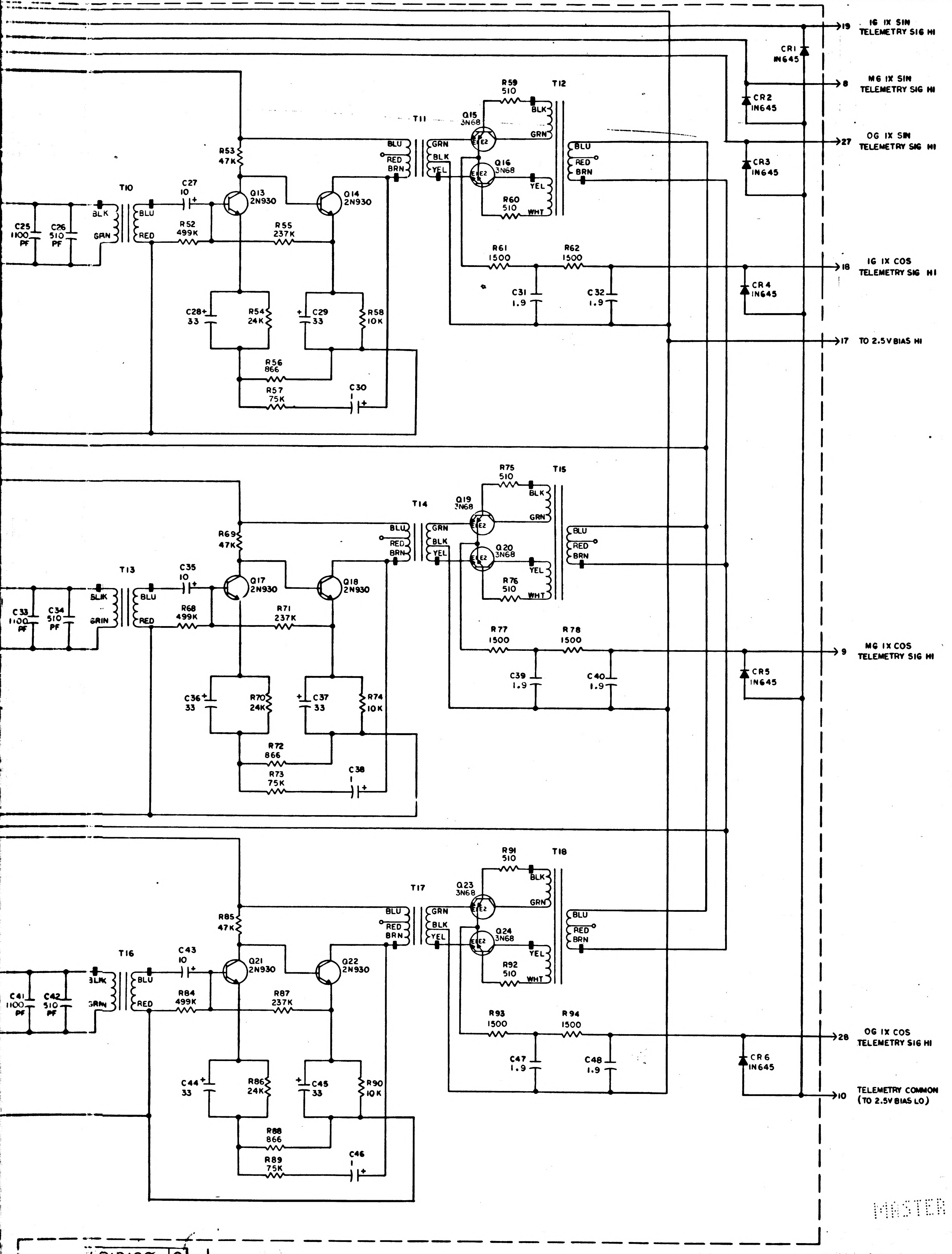

8
7
6
5
D
C
B
A
28VRMS 800CPS ISS REF
LO 25
HI 20
+28VDC ISS OPERATE 6
R97 510
C49 47
IG IX SIN SIGNAL INPUT
HI 5
LO 2
R1 499K
R2 499K
R3 52.3K
C1 1100 PF
C2 510 PF
T1
BLK
GRN
BLU
RED
C3 10
R4 499K
Q1 2N930
Q2 2N930
R5 47K
R7 237K
C4 33
R6 24K
C5 33
R10 10K
R8 866
R9 75K
C6 1
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R11 510
R12 510
T3
WHT
R13 1500
R14 1500
C7 1.9
C8 1.9
OVDC 7
MG IX SIN SIGNAL INPUT
HI 23
LO 21
R17 499K
R18 499K
R19 52.3K
C9 1100 PF
C10 510 PF
T4
C11 10
R20 499K
Q5 2N930
Q6 2N930
R21 47K
R23 237K
C12 33
R22 24K
C13 33
R26 10K
R24 866
R25 75K
C14 1
T5
Q7 3N68
Q8 3N68
R27 510
R28 510
T6
R29 1500
R30 1500
C15 1.9
C16 1.9
SPARES 12 14 26 29
STRUCTURE GROUND 1
OG IX SIN SIGNAL INPUT
HI 11
LO 16
R33 499K
R34 499K
R35 52.3K
C17 1100 PF
C18 510 PF
T7
C19 10
R36 499K
Q9 2N930
Q10 2N930
R37 47K
R39 237K
C20 33
R38 24K
C21 33
R42 10K
R40 866
R41 75K
C22 1
T8
Q11 3N68
Q12 3N68
R43 510
R44 510
T9
R45 1500
R46 1500
C23 1.9
C24 1.9
IG IX COS SIGNAL INPUT
HI 4
LO 3
MG IX COS SIGNAL INPUT
HI 22
LO 24
OG IX COS SIGNAL INPUT
HI 13
LO 15
R49 499K
R50 499K
R51 52.3K
C25 1100 PF
C26 510 PF
T10
C27 10
R52 499K
Q13 2N930
Q14 2N930
R53 47K
C28 33
R54 24K
C29 33
R56 866
R57 75K
C30
R65 499K
R66 499K
R67 52.3K
C33 1100 PF
C34 510 PF
T13
C35 10
R68 499K
Q17 2N930
Q18 2N930
R69 47K
C36 33
R70 24K
C37 33
R72 866
R73 75K
C38
R81 499K
R82 499K
R83 52.3K
C41 1100 PF
C42 510 PF
T16
C43 10
R84 499K
Q21 2N930
Q22 2N930
R85 47K
C44 33
R86 24K
C45 33
R88 866
R89 75K
C46

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPEC'FIED CAPACITOR VALUES ARE IN MICROFARADS

34

2010120 B



19 IG 1X SIN TELEMETRY SIG HI
8 MG 1X SIN TELEMETRY SIG HI
27 OG 1X SIN TELEMETRY SIG HI
18 IG 1X COS TELEMETRY SIG HI
17 TO 2.5V BIAS HI
9 MG 1X COS TELEMETRY SIG HI
28 OG 1X COS TELEMETRY SIG HI
10 TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
T10
T11
T12
T13
T14
T15
T16
T17
T18
Q13 2N930
Q14 2N930
Q15 3N68
Q16 3N68
Q17 2N930
Q18 2N930
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
C25 1100 PF
C26 510 PF
C27 10
C28 33
C29 33
C30 1
C31 1.9
C32 1.9
C33 1100 PF
C34 510 PF
C35 10
C36 33
C37 33
C38 1
C39 1.9
C40 1.9
C41 1100 PF
C42 510 PF
C43 10
C44 33
C45 33
C46 1
C47 1.9
C48 1.9
R52 499K
R53 47K
R54 24K
R55 237K
R56 866
R57 75K
R58 10K
R59 510
R60 510
R61 1500
R62 1500
R68 499K
R69 47K
R70 24K
R71 237K
R72 866
R73 75K
R74 10K
R75 510
R76 510
R77 1500
R78 1500
R84 499K
R85 47K
R86 24K
R87 237K
R88 866
R89 75K
R90 10K
R91 510
R92 510
R93 1500
R94 1500
BLK
GRN
BLU
RED
BRN
YEL
WHT
E1
E2

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 26029	11Feb66	ERL
B	REVISED PER TDRR 27173	3/17/66	LSB
C	REVISED PER TDRR 27781	4/4/66	LSB

REVISIONS 24543

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	1010311-306		75 K	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47 K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	1010311-306		75 K	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	1010311-306		75K	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	1010311-306		75K	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10 W
R73	1010311-306		75K	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	1010311-306		75 K	±1%	1/10 W
R90	1006750-56		1.0 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-20	RESISTOR	330	±2%	1/4 W
C1	1010410-18	CAPACITOR	1100PF	±2%	300 VDC
C2	1010410-10		510 PF	±2%	500 VDC
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-18		1100PF	± 2%	300 VDC
C10	1010410-10		510 PF	± 2%	500 VDC
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-18		1100PF	± 2%	300 VDC
C18	1010410-10		510 PF	± 2%	500 VDC
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-18		1100PF	± 2%	300 VDC
C26	1010410-10		510 PF	± 2%	500 VDC
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-18		1100PF	± 2%	300 VDC
C34	1010410-10		510 PF	± 2%	500 VDC
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-18		1100PF	± 2%	300 VDC
C42	1010410-10		510 PF	± 2%	500 VDC
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-134	CAPACITOR	22	±10%	50VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

REF DWG:
SIGNAL CONDITIONER ASSEMBLY
GIMBAL RESOLVER
DWG NO. 2007230

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO — CONTRACT

DRAWN A. DiLeo DATE 4 OCT 65
CHECKED 8 Nov 65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC
SIGNAL CONDITIONER, GIMBAL RESOLVER

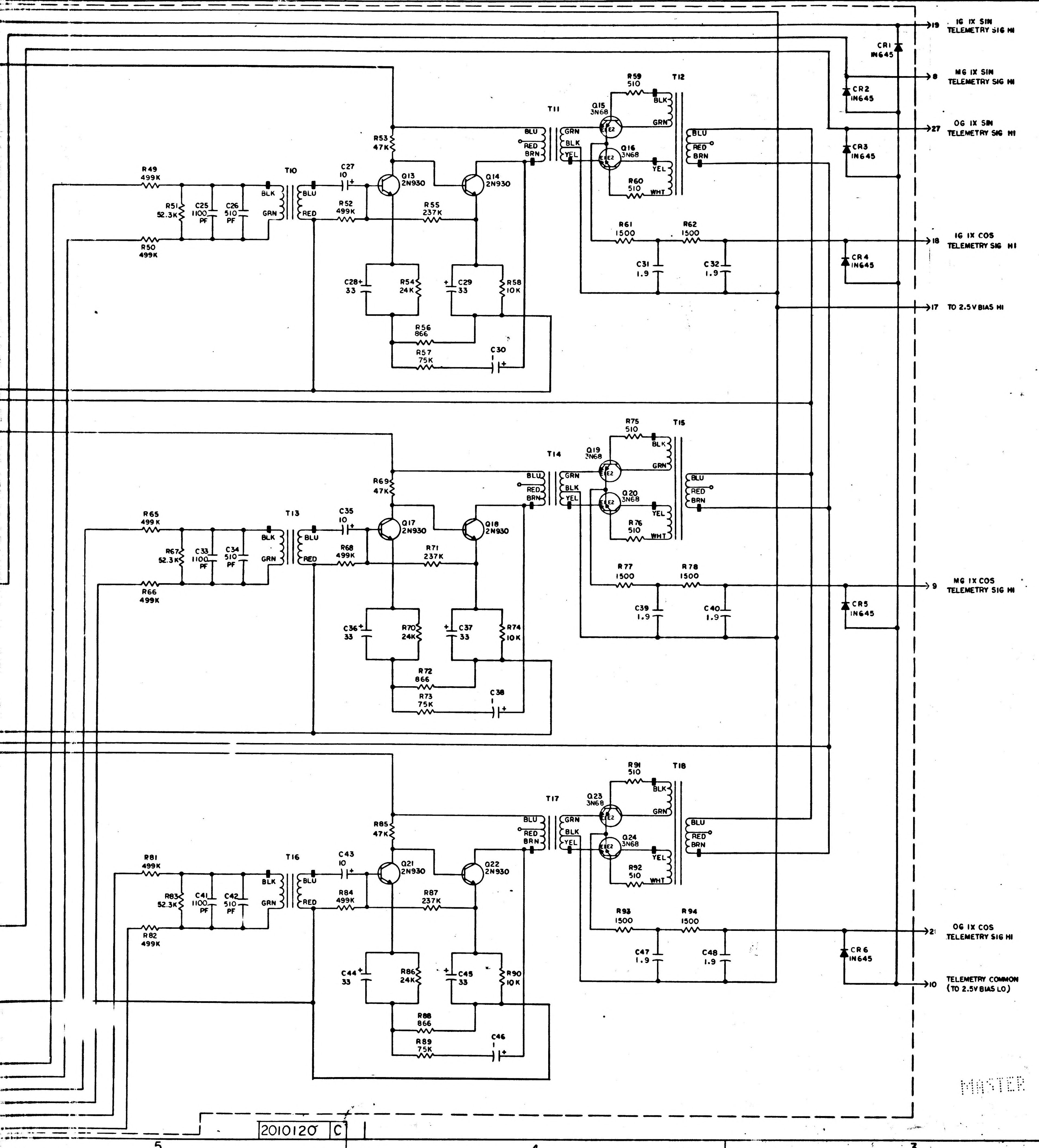
CODE IDENT NO	SIZE	NASA DRAWING NO
80230	J	2010120
SCALE —	WT —	SHEET 1 OF 1

2010120 C

MASTER

3H

E-3


19 IG 1X SIN TELEMETRY SIG HI
8 MG 1X SIN TELEMETRY SIG HI
27 OG 1X SIN TELEMETRY SIG HI
18 IG 1X COS TELEMETRY SIG HI
17 TO 2.5V BIAS HI
9 MG 1X COS TELEMETRY SIG HI
21 OG 1X COS TELEMETRY SIG HI
10 TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
R49 499K
R50 499K
R51 52.3K
C25 1100 PF
C26 510 PF
T10
BLK
GRN
BLU
RED
C27 10
R52 499K
R53 47K
Q13 2N930
Q14 2N930
R55 237K
C28 33
R54 24K
C29 33
R58 10K
R56 866
R57 75K
C30 1
T11
GRN
BLK
YEL
Q15 3N68
Q16 3N68
R59 510
T12
R60 510
WHT
R61 1500
R62 1500
C31 1.9
C32 1.9
R65 499K
R66 499K
R67 52.3K
C33 1100 PF
C34 510 PF
T13
C35 10
R68 499K
R69 47K
Q17 2N930
Q18 2N930
R71 237K
C36 33
R70 24K
C37 33
R74 10K
R72 866
R73 75K
C38 1
T14
Q19 3N68
Q20 3N68
R75 510
T15
R76 510
R77 1500
R78 1500
C39 1.9
C40 1.9
R81 499K
R82 499K
R83 52.3K
C41 1100 PF
C42 510 PF
T16
C43 10
R84 499K
R85 47K
Q21 2N930
Q22 2N930
R87 237K
C44 33
R86 24K
C45 33
R90 10K
R88 866
R89 75K
C46 1
T17
Q23 3N68
Q24 3N68
R91 510
T18
R92 510
R93 1500
R94 1500
C47 1.9
C48 1.9

2010120 C

MASTER

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-120		866	±1%	1/10 W
R9	1010311-306		75K	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1006750-25		510	±2%	1/4 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-120		866	±1%	1/10 W
R25	1010311-306		75K	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-25		510	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-120		866	±1%	1/10 W
R41	1010311-306		75K	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1006750-25		510	±2%	1/4 W
R44	1006750-25		510	±2%	1/4 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-120		866	±1%	1/10 W
R57	1010311-306		75K	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1006750-25		510	±2%	1/4 W
R60	1006750-25		510	±2%	1/4 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-120		866	±1%	1/10 W
R73	1010311-306		75K	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1006750-25		510	±2%	1/4 W
R76	1006750-25		510	±2%	1/4 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-120		866	±1%	1/10 W
R89	1010311-306		75K	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1006750-25		510	±2%	1/4 W
R92	1006750-25		510	±2%	1/4 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R97	1006750-20	RESISTOR	330	±2%	1/4 W
C1	1010410-18	CAPACITOR	1100PF	±2%	300 VDC
C2	1010410-10		510 PF	±2%	500 VDC
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-18		1100PF	± 2%	300 VDC
C10	1010410-10		510 PF	± 2%	500 VDC
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-18		1100PF	± 2%	300 VDC
C18	1010410-10		510 PF	± 2%	500 VDC
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-18		1100PF	± 2%	300 VDC
C26	1010410-10		510 PF	± 2%	500 VDC
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-18		1100PF	± 2%	300 VDC
C34	1010410-10		510 PF	± 2%	500 VDC
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-18		1100PF	± 2%	300 VDC
C42	1010410-10		510 PF	± 2%	500 VDC
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-134	CAPACITOR	22	±10%	50VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

SYM	DESCRIPTION
A	REVISED PER TDRR 2629
B	REVISED PER TDRR 2773
C	REVISED PER TDRR 2781

REF DWG:
SIGNAL CONDITIONER ASSEMBLY
GIMBAL RESOLVER
DWG NO. 2[illegible]07230

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

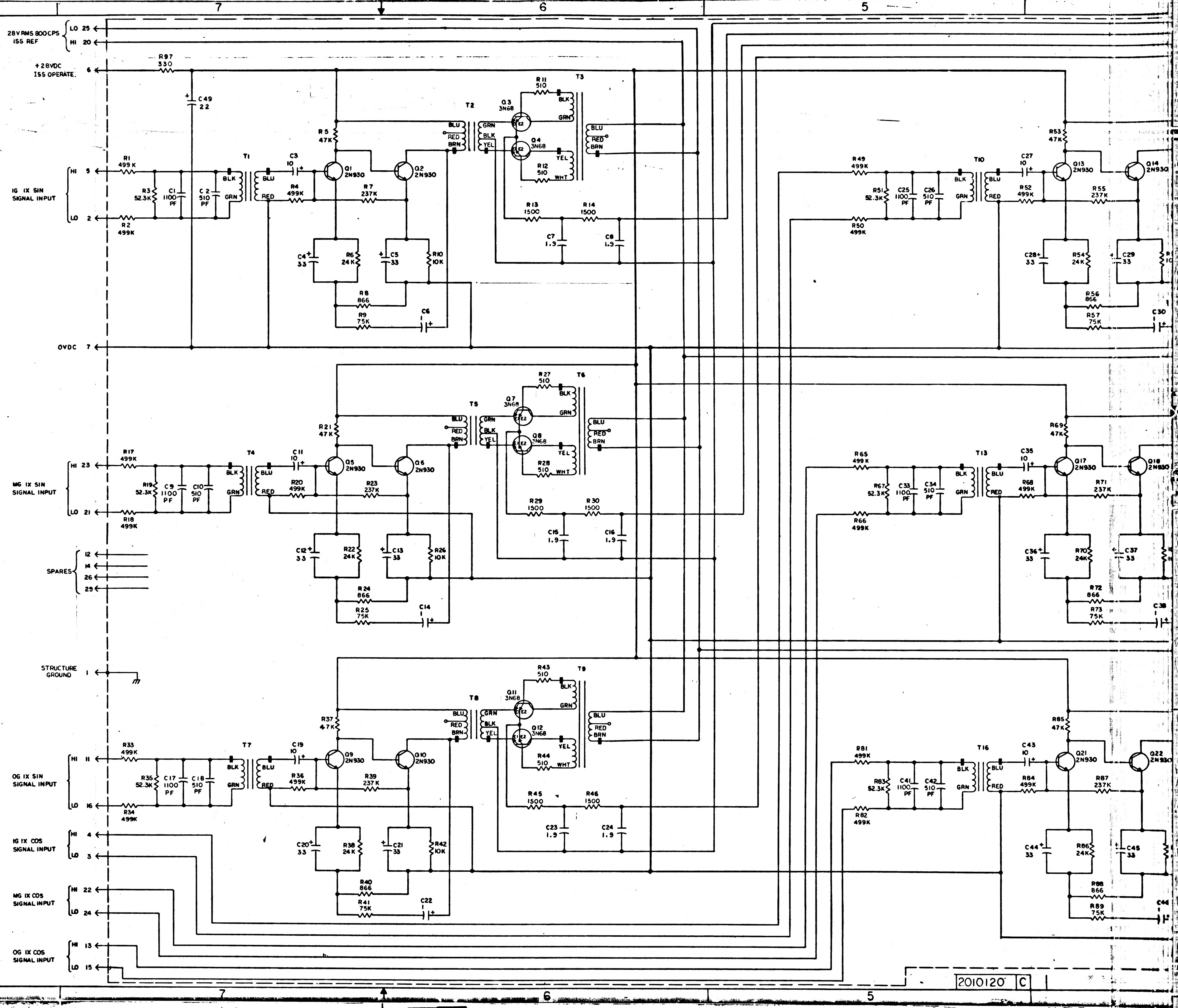
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. Di Leo DATE 4 OCT 65
CHECKED 8 Nov 65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

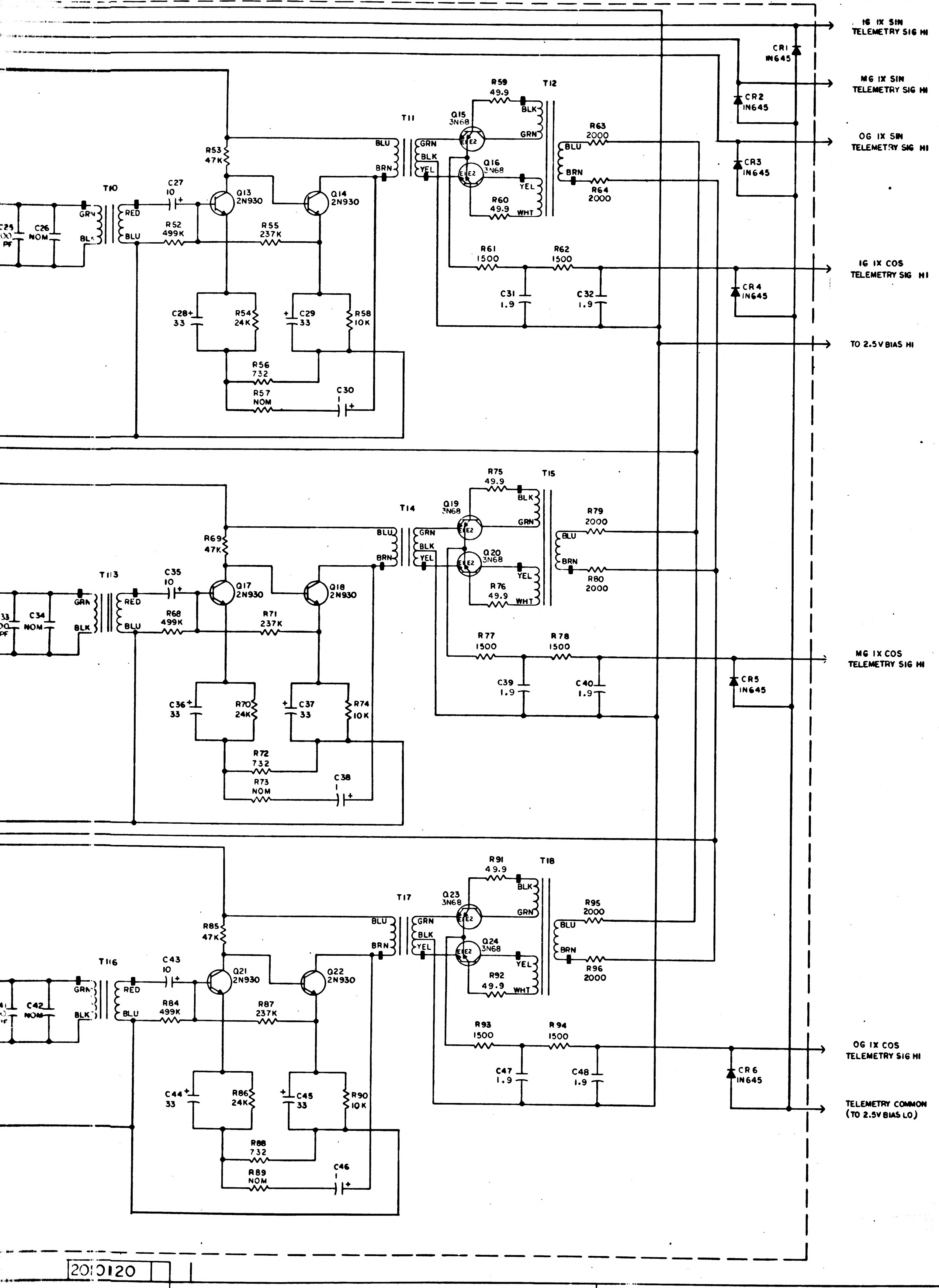
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC
SIGNAL CONDITIONER,
GIMBAL RESOLVER

CODE IDENT NO 80230
SIZE J
2010120
SCALE —
WT —


28V RMS 800CPS ISS REF
LO 25
HI 20
+28VDC ISS OPERATE
6
R97 330
C49 22
IG IX SIN SIGNAL INPUT
HI 5
LO 2
R1 499K
R2 499K
R3 52.3K
C1 1100 PF
C2 510 PF
T1
BLK
GRN
BLU
RED
C3 10
R4 499K
R5 47K
Q1 2N930
Q2 2N930
R7 237K
C4 33
R6 24K
C5 33
R10 10K
R8 866
R9 75K
C6 1
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R11 510
R12 510
T3
WHT
R13 1500
R14 1500
C7 1.9
C8 1.9
OVDC 7
MG IX SIN SIGNAL INPUT
HI 23
LO 21
R17 499K
R18 499K
R19 52.3K
C9 1100 PF
C10 510 PF
T4
C11 10
R20 499K
R21 47K
Q5 2N930
Q6 2N930
R23 237K
C12 33
R22 24K
C13 33
R26 10K
R24 866
R25 75K
C14 1
T5
Q7 3N68
Q8 3N68
R27 510
R28 510
T6
R29 1500
R30 1500
C15 1.9
C16 1.9
SPARES
12
14
26
29
STRUCTURE GROUND 1
OG IX SIN SIGNAL INPUT
HI 11
LO 16
R33 499K
R34 499K
R35 52.3K
C17 1100 PF
C18 510 PF
T7
C19 10
R36 499K
R37 47K
Q9 2N930
Q10 2N930
R39 237K
C20 33
R38 24K
C21 33
R42 10K
R40 866
R41 75K
C22 1
T8
Q11 3N68
Q12 3N68
R43 510
R44 510
T9
R45 1500
R46 1500
C23 1.9
C24 1.9
IG IX COS SIGNAL INPUT
HI 4
LO 3
MG IX COS SIGNAL INPUT
HI 22
LO 24
OG IX COS SIGNAL INPUT
HI 13
LO 15
R49 499K
R50 499K
R51 52.3K
C25 1100 PF
C26 510 PF
T10
C27 10
R52 499K
R53 47K
Q13 2N930
Q14 2N930
R55 237K
C28 33
R54 24K
C29 33
R56 866
R57 75K
C30
R65 499K
R66 499K
R67 52.3K
C33 1100 PF
C34 510 PF
T13
C35 10
R68 499K
R69 47K
Q17 2N930
Q18 2N930
R71 237K
C36 33
R70 24K
C37 33
R72 866
R73 75K
C38
R81 499K
R82 499K
R83 52.3K
C41 1100 PF
C42 510 PF
T16
C43 10
R84 499K
R85 47K
Q21 2N930
Q22 2N930
R87 237K
C44 33
R86 24K
C45 33
R88 866
R89 75K
C46
8
7
6
5
D
C
B
A
2010120 C

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS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MG 1X SIN TELEMETRY SIG HI
OG 1X SIN TELEMETRY SIG HI
1G 1X COS TELEMETRY SIG HI
TO 2.5V BIAS HI
MG 1X COS TELEMETRY SIG HI
OG 1X COS TELEMETRY SIG HI
TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
T10
T11
T12
T13
T14
T15
T16
T17
T18
Q13 2N930
Q14 2N930
Q15 3N68
Q16 3N68
Q17 2N930
Q18 2N930
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
C27 10
C35 10
C43 10
R52 499K
R68 499K
R84 499K
R53 47K
R69 47K
R85 47K
R55 237K
R71 237K
R87 237K
R54 24K
R70 24K
R86 24K
R58 10K
R74 10K
R90 10K
R56 732
R72 732
R88 732
R57 NOM
R73 NOM
R89 NOM
C28 33
C29 33
C36 33
C37 33
C44 33
C45 33
C30
C38
C46
R59 49.9
R60 49.9
R75 49.9
R76 49.9
R91 49.9
R92 49.9
R61 1500
R62 1500
R77 1500
R78 1500
R93 1500
R94 1500
C31 1.9
C32 1.9
C39 1.9
C40 1.9
C47 1.9
C48 1.9
R63 2000
R64 2000
R79 2000
R80 2000
R95 2000
R96 2000
C26 NOM
C34 NOM
C42 NOM
GRN
BLK
RED
BLU
BRN
YEL
WHT
4
3
2010120

2
1

REVISIONS 24543

SYM DESCRIPTION

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-113		732	±1%	1/10 W
R9	SEE NOTE 4		NOM	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1010311-1		49.9	±1%	1/10 W
R12	1010311-1		49.9	±1%	1/10 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-39		2000	±2%	1/4 W
R16	1006750-39		2000	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47 K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-113		732	±1%	1/10 W
R25	SEE NOTE 4		NOM	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1010311-1		49.9	±1%	1/10 W
R28	1010311-1		49.9	±1%	1/10 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R31	1006750-39		2000	±2%	1/4 W
R32	1006750-39		2000	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-113		732	±1%	1/10 W
R41	SEE NOTE 4		NOM	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1010311-1		49.9	±1%	1/10 W
R44	1010311-1		49.9	±1%	1/10 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R47	1006750-39		2000	±2%	1/4 W
R48	1006750-39		2000	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-113		732	±1%	1/10 W
R57	SEE NOTE 4		NOM	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1010311-1		49.9	±1%	1/10 W
R60	1010311-1		49.9	±1%	1/10 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R63	1006750-39		2000	±2%	1/4 W
R64	1006750-39		2000	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-113		732	±1%	1/10 W
R73	SEE NOTE 4		NOM	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1010311-1		49.9	±1%	1/10 W
R76	1010311-1		49.9	±1%	1/10 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R79	1006750-39		2000	±2%	1/4 W
R80	1006750-39		2000	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-113		732	±1%	1/10 W
R89	SEE NOTE 4		NOM	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1010311-1		49.9	±1%	1/10 W
R92	1010311-1		49.9	±1%	1/10 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R95	1006750-39		2000	±2%	1/4 W
R96	1006750-39		2000	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-19	CAPACITOR	1200PF	±2%	500 VDC
C2	SEE NOTE 4		NOM	±2%	
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-19		1200PF	±2%	500 VDC
C10	SEE NOTE 4		NOM	±2%	—
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-19		1200PF	±2%	500 VDC
C18	SEE NOTE 4		NOM	±2%	—
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-19		1200PF	±2%	500 VDC
C26	SEE NOTE 4		NOM	±2%	—
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-19		1200PF	±2%	500 VDC
C34	SEE NOTE 4		NOM	±2%	—
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-19		1200PF	±2%	500 VDC
C42	SEE NOTE 4		NOM	±2%	—
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1010324				
T3	1010323				
T4	1008832				
T5	1010324				
T6	1010323				
T7	1008832				
T8	1010324				
T9	1010323				
T10	1008832				
T11	1010324				
T12	1010323				
T13	1008832				
T14	1010324				
T15	1010323				
T16	1008832				
T17	1010324				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

R9,R25,R41,R57,R73,R89

PART NO.	VALUE
1010311-296	59.0 K
-297	60.4 K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8 K
-304	71.5 K
-305	73.2 K
-306	75.0 K
-307	76.8 K
-308	78.7 K
-309	80.6 K
-310	82.5 K
-311	84.5 K
-312	86.6 K
-313	88.7 K
1010311-314	90.9 K

C2,C10,C18,C26,C34,C42

PART NO	VALUE	RATING
1010410-1	220PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	
-11	560	300 VDC
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200PF	

REF DWG:
SIGNAL CONDITIONER ASSEMBLY
GIMBAL RESOLVER
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN A. D. Leo DATE 4 OCT 65
CHECKED 8 Nov 65
APPROVAL J. 22 Nov 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC
SIGNAL CONDITIONER, GIMBAL RESOLVER

CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2010120
SCALE —
WT —
SHEET 1 OF 1

D
C
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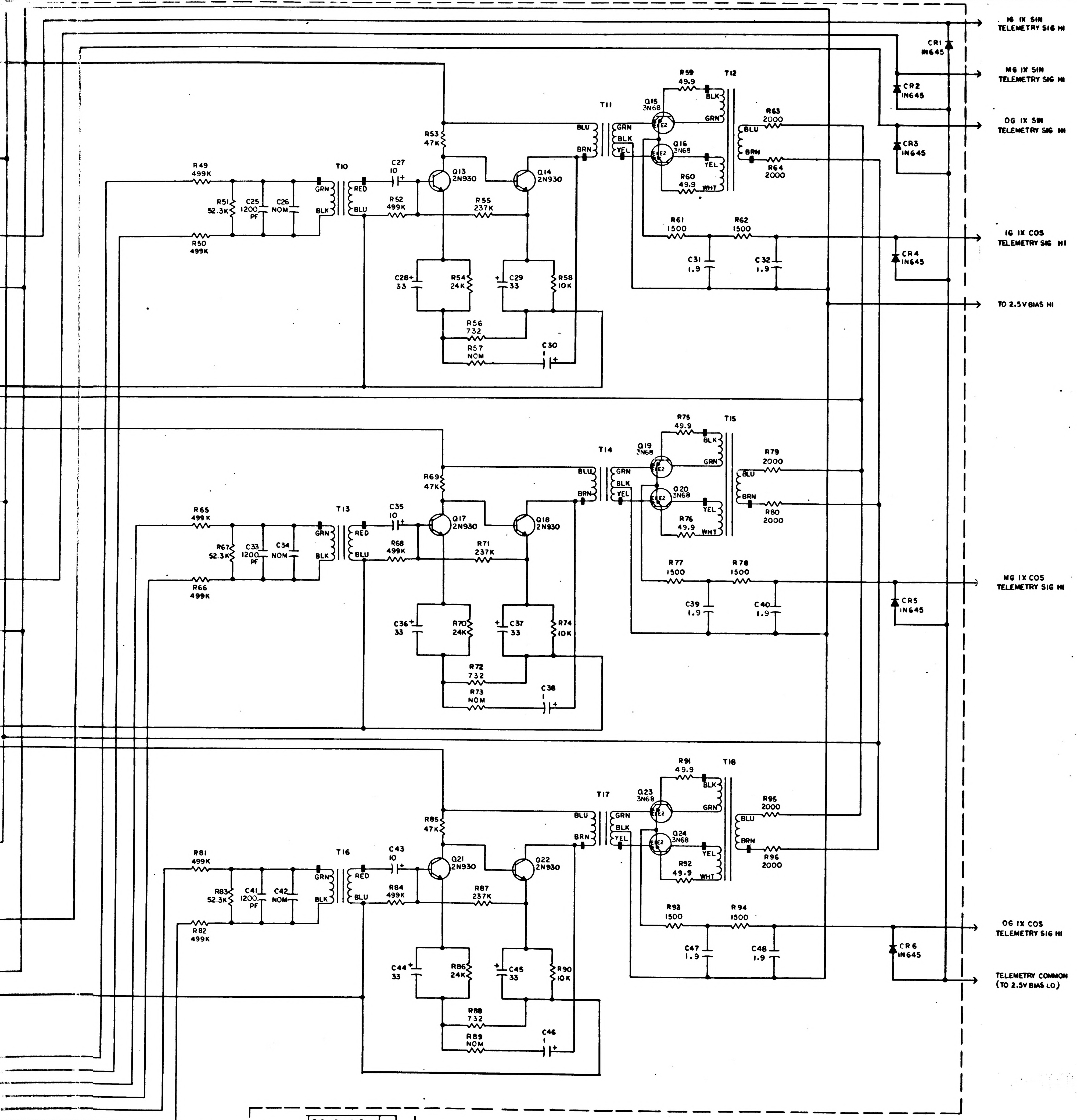
2010120
3H

E3


5
4
3
2
1
IG IX SIN TELEMETRY SIG HI
MG IX SIN TELEMETRY SIG HI
OG IX SIN TELEMETRY SIG HI
IG IX COS TELEMETRY SIG HI
TO 2.5V BIAS HI
MG IX COS TELEMETRY SIG HI
OG IX COS TELEMETRY SIG HI
TELEMETRY COMMON (TO 2.5V BIAS LO)
CR1 IN645
CR2 IN645
CR3 IN645
CR4 IN645
CR5 IN645
CR6 IN645
R49 499K
R50 499K
R51 52.3K
C25 1200 PF
C26 NOM
T10
GRN
BLK
RED
BLU
C27 10
R52 499K
Q13 2N930
Q14 2N930
R55 237K
R53 47K
T11
BLU
BRN
GRN
BLK
YEL
Q15 3N68
Q16 3N68
R59 49.9
R60 49.9
T12
BLK
GRN
YEL
WHT
BLU
BRN
R63 2000
R64 2000
R61 1500
R62 1500
C31 1.9
C32 1.9
C28 33
R54 24K
C29 33
R58 10K
R56 732
R57 NOM
C30
R65 499K
R66 499K
R67 52.3K
C33 1200 PF
C34 NOM
T13
C35 10
R68 499K
Q17 2N930
Q18 2N930
R71 237K
R69 47K
T14
Q19 3N68
Q20 3N68
R75 49.9
R76 49.9
T15
R79 2000
R80 2000
R77 1500
R78 1500
C39 1.9
C40 1.9
C36 33
R70 24K
C37 33
R74 10K
R72 732
R73 NOM
C38
R81 499K
R82 499K
R83 52.3K
C41 1200 PF
C42 NOM
T16
C43 10
R84 499K
Q21 2N930
Q22 2N930
R87 237K
R85 47K
T17
Q23 3N68
Q24 3N68
R91 49.9
R92 49.9
T18
R95 2000
R96 2000
R93 1500
R94 1500
C47 1.9
C48 1.9
C44 33
R86 24K
C45 33
R90 10K
R88 732
R89 NOM
C46
E2

2010120

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010364-769	RESISTOR	499 K	±1%	1/8 W
R2	1010364-769		499 K	±1%	1/8 W
R3	1010311-291		52.3 K	±1%	1/10 W
R4	1010364-769		499 K	±1%	1/8 W
R5	1006750-72		47 K	±2%	1/4 W
R6	1006750-65		24 K	±2%	1/4 W
R7	1010364-707		237 K	±1%	1/8 W
R8	1010311-113		732	±1%	1/10 W
R9	SEE NOTE 4		NOM	±1%	1/10 W
R10	1006750-56		10 K	±2%	1/4 W
R11	1010311-1		49.9	±1%	1/10 W
R12	1010311-1		49.9	±1%	1/10 W
R13	1006750-36		1500	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-39		2000	±2%	1/4 W
R16	1006750-39		2000	±2%	1/4 W
R17	1010364-769		499 K	±1%	1/8 W
R18	1010364-769		499 K	±1%	1/8 W
R19	1010311-291		52.3 K	±1%	1/10 W
R20	1010364-769		499 K	±1%	1/8 W
R21	1006750-72		47 K	±2%	1/4 W
R22	1006750-65		24 K	±2%	1/4 W
R23	1010364-707		237 K	±1%	1/8 W
R24	1010311-113		732	±1%	1/10 W
R25	SEE NOTE 4		NOM	±1%	1/10 W
R26	1006750-56		10 K	±2%	1/4 W
R27	1010311-1		49.9	±1%	1/10 W
R28	1010311-1		49.9	±1%	1/10 W
R29	1006750-36		1500	±2%	1/4 W
R30	1006750-36		1500	±2%	1/4 W
R31	1006750-39		2000	±2%	1/4 W
R32	1006750-39		2000	±2%	1/4 W
R33	1010364-769		499 K	±1%	1/8 W
R34	1010364-769		499 K	±1%	1/8 W
R35	1010311-291		52.3 K	±1%	1/10 W
R36	1010364-769		499 K	±1%	1/8 W
R37	1006750-72		47 K	±2%	1/4 W
R38	1006750-65		24 K	±2%	1/4 W
R39	1010364-707		237 K	±1%	1/8 W
R40	1010311-113		732	±1%	1/10 W
R41	SEE NOTE 4		NOM	±1%	1/10 W
R42	1006750-56		10 K	±2%	1/4 W
R43	1010311-1		49.9	±1%	1/10 W
R44	1010311-1		49.9	±1%	1/10 W
R45	1006750-36		1500	±2%	1/4 W
R46	1006750-36		1500	±2%	1/4 W
R47	1006750-39		2000	±2%	1/4 W
R48	1006750-39		2000	±2%	1/4 W
R49	1010364-769		499 K	±1%	1/8 W
R50	1010364-769		499 K	±1%	1/8 W
R51	1010311-291		52.3 K	±1%	1/10 W
R52	1010364-769		499 K	±1%	1/8 W
R53	1006750-72		47 K	±2%	1/4 W
R54	1006750-65		24 K	±2%	1/4 W
R55	1010364-707		237 K	±1%	1/8 W
R56	1010311-113		732	±1%	1/10 W
R57	SEE NOTE 4		NOM	±1%	1/10 W
R58	1006750-56		10 K	±2%	1/4 W
R59	1010311-1		49.9	±1%	1/10 W
R60	1010311-1		49.9	±1%	1/10 W
R61	1006750-36		1500	±2%	1/4 W
R62	1006750-36		1500	±2%	1/4 W
R63	1006750-39		2000	±2%	1/4 W
R64	1006750-39		2000	±2%	1/4 W
R65	1010364-769		499 K	±1%	1/8 W
R66	1010364-769		499 K	±1%	1/8 W
R67	1010311-291		52.3 K	±1%	1/10 W
R68	1010364-769		499 K	±1%	1/8 W
R69	1006750-72		47 K	±2%	1/4 W
R70	1006750-65		24 K	±2%	1/4 W
R71	1010364-707		237 K	±1%	1/8 W
R72	1010311-113		732	±1%	1/10 W
R73	SEE NOTE 4		NOM	±1%	1/10 W
R74	1006750-56		10 K	±2%	1/4 W
R75	1010311-1		49.9	±1%	1/10 W
R76	1010311-1		49.9	±1%	1/10 W
R77	1006750-36		1500	±2%	1/4 W
R78	1006750-36		1500	±2%	1/4 W
R79	1006750-39		2000	±2%	1/4 W
R80	1006750-39		2000	±2%	1/4 W
R81	1010364-769		499 K	±1%	1/8 W
R82	1010364-769		499 K	±1%	1/8 W
R83	1010311-291		52.3 K	±1%	1/10 W
R84	1010364-769		499 K	±1%	1/8 W
R85	1006750-72		47 K	±2%	1/4 W
R86	1006750-65		24 K	±2%	1/4 W
R87	1010364-707		237 K	±1%	1/8 W
R88	1010311-113		732	±1%	1/10 W
R89	SEE NOTE 4		NOM	±1%	1/10 W
R90	1006750-56		10 K	±2%	1/4 W
R91	1010311-1		49.9	±1%	1/10 W
R92	1010311-1		49.9	±1%	1/10 W
R93	1006750-36		1500	±2%	1/4 W
R94	1006750-36		1500	±2%	1/4 W
R95	1006750-39		2000	±2%	1/4 W
R96	1006750-39		2000	±2%	1/4 W
R97	1006750-25	RESISTOR	510	±2%	1/4 W
C1	1010410-19	CAPACITOR	1200PF	±2%	500 VDC
C2	SEE NOTE 4		NOM	±2%	
C3	1006755-31		10 UF	±10%	20 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C4	1006755-34	CAPACITOR	33	±10%	20 VDC
C5	1006755-34		33	±10%	20 VDC
C6	1006755-69		1	±10%	35 VDC
C7	1010279-16		1.9	±10%	6 VDC
C8	1010279-16		1.9	±10%	6 VDC
C9	1010410-19		1200PF	± 2%	500 VDC
C10	SEE NOTE 4		NOM	± 2%	———
C11	1006755-31		10	±10%	20 VDC
C12	1006755-34		33	±10%	20 VDC
C13	1006755-34		33	±10%	20 VDC
C14	1006755-69		1	±10%	35 VDC
C15	1010279-16		1.9	±10%	6 VDC
C16	1010279-16		1.9	±10%	6 VDC
C17	1010410-19		1200PF	± 2%	500 VDC
C18	SEE NOTE 4		NOM	± 2%	———
C19	1006755-31		10	±10%	20 VDC
C20	1006755-34		33	±10%	20 VDC
C21	1006755-34		33	±10%	20 VDC
C22	1006755-69		1	±10%	35 VDC
C23	1010279-16		1.9	±10%	6 VDC
C24	1010279-16		1.9	±10%	6 VDC
C25	1010410-19		1200PF	± 2%	500 VDC
C26	SEE NOTE 4		NOM	± 2%	———
C27	1006755-31		10	±10%	20 VDC
C28	1006755-34		33	±10%	20 VDC
C29	1006755-34		33	±10%	20 VDC
C30	1006755-69		1	±10%	35 VDC
C31	1010279-16		1.9	±10%	6 VDC
C32	1010279-16		1.9	±10%	6 VDC
C33	1010410-19		1200PF	± 2%	500 VDC
C34	SEE NOTE 4		NOM	± 2%	———
C35	1006755-31		10	±10%	20 VDC
C36	1006755-34		33	±10%	20 VDC
C37	1006755-34		33	±10%	20 VDC
C38	1006755-69		1	±10%	35 VDC
C39	1010279-16		1.9	±10%	6 VDC
C40	1010279-16		1.9	±10%	6 VDC
C41	1010410-19		1200PF	± 2%	500 VDC
C42	SEE NOTE 4		NOM	± 2%	———
C43	1006755-31		10	±10%	20 VDC
C44	1006755-34		33	±10%	20 VDC
C45	1006755-34		33	±10%	20 VDC
C46	1006755-69		1	±10%	35 VDC
C47	1010279-16		1.9	±10%	6 VDC
C48	1010279-16		1.9	±10%	6 VDC
C49	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1010324				
T3	1010323				
T4	1008832				
T5	1010324				
T6	1010323				
T7	1008832				
T8	1010324				
T9	1010323				
T10	1008832				
T11	1010324				
T12	1010323				
T13	1008832				
T14	1010324				
T15	1010323				
T16	1008832				
T17	1010324				
T18	1010323	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397-1	TRANSISTOR	2N930		
Q14	1010397-1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397-1	TRANSISTOR	2N930		
Q18	1010397-1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	1010837-001	DIODE	IN645		

R9, R25, R41, R57, R73, R89	
PART NO.	VALUE
1010311-296	59.0 K
-297	60.4 K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8 K
-304	71.5 K
-305	73.2 K
-306	75.0 K
-307	76.8 K
-308	78.7 K
-309	80.6 K
-310	82.5 K
-311	84.5 K
-312	86.6 K
-313	88.7 K
1010311-314	90.9 K

C2, C10, C18, C26, C34, C42		
PART NO.	VALUE	RATING
1010410-1	220PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	
-11	560	300 VDC
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200PF	

REF DWG:
SIGNAL CONDITIO
GIMBAL RESOLVE
DWG NO.

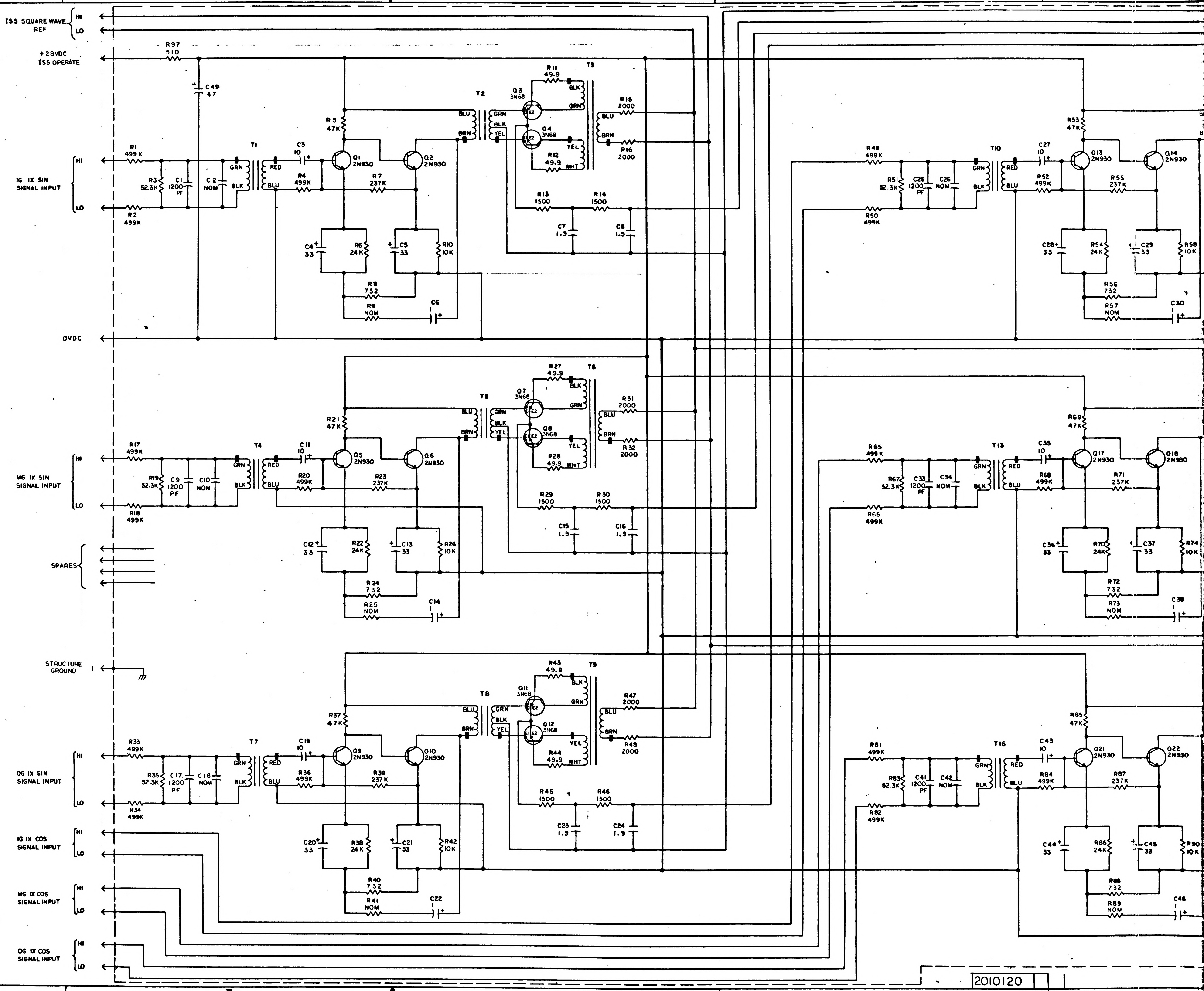
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
LIST OF MATERIALS		

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A. Di Leo DATE 4 OCT 65
CHECKED 8 Nov 65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRA
HOUSTON T
SCHEMA
SIGNAL CONDI
GIMBAL RESO
CODE IDENT NO 80230
SIZE J
20
SCALE —
WT —


ISS SQUARE WAVE REF
HI
LO
+28VDC ISS OPERATE
R97 510
C49 47
IG IX SIN SIGNAL INPUT
R1 499K
R2 499K
R3 52.3K
C1 1200 PF
C2 NOM
T1
GRN
BLK
RED
BLU
C3 10
R4 499K
R5 47K
Q1 2N930
Q2 2N930
R7 237K
C4 33
R6 24K
C5 33
R10 10K
R8 732
R9 NOM
C6 1
T2
Q3 3N68
Q4 3N68
R11 49.9
R12 49.9
T3
R15 2000
R16 2000
R13 1500
R14 1500
C7 1.9
C8 1.9
YEL
WHT
OVDC
MG IX SIN SIGNAL INPUT
R17 499K
R18 499K
R19 52.3K
C9 1200 PF
C10 NOM
T4
C11 10
R20 499K
R21 47K
Q5 2N930
Q6 2N930
R23 237K
C12 33
R22 24K
C13 33
R26 10K
R24 732
R25 NOM
C14 1
T5
Q7 3N68
Q8 3N68
R27 49.9
R28 49.9
T6
R31 2000
R32 2000
R29 1500
R30 1500
C15 1.9
C16 1.9
SPARES
STRUCTURE GROUND
OG IX SIN SIGNAL INPUT
R33 499K
R34 499K
R35 52.3K
C17 1200 PF
C18 NOM
T7
C19 10
R36 499K
R37 47K
Q9 2N930
Q10 2N930
R39 237K
C20 33
R38 24K
C21 33
R42 10K
R40 732
R41 NOM
C22 1
T8
Q11 3N68
Q12 3N68
R43 49.9
R44 49.9
T9
R47 2000
R48 2000
R45 1500
R46 1500
C23 1.9
C24 1.9
IG IX COS SIGNAL INPUT
MG IX COS SIGNAL INPUT
OG IX COS SIGNAL INPUT
R49 499K
R50 499K
R51 52.3K
C25 1200 PF
C26 NOM
T10
C27 10
R52 499K
R53 47K
Q13 2N930
Q14 2N930
R55 237K
C28 33
R54 24K
C29 33
R58 10K
R56 732
R57 NOM
C30 1
R65 499K
R66 499K
R67 52.3K
C33 1200 PF
C34 NOM
T13
C35 10
R68 499K
R69 47K
Q17 2N930
Q18 2N930
R71 237K
C36 33
R70 24K
C37 33
R74 10K
R72 732
R73 NOM
C38 1
R81 499K
R82 499K
R83 52.3K
C41 1200 PF
C42 NOM
T16
C43 10
R84 499K
R85 47K
Q21 2N930
Q22 2N930
R87 237K
C44 33
R86 24K
C45 33
R90 10K
R88 732
R89 NOM
C46 1
8
7
6
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D
C
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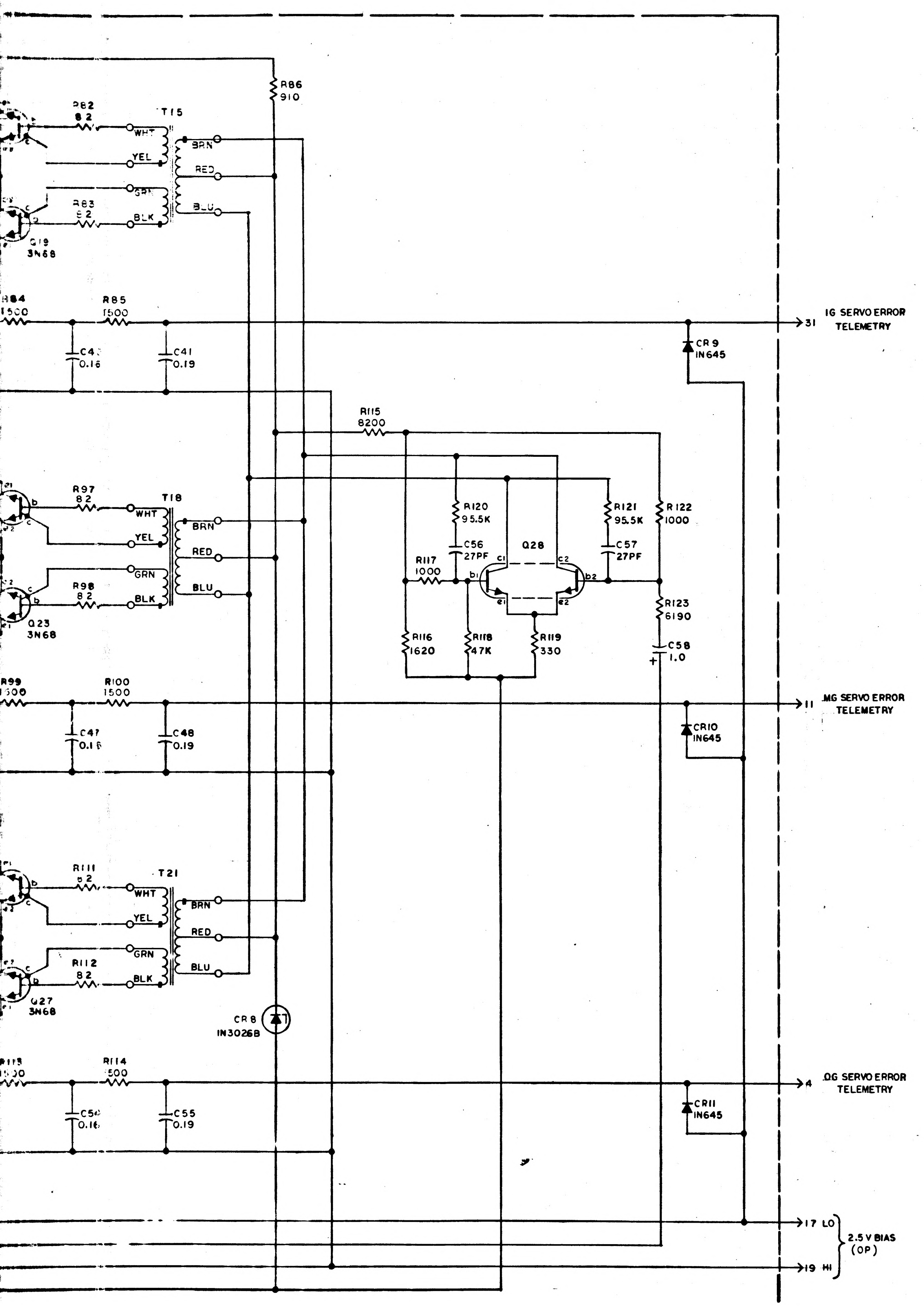
2010120

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SELECT R9, R25, R41, R57, R73, R89, C2, C10, C18, C26, C34 & C42 PER APPLICABLE P.S. FROM APPROPRIATE CHART

3H



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750 - 11	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10 K	2	1/4 W
R12	1010311 - 311		84.5K	1	1/10W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1006760 - 31		910	2	1/2 W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10 K	2	1/4 W
R28	1010311 - 311		84.5K	1	1/10 W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10 W
R34	1010311 - 315		93.1K	1	1/10W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 311		84.5K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1/10 W
R50	1006750 - 72		47K	2	1/4 W
R51	1006750 - 20		330	2	1/4 W
R52	1006750 - 163		95.5K	2	1/4 W
R53	1006750 - 163		95.5K	2	1/4 W
R54	1010311 - 126		1000	1	1/10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 36		1500	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9K	1	1/10W
R65	1010364 - 657		130 K	1	1/10W
R66	1010377 - 306		12.5K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 153		37.5K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10W
R73	1010311 - 315		93.1K	1	1/10W
R74	1010311 - 291		52.3K	1	1/10W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10 K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1006760 - 31		910	2	1/2 W
R87	1010311 - 315		93.1K	1	1/10W
R88	1010311 - 315		93.1K	1	1/10W
R89	1010311 - 291		52.3K	1	1/10W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 163		95.5K	2	1/4 W
R121	1006750 - 163		95.5K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1010830-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR9	1010837-001		IN645		
CR10	1010837-001		IN645		
CR11	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REPLACES REV - WITH CHANGE PER TDRR 27966	ADL	RPK		

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

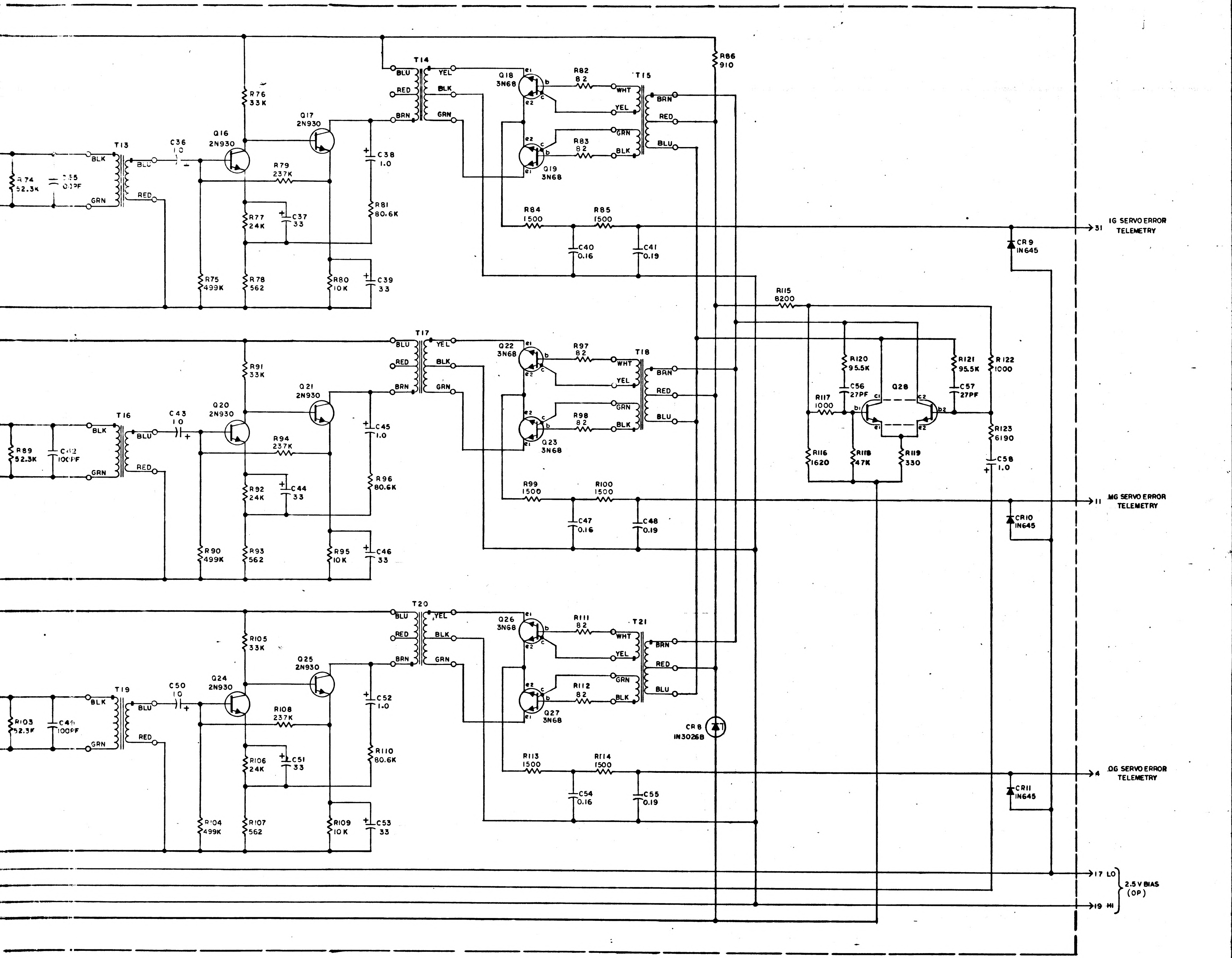
DRAWN A. D. Lee 20 APRIL 66
CHECKED
APPROVED 11 April 66
APPROVED
APPROVED MIT
APPROVED MSC
A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER IRIG & PIPA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010122
SCALE —
SHEET OF

2010122 A


T13
T14
T15
T16
T17
T18
T19
T20
T21
BLK
BLU
RED
GRN
BRN
YEL
WHT
R74 52.3K
C35 0.1PF
C36 1.0
Q16 2N930
Q17 2N930
R76 33K
R79 237K
R77 24K
C37 33
R75 499K
R78 562
R80 10K
C39 33
C38 1.0
R81 80.6K
Q18 3N68
Q19 3N68
R82 82
R83 82
R84 1500
R85 1500
C40 0.16
C41 0.19
R86 910
R89 52.3K
C42 100PF
C43 1.0
Q20 2N930
Q21 2N930
R91 33K
R94 237K
R92 24K
C44 33
R90 499K
R93 562
R95 10K
C46 33
C45 1.0
R96 80.6K
Q22 3N68
Q23 3N68
R97 82
R98 82
R99 1500
R100 1500
C47 0.16
C48 0.19
R103 52.3K
C49 100PF
C50 1.0
Q24 2N930
Q25 2N930
R105 33K
R108 237K
R106 24K
C51 33
R104 499K
R107 562
R109 10K
C53 33
C52 1.0
R110 80.6K
Q26 3N68
Q27 3N68
R111 82
R112 82
R113 1500
R114 1500
C54 0.16
C55 0.19
CR8 IN3026B
R115 8200
R120 95.5K
C56 27PF
R117 1000
Q28
R121 95.5K
C57 27PF
R122 1000
R116 1620
R118 47K
R119 330
R123 6190
C58 1.0
CR9 IN645
CR10 IN645
CR11 IN645
31 IG SERVO ERROR TELEMETRY
11 MG SERVO ERROR TELEMETRY
4 OG SERVO ERROR TELEMETRY
17 LO
19 HI
2.5 V BIAS (OP)

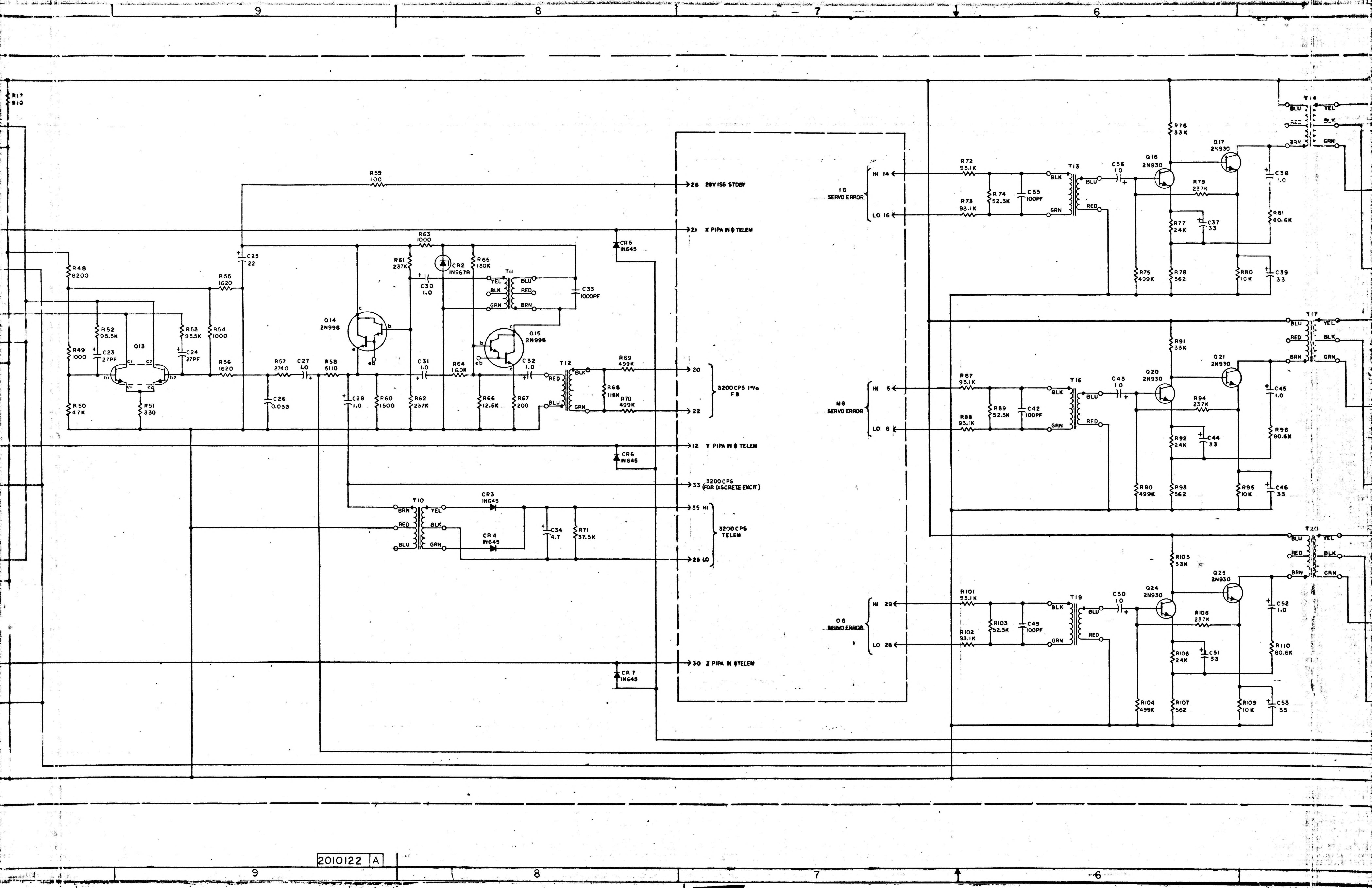
REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10K	2	1/4 W
R12	1010311 - 311		84.5K	1	1/10W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1006760 - 31		910	2	1/2 W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10K	2	1/4 W
R28	1010311 - 311		84.5K	1	1/10W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10W
R34	1010311 - 315		93.1K	1	1/10W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 311		84.5K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1 10W
R50	1006750 - 72		47K	2	1 4 W
R51	1006750 - 20		330	2	1 4 W
R52	1006750 - 163		95.5K	2	1 4 W
R53	1006750 - 163		95.5K	2	1 4 W
R54	1010311 - 126		1000	1	1 10W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 36		1500	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9K	1	1/10W
R65	1010364 - 657		130K	1	1/10W
R66	1010377 - 306		12.5K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 153		37.5K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10W
R73	1010311 - 315		93.1K	1	1/10W
R74	1010311 - 291		52.3K	1	1/10W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1006760 - 31		910	2	1/2 W
R87	1010311 - 315		93.1K	1	1/10 W
R88	1010311 - 315		93.1K	1	1/10 W
R89	1010311 - 291		52.3K	1	1/10 W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 163		95.5K	2	1/4 W
R121	1006750 - 163		95.5K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %
C1	1006755-134	CAPACITOR	2.2	10
C2	1010409-25		100PF	2
C3	1006755-31		10	10
C4	1006755-34		33	
C5	1006755-69		1.0	
C6	1006755-34		33	
C7	1010279-7		0.[illegible]4	
C8	1010279-9		0.[illegible]0	10
C9	1010409-25		100PF	2
C10	1006755-31		10	10
C11	1006755-34		33	
C12	1006755-69		1.0	
C13	1006755-34		33	
C14	1010279-7		0.[illegible]4	
C15	1010279-9		0.[illegible]0	10
C16	1010409-25		100PF	2
C17	1006755-31		10	10
C18	1006755-34		33	
C19	1006755-69		1.0	
C20	1006755-34		33	
C21	1010279-7		0.[illegible]4	
C22	1010279-9		0.[illegible]0	10
C23	1010409-11		27PF	2
C24	1010409-11		27PF	2
C25	1006755-134		2.2	10
C26	1010316-19		0.033	1
C27	1006755-69		1.0	10
C28	-69		1.0	
C30	-69		1.0	
C31	-69		1.0	
C32	1006755-69		1.0	10
C33	1010410-17		1000PF	2
C34	1006755-77		4.7	10
C35	1010409-25		100PF	2
C36	1006755-31		10	10
C37	1006755-34		33	
C38	1006755-69		1.0	
C39	1006755-34		33	
C40	1010279-3		0.16	
C41	1010279-4		0.19	10
C42	1010409-25		100PF	2
C43	1006755-31		10	10
C44	1006755-34		33	
C45	1006755-69		1.0	
C46	1006755-34		33	
C47	1010279-3		0.16	
C48	1010279-4		0.19	10
C49	1010409-25		100PF	2
C50	1006755-31		10	10
C51	1006755-34		33	
C52	1006755-69		1.0	
C53	1006755-34		33	
C54	1010279-3		0.16	
C55	1010279-4		0.19	10
C56	1010409-11		27PF	2
C57	1010409-11		27PF	2
C58	1006755-69	CAPACITOR	1.0	10
CR1	1010829-11	DIODE	IN3026B	
CR2	1010830-11		IN96[illegible]B	
CR3	1010837-001		IN645	
CR4	-001		IN645	
CR5	-001		IN645	
CR6	-001		IN645	
CR7	1010837-001		IN645	
CR8	1010829-11		IN3026B	
CR9	1010837-001		IN645	
CR10	1010837-001		IN645	
CR11	1010837-001	DIODE	IN645	
Q1	1010397-1	TRANSISTOR	2N930	
Q2	1010397-1		2N930	
Q3	1010367		3N68	
Q4	1010367		3N68	
Q5	1010397-1		2N930	
Q6	1010397-1		2N930	
Q7	1010367		3N68	
Q8	1010367		3N68	
Q9	1010397-1		2N930	
Q10	1010397-1		2N930	
Q11	1010367		3N68	
Q12	1010367		3N68	
Q13	1010376-3			
Q14	1010342		2N918	
Q15	1010342		2N918	
Q16	1010397-1		2N930	
Q17	1010397-1		2N930	
Q18	1010367		3N68	
Q19	1010367		3N68	
Q20	1010397-1		2N930	
Q21	1010397-1		2N930	
Q22	1010367		3N68	
Q23	1010367		3N68	
Q24	1010397-1		2N930	
Q25	1010397-1		2N930	
Q26	1010367		3N68	
Q27	1010367		3N68	
Q28	1010376-3	TRANSISTOR		

MASTER

2010122 A

E-3

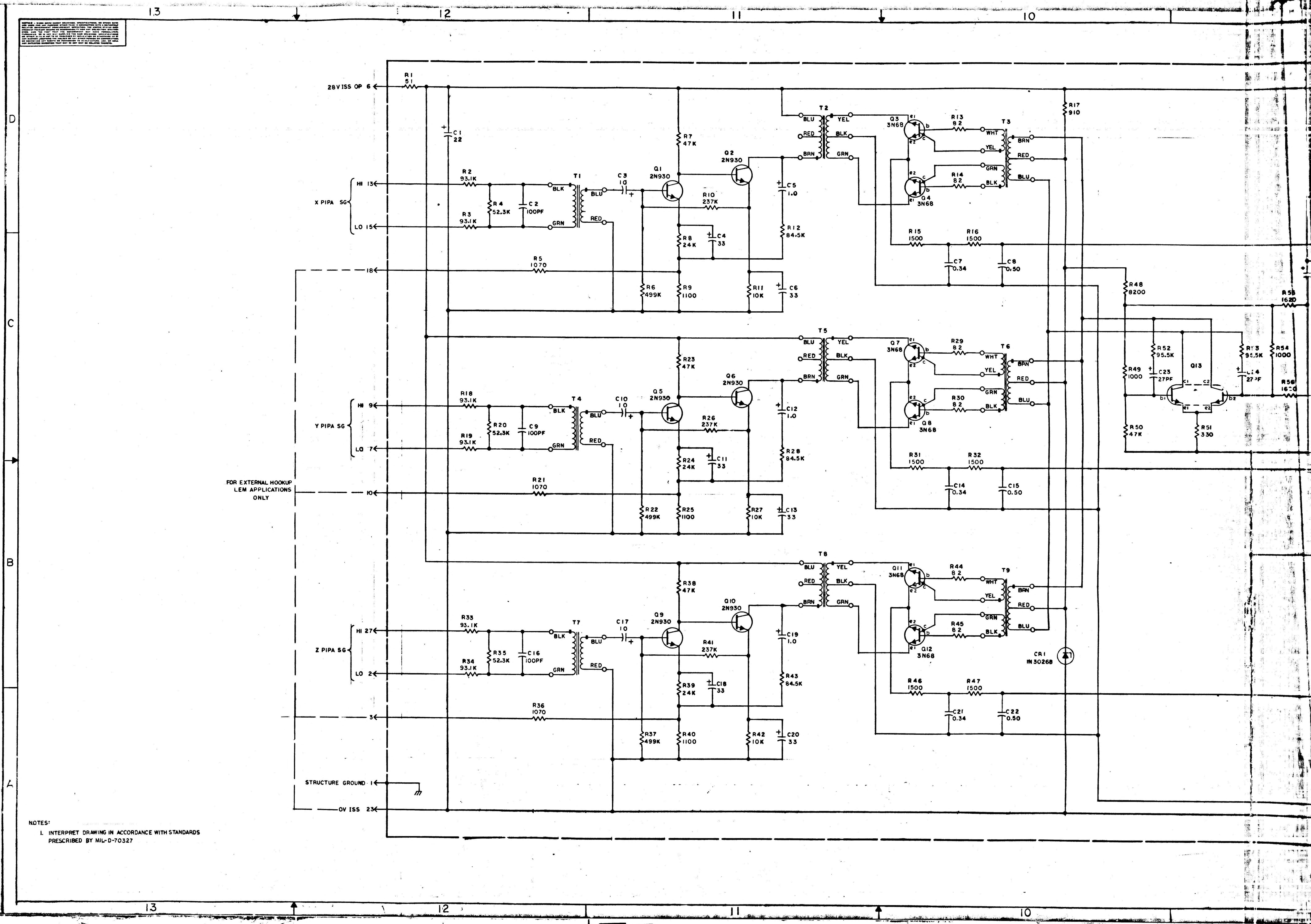


9
8
7
6
R17
810
R59
100
26 28V ISS STDBY
21 X PIPA IN φ TELEM
C25
22
R48
8200
R55
1620
R52
95.5K
R53
95.5K
R54
1000
C23
27PF
C24
27PF
Q13
R49
1000
R56
1620
R50
4.7K
R51
330
R63
1000
R61
237K
CR2
IN9678
R65
130K
T11
YEL
BLK
GRN
BLU
RED
BRN
C30
1.0
C33
1000PF
Q14
2N998
Q15
2N998
R57
2740
C27
1.0
R58
5110
C31
1.0
R64
16.9K
C32
1.0
T12
RED
BLK
BLU
GRN
R69
499K
R68
118K
R70
499K
20
22
3200CPS 1%
FB
C26
0.033
C28
1.0
R60
1500
R62
237K
R66
12.5K
R67
200
CR5
IN645
12 Y PIPA IN φ TELEM
CR6
IN645
33 3200CPS (FOR DISCRETE EXCIT)
T10
BRN
RED
BLU
YEL
BLK
GRN
CR3
IN645
CR4
IN645
C34
4.7
R71
37.5K
35 HI
25 LO
3200CPS
TELEM
30 Z PIPA IN φ TELEM
CR7
IN645
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
BLK
GRN
BLU
RED
C36
10
Q16
2N930
Q17
2N930
R76
33K
R79
237K
R77
24K
C37
33
R81
80.6K
C38
1.0
T14
BLU
RED
BRN
YEL
BLK
GRN
R75
499K
R78
562
R80
10K
C39
33
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
C43
10
Q20
2N930
Q21
2N930
R91
33K
R94
237K
R92
24K
C44
33
R96
80.6K
C45
1.0
T17
R90
499K
R93
562
R95
10K
C46
33
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
C50
10
Q24
2N930
Q25
2N930
R105
33K
R108
237K
R106
24K
C51
33
R110
80.6K
C52
1.0
T20
R104
499K
R107
562
R109
10K
C53
33

2010122 A

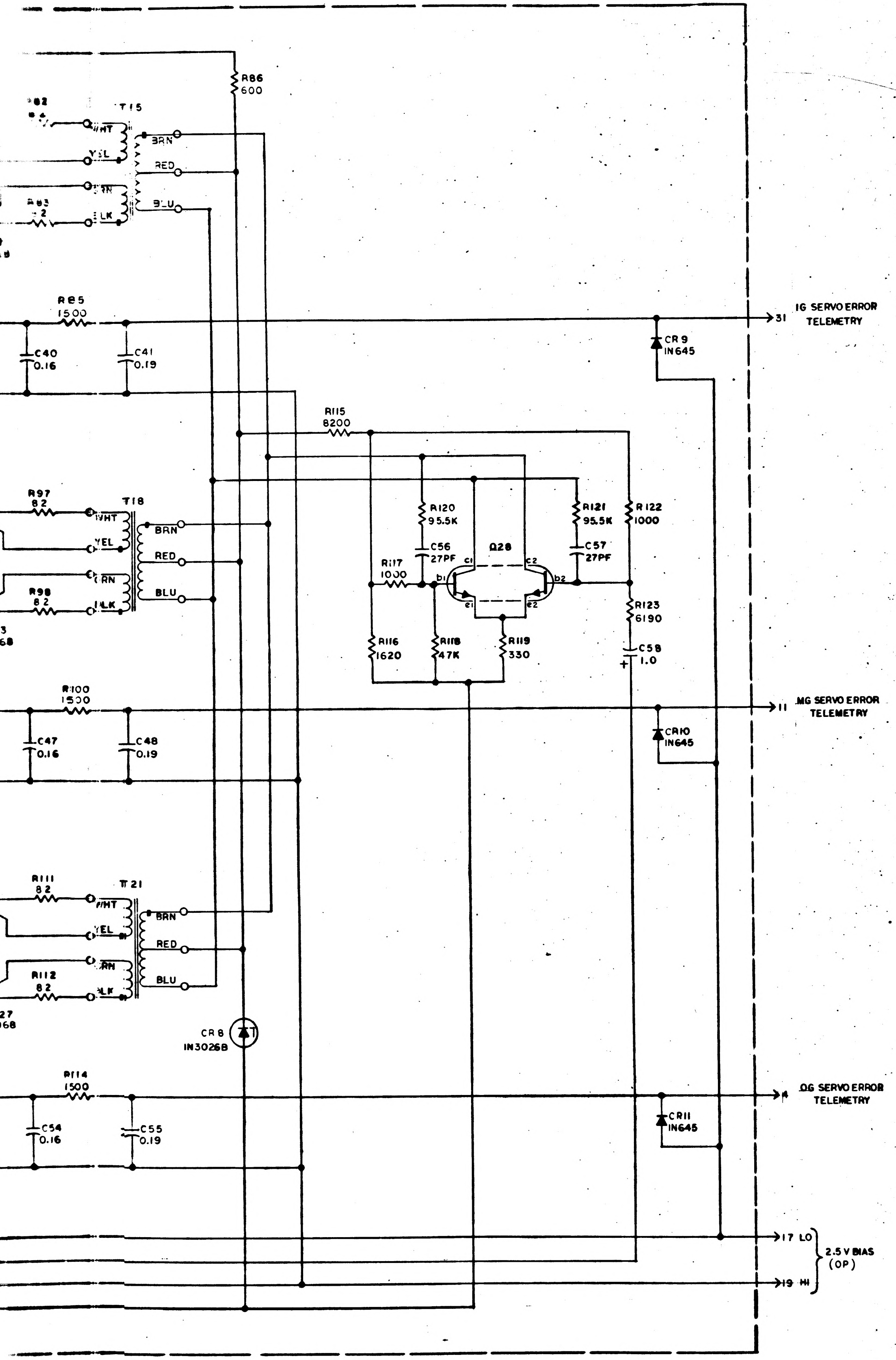
E-2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


13
12
11
10
D
C
B
A
28V ISS OP 6
R1 51
C1 22
X PIPA SG
HI 13
LO 15
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
R8 24K
C4 33
R5 1070
18
R6 499K
R9 1100
R11 10K
C6 33
C5 1.0
R12 84.5K
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
e1
e2
b
c
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 910
R48 8200
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R26 237K
R24 24K
C11 33
C12 1.0
R28 84.5K
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
10
R21 1070
R22 499K
R25 1100
R27 10K
C13 33
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
R49 1000
R50 47K
R52 95.5K
C23 27PF
Q13
c1
c2
b1
b2
e1
e2
R53 95.5K
C24 27PF
R51 330
R54 1000
R55 1620
R56 1620
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R41 237K
R39 24K
C18 33
C19 1.0
R43 84.5K
3
R36 1070
R37 499K
R40 1100
R42 10K
C20 33
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 IN3026B
STRUCTURE GROUND 1
OV ISS 23

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750-1	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10W
R3	1010311-315		93.1K	1	1/10W
R4	1010311-291		52.3K	1	1/10W
R5	1010311-129		1070	1	1/10W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-311		84.5K	1	1/10W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	1 W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-311		84.5K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10 W
R34	1010311-315		93.1K	1	1/10 W
R35	1010311-291		52.3K	1	1/10 W
R36	1010311-129		1070	1	1/10 W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-311		84.5K	1	1/10W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1/10 W
R50	1006750-72		47K	2	1/4 W
R51	1006750-20		330	2	1/4 W
R52	1006750-163		95.5K	2	1/4 W
R53	1006750-163		95.5K	2	1/4 W
R54	1010311-126		1000	1	1/10 W
R55	-146		1620		
R56	-146		1620		
R57	-168		2740		
R58	1010311-194		5110		1/10W
R59	1006750-8		100	2	1/4 W
R60	1006760-36		1500	2	1/2 W
R61	1010364-707		237K		1/8 W
R62	1010364-707		237K		1/8 W
R63	1010311-126		1000		1/10W
R64	1010311-244		16.9K		1/10W
R65	1010364-657		130K	1	1/10W
R66	1010377-306		12.5K	.01	1/10W
R67	1010311-59		200	1	1/10W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-153		37.5K	2	1/4 W
R72	1010311-315		93.1K	1	1/10W
R73	1010311-315		93.1K	1	1/10W
R74	1010311-291		52.3K	1	1/10W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1005750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10 W
R88	1010311-315		93.1K	1	1/10 W
R89	1010311-291		52.3K	1	1/10 W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	-6		82	2	1/4 W
R113	-36		1500	2	1/4 W
R114	-36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-163		95.5K	2	1/4 W
R121	1006750-163		95.5K	2	1/4 W
R122	1010311-126		1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1010830-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR9	1010837-001		IN645		
CR10	1010837-001		IN645		
CR11	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REVISIONS							
SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED	
A		REPLACES REV-WITH CHANGE PER TDRR 27966					
B		REVISED PER TDRR 28631	ADL		5/13/66		5-17-66

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

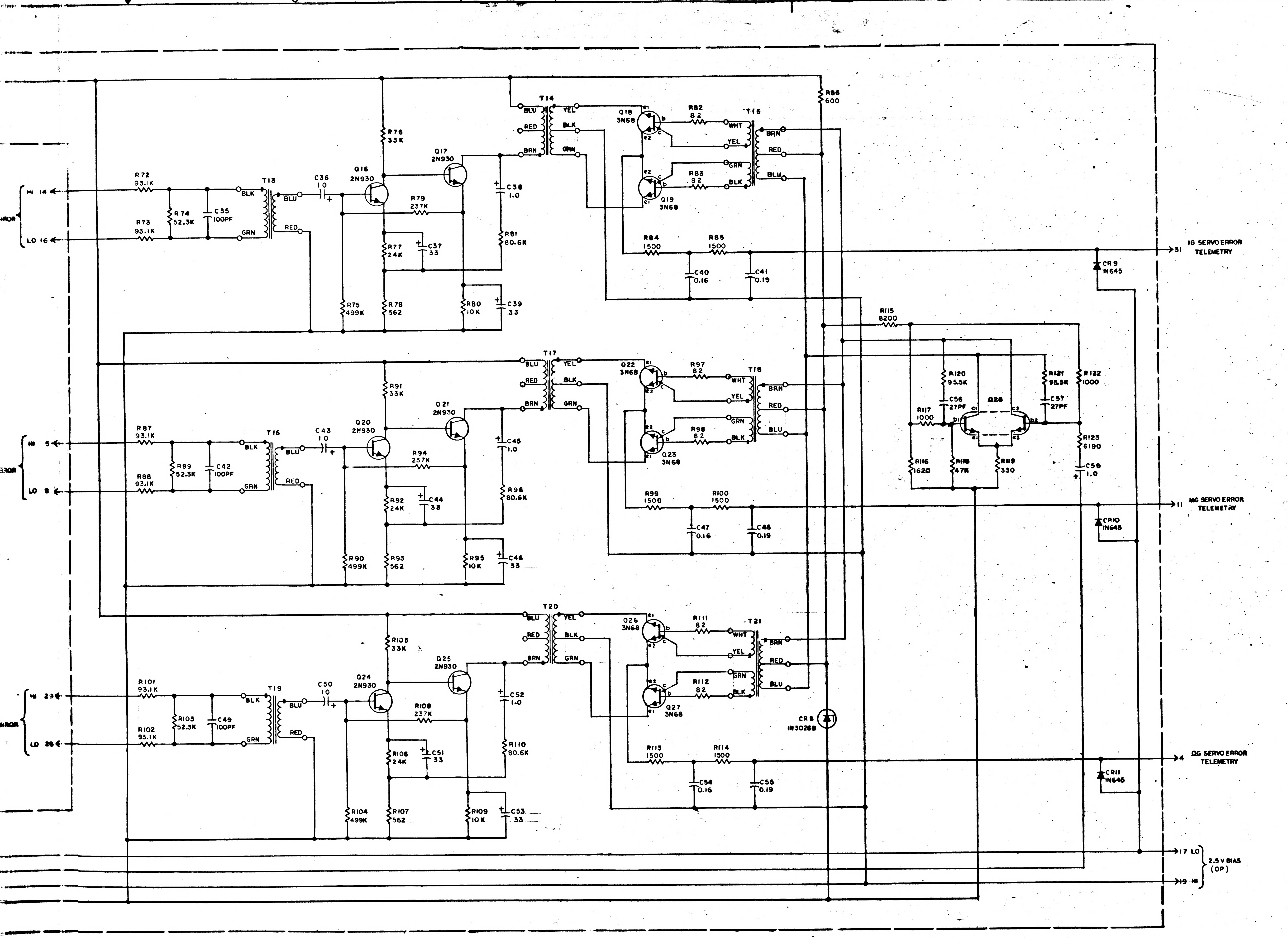
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. G. MICHNIK
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC SIGNAL CONDITIONER IRIG & PIPA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010122
SCALE —
SHEET OF


6
5
4
3
HI 14
LO 16
HI 5
LO 6
HI 23
LO 28
R72 93.1K
R73 93.1K
R74 52.3K
C35 100PF
T13
BLK
BLU
GRN
RED
C36 10
Q16 2N930
Q17 2N930
R76 33K
R79 237K
C38 1.0
R77 24K
C37 33
R81 80.6K
R75 499K
R78 562
R80 10K
C39 33
T14
YEL
BLK
GRN
BRN
Q18 3N68
Q19 3N68
R82 82
R83 82
WHT
T15
R84 1500
R85 1500
C40 0.16
C41 0.19
R86 600
1G SERVO ERROR TELEMETRY
31
CR9 1N645
R115 8200
R120 95.5K
R121 95.5K
R122 1000
C56 27PF
C57 27PF
Q28
R117 1000
R116 1620
R118 47K
R119 330
R123 6190
C58 1.0
R87 93.1K
R88 93.1K
R89 52.3K
C42 100PF
T16
C43 10
Q20 2N930
Q21 2N930
R91 33K
R94 237K
C45 1.0
R92 24K
C44 33
R96 80.6K
R90 499K
R93 562
R95 10K
C46 33
T17
T18
Q22 3N68
Q23 3N68
R97 82
R98 82
R99 1500
R100 1500
C47 0.16
C48 0.19
MG SERVO ERROR TELEMETRY
11
CR10 1N645
R101 93.1K
R102 93.1K
R103 52.3K
C49 100PF
T19
C50 10
Q24 2N930
Q25 2N930
R105 33K
R108 237K
C52 1.0
R106 24K
C51 33
R110 80.6K
R104 499K
R107 562
R109 10K
C53 33
T20
T21
Q26 3N68
Q27 3N68
R111 82
R112 82
R113 1500
R114 1500
C54 0.16
C55 0.19
CR8 1N3025B
0G SERVO ERROR TELEMETRY
4
CR11 1N645
17 LO
19 HI
2.5V BIAS (OP)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10K	2	1/4 W
R12	1010311 - 311		84.5K	1	1/10W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1010604 - 1		600	1	W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10K	2	1/4 W
R28	1010311 - 311		84.5K	1	1/10W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10W
R34	1010311 - 315		93.1K	1	1/10W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 311		84.5K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1/10 W
R50	1006750 - 72		47K	2	1/4 W
R51	1006750 - 20		330	2	1/4 W
R52	1006750 - 163		95.5K	2	1/4 W
R53	1006750 - 163		95.5K	2	1/4 W
R54	1010311 - 126		1000	1	1/10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 36		1500	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9K	1	1/10W
R65	1010364 - 657		130K	1	1/10W
R66	1010377 - 306		12.5K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 153		37.5K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10W
R73	1010311 - 315		93.1K	1	[illegible] W
R74	1010311 - 291		52.3K	1	[illegible] W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10 W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1010604 - 1		600	1	1 W
R87	1010311 - 315		93.1K	1	1/10 W
R88	1010311 - 315		93.1K	1	1/10 W
R89	1010311 - 291		52.3K	1	1/10 W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K		1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 163		95.5K	2	1/4 W
R121	1006750 - 163		95.5K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART
C1	10067
C2	10104
C3	1006
C4	10067
C5	10067
C6	1006
C7	10102
C8	10102
C9	1010
C10	10067
C11	10067
C12	10067
C13	[illegible]
C14	[illegible]
C15	[illegible]
C16	1010
C17	10067
C18	10067
C19	[illegible]
C20	10067
C21	[illegible]
C22	101027
C23	10104
C24	101040
C25	100675
C26	10103
C27	10067
C28	
C30	
C31	
C32	10067
C33	101041
C34	10067
C35	101040
C36	1006755
C37	1006755
C38	1006755
C39	100675
C40	1010279
C41	1010279
C42	1010409
C43	1006755
C44	1006755
C45	1006755
C46	1006755
C47	1010279
C48	1010279
C49	1010409
C50	1006755
C51	1006755
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C54	1010279
C55	1010279
C56	1010409
C57	1010409
C58	1006755
CR1	101082
CR2	101083
CR3	101083
CR4	
CR5	
CR6	
CR7	101083
CR8	101082
CR9	101083
CR10	10108
CR11	101083
Q1	101039
Q2	101039
Q3	101036
Q4	101036
Q5	101039
Q6	101039
Q7	101036
Q8	101036
Q9	101039
Q10	101036
Q11	101036
Q12	101036
Q13	101037
Q14	101034
Q15	101034
Q16	101039
Q17	101039
Q18	101036
Q19	101036
Q20	101039
Q21	101039
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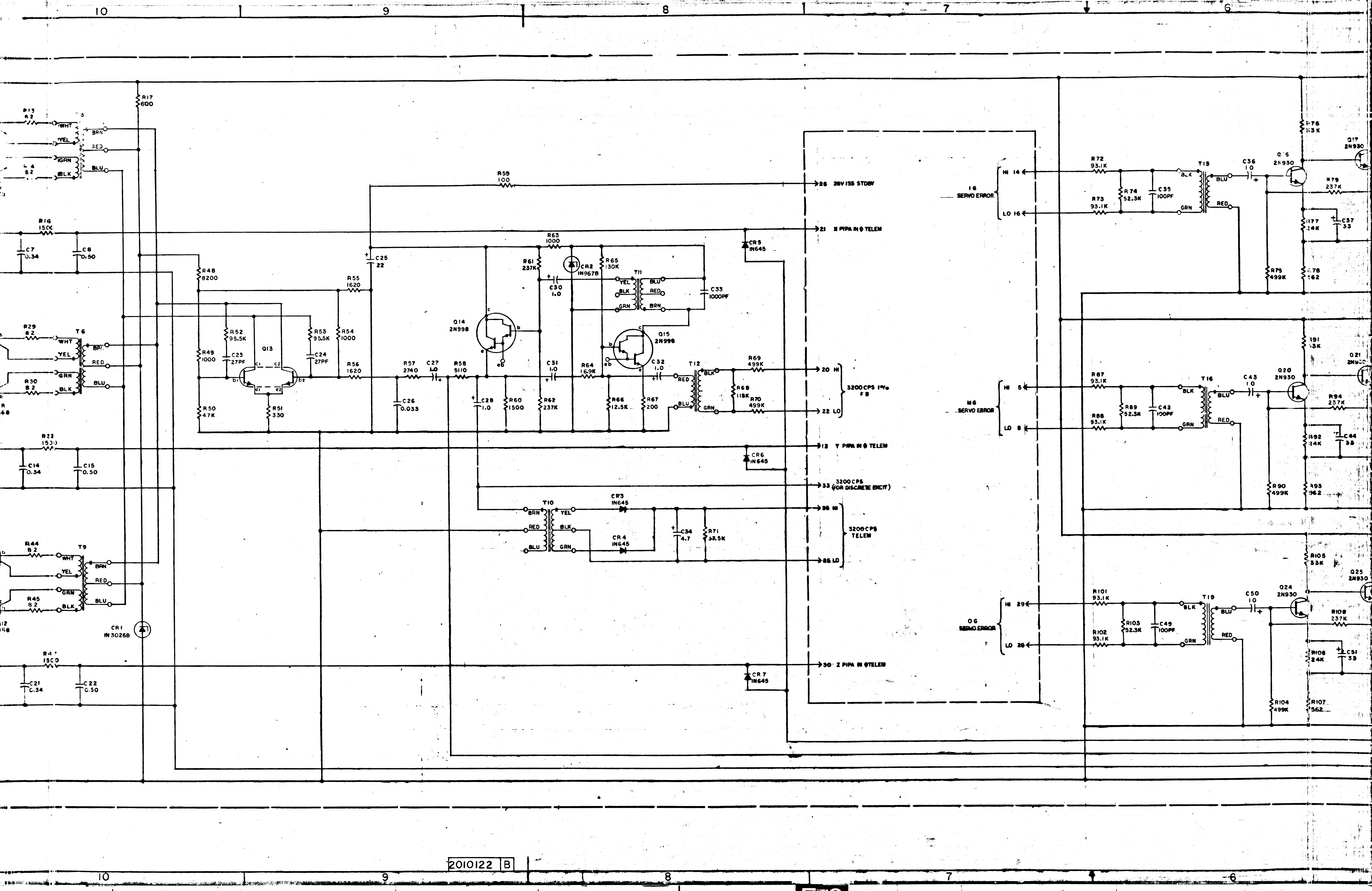
Q23	101036
Q24	101039
Q25	101039
Q26	101036
Q27	101036
Q28	101037

2010122 B


10
9
8
7
6
R17
600
R13
82
WHT
YEL
GRN
BLK
BRN
RED
BLU
R16
1500
C7
0.34
C8
0.50
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
R48
8200
R49
1000
R50
47K
R52
95.5K
R53
95.5K
C23
27PF
C24
27PF
Q13
R51
330
R54
1000
R55
1620
R56
1620
C25
22
R57
2740
C27
1.0
R58
5110
C26
0.033
C28
1.0
R60
1500
R61
237K
R62
237K
R63
1000
CR2
IN967B
R65
130K
C30
1.0
C31
1.0
T11
C33
1000PF
Q14
2N998
Q15
2N998
R64
16.9K
R66
12.5K
R67
200
C32
1.0
T12
R68
118K
R69
499K
R70
499K
20 HI
22 LO
3200CPS 1%
FB
CR5
IN645
R29
82
T6
R30
82
R22
1500
C14
0.34
C15
0.50
12 Y PIPA IN Φ TELEM
CR6
IN645
33 3200CPS (FOR DISCRETE EXCIT)
T10
CR3
IN645
CR4
IN645
C34
4.7
R71
32.5K
35 HI
25 LO
3200CPS
TELEM
R44
82
T9
R45
82
CR1
IN3026B
R41
1500
C21
0.34
C22
0.50
30 Z PIPA IN Φ TELEM
CR7
IN645
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
C36
10
Q15
2N930
Q17
2N930
R76
13K
R77
34K
C37
33
R79
237K
R75
499K
R78
562
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
C43
10
Q20
2N930
Q21
2N930
R91
13K
R94
237K
R92
34K
C44
33
R90
499K
R93
562
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
C50
10
Q24
2N930
Q25
2N930
R105
33K
R108
237K
R106
24K
C51
33
R104
499K
R107
562

2010122 B

F2

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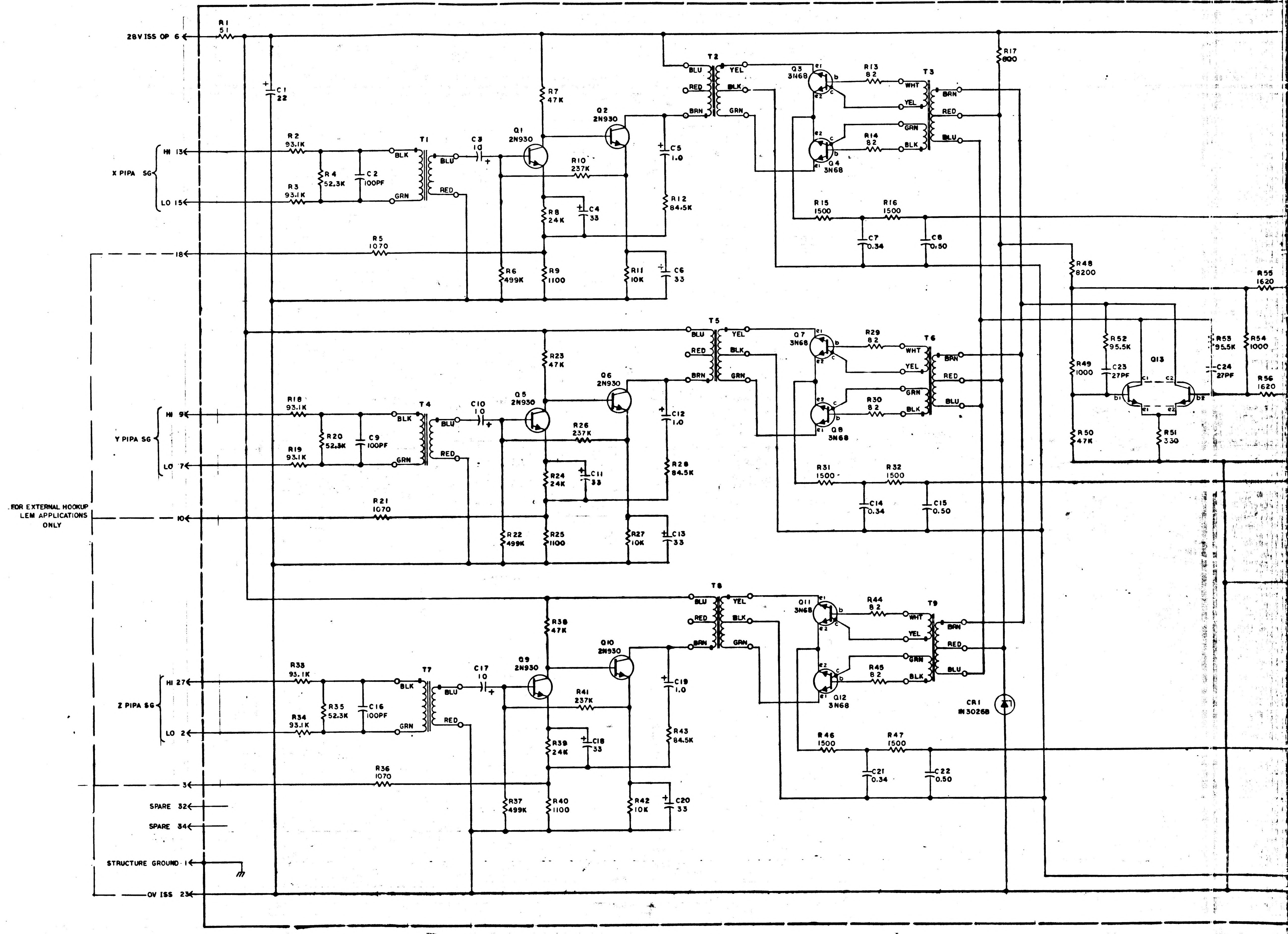
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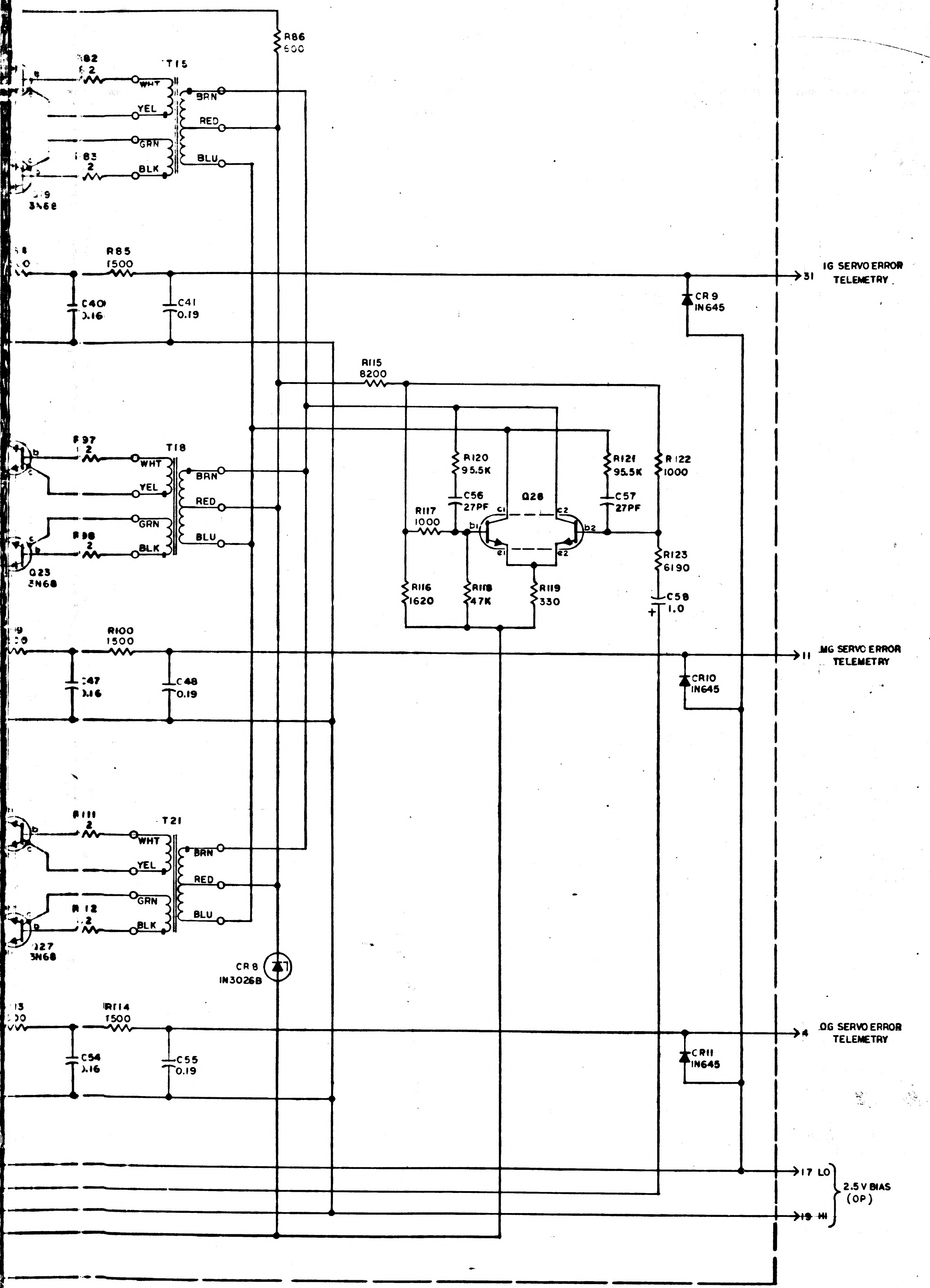
R1 51
C1 22
X PIPA SG
HI 13
LO 15
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
R8 24K
C4 33
C5 1.0
R12 84.5K
R5 1070
18
R6 499K
R9 1100
R11 10K
C6 33
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
e1
e2
b
c
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R17 800
R15 1500
R16 1500
C7 0.34
C8 0.50
R48 8200
R49 1000
R50 47K
R52 95.5K
C23 27PF
Q13
c1
c2
b1
b2
e1
e2
R51 330
R53 95.5K
C24 27PF
R54 1000
R55 1620
R56 1620
T5
Q5 2N930
Q6 2N930
R23 47K
R26 237K
R24 24K
C11 33
C12 1.0
R28 84.5K
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
R21 1070
10
R22 499K
R25 1100
R27 10K
C13 33
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
T8
Q9 2N930
Q10 2N930
R38 47K
R41 237K
R39 24K
C18 33
C19 1.0
R43 84.5K
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
R36 1070
3
R37 499K
R40 1100
R42 10K
C20 33
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 IN3026B
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
R1	1006750-1	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10W
R3	1010311-315		93.1K	1	1/10W
R4	1010311-291		52.3K	1	1/10W
R5	1010311-129		1070	1	1/10W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-307		76.8K	1	1/10W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	1 W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-307		76.8K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10W
R34	1010311-315		93.1K	1	1/10W
R35	1010311-291		52.3K	1	1/10W
R36	1010311-129		1070	1	1/10W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-307		76.8K	1	1/10W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1/10 W
R50	1006750-72		47K	2	1/4 W
R51	1006750-20		330	2	1/4 W
R52	1006750-163		95.5K	2	1/4 W
R53	1006750-163		95.5K	2	1/4 W
R54	1010311-126		1000	1	1/10 W
R55	-146		1620	1	
R56	-146		1620	1	
R57	-168		2740	1	
R58	1010311-194		5110	1	1/10W
R59	1006750-8		100	2	1/4 W
R60	1006760-36		1500	2	1/2 W
R61	1010364-707		237K	1	1/8 W
R62	1010364-707		237K	1	1/8 W
R63	1010311-126		1000	1	1/10W
R64	1010311-244		16.9K	1	1/10W
R65	1010364-657		130K	1	1/10W
R66	1010377-306		12.5K	.01	1/10W
R67	1010311-59		200	1	1/10W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-153		37.5K	2	1/4 W
R72	1010311-315		93.1K	1	1/10W
R73	1010311-315		93.1K	1	1/10W
R74	1010311-291		52.3K	1	1/10W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1006750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10W
R88	1010311-315		93.1K	1	1/10W
R89	1010311-291		52.3K	1	1/10W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	-6		82	2	1/4 W
R113	-36		1500	2	1/4 W
R114	-36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-163		95.5K	2	1/4 W
R121	1006750-163		95.5K	2	1/4 W
R122	1010311-126		1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	1N3026B		
CR2	1010830-11		1N967B		
CR3	1010837-001		1N645		
CR4	-001		1N645		
CR5	-001		1N645		
CR6	-001		1N645		
CR7	1010837-001		1N645		
CR8	1010829-11		1N3026B		
CR9	1010837-001		1N645		
CR10	1010837-001		1N645		
CR11	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REPLACES REV-WITH CHANGE PER TDRR 27966	ADL	RAK			—
B		REVISED PER TDRR 28631	ADL	LSB	5/13/66		5-17-66
C		REVISED PER TDRR 29133	LSB				6-1-66

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Lee
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

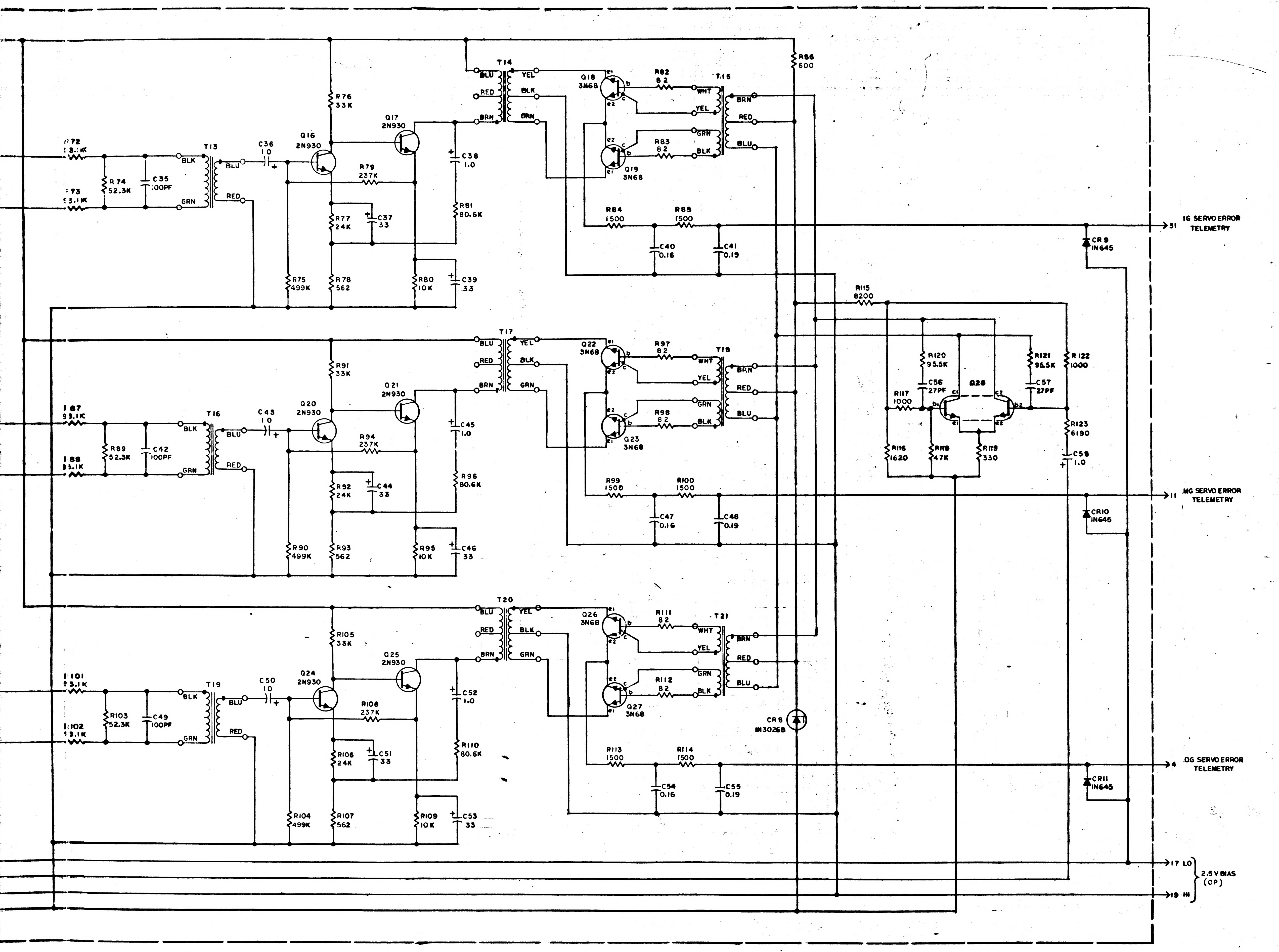
SCHEMATIC
SIGNAL CONDITIONER IRIG & PIPA

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010122
SCALE — | SHEET 1 OF 1

MASTER

2010122 C

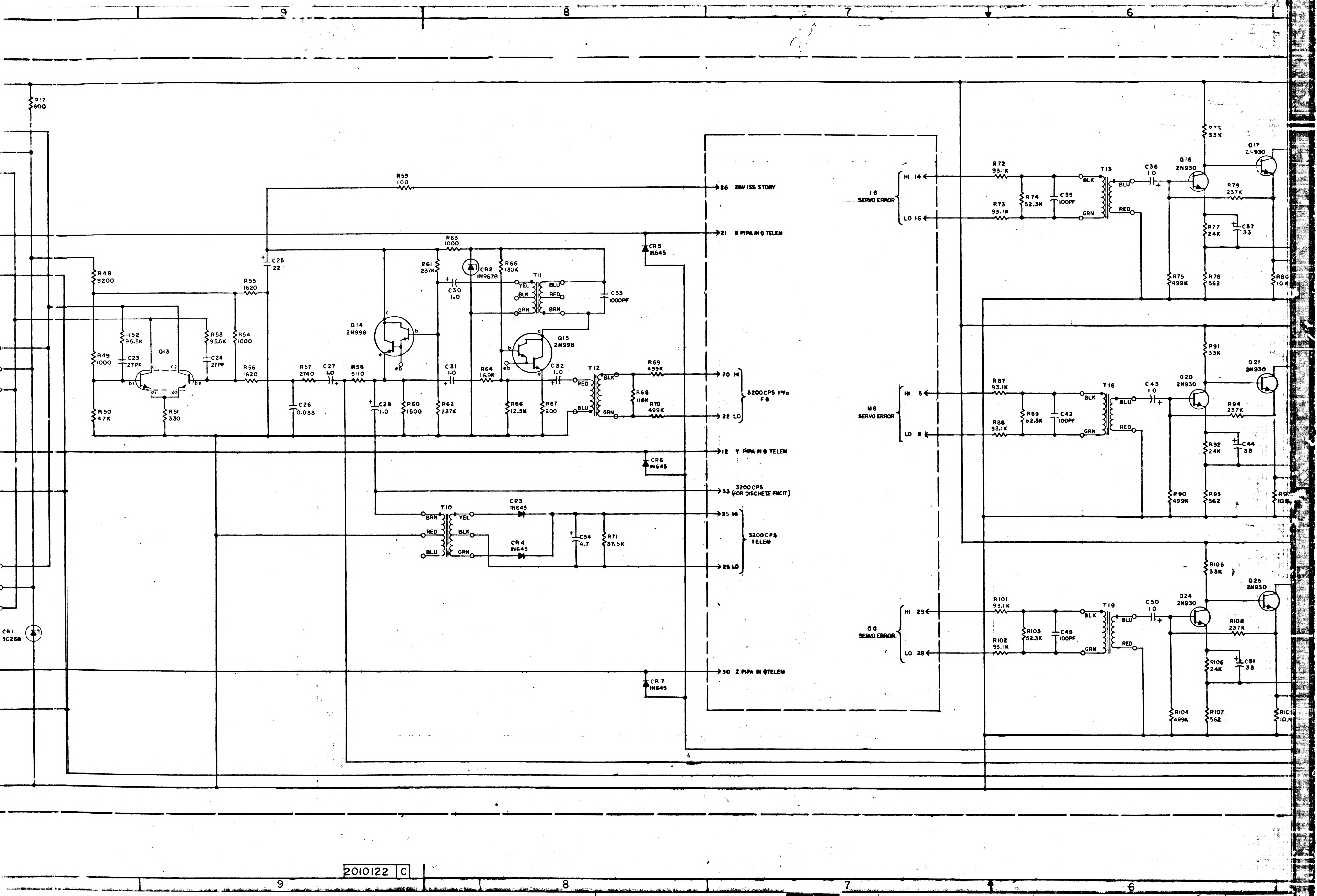
E-4


T14
BLU
RED
BRN
YEL
BLK
GRN
Q18
3N68
e1
b
c
e2
R82
82
T15
WHT
YEL
GRN
BLK
BRN
RED
BLU
R83
82
Q19
3N68
R86
600
R76
33K
Q16
2N930
Q17
2N930
R79
237K
C38
1.0
C36
10
T13
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
R77
24K
C37
33
R81
80.6K
R84
1500
R85
1500
C40
0.16
C41
0.19
1G SERVO ERROR TELEMETRY
31
CR9
IN645
R75
499K
R78
562
R80
10K
C39
33
R115
8200
T17
Q22
3N68
R97
82
T18
R98
82
Q23
3N68
R91
33K
Q20
2N930
Q21
2N930
R94
237K
C45
1.0
C43
10
T16
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
R92
24K
C44
33
R96
80.6K
R99
1500
R100
1500
C47
0.16
C48
0.19
MG SERVO ERROR TELEMETRY
11
CR10
IN645
R90
499K
R93
562
R95
10K
C46
33
R120
95.5K
R121
95.5K
R122
1000
C56
27PF
C57
27PF
Q28
c1
c2
b1
b2
e1
e2
R117
1000
R116
1620
R118
47K
R119
330
R123
6190
C58
1.0
T20
Q26
3N68
R111
82
T21
R112
82
Q27
3N68
R105
33K
Q24
2N930
Q25
2N930
R108
237K
C52
1.0
C50
10
T19
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
R106
24K
C51
33
R110
80.6K
R113
1500
R114
1500
C54
0.16
C55
0.19
0G SERVO ERROR TELEMETRY
4
CR11
IN645
CR8
IN3026B
R104
499K
R107
562
R109
10K
C53
33
17 LO
2.5 V BIAS (OP)
19 HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10 K	2	1/4 W
R12	1010311 - 307		76.8K	1	1/10W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1010604 - 1		600	1	W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10K	2	1/4 W
R28	1010311 - 307		76.8K	1	1/10 W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10W
R34	1010311 - 315		93.1K	1	1/10W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 307		76.8K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1/10 W
R50	1006750 - 72		47K	2	1/4 W
R51	1006750 - 20		330	2	1/4 W
R52	1006750 - 163		95.5K	2	1/4 W
R53	1006750 - 163		95.5K	2	1/4 W
R54	1010311 - 126		1000	1	1/10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 36		1500	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9K	1	1/10W
R65	1010364 - 657		130K	1	1/10W
R66	1010377 - 306		12.5K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 153		37.5K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10W
R73	1010311 - 315		93.1K	1	1/10W
R74	1010311 - 291		52.3K	1	1/10W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1010604 - 1		600	1	1 W
R87	1010311 - 315		93.1K	1	1/10W
R88	1010311 - 315		93.1K	1	1/10W
R89	1010311 - 291		52.3K	1	1/10W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		30.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 163		95.5K	2	1/4 W
R121	1006750 - 163		95.5K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

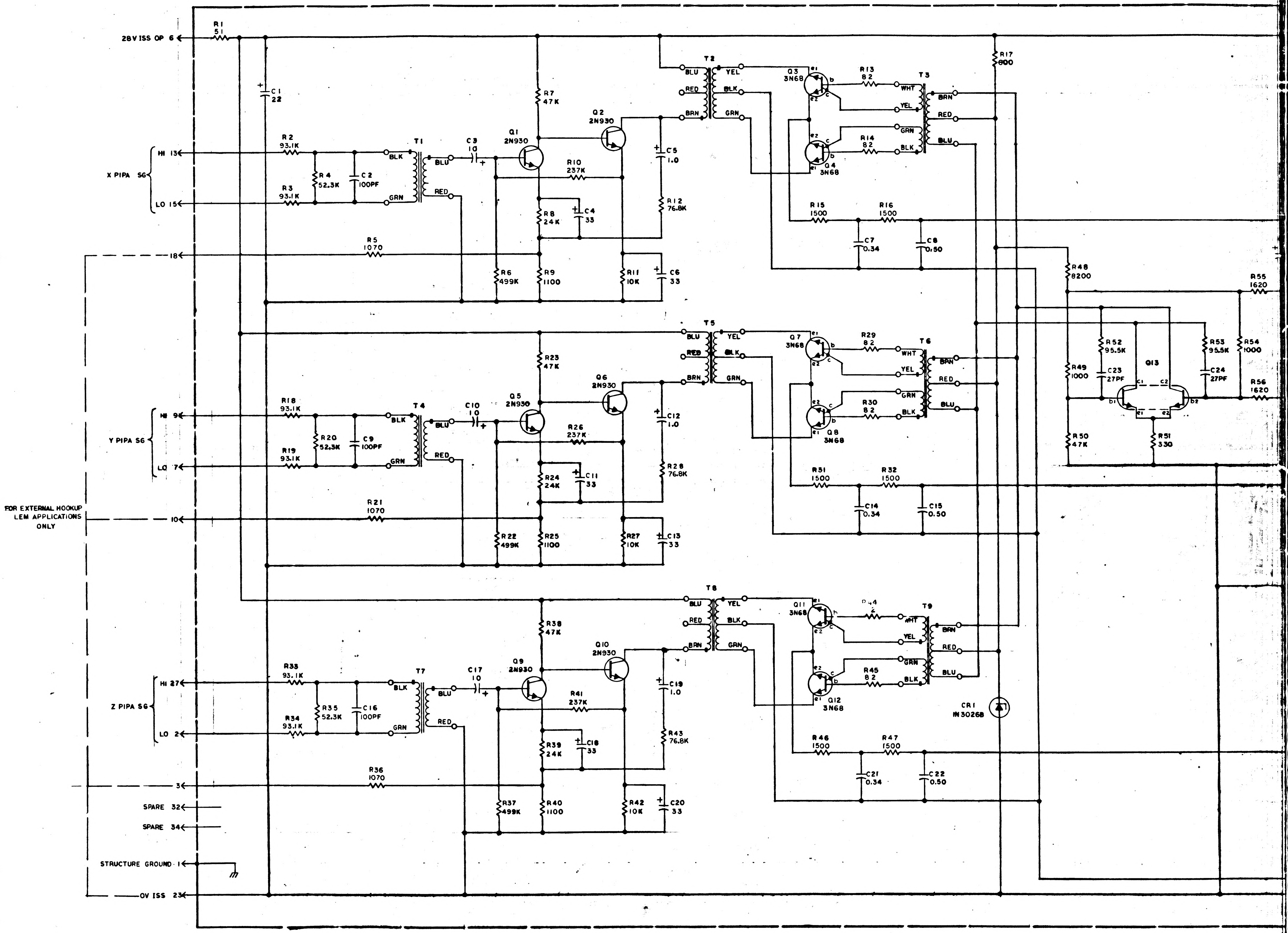
REF DES	PART NO.	DESCRIPTION
C1	1006755 -134	CAPACITOR
C2	1010409 -25	
C3	1006755 -31	
C4	1006755 -34	
C5	1006755 -69	
C6	1006755 -34	
C7	1010279 -7	
C8	1010279 -9	
C9	1010409 -25	
C10	1006755 -31	
C11	1006755 -34	
C12	1006755 -69	
C13	1006755 -34	
C14	1010279 -7	
C15	1010279 -9	
C16	1010409 -25	
C17	1006755 -31	
C18	1006755 -34	
C19	1006755 -69	
C20	1006755 -34	
C21	1010279 -7	
C22	1010279 -9	
C23	1010409 -11	
C24	1010409 -11	
C25	1006755 -134	
C26	101031 -19	
C27	1006755 -69	
C28	-69	
C30	-69	
C31	-69	
C32	1006755 -69	
C33	101041 -17	
C34	1006755 -77	
C35	101040 -25	
C36	1006755 -31	
C37	1006755 -34	
C38	1006755 -69	
C39	1006755 -34	
C40	1010279 -3	
C41	1010279 -4	
C42	101040 -25	
C43	1006755 -31	
C44	1006755 -34	
C45	1006755 -69	
C46	1006755 -34	
C47	101027 -3	
C48	101027 -4	
C49	101040 -25	
C50	1006755 -31	
C51	1006755 -34	
C52	1006755 -69	
C53	1006755 -34	
C54	101027 -3	
C55	101027 -4	
C56	101040 -11	
C57	101040 -11	
C58	100675 -69	CAPACITOR
CR1	101082 -11	DIODE
CR2	101083 -11	
CR3	101083 -001	
CR4	-001	
CR5	-001	
CR6	-001	
CR7	101083 -001	
CR8	101082 -11	
CR9	101083 -001	
CR10	101083 -001	
CR11	101083 -001	DIODE
Q1	101039 -1	TRANSISTOR
Q2	101039 -1	
Q3	101036	
Q4	101036	
Q5	101039 -1	
Q6	101039 -1	
Q7	101036	
Q8	101036	
Q9	101039 -1	
Q10	101039 -1	
Q11	101036	
Q12	101036	
Q13	101037 -3	
Q14	10103	
Q15	10103	
Q16	10103 -1	
Q17	10103 -1	
Q18	101036	
Q19	101036	
Q20	10103 -1	
Q21	101039 -1	
Q22	10103	
Q23	10103	
Q24	10103 -1	
Q25	10103 -1	
Q26	10103	
Q27	10103	
Q28	10103 -3	TRANSISTOR

MASTER


9
8
7
6
R17
600
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
R63
1000
CR5
1N645
C25
22
R61
237K
CR2
1N9678
R65
130K
T11
YEL
BLK
GRN
BLU
RED
BRN
C30
1.0
C33
1000PF
R48
9200
R55
1620
R52
95.5K
R53
95.5K
R54
1000
Q13
Q14
2N998
Q15
2N998
R49
1000
C23
27PF
C24
27PF
R56
1620
R57
2740
C27
1.0
R58
5110
C31
1.0
R64
16.9K
C32
1.0
T12
RED
BLK
BLU
GRN
R69
499K
R68
118K
R70
499K
20 HI
22 LO
3200CPS 1%
FB
R50
47K
R51
330
C26
0.033
C28
1.0
R60
1500
R62
237K
R66
12.5K
R67
200
12 Y PIPA IN Φ TELEM
CR6
1N645
33 3200CPS (FOR DISCRETE EXCIT)
T10
BRN
RED
BLU
YEL
BLK
GRN
CR3
1N645
CR4
1N645
C34
4.7
R71
37.5K
35 HI
25 LO
3200CPS
TELEM
CR1
3C268
30 Z PIPA IN ΦTELEM
CR7
1N645
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
BLK
GRN
BLU
RED
C36
10
Q16
2N930
Q17
2N930
R73
33K
R79
237K
R77
24K
C37
33
R75
499K
R78
562
R80
10K
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
BLK
GRN
BLU
RED
C43
10
Q20
2N930
Q21
2N930
R91
33K
R94
237K
R92
24K
C44
33
R90
499K
R93
562
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
BLK
GRN
BLU
RED
C50
10
Q24
2N930
Q25
2N930
R105
33K
R108
237K
R106
24K
C51
33
R104
499K
R107
562

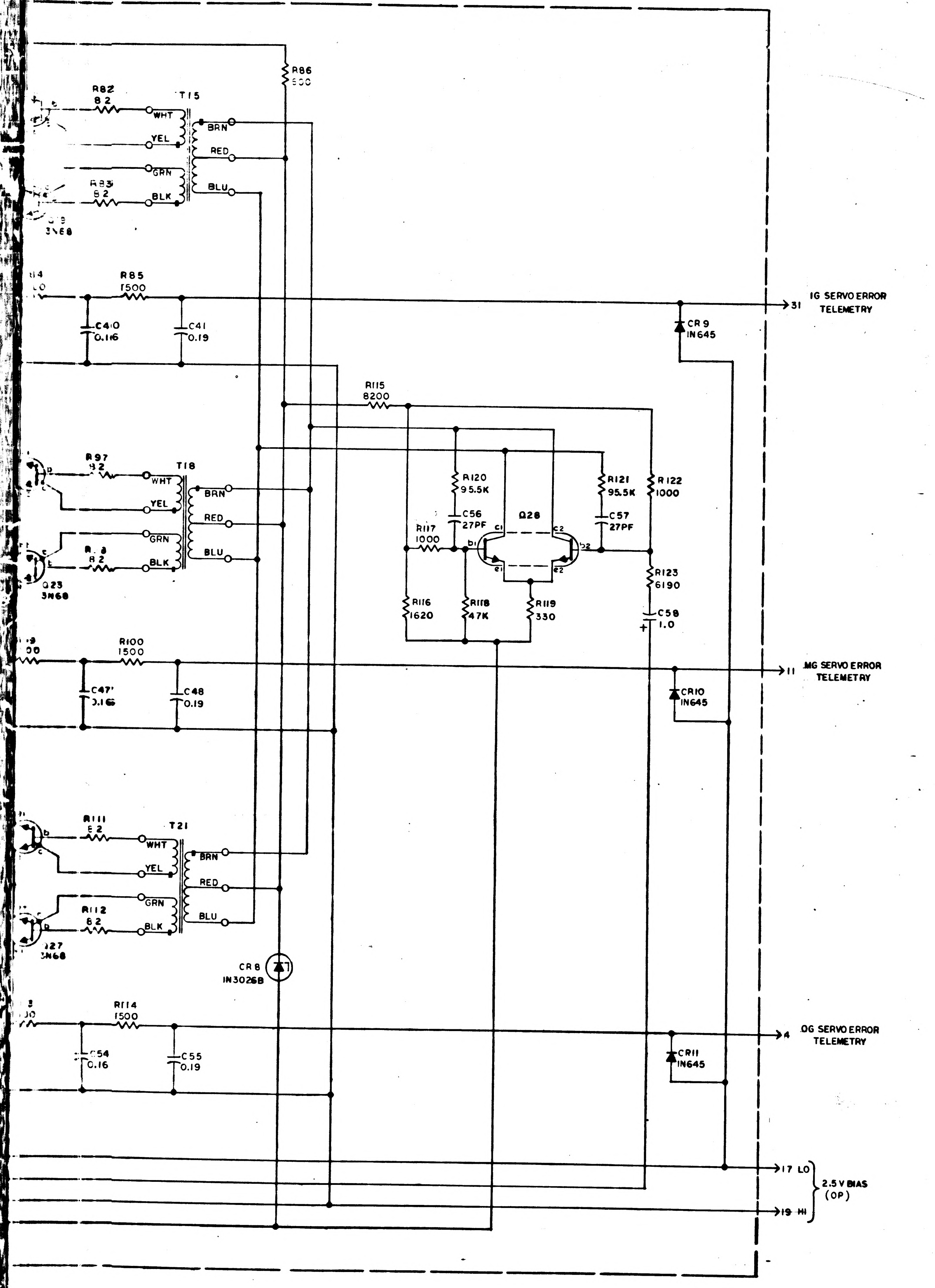
2010122 C

F-2


28V ISS OP 6
R1 51
C1 22
X PIPA S6
HI 13
LO 15
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
C5 1.0
R12 76.8K
R8 24K
C4 33
R5 1070
18
R6 499K
R9 1100
R11 10K
C6 33
T2
YEL
BRN
Q3 3N68
Q4 3N68
R13 82
R14 82
T3
WHT
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
R48 8200
R55 1620
R49 1000
R50 47K
R52 95.5K
C23 27PF
Q13
R53 95.5K
C24 27PF
R54 1000
R56 1620
R51 330
Y PIPA S6
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R26 237K
C12 1.0
R28 76.8K
R24 24K
C11 33
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
R21 1070
10
R22 499K
R25 1100
R27 10K
C13 33
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
Z PIPA S6
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R41 237K
C19 1.0
R43 76.8K
R39 24K
C18 33
R36 1070
3
R37 499K
R40 1100
R42 10K
C20 33
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
CR1 1N3026B
R46 1500
R47 1500
C21 0.34
C22 0.50
SPARE 32
SPARE 34
STRUCTURE GROUND 1
0V ISS 23

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750-11	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10 W
R3	1010311-315		93.1K	1	1/10 W
R4	1010311-291		52.3K	1	1/10 W
R5	1010311-129		1070	1	1/10 W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10 W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-307		76.8K	1	1/10 W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	1 W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10 W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-307		76.8K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10 W
R34	1010311-315		93.1K	1	1/10 W
R35	1010311-291		52.3K	1	1/10 W
R36	1010311-129		1070	1	1/10 W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-307		76.8K	1	1/10 W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1 10 W
R50	1006750-72		47K	2	1 4 W
R51	1006750-20		330	2	1 4 W
R52	1006750-163		95.5K	2	1 4 W
R53	1006750-163		95.5K	2	1 4 W
R54	1010311-126		1000	1	1 10 W
R55	-146		1620	1	
R56	-146		1620	1	
R57	-168		2740	1	
R58	1010311-194		5110	1	1/10 W
R59	1006750-8		100	2	1/4 W
R60	1006760-36		1500	2	1/2 W
R61	1010364-707		237K	1	1/8 W
R62	1010364-707		237K	1	1/8 W
R63	1010311-126		1000	1	1/10 W
R64	1010311-244		16.9K	1	1/10 W
R65	1010364-657		130K	1	1/10 W
R66	1010377-306		12.5K	.01	1/10 W
R67	1010311-59		200	1	1/10 W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-153		37.5K	2	1/4 W
R72	1010311-315		93.1K	1	1/10 W
R73	1010311-315		93.1K	1	1/10 W
R74	1010311-291		52.3K	1	1/10 W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10 W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10 W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1006750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10 W
R88	1010311-315		93.1K	1	1/10 W
R89	1010311-291		52.3K	1	1/10 W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10 W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	-6		82	2	1/4 W
R113	-36		1500	2	1/4 W
R114	-36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-163		95.5K	2	1/4 W
R121	1006750-163		95.5K	2	1/4 W
R122	1010311-126		1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1008815-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR9	1010837-001		IN645		
CR10	1010837-001		IN645		
CR11	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REPLACES REV - WITH CHANGE PER TDRR 27966	ADL	RAK	[illegible]		
B		REVISED PER TDRR 28631	ADL	LTB	5/13/66	[illegible]	5-17-66
C		REVISED PER TDRR 29133	LTB			NGB	6-?-66
D		REVISED PER TDRR 29141	KCH		5-?-66	[illegible]	6-14-66

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Lao 30 APR 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
IRIG & PIPA

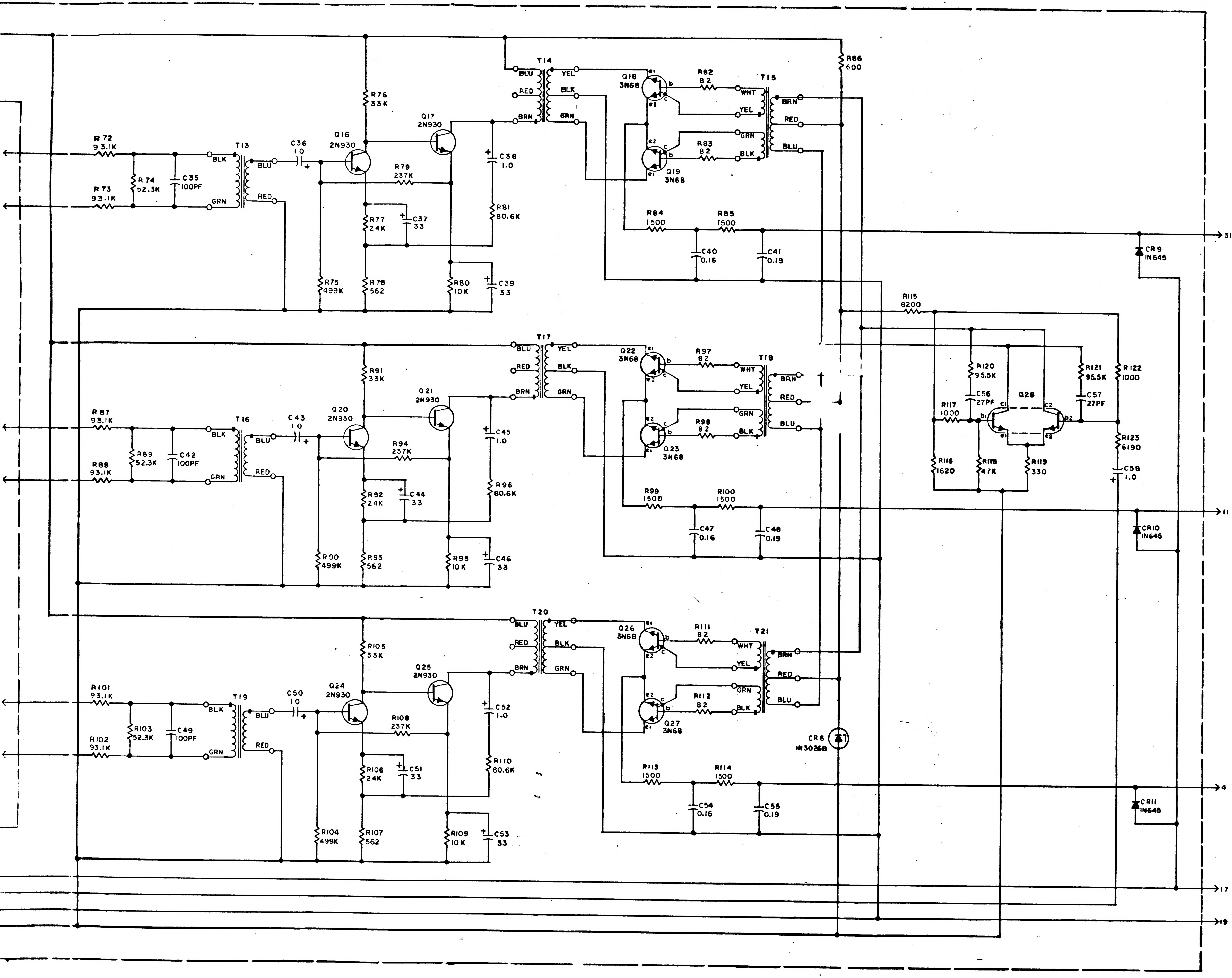
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010122
SCALE —
SHEET 1 OF 1

2010122 D

MASTER

4H

E4



R72 93.1K
R73 93.1K
R74 52.3K
C35 100PF
T13
BLK
BLU
GRN
RED
C36 10
Q16 2N930
R76 33K
Q17 2N930
R79 237K
C38 1.0
R77 24K
C37 33
R81 80.6K
R75 499K
R78 562
R80 10K
C39 33
T14
BLU
YEL
RED
BLK
BRN
GRN
Q18 3N68
R82 82
T15
WHT
YEL
BRN
RED
BLU
GRN
BLK
R83 82
Q19 3N68
R84 1500
R85 1500
C40 0.16
C41 0.19
R86 600
31 1G SERVO ERROR TELEMETRY
CR9 1N645
R115 8200
R120 95.5K
C56 27PF
Q28
R121 95.5K
C57 27PF
R122 1000
R117 1000
R123 6190
R116 1620
R118 47K
R119 330
C58 1.0
R87 93.1K
R88 93.1K
R89 52.3K
C42 100PF
T16
C43 10
Q20 2N930
R91 33K
Q21 2N930
R94 237K
C45 1.0
R92 24K
C44 33
R96 80.6K
R90 499K
R93 562
R95 10K
C46 33
T17
Q22 3N68
R97 82
T18
R98 82
Q23 3N68
R99 1500
R100 1500
C47 0.16
C48 0.19
11 MG SERVO ERROR TELEMETRY
CR10 1N645
R101 93.1K
R102 93.1K
R103 52.3K
C49 100PF
T19
C50 10
Q24 2N930
R105 33K
Q25 2N930
R108 237K
C52 1.0
R106 24K
C51 33
R110 80.6K
R104 499K
R107 562
R109 10K
C53 33
T20
Q26 3N68
R111 82
T21
R112 82
Q27 3N68
CR8 1N3026B
R113 1500
R114 1500
C54 0.16
C55 0.19
4 OG SERVO ERROR TELEMETRY
CR11 1N645
17 LO
19 HI
2.5 V BIAS (OP)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750-1	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10 W
R3	1010311-315		93.1K	1	1/10 W
R4	1010311-291		52.3K	1	1/10 W
R5	1010311-129		1070	1	1/10 W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10 W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-307		76.8K	1	1/10 W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10 W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-307		76.8K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10 W
R34	1010311-315		93.1K	1	1/10 W
R35	1010311-291		52.3K	1	1/10 W
R36	1010311-129		1070	1	1/10 W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-307		76.8K	1	1/10 W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1/10 W
R50	1006750-72		47K	2	1/4 W
R51	1006750-20		330	2	1/4 W
R52	1006750-163		95.5K	2	1/4 W
R53	1006750-163		95.5K	2	1/4 W
R54	1010311-126		1000	1	1/10 W
R55	↓ -146		1620	1	↓
R56	↓ -146		1620	1	↓
R57	↓ -168		2740	1	↓
R58	1010311-194		5110	1	1/10 W
R59	1006750-8		100	2	1/4 W
R60	1006760-36		1500	2	1/2 W
R61	1010364-707		237K	1	1/8 W
R62	1010364-707		237K	1	1/8 W
R63	1010311-126		1000	1	1/10 W
R64	1010311-244		16.9K	1	1/10 W
R65	1010364-657		130K	1	1/10 W
R66	1010377-306		12.5K	.01	1/10 W
R67	1010311-59		200	1	1/10 W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-153		37.5K	2	1/4 W
R72	1010311-315		93.1K	1	1/10 W
R73	1010311-315		93.1K	1	1/10 W
R74	1010311-291		52.3K	1	1/10 W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10 W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10 W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1006750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10 W
R88	1010311-315		93.1K	1	1/10 W
R89	1010311-291		52.3K	1	1/10 W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10 W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	↓ -6		82	2	1/4 W
R113	↓ -36		1500	2	1/4 W
R114	↓ -36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-163		95.5K	2	1/4 W
R121	1006750-163		95.5K	2	1/4 W
R122	1010311-126	↓	1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES
C1
C2
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C10
C11
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C58
CR1
CR2
CR3
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CR5
CR6
CR7
CR8
CR9
CR10
CR11
Q1
Q2
Q3
Q4
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Q6
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Q27
Q28

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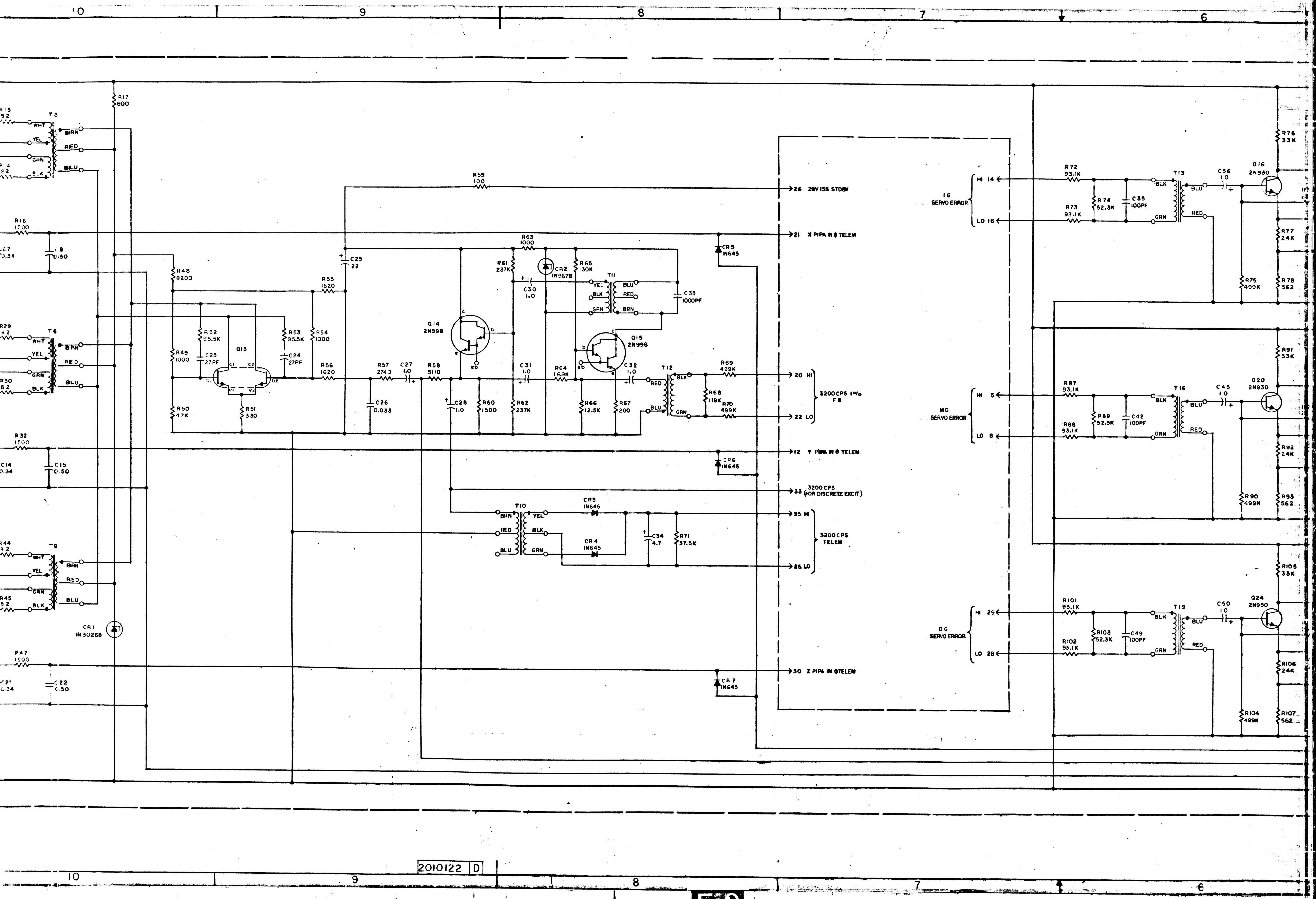
10
9
8
7
6
R13
T8
WHT
YEL
GRN
BLK
BRN
RED
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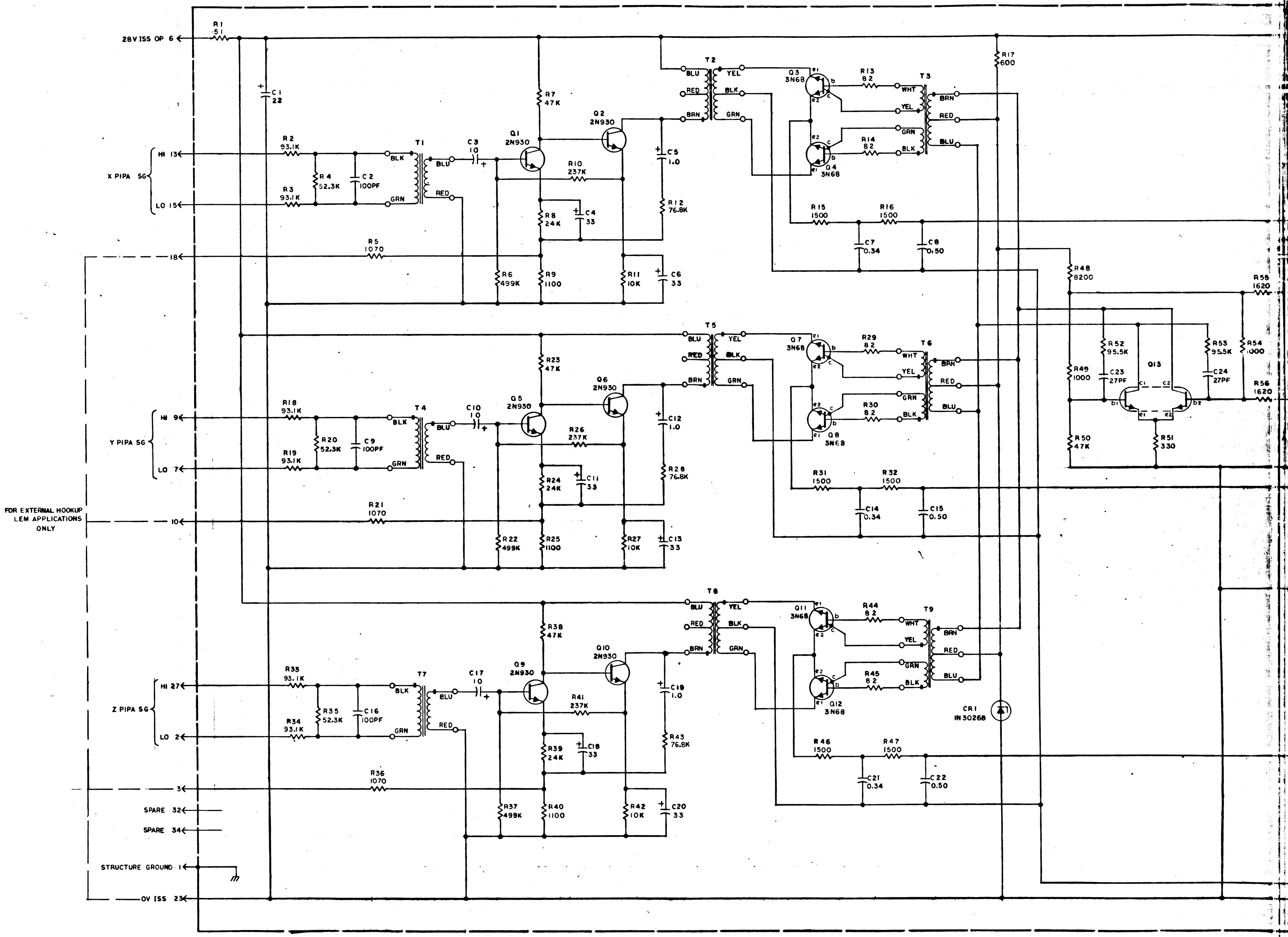
R17
600
R16
1500
C7
0.34
C8
0.50
R48
8200
R29
T6
R30
R49
1000
R50
47K
R52
95.5K
C23
27PF
Q13
R53
95.5K
C24
27PF
R54
1000
R51
330
R55
1620
R56
1620
C25
22
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
R63
1000
R61
237K
CR2
IN967B
R65
130K
T11
C30
1.0
C33
1000PF
Q14
2N998
Q15
2N998
R57
2740
C27
1.0
R58
5110
C26
0.033
C28
1.0
R60
1500
R62
237K
C31
1.0
R64
16.9K
R66
12.5K
R67
200
C32
1.0
T12
R68
118K
R69
499K
R70
499K
20 HI
22 LO
3200CPS 1% FB
CR5
IN645
R32
1500
C14
0.34
C15
0.50
12 Y PIPA IN Φ TELEM
CR6
IN645
33 3200CPS (FOR DISCRETE EXCIT)
T10
CR3
IN645
CR4
IN645
C34
4.7
R71
37.5K
35 HI
25 LO
3200CPS TELEM
R44
T9
R45
CR1
IN3026B
R47
1500
C21
0.34
C22
0.50
30 Z PIPA IN Φ TELEM
CR7
IN645
IG SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
C36
10
Q16
2N930
R76
33K
R77
24K
R75
499K
R78
562
MG SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
C43
10
Q20
2N930
R91
33K
R92
24K
R90
499K
R93
562
OG SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
C50
10
Q24
2N930
R105
33K
R106
24K
R104
499K
R107
562

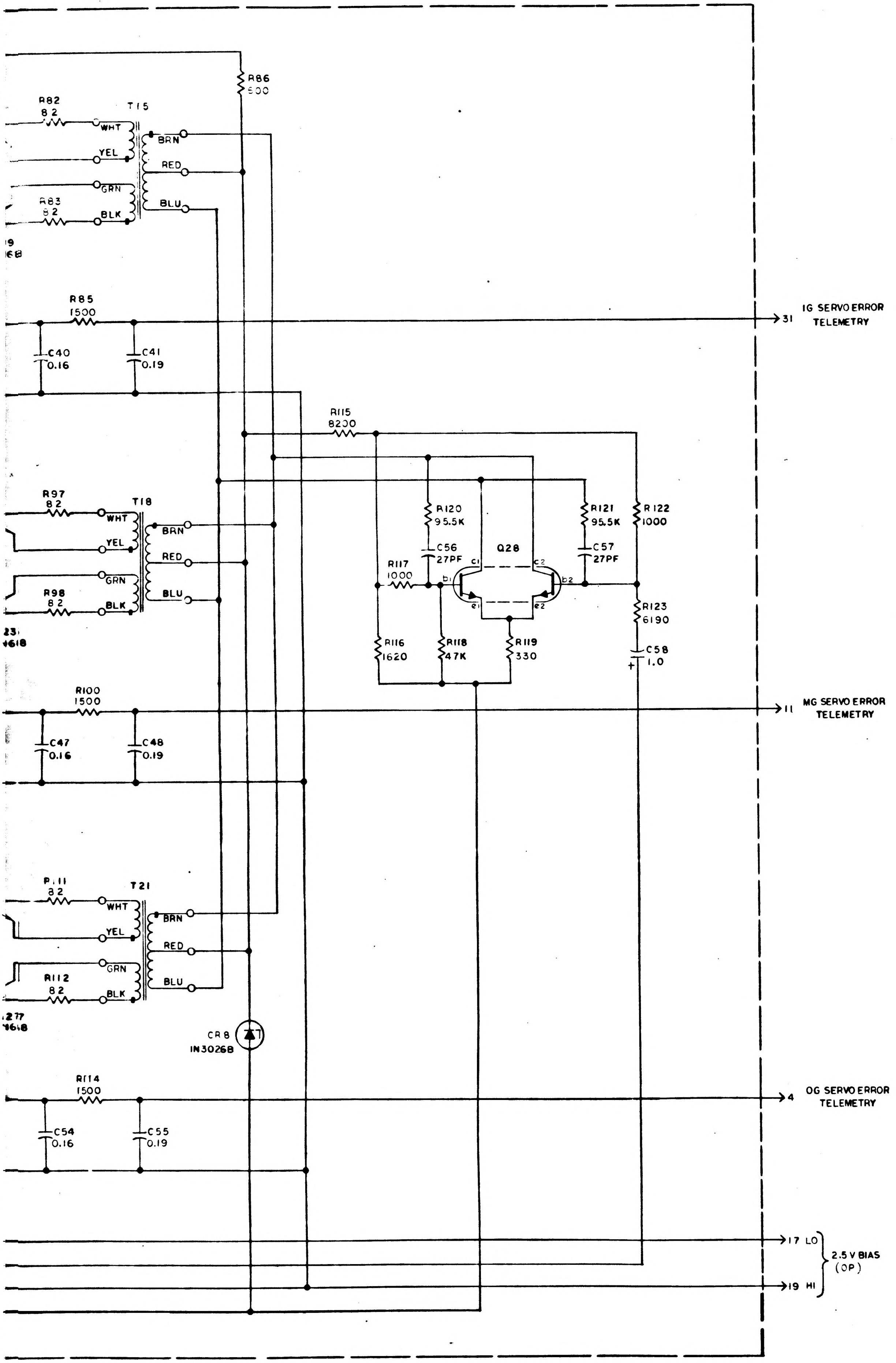
2010122 D

[illegible]TICE — WHEN [illegible] DRAWINGS, SPECIFICATIONS, OR OTHER DATA [illegible] USED FOR ANY [illegible] OTHER THAN IN CONNECTION WITH A DEFINITELY [illegible] GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


28V ISS OP 6
R1 .51
C1 22
R17 600
X PIPA SG
HI 13
LO 15
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
C5 1.0
R12 76.8K
R8 24K
C4 33
18
R5 1070
R6 499K
R9 1100
R11 10K
C6 33
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R48 8200
R49 1000
R50 47K
R52 95.5K
C23 27PF
Q13
c1
c2
b1
b2
e1
e2
R53 95.5K
C24 27PF
R54 1000
R51 330
R55 1620
R56 1620
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R26 237K
C12 1.0
R28 76.8K
R24 24K
C11 33
FOR EXTERNAL HOOKUP
LEM APPLICATIONS
ONLY
10
R21 1070
R22 499K
R25 1100
R27 10K
C13 33
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R41 237K
C19 1.0
R43 76.8K
R39 24K
C18 33
3
R36 1070
R37 499K
R40 1100
R42 10K
C20 33
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
CR1 IN3026B
R46 1500
R47 1500
C21 0.34
C22 0.50

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R 1	1006750 - 1	RESISTOR	51	2	1/4 W
R 2	1010311 - 315		93.1K	1	1/10 W
R 3	1010311 - 315		93.1K	1	1/10 W
R 4	1010311 - 291		52.3K	1	1/10 W
R 5	1010311 - 129		1070	1	1/10 W
R 6	1010364 - 769		499K	1	1/8 W
R 7	1006750 - 72		47K	2	1/4 W
R 8	1006750 - 65		24K	2	1/4 W
R 9	1010311 - 130		1100	1	1/10 W
R 10	1010364 - 707		237K	1	1/8 W
R 11	1006750 - 56		10 K	2	1/4 W
R 12	1010311 - 307		76.8K	1	1/10 W
R 13	1006750 - 6		82	2	1/4 W
R 14	1006750 - 6		82	2	1/4 W
R 15	1006750 - 36		1500	2	1/4 W
R 16	1006750 - 36		1500	2	1/4 W
R 17	1010604 - 1		600	1	1 W
R 18	1010311 - 315		93.1K	1	1/10 W
R 19	1010311 - 315		93.1K	1	1/10 W
R 20	1010311 - 291		52.3K	1	1/10 W
R 21	1010311 - 129		1070	1	1/10 W
R 22	1010364 - 769		499K	1	1/8 W
R 23	1006750 - 72		47K	2	1/4 W
R 24	1006750 - 65		24K	2	1/4 W
R 25	1010311 - 130		1100	1	1/10 W
R 26	1010364 - 707		237K	1	1/8 W
R 27	1006750 - 56		10 K	2	1/4 W
R 28	1010311 - 307		76.8K	1	1/10 W
R 29	1006750 - 6		82	2	1/4 W
R 30	1006750 - 6		82	2	1/4 W
R 31	1006750 - 36		1500	2	1/4 W
R 32	1006750 - 36		1500	2	1/4 W
R 33	1010311 - 315		93.1K	1	1/10 W
R 34	1010311 - 315		93.1K	1	1/10 W
R 35	1010311 - 291		52.3K	1	1/10 W
R 36	1010311 - 129		1070	1	1/10 W
R 37	1010364 - 769		499K	1	1/8 W
R 38	1006750 - 72		47K	2	1/4 W
R 39	1006750 - 65		24K	2	1/4 W
R 40	1010311 - 130		1100	1	1/10 W
R 41	1010364 - 707		237K	1	1/8 W
R 42	1006750 - 56		10K	2	1/4 W
R 43	1010311 - 307		76.8K	1	1/10 W
R 44	1006750 - 6		82	2	1/4 W
R 45	1006750 - 6		82	2	1/4 W
R 46	1006750 - 36		1500	2	1/4 W
R 47	1006750 - 36		1500	2	1/4 W
R 48	1006750 - 54		8200	2	1/4 W
R 49	1010311 - 126		1000	1	1/10 W
R 50	1006750 - 72		47K	2	1/4 W
R 51	1006750 - 20		330	2	1/4 W
R 52	1006750 - 163		95.5K	2	1/4 W
R 53	1006750 - 163		95.5K	2	1/4 W
R 54	1010311 - 126		1000	1	1/10 W
R 55	- 146		1620	1	
R 56	- 146		1620	1	
R 57	- 168		2740	1	
R 58	1010311 - 194		5110	1	1/10 W
R 59	1006750 - 8		100	2	1/4 W
R 60	1006760 - 36		1500	2	1/2 W
R 61	1010364 - 707		237K	1	1/8 W
R 62	1010364 - 707		237K	1	1/8 W
R 63	1010311 - 126		1000	1	1/10 W
R 64	1010311 - 244		16.9K	1	1/10 W
R 65	1010364 - 657		130K	1	1/10 W
R 66	1010377 - 306		12.5K	.01	1/10 W
R 67	1010311 - 59		200	1	1/10 W
R 68	1010364 - 649		118K	1	1/8 W
R 69	1010364 - 769		499K	1	1/8 W
R 70	1010364 - 769		499K	1	1/8 W
R 71	1006750 - 153		37.5K	2	1/4 W
R 72	1010311 - 315		93.1K	1	1/10 W
R 73	1010311 - 315		93.1K	1	1/10 W
R 74	1010311 - 291		52.3K	1	1/10 W
R 75	1010364 - 769		499K	1	1/8 W
R 76	1006750 - 68		33K	2	1/4 W
R 77	1006750 - 65		24K	2	1/4 W
R 78	1010311 - 102		562	1	1/10 W
R 79	1010364 - 707		237K	1	1/8 W
R 80	1006750 - 56		10 K	2	1/4 W
R 81	1010311 - 309		80.6K	1	1/10 W
R 82	1006750 - 6		82	2	1/4 W
R 83	1006750 - 6		82	2	1/4 W
R 84	1006750 - 36		1500	2	1/4 W
R 85	1006750 - 36		1500	2	1/4 W
R 86	1010604 - 1		600	1	1 W
R 87	1010311 - 315		93.1K	1	1/10 W
R 88	1010311 - 315		93.1K	1	1/10 W
R 89	1010311 - 291		52.3K	1	1/10 W
R 90	1010364 - 769		499K	1	1/8 W
R 91	1006750 - 68		33K	2	1/4 W
R 92	1006750 - 65		24K	2	1/4 W
R 93	1010311 - 102		562	1	1/10 W
R 94	1010364 - 707		237K	1	1/8 W
R 95	1006750 - 56		10K	2	1/4 W
R 96	1010311 - 309		80.6K	1	1/10 W
R 97	1006750 - 6		82	2	1/4 W
R 98	1006750 - 6		82	2	1/4 W
R 99	1006750 - 36		1500	2	1/4 W
R 100	1006750 - 36		1500	2	1/4 W
R 101	1010311 - 315		93.1K	1	1/10 W
R 102	1010311 - 315		93.1K	1	1/10 W
R 103	1010311 - 291		52.3K	1	1/10 W
R 104	1010364 - 769		499K	1	1/8 W
R 105	1006750 - 68		33K	2	1/4 W
R 106	1006750 - 65		24K	2	1/4 W
R 107	1010311 - 102		562	1	1/10 W
R 108	1010364 - 707		237K	1	1/8 W
R 109	1006750 - 56		10K	2	1/4 W
R 110	1010311 - 309		80.6K	1	1/10 W
R 111	1006750 - 6		82	2	1/4 W
R 112	- 6		82	2	1/4 W
R 113	- 36		1500	2	1/4 W
R 114	- 36		1500	2	1/4 W
R 115	1006750 - 54		8200	2	1/4 W
R 116	1010311 - 146		1620	1	1/10 W
R 117	1010311 - 126		1000	1	1/10 W
R 118	1006750 - 72		47K	2	1/4 W
R 119	1006750 - 20		330	2	1/4 W
R 120	1006750 - 163		95.5K	2	1/4 W
R 121	1006750 - 163		95.5K	2	1/4 W
R 122	1010311 - 126		1000	1	1/10 W
R 123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C 1	1006755-134	CAPACITOR	22	10	50 VDC
C 2	1010409-25		100PF	2	500
C 3	1006755-31		10	10	20
C 4	1006755-34		33		20
C 5	1006755-69		1.0		35
C 6	1006755-34		33		20
C 7	1010279-7		0.34		6
C 8	1010279-9		0.50	10	6
C 9	1010409-25		100PF	2	500
C 10	1006755-31		10	10	20
C 11	1006755-34		33		20
C 12	1006755-69		1.0		35
C 13	1006755-34		33		20
C 14	1010279-7		0.34		6
C 15	1010279-9		0.50	10	6
C 16	1010409-25		100PF	2	500
C 17	1006755-31		10	10	20
C 18	1006755-34		33		20
C 19	1006755-69		1.0		35
C 20	1006755-34		33		20
C 21	1010279-7		0.34		6
C 22	1010279-9		0.50	10	6
C 23	1010409-11		27PF	2	500
C 24	1010409-11		27PF	2	500
C 25	1006755-134		22	10	50
C 26	1010316-19		0.033	1	100
C 27	1006755-69		1.0	10	35
C 28	-69		1.0		
C 30	-69		1.0		
C 31	-69		1.0		
C 32	1006755-69		1.0	10	35
C 33	1010410-17		1000PF	2	300
C 34	1006755-77		4.7	10	35
C 35	1010409-25		100PF	2	500
C 36	1006755-31		10	10	20
C 37	1006755-34		33		20
C 38	1006755-69		1.0		35
C 39	1006755-34		33		20
C 40	1010279-3		0.16		6
C 41	1010279-4		0.19	10	6
C 42	1010409-25		100 PF	2	500
C 43	1006755-31		10	10	20
C 44	1006755-34		33		20
C 45	1006755-69		1.0		35
C 46	1006755-34		33		20
C 47	1010279-3		0.16		6
C 48	1010279-4		0.19	10	6
C 49	1010409-25		100PF	2	500
C 50	1006755-31		10	10	20
C 51	1006755-34		33		20
C 52	1006755-69		1.0		35
C 53	1006755-34		33		20
C 54	1010279-3		0.16		6
C 55	1010279-4		0.19	10	6
C 56	1010409-11		27PF	2	500
C 57	1010409-11		27PF	2	500
C 58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR 1	1010829-11	DIODE	IN3026B		
CR 2	1008815-11		IN967B		
CR 3	1010837-001		IN645		
CR 4	-001		IN645		
CR 5	-001		IN645		
CR 6	-001		IN645		
CR 7	1010837-001		IN645		
CR 8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1		2N930		
Q 3	1010367		3N68		
Q 4	1010367		3N68		
Q 5	1010397 - 1		2N930		
Q 6	1010397 - 1		2N930		
Q 7	1010367		3N68		
Q 8	1010367		3N68		
Q 9	1010397 - 1		2N930		
Q 10	1010397 - 1		2N930		
Q 11	1010367		3N68		
Q 12	1010367		3N68		
Q 13	1010376 - 3				
Q 14	1010342		2N998		
Q 15	1010342		2N998		
Q 16	1010397 - 1		2N930		
Q 17	1010397 - 1		2N930		
Q 18	1010367		3N68		
Q 19	1010367		3N68		
Q 20	1010397 - 1		2N930		
Q 21	1010397 - 1		2N930		
Q 22	1010367		3N68		
Q 23	1010367		3N68		
Q 24	1010397 - 1		2N930		
Q 25	1010397 - 1		2N930		
Q 26	1010367		3N68		
Q 27	1010367		3N68		
Q 28	1010376 - 3	TRANSISTOR			

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REPLACES REV - WITH CHANGE PER TDRR 27966	ADL	RPK			
B		REVISED PER TDRR 28631	ADL	LJB	5/13/66		5 17 66
C		REVISED PER TDRR 29133	LJB				6-1-66
D		REVISED PER TDRR 29141	KCH		9 JUN 66		6-14-66
E		REVISED PER TDRR 30152			19 JUL 66		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T 1	1008832	TRANSFORMER			
T 2	1008842				
T 3	1008845				
T 4	1008832				
T 5	1008842				
T 6	1008845				
T 7	1008832				
T 8	1008842				
T 9	1008845				
T 10	1008842				
T 11	1008842				
T 12	1008832				
T 13	1008832				
T 14	1008842				
T 15	1008845				
T 16	1008832				
T 17	1008842				
T 18	1008845				
T 19	1008832				
T 20	1008842				
T 21	1008845	TRANSFORMER			

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

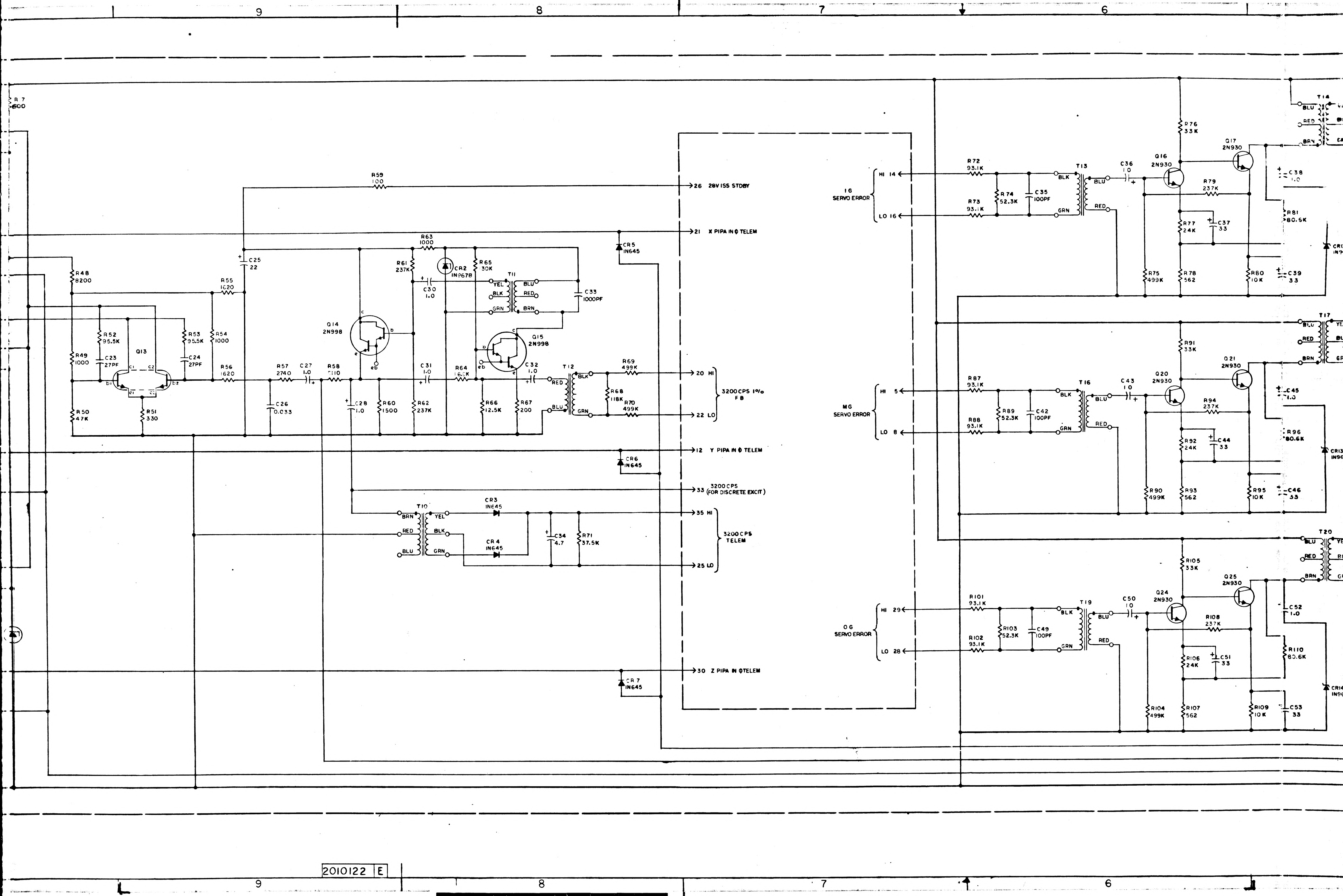
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Leo 30 MAR 66
CHECKED
APPROVED 11 April 66
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

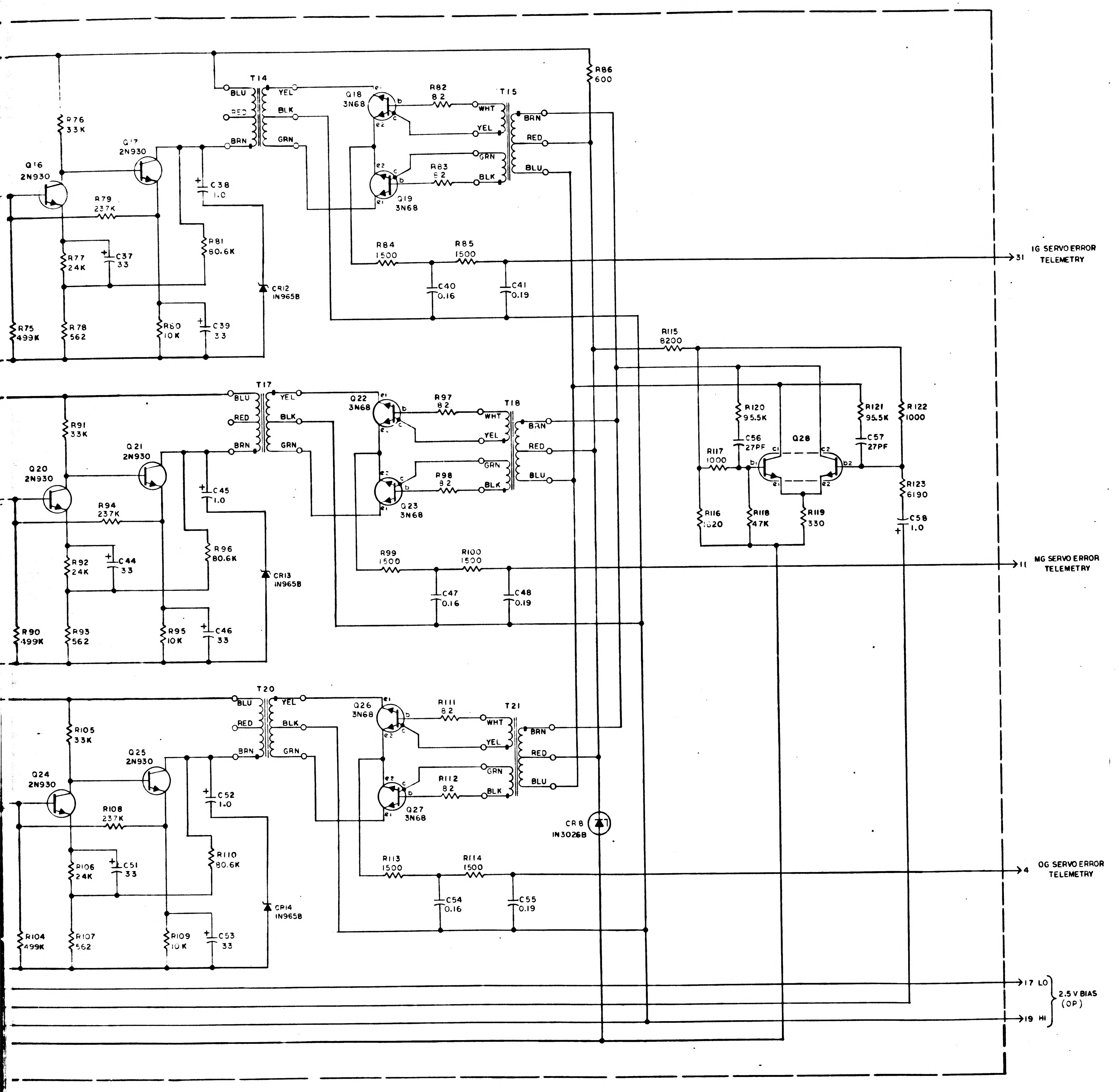
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
IRIG & PIPA

CODE IDENT NO. 30230
SIZE J
DRAWING NO. 2010122
SCALE —
SHEET 1 OF 1


9
8
7
6
R7
600
R48
8200
R49
1000
R50
47K
R51
330
R52
95.5K
R53
95.5K
C23
27PF
C24
27PF
Q13
b1
b2
c1
c2
R54
1000
R55
1620
R56
1620
C25
22
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
R63
1000
R61
237K
CR2
1N967B
R65
30K
C30
1.0
T11
YEL
BLK
GRN
BLU
RED
BRN
C33
1000PF
Q14
2N998
Q15
2N998
R57
2740
C27
1.0
R58
5110
C26
0.033
C28
1.0
R60
1500
R62
237K
C31
1.0
R64
16.2K
R66
12.5K
R67
200
C32
1.0
T12
R68
118K
R69
499K
R70
499K
20 HI
22 LO
3200CPS 1%
FB
CR5
1N645
CR6
1N645
CR7
1N645
12 Y PIPA IN Φ TELEM
33 3200CPS (FOR DISCRETE EXCIT)
T10
CR3
1N645
CR4
1N645
C34
4.7
R71
37.5K
35 HI
25 LO
3200CPS
TELEM
30 Z PIPA IN ΦTELEM
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
C36
10
Q16
2N930
Q17
2N930
R76
33K
R77
24K
R78
562
R75
499K
R79
237K
C37
33
R80
10K
R81
80.6K
C38
1.0
C39
33
T14
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
C43
10
Q20
2N930
Q21
2N930
R91
33K
R92
24K
R93
562
R90
499K
R94
237K
C44
33
R95
10K
R96
80.6K
C45
1.0
C46
33
CR13
T17
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
C50
10
Q24
2N930
Q25
2N930
R105
33K
R106
24K
R107
562
R104
499K
R108
237K
C51
33
R109
10K
R110
80.6K
C52
1.0
C53
33
CR14
T20
2010122 E

27/2010122


T14
BLU
RED
BRN
YEL
BLK
GRN
Q18
3N68
R82
82
T15
WHT
YEL
GRN
BLK
BRN
RED
BLU
R83
82
Q19
3N68
R86
600
R76
33K
Q17
2N930
Q16
2N930
R79
237K
C38
1.0
R81
80.6K
R77
24K
C37
33
CR12
IN965B
R75
499K
R78
562
R80
10K
C39
33
R84
1500
R85
1500
C40
0.16
C41
0.19
31
IG SERVO ERROR TELEMETRY
R115
8200
T17
Q22
3N68
R97
82
T18
R91
33K
Q21
2N930
Q20
2N930
C45
1.0
R94
237K
C44
33
R92
24K
R96
80.6K
CR13
IN965B
R90
499K
R93
562
R95
10K
C46
33
R99
1500
R100
1500
C47
0.16
C48
0.19
11
MG SERVO ERROR TELEMETRY
R98
82
Q23
3N68
R120
95.5K
C56
27PF
Q28
R121
95.5K
C57
27PF
R122
1000
R117
1000
R116
1620
R118
47K
R119
330
R123
6190
C58
1.0
T20
Q26
3N68
R111
82
T21
R105
33K
Q25
2N930
Q24
2N930
C52
1.0
R108
237K
C51
33
R106
24K
R110
80.6K
CR14
IN965B
R104
499K
R107
562
R109
10K
C53
33
R113
1500
R114
1500
C54
0.16
C55
0.19
4
OG SERVO ERROR TELEMETRY
R112
82
Q27
3N68
CR8
IN3026B
17 LO
19 HI
2.5 V BIAS (OP)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750-1	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10 W
R3	1010311-315		93.1K	1	1/10 W
R4	1010311-291		52.3K	1	1/10 W
R5	1010311-129		1070	1	1/10 W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10 W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-307		76.8K	1	1/10 W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	1 W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10 W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-307		76.8K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10 W
R34	1010311-315		93.1K	1	1/10 W
R35	1010311-291		52.3K	1	1/10 W
R36	1010311-129		1070	1	1/10 W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-307		76.8K	1	1/10 W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1/10 W
R50	1006750-72		47K	2	1/4 W
R51	1006750-20		330	2	1/4 W
R52	1006750-163		95.5K	2	1/4 W
R53	1006750-163		95.5K	2	1/4 W
R54	1010311-126		1000	1	1/10 W
R55	-146		1620	1	
R56	-146		1620	1	
R57	-168		2740	1	
R58	1010311-194		5110	1	1/10 W
R59	1006750-8		100	2	1/4 W
R60	1006760-36		1500	2	1/2 W
R61	1010364-707		237K	1	1/8 W
R62	1010364-707		237K	1	1/8 W
R63	1010311-126		1000	1	1/10 W
R64	1010311-244		16.9K	1	1/10 W
R65	1010364-657		130K	1	1/10 W
R66	1010377-306		12.5K	.01	1/10 W
R67	1010311-59		200	1	1/10 W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-153		37.5K	2	1/4 W
R72	1010311-315		93.1K	1	1/10 W
R73	1010311-315		93.1K	1	1/10 W
R74	1010311-291		52.3K	1	1/10 W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10 W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10 W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1006750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10 W
R88	1010311-315		93.1K	1	1/10 W
R89	1010311-291		52.3K	1	1/10 W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10 W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	-6		82	2	1/4 W
R113	-36		1500	2	1/4 W
R114	-36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-163		95.5K	2	1/4 W
R121	1006750-163		95.5K	2	1/4 W
R122	1010311-126		1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100PF	.2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1008815-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REF DES	PART NO.	DESC
T1	1008832	TRANS
T2	1008842	
T3	1008845	
T4	1008832	
T5	1008842	
T6	1008845	
T7	1008832	
T8	1008842	
T9	1008845	
T10	1008842	
T11	1008842	
T12	1008832	
T13	1008832	
T14	1008842	
T15	1008845	
T16	1008832	
T17	1008842	
T18	1008845	
T19	1008832	
T20	1008842	
T21	1008845	TRAN

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY	USED ON
APPLICATION	

QTY REQD

DRAWN

CHECKED

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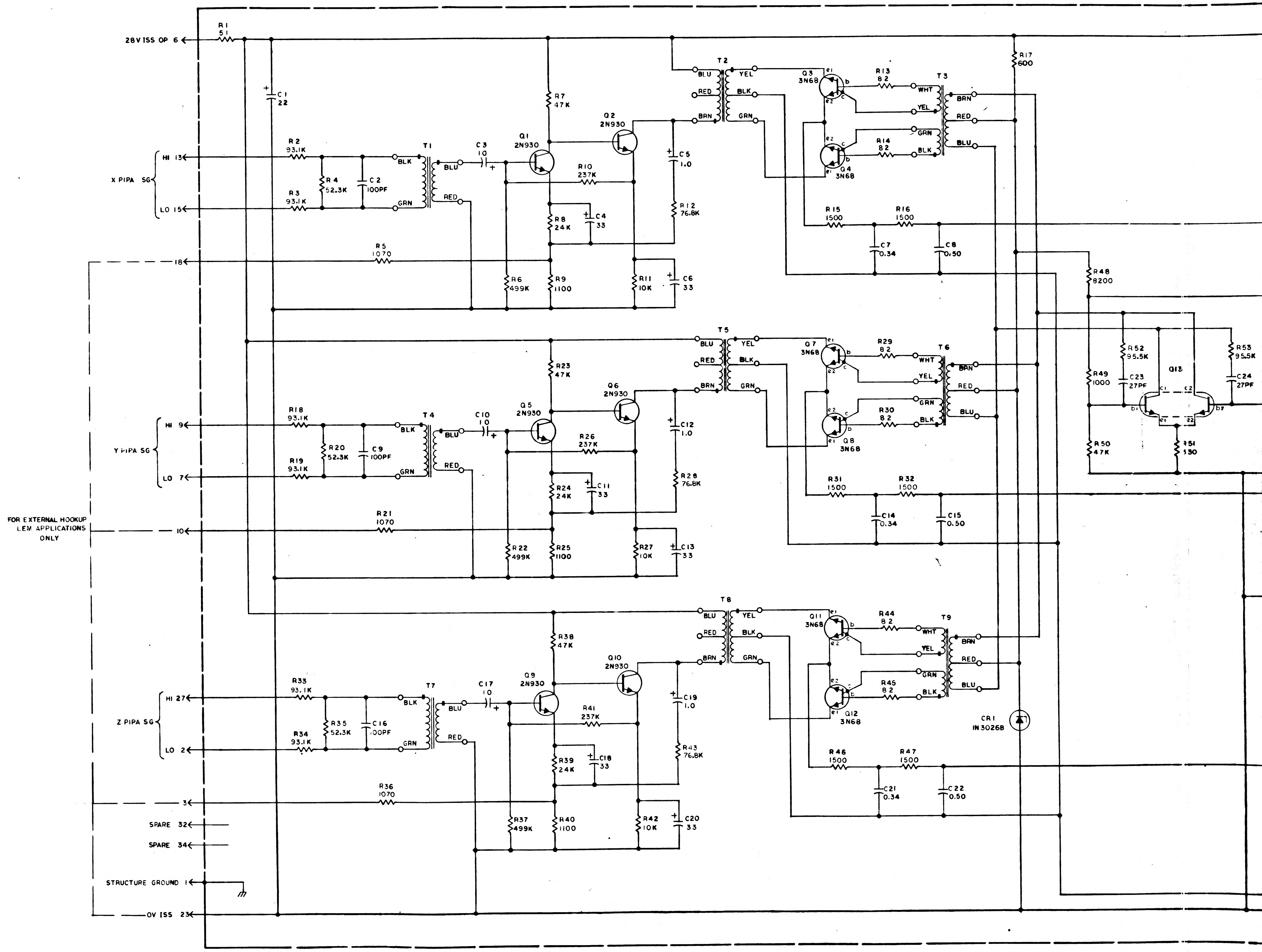
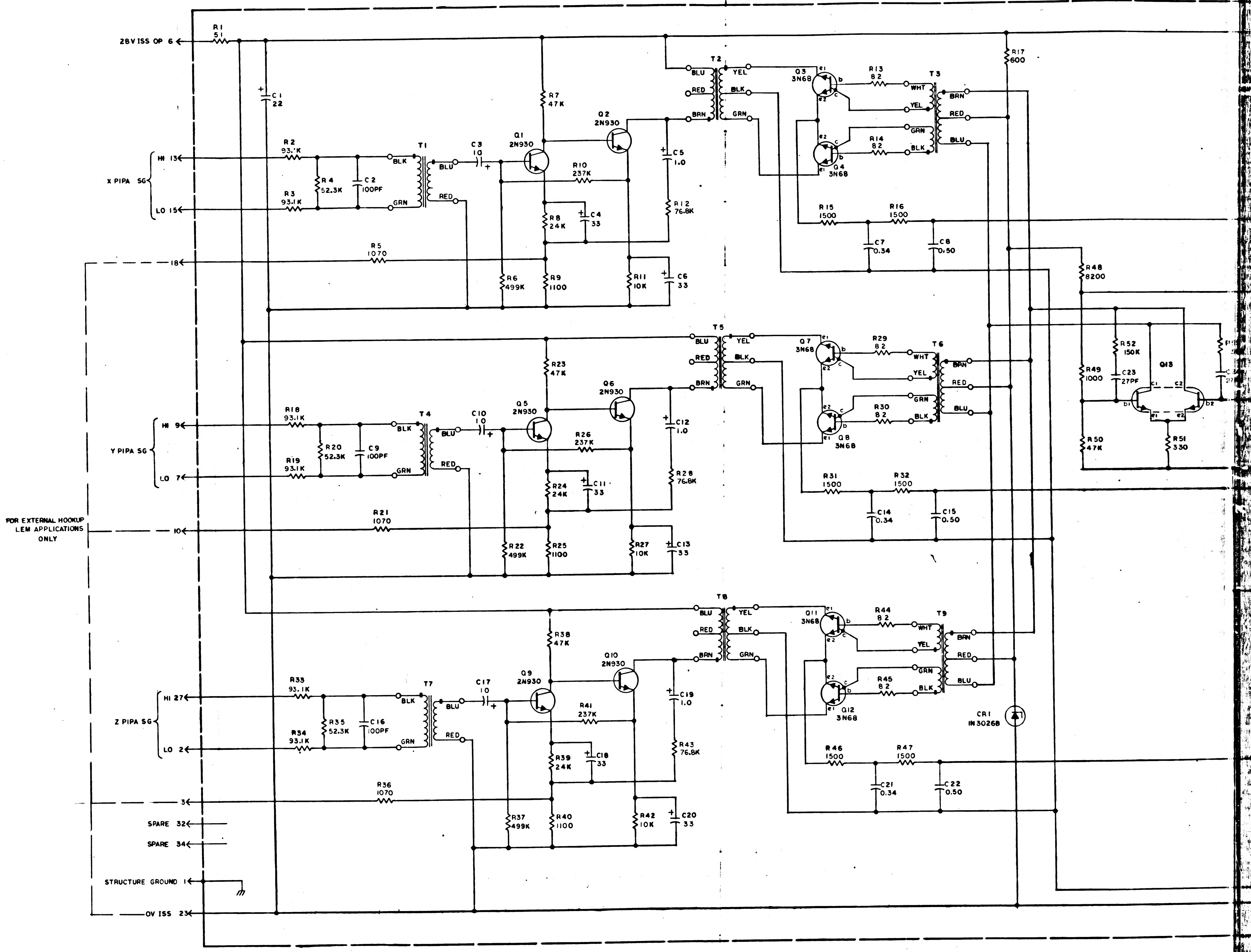

13
12
11
10
D
C
B
A
28V ISS OP 6
R1 51
C1 22
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
HI 13
LO 15
X PIPA SG
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
R8 24K
C4 33
R6 499K
R9 1100
R11 10K
C6 33
C5 1.0
R12 76.8K
R5 1070
18
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
R48 8200
R49 1000
R50 47K
R52 95.5K
C23 27PF
Q13
R51 350
R53 95.5K
C24 27PF
HI 9
LO 7
Y PIPA SG
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R26 237K
R24 24K
C11 33
R22 499K
R25 1100
R27 10K
C13 33
C12 1.0
R28 76.8K
FOR EXTERNAL HOOKUP
LEM APPLICATIONS
ONLY
R21 1070
10
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
HI 27
LO 2
Z PIPA SG
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R41 237K
R39 24K
C18 33
R37 499K
R40 1100
R42 10K
C20 33
C19 1.0
R43 76.8K
R36 1070
3
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 1N3026B
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23
e1
e2
b
c

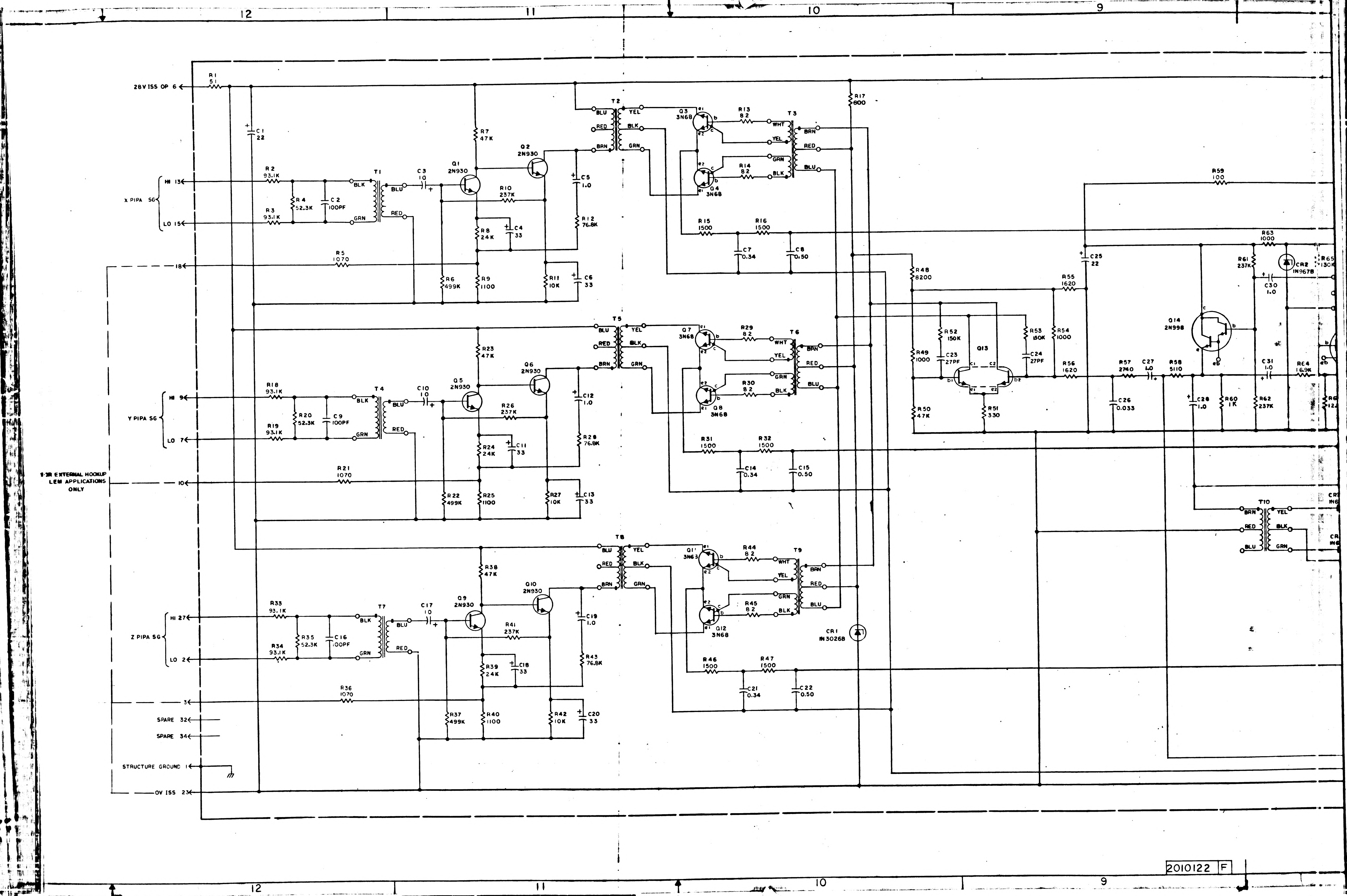
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

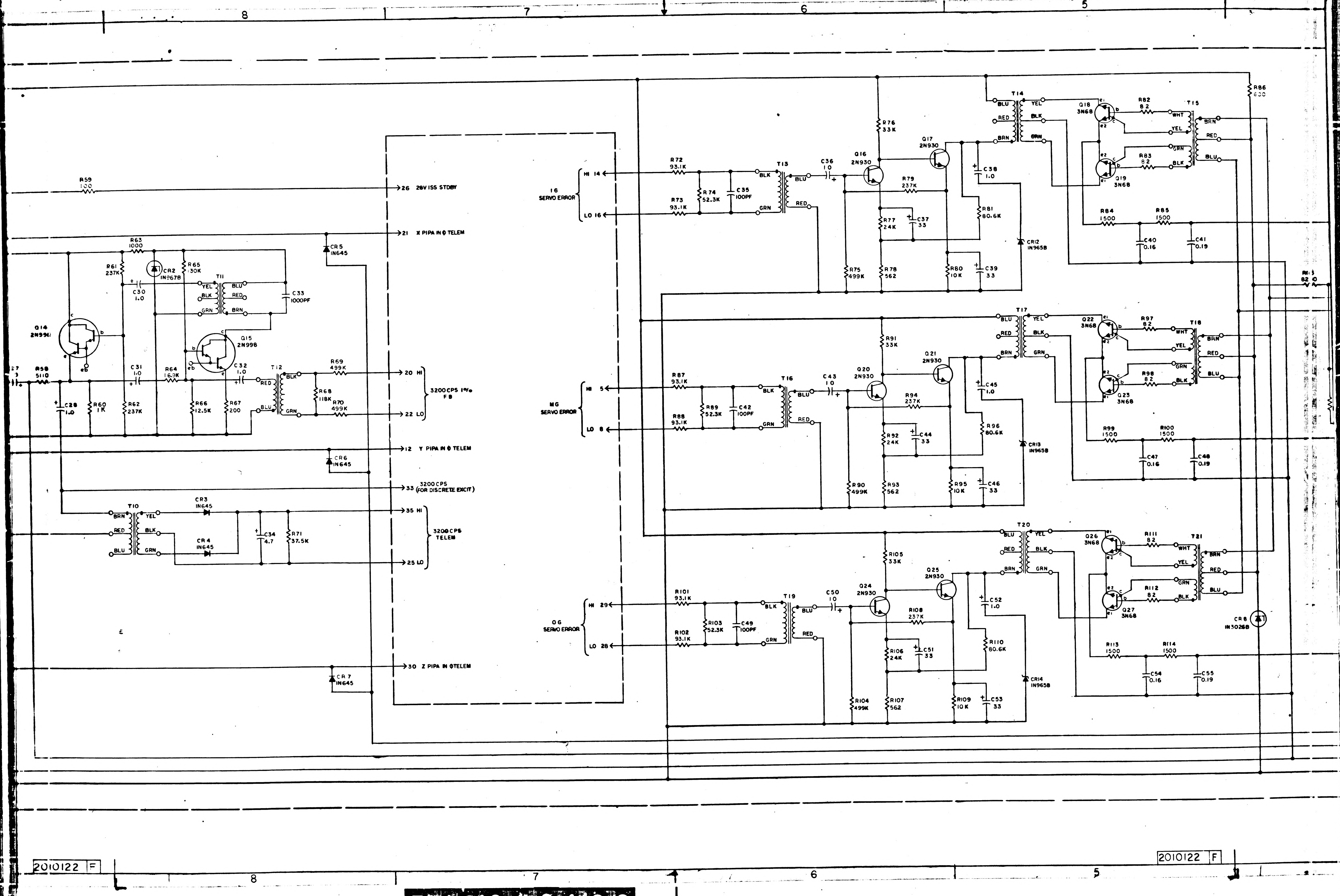

28V ISS OP 6
R1 51
C1 22
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
HI 13
LO 15
X PIPA SG
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R8 24K
R9 1100
R6 499K
R10 237K
C4 33
C5 1.0
R12 76.8K
R11 10K
C6 33
R5 1070
18
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
R48 8200
R49 1000
R50 47K
R52 150K
C23 27PF
Q13
R51 330
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R24 24K
R25 1100
R22 499K
R26 237K
C11 33
C12 1.0
R28 76.8K
R27 10K
C13 33
R21 1070
10
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R39 24K
R40 1100
R37 499K
R41 237K
C18 33
C19 1.0
R43 76.8K
R42 10K
C20 33
R36 1070
3
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 1N3026B
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23

NOTES:

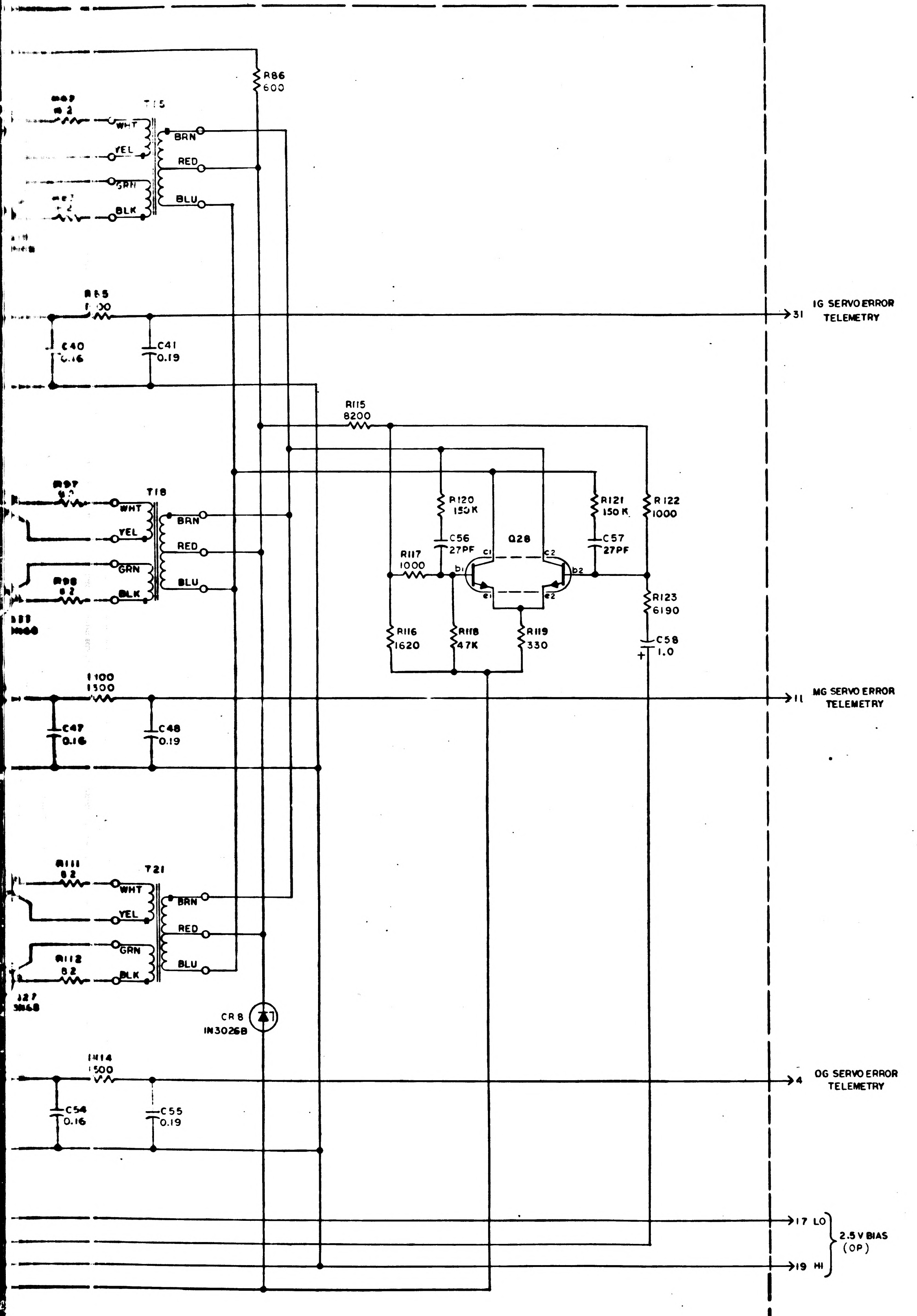
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327


12
11
10
9
28V ISS OP 6
R1 51
C1 22
X PIPA SG
HI 13
LO 15
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
BLK
GRN
T1
BLU
RED
C3 10
Q1 2N930
R7 47K
Q2 2N930
R10 237K
C4 33
R8 24K
C5 1.0
R12 76.8K
R5 1070
18
R6 499K
R9 1100
R11 10K
C6 33
T2
YEL
BLK
GRN
BRN
Q3 3N68
R13 82
T3
WHT
R14 82
Q4 3N68
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
R23 47K
Q6 2N930
R26 237K
C11 33
R24 24K
C12 1.0
R28 76.8K
1-3R EXTERNAL HOOKUP
LEM APPLICATIONS
ONLY
10
R21 1070
R22 499K
R25 1100
R27 10K
C13 33
T5
Q7 3N68
R29 82
T6
R30 82
Q8 3N68
R31 1500
R32 1500
C14 0.34
C15 0.50
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
R38 47K
Q10 2N930
R41 237K
C18 33
R39 24K
C19 1.0
R43 76.8K
3
R36 1070
R37 499K
R40 1100
R42 10K
C20 33
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23
T8
Q11 3N63
R44 82
T9
R45 82
Q12 3N68
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 1N3026B
R48 8200
R49 1000
R50 47K
R52 150K
C23 27PF
Q13
c1
c2
b1
b2
e1
e2
R51 330
R53 150K
C24 27PF
R54 1000
R55 1620
R56 1620
C25 22
R57 2740
C26 0.033
C27 1.0
R58 5110
C28 1.0
R59 100
Q14 2N998
c
b
e
eb
R60 1K
R61 237K
R62 237K
R63 1000
CR2 1N967B
R65 130K
C30 1.0
C31 1.0
R64 16.9K
T10
2010122 F

2/2010122



8
7
6
5
R59 100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
CR5 1N645
R63 1000
R61 237K
CR2 1N967B
R65 130K
T11
YEL
BLK
GRN
BLU
RED
BRN
C30 1.0
C33 1000PF
Q14 2N991
Q15 2N998
R58 5110
C31 1.0
R64 16.9K
C32 1.0
T12
RED
BLU
BLK
GRN
R69 499K
R68 118K
R70 499K
20 HI
22 LO
3200CPS 1% FB
C28 1.0
R60 1K
R62 237K
R66 12.5K
R67 200
12 Y PIPA IN Φ TELEM
CR6 1N645
33 3200CPS (FOR DISCRETE EXCIT)
T10
BRN
RED
BLU
YEL
BLK
GRN
CR3 1N645
CR4 1N645
C34 4.7
R71 37.5K
35 HI
25 LO
3200CPS TELEM
30 Z PIPA IN Φ TELEM
CR7 1N645
IG SERVO ERROR
HI 14
LO 16
R72 93.1K
R73 93.1K
R74 52.3K
C35 100PF
T13
C36 10
Q16 2N930
R76 33K
Q17 2N930
R79 237K
C38 1.0
R77 24K
C37 33
R81 80.6K
CR12 1N965B
R75 499K
R78 562
R80 10K
C39 33
T14
Q18 3N68
R82 82
T15
WHT
R83 82
Q19 3N68
R84 1500
R85 1500
C40 0.16
C41 0.19
R86 600
R115 82.0
MG SERVO ERROR
HI 5
LO 8
R87 93.1K
R88 93.1K
R89 52.3K
C42 100PF
T16
C43 10
Q20 2N930
R91 33K
Q21 2N930
R94 237K
C45 1.0
R92 24K
C44 33
R96 80.6K
CR13 1N965B
R90 499K
R93 562
R95 10K
C46 33
T17
Q22 3N68
R97 82
T18
R98 82
Q23 3N68
R99 1500
R100 1500
C47 0.16
C48 0.19
OG SERVO ERROR
HI 29
LO 28
R101 93.1K
R102 93.1K
R103 52.3K
C49 100PF
T19
C50 10
Q24 2N930
R105 33K
Q25 2N930
R108 237K
C52 1.0
R106 24K
C51 33
R110 80.6K
CR14 1N965B
R104 499K
R107 562
R109 10K
C53 33
T20
Q26 3N68
R111 82
T21
R112 82
Q27 3N68
R113 1500
R114 1500
C54 0.16
C55 0.19
CR8 1N3026B



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10 K	2	1/4 W
R12	1010311 - 307		76.8K	1	1/10 W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1010604 - 1		600	1	1 W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10 K	2	1/4 W
R28	1010311 - 307		76.8K	1	1/10 W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10 W
R34	1010311 - 315		93.1K	1	1/10 W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 307		76.8K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1 10 W
R50	1006750 - 72		47K	2	1 4 W
R51	1006750 - 20		330	2	1 4 W
R52	1006750 - 84		150K	2	1 4 W
R53	1006750 - 84		150K	2	1 4 W
R54	1010311 - 126		1000	1	1 10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 32		1K	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9 K	1	1/10W
R65	1010364 - 657		130 K	1	1/10W
R66	1010377 - 306		12.5K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 153		37.5K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10W
R73	1010311 - 315		93.1K	1	1/10W
R74	1010311 - 291		52.3K	1	1/10W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10 K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1010604 - 1		600	1	1 W
R87	1010311 - 315		93.1K	1	1/10 W
R88	1010311 - 315		93.1K	1	1/10 W
R89	1010311 - 291		52.3K	1	1/10W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 84		150K	2	1/4 W
R121	1006750 - 84		150 K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	1N3026B		
CR2	1008815-11		1N967B		
CR3	1010837-001		1N645		
CR4	-001		1N645		
CR5	-001		1N645		
CR6	-001		1N645		
CR7	1010837-001		1N645		
CR8	1010829-11		1N3026B		
CR12	1008815-9	DIODE	1N965B		
CR13	1008815-9	DIODE	1N965B		
CR14	1008815-9	DIODE	1N965B		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REPLACES REV - WITH CHANGE PER TDRR 27966	ADL	RJK			
B		REVISED PER TDRR 28631	ADL	LSB	5/13/66		5-17-66
C		REVISED PER TDRR 29133	LSB				6-1-66
D		REVISED PER TDRR 29141	KCN		9 Jun 66		6-14-66
E		REVISED PER TDRR 30182			19 Jul 66		
F		REVISED PER TDRR 30369	EMF	JT			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1009832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Leo 30 APR 66
CHECKED
APPROVED 1 APRIL 66
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER IRIG & PIPA

CODE IDENT NO. 30230 | SIZE J | DRAWING NO. 2010122
SCALE — | SHEET 1 OF 1

2010122 F

4/2010122

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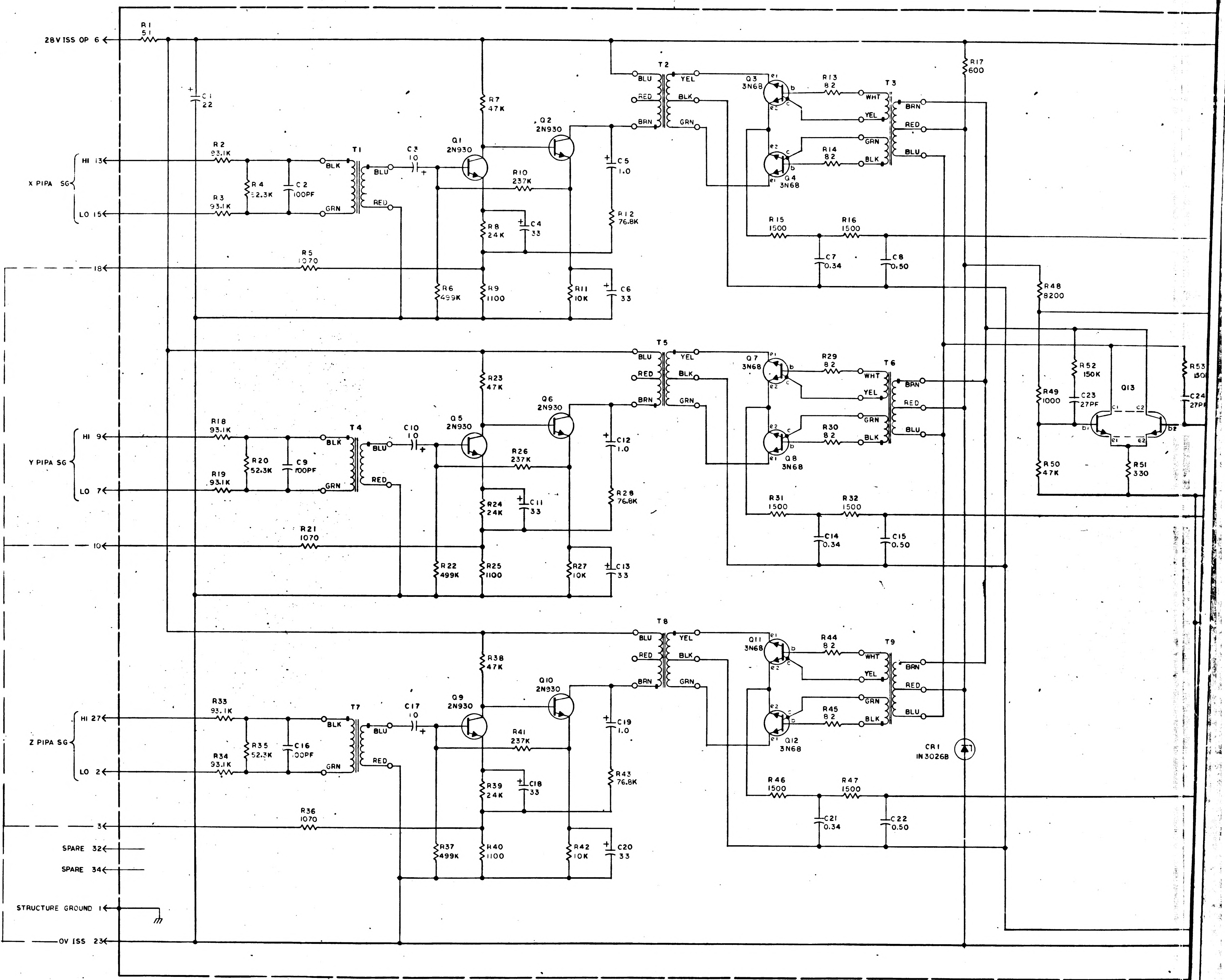
D

C

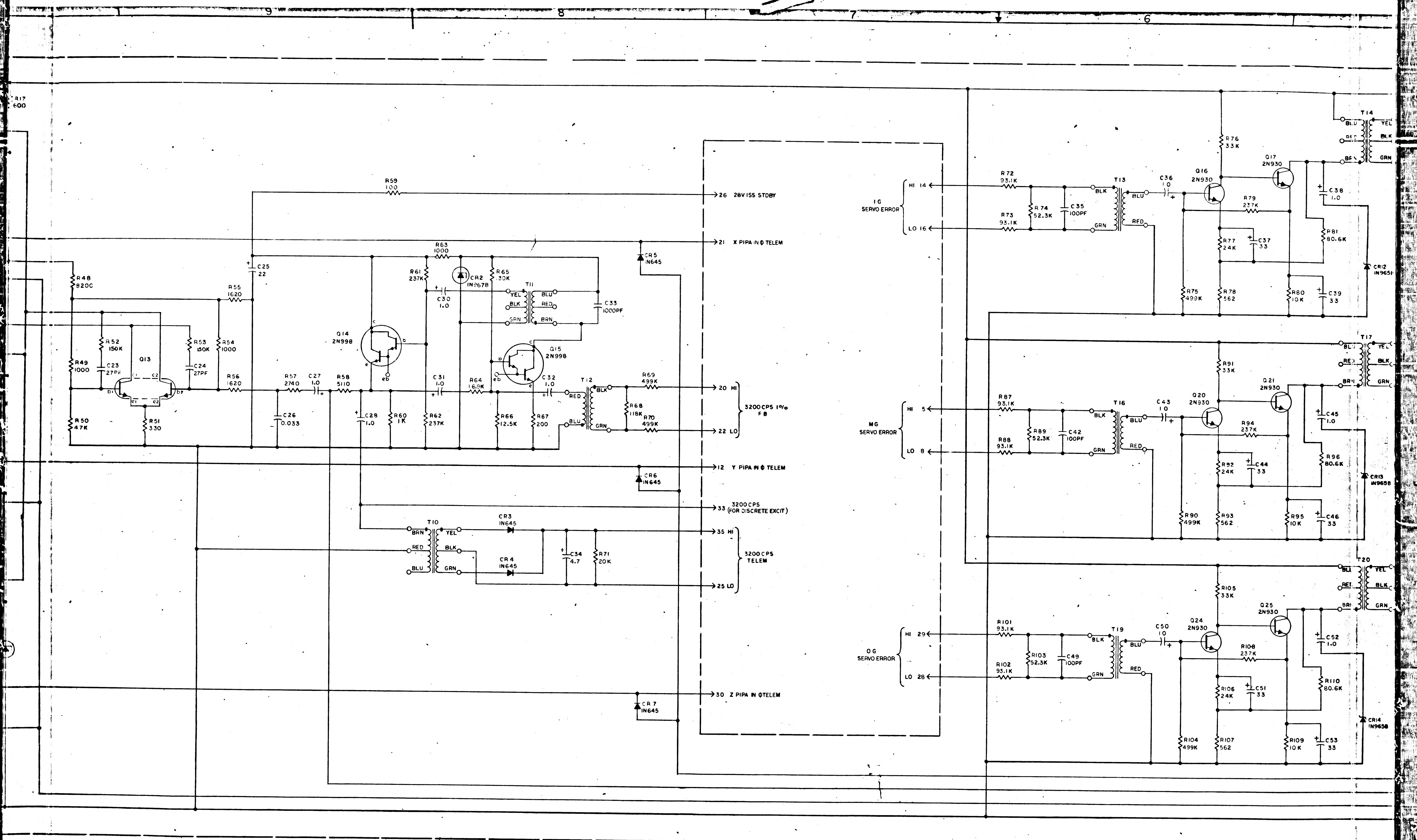
B

A

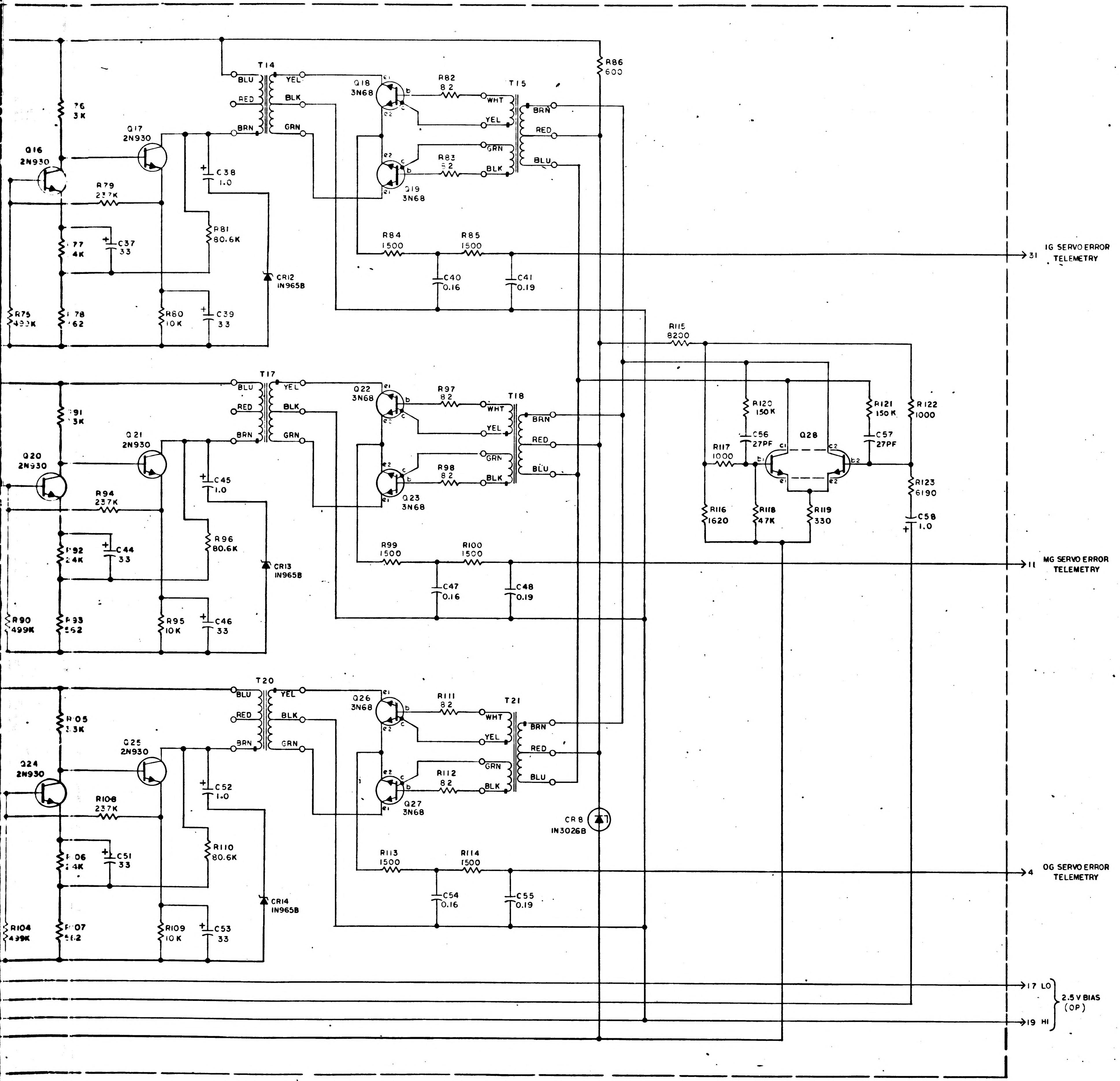

28V ISS OP 6
R1 51
C1 22
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R8 24K
C4 33
R9 1100
R10 237K
R6 499K
R11 10K
C5 1.0
R12 76.8K
C6 33
X PIPA SG
HI 13
LO 15
R5 1070
18
T2
YEL
BLK
GRN
BRN
Q3 3N68
Q4 3N68
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
R48 8200
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R24 24K
C11 33
R25 1100
R26 237K
R22 499K
R27 10K
C12 1.0
R28 76.8K
C13 33
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
R21 1070
10
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
R49 1000
R50 47K
R52 150K
C23 27PF
Q13
R51 330
R53 150
C24 27PF
b1
b2
c1
c2
e1
e2
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R39 24K
C18 33
R40 1100
R41 237K
R37 499K
R42 10K
C19 1.0
R43 76.8K
C20 33
R36 1070
3
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
R46 1500
R47 1500
C21 0.34
C22 0.50
CR1 1N3026B
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327


9
8
7
6
R17
600
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
CR5
IN645
R48
820C
R49
1000
R50
47K
R52
150K
C23
27PF
Q13
R51
330
R53
150K
C24
27PF
R54
1000
R55
1620
R56
1620
C25
22
R57
2740
C26
0.033
C27
1.0
R58
5110
C28
1.0
R60
1K
Q14
2N998
R61
237K
R62
237K
R63
1000
CR2
IN9678
C30
1.0
R65
130K
T11
YEL
BLK
GRN
BLU
RED
BRN
C33
1000PF
Q15
2N998
C31
1.0
R64
16.9K
R66
12.5K
R67
200
C32
1.0
T12
RED
BLU
BLK
GRN
R68
118K
R69
499K
R70
499K
20 HI
22 LO
3200CPS 1Φ
FB
12 Y PIPA IN Φ TELEM
CR6
IN645
33 3200CPS (FOR DISCRETE EXCIT)
T10
BRN
RED
BLU
YEL
BLK
GRN
CR3
IN645
CR4
IN645
C34
4.7
R71
20K
35 HI
25 LO
3200CPS
TELEM
30 Z PIPA IN Φ TELEM
CR7
IN645
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
BLK
GRN
BLU
RED
C36
10
Q16
2N930
Q17
2N930
R76
33K
R79
237K
R77
24K
C37
33
R75
499K
R78
562
R80
10K
R81
80.6K
C38
1.0
C39
33
CR12
IN965B
T14
BLU
RED
BRN
YEL
BLK
GRN
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
BLK
GRN
BLU
RED
C43
10
Q20
2N930
Q21
2N930
R91
33K
R94
237K
R92
24K
C44
33
R90
499K
R93
562
R95
10K
R96
80.6K
C45
1.0
C46
33
CR13
IN965B
T17
BLU
RED
BRN
YEL
BLK
GRN
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
BLK
GRN
BLU
RED
C50
10
Q24
2N930
Q25
2N930
R105
33K
R108
237K
R106
24K
C51
33
R104
499K
R107
562
R109
10K
R110
80.6K
C52
1.0
C53
33
CR14
IN965B
T20
BLU
RED
BRN
YEL
BLK
GRN

2010122 G


T14
BLU
RED
BRN
YEL
BLK
GRN
Q18
3N68
R82
82
T15
WHT
YEL
GRN
BLK
BRN
RED
BLU
R83
82
Q19
3N68
R86
600
R76
3K
Q17
2N930
Q16
2N930
C38
1.0
R79
237K
R81
80.6K
R77
4K
C37
33
CR12
IN965B
R84
1500
R85
1500
C40
0.16
C41
0.19
31
IG SERVO ERROR TELEMETRY
R75
499K
R78
562
R80
10K
C39
33
R115
8200
R120
150K
C56
27PF
Q28
R121
150K
C57
27PF
R122
1000
R117
1000
R116
1620
R118
47K
R119
330
R123
6190
C58
1.0
T17
Q22
3N68
R97
82
T18
Q21
2N930
Q20
2N930
R91
33K
C45
1.0
R94
237K
R96
80.6K
R98
82
Q23
3N68
R92
24K
C44
33
CR13
IN965B
R99
1500
R100
1500
C47
0.16
C48
0.19
11
MG SERVO ERROR TELEMETRY
R90
499K
R93
562
R95
10K
C46
33
T20
Q26
3N68
R111
82
T21
Q25
2N930
Q24
2N930
R105
3.3K
C52
1.0
R108
237K
R110
80.6K
R112
82
Q27
3N68
CR8
IN3026B
R106
24K
C51
33
CR14
IN965B
R113
1500
R114
1500
C54
0.16
C55
0.19
4
OG SERVO ERROR TELEMETRY
R104
499K
R107
56.2
R109
10K
C53
33
17 LO
19 HI
2.5 V BIAS (OP)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R 1	1006750 - 1	RESISTOR	51	2	1/4 W
R 2	1010311 - 315		93.1K	1	1/10 W
R 3	1010311 - 315		93.1K	1	1/10 W
R 4	1010311 - 291		52.3K	1	1/10 W
R 5	1010311 - 129		1070	1	1/10 W
R 6	1010364 - 769		499K	1	1/8 W
R 7	1006750 - 72		47K	2	1/4 W
R 8	1006750 - 65		24K	2	1/4 W
R 9	1010311 - 130		1100	1	1/10 W
R 10	1010364 - 707		237K	1	1/8 W
R 11	1006750 - 56		10 K	2	1/4 W
R 12	1010311 - 307		76.8K	1	1/10 W
R 13	1006750 - 6		82	2	1/4 W
R 14	1006750 - 6		82	2	1/4 W
R 15	1006750 - 36		1500	2	1/4 W
R 16	1006750 - 36		1500	2	1/4 W
R 17	1010604 - 1		600	1	1 W
R 18	1010311 - 315		93.1K	1	1/10 W
R 19	1010311 - 315		93.1K	1	1/10 W
R 20	1010311 - 291		52.3K	1	1/10 W
R 21	1010311 - 129		1070	1	1/10 W
R 22	1010364 - 769		499K	1	1/8 W
R 23	1006750 - 72		47K	2	1/4 W
R 24	1006750 - 65		24K	2	1/4 W
R 25	1010311 - 130		1100	1	1/10 W
R 26	1010364 - 707		237K	1	1/8 W
R 27	1006750 - 56		10K	2	1/4 W
R 28	1010311 - 307		76.8K	1	1/10 W
R 29	1006750 - 6		82	2	1/4 W
R 30	1006750 - 6		82	2	1/4 W
R 31	1006750 - 36		1500	2	1/4 W
R 32	1006750 - 36		1500	2	1/4 W
R 33	1010311 - 315		93.1K	1	1/10 W
R 34	1010311 - 315		93.1K	1	1/10 W
R 35	1010311 - 291		52.3K	1	1/10 W
R 36	1010311 - 129		1070	1	1/10 W
R 37	1010364 - 769		499K	1	1/8 W
R 38	1006750 - 72		47K	2	1/4 W
R 39	1006750 - 65		24K	2	1/4 W
R 40	1010311 - 130		1100	1	1/10 W
R 41	1010364 - 707		237K	1	1/8 W
R 42	1006750 - 56		10K	2	1/4 W
R 43	1010311 - 307		76.8K	1	1/10 W
R 44	1006750 - 6		82	2	1/4 W
R 45	1006750 - 6		82	2	1/4 W
R 46	1006750 - 36		1500	2	1/4 W
R 47	1006750 - 36		1500	2	1/4 W
R 48	1006750 - 54		8200	2	1/4 W
R 49	1010311 - 126		1000	1	1/10 W
R 50	1006750 - 72		47K	2	1/4 W
R 51	1006750 - 20		330	2	1/4 W
R 52	1006750 - 84		150K	2	1/4 W
R 53	1006750 - 84		150K	2	1/4 W
R 54	1010311 - 126		1000	1	1/10 W
R 55	- 146		1620	1	
R 56	- 146		1620	1	
R 57	- 168		2740	1	
R 58	1010311 - 194		5110	1	1/10 W
R 59	1006750 - 8		100	2	1/4 W
R 60	1006760 - 32		1K	2	1/2 W
R 61	1010364 - 707		237K	1	1/8 W
R 62	1010364 - 707		237K	1	1/8 W
R 63	1010311 - 126		1000	1	1/10 W
R 64	1010311 - 244		16.9K	1	1/10 W
R 65	1010364 - 657		130K	1	1/10 W
R 66	1010377 - 306		12.5K	.01	1/10 W
R 67	1010311 - 59		200	.1	1/10 W
R 68	1010364 - 649		118K	1	1/8 W
R 69	1010364 - 769		499K	1	1/8 W
R 70	1010364 - 769		499K	1	1/8 W
R 71	1006750 - 63		20K	2	1/4 W
R 72	1010311 - 315		93.1K	1	1/10 W
R 73	1010311 - 315		93.1K	1	1/10 W
R 74	1010311 - 291		52.3K	1	1/10 W
R 75	1010364 - 769		499K	1	1/8 W
R 76	1006750 - 68		33K	2	1/4 W
R 77	1006750 - 65		24K	2	1/4 W
R 78	1010311 - 102		562	1	1/10 W
R 79	1010364 - 707		237K	1	1/8 W
R 80	1006750 - 56		10K	2	1/4 W
R 81	1010311 - 309		80.6K	1	1/10 W
R 82	1006750 - 6		82	2	1/4 W
R 83	1006750 - 6		82	2	1/4 W
R 84	1006750 - 36		1500	2	1/4 W
R 85	1006750 - 36		1500	2	1/4 W
R 86	1010604 - 1		600	1	1 W
R 87	1010311 - 315		93.1K	1	1/10 W
R 88	1010311 - 315		93.1K	1	1/10 W
R 89	1010311 - 291		52.3K	1	1/10 W
R 90	1010364 - 769		499K	1	1/8 W
R 91	1006750 - 68		33K	2	1/4 W
R 92	1006750 - 65		24K	2	1/4 W
R 93	1010311 - 102		562	1	1/10 W
R 94	1010364 - 707		237K	1	1/8 W
R 95	1006750 - 56		10K	2	1/4 W
R 96	1010311 - 309		80.6K	1	1/10 W
R 97	1006750 - 6		82	2	1/4 W
R 98	1006750 - 6		82	2	1/4 W
R 99	1006750 - 36		1500	2	1/4 W
R 100	1006750 - 36		1500	2	1/4 W
R 101	1010311 - 315		93.1K	1	1/10 W
R 102	1010311 - 315		93.1K	1	1/10 W
R 103	1010311 - 291		52.3K	1	1/10 W
R 104	1010364 - 769		499K	1	1/8 W
R 105	1006750 - 68		33K	2	1/4 W
R 106	1006750 - 65		24K	2	1/4 W
R 107	1010311 - 102		562	1	1/10 W
R 108	1010364 - 707		237K	1	1/8 W
R 109	1006750 - 56		10K	2	1/4 W
R 110	1010311 - 309		80.6K	1	1/10 W
R 111	1006750 - 6		82	2	1/4 W
R 112	- 6		82	2	1/4 W
R 113	- 36		1500	2	1/4 W
R 114	- 36		1500	2	1/4 W
R 115	1006750 - 54		8200	2	1/4 W
R 116	1010311 - 146		1620	1	1/10 W
R 117	1010311 - 126		1000	1	1/10 W
R 118	1006750 - 72		47K	2	1/4 W
R 119	1006750 - 20		330	2	1/4 W
R 120	1006750 - 84		150K	2	1/4 W
R 121	1006750 - 84		150K	2	1/4 W
R 122	1010311 - 126		1000	1	1/10 W
R 123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C 1	1006755-134	CAPACITOR	22	10	50 VDC
C 2	1010409-25		100PF	2	500
C 3	1006755-31		10	10	20
C 4	1006755-34		33		20
C 5	1006755-69		1.0		35
C 6	1006755-34		33		20
C 7	1010279-7		0.34		6
C 8	1010279-9		0.50	10	6
C 9	1010409-25		100PF	2	500
C 10	1006755-31		10	10	20
C 11	1006755-34		33		20
C 12	1006755-69		1.0		35
C 13	1006755-34		33		20
C 14	1010279-7		0.34		6
C 15	1010279-9		0.50	10	6
C 16	1010409-25		100PF	2	500
C 17	1006755-31		10	10	20
C 18	1006755-34		33		20
C 19	1006755-69		1.0		35
C 20	1006755-34		33		20
C 21	1010279-7		0.34		6
C 22	1010279-9		0.50	10	6
C 23	1010409-11		27PF	2	500
C 24	1010409-11		27PF	2	500
C 25	1006755-134		22	10	50
C 26	1010316-19		0.033	1	100
C 27	1006755-69		1.0	10	35
C 28	-69		1.0		
C 30	-69		1.0		
C 31	-69		1.0		
C 32	1006755-69		1.0	10	35
C 33	1010410-17		1000PF	2	300
C 34	1006755-77		4.7	10	35
C 35	1010409-25		100PF	2	500
C 36	1006755-31		10	10	20
C 37	1006755-34		33		20
C 38	1006755-69		1.0		35
C 39	1006755-34		33		20
C 40	1010279-3		0.16		6
C 41	1010279-4		0.19	10	6
C 42	1010409-25		100 PF	2	500
C 43	1006755-31		10	10	20
C 44	1006755-34		33		20
C 45	1006755-69		1.0		35
C 46	1006755-34		33		20
C 47	1010279-3		0.16		6
C 48	1010279-4		0.19	10	6
C 49	1010409-25		100PF	2	500
C 50	1006755-31		10	10	20
C 51	1006755-34		33		20
C 52	1006755-69		1.0		35
C 53	1006755-34		33		20
C 54	1010279-3		0.16		6
C 55	1010279-4		0.19	10	6
C 56	1010409-11		27PF	2	500
C 57	1010409-11		27PF	2	500
C 58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR 1	1010829-11	DIODE	IN3026B		
CR 2	1008815-11		IN967B		
CR 3	1010837-001		IN645		
CR 4	-001		IN645		
CR 5	-001		IN645		
CR 6	-001		IN645		
CR 7	1010837-001		IN645		
CR 8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1		2N930		
Q 3	1010367		3N68		
Q 4	1010367		3N68		
Q 5	1010397-1		2N930		
Q 6	1010397-1		2N930		
Q 7	1010367		3N68		
Q 8	1010367		3N68		
Q 9	1010397-1		2N930		
Q 10	1010397-1		2N930		
Q 11	1010367		3N68		
Q 12	1010367		3N68		
Q 13	1010376-3				
Q 14	1010342		2N998		
Q 15	1010342		2N998		
Q 16	1010397-1		2N930		
Q 17	1010397-1		2N930		
Q 18	1010367		3N68		
Q 19	1010367		3N68		
Q 20	1010397-1		2N930		
Q 21	1010397-1		2N930		
Q 22	1010367		3N68		
Q 23	1010367		3N68		
Q 24	1010397-1		2N930		
Q 25	1010397-1		2N930		
Q 26	1010367		3N68		
Q 27	1010367		3N68		
Q 28	1010376-3	TRANSISTOR			

REF DES	PART NO.	DESCR
T 1	1008832	TRANS
T 2	1008842	
T 3	1008845	
T 4	1008832	
T 5	1008842	
T 6	1008845	
T 7	1008832	
T 8	1008842	
T 9	1008845	
T 10	1008842	
T 11	1008842	
T 12	1008832	
T 13	1008832	
T 14	1008842	
T 15	1008845	
T 16	1008832	
T 17	1008842	
T 18	1008845	
T 19	1008832	
T 20	1008842	
T 21	1008845	TRANS

REF DW
SIGN
DWG

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

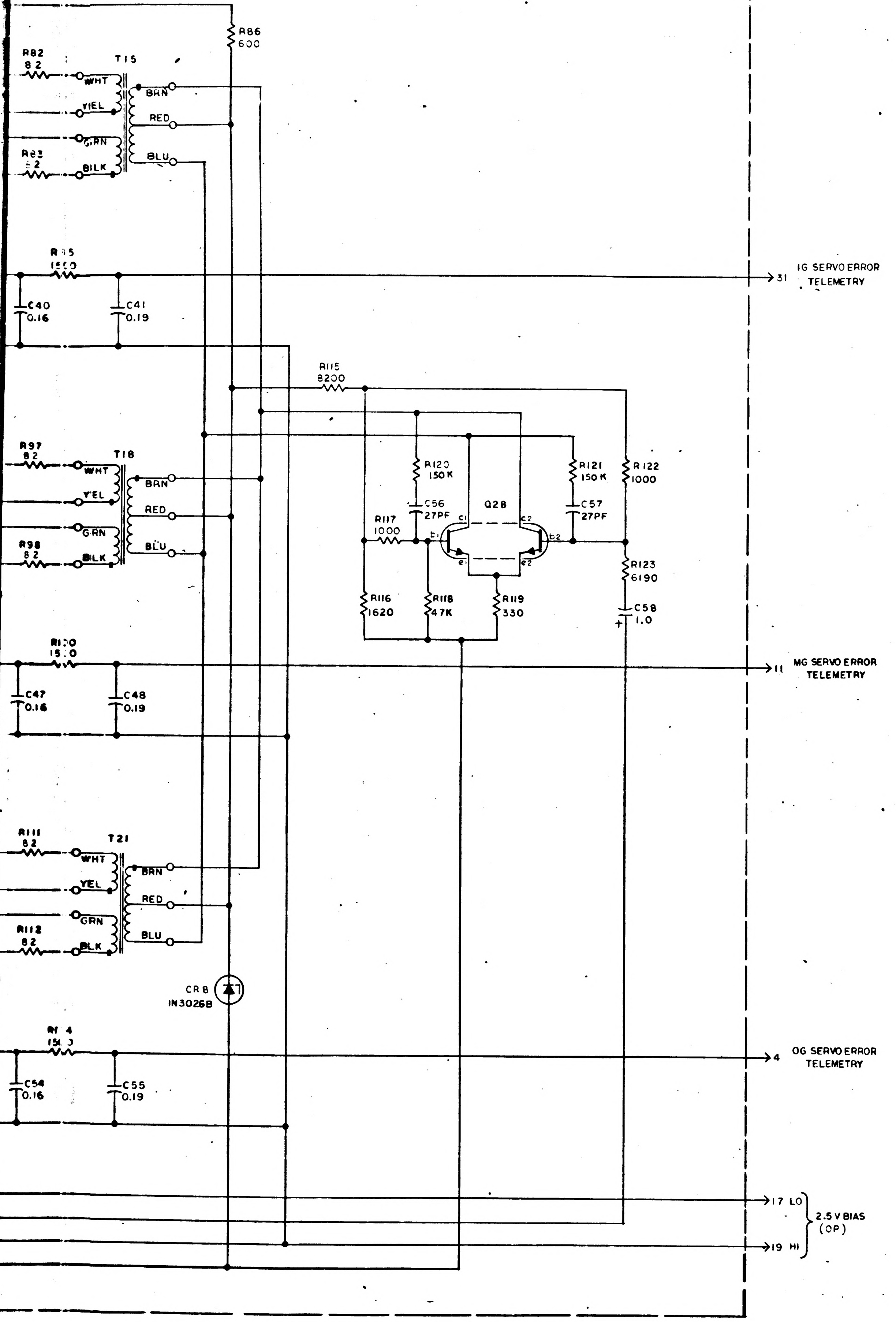
QTY REQD
IDENT

INSTRUMENT
CAMBRID

RAWN a. G.
HECKED
PPROVED
PPROVED
PPROVED
PPROVED

2010122 G

3/2010122



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10 W
R3	1010311 - 315		93.1K	1	1/10 W
R4	1010311 - 291		52.3K	1	1/10 W
R5	1010311 - 129		1070	1	1/10 W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10 W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10 K	2	1/4 W
R12	1010311 - 307		76.8K	1	1/10 W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1006750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1010604 - 1		600	1	1 W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10 W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10 K	2	1/4 W
R28	1010311 - 307		76.8K	1	1/10 W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10 W
R34	1010311 - 315		93.1K	1	1/10 W
R35	1010311 - 291		52.3K	1	1/10 W
R36	1010311 - 129		1070	1	1/10 W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10 K	2	1/4 W
R43	1010311 - 307		76.8K	1	1/10 W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1/10 W
R50	1006750 - 72		47K	2	1/4 W
R51	1006750 - 20		330	2	1/4 W
R52	1006750 - 84		150K	2	1/4 W
R53	1006750 - 84		150K	2	1/4 W
R54	1010311 - 126		1000	1	1/10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10 W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 32		1K	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10 W
R64	1010311 - 244		16.9K	1	1/10 W
R65	1010364 - 657		130 K	1	1/10 W
R66	1010377 - 306		12.5K	.01	1/10 W
R67	1010311 - 59		200	.1	1/10 W
R68	1010364 - 649		118K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 63		20K	2	1/4 W
R72	1010311 - 315		93.1K	1	1/10 W
R73	1010311 - 315		93.1K	1	1/10 W
R74	1010311 - 291		52.3K	1	1/10 W
R75	1010364 - 769		499K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10 W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10 K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10 W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1010604 - 1		600	1	1 W
R87	1010311 - 315		93.1K	1	1/10 W
R88	1010311 - 315		93.1K	1	1/10 W
R89	1010311 - 291		52.3K	1	1/10 W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10 W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 84		150K	2	1/4 W
R121	1006750 - 84		150K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	.2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69	CAPACITOR	1.0	10	35 VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1008815-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
A		REPLACES REV - WITH CHANGE PER TDRR 27966	NDL	RPK	[illegible]		
B		REVISED PER TDRR 28631	ADL	LJB	3/13/66	[illegible]	5 13 66
C		REVISED PER TDRR 29133	LJB			NGH	5-1-66
D		REVISED PER TDRR 29141	KCH		9 JUN 66	NGH	5-14-66
E		REVISED PER TDRR 30152	[illegible]	[illegible]	19 JUL 66		
F		REVISED PER TDRR 30369	ENF	JT	10 AUG 66		
G		REVISED PER TDRR 32326	JD	EFB	22 DEC 66		

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Leo 30 MAR 66
CHECKED
APPROVED 1 APR 66
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER IRIG & PIPA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010122
SCALE —
SHEET 1 OF 1

2010122 G

4/2010122

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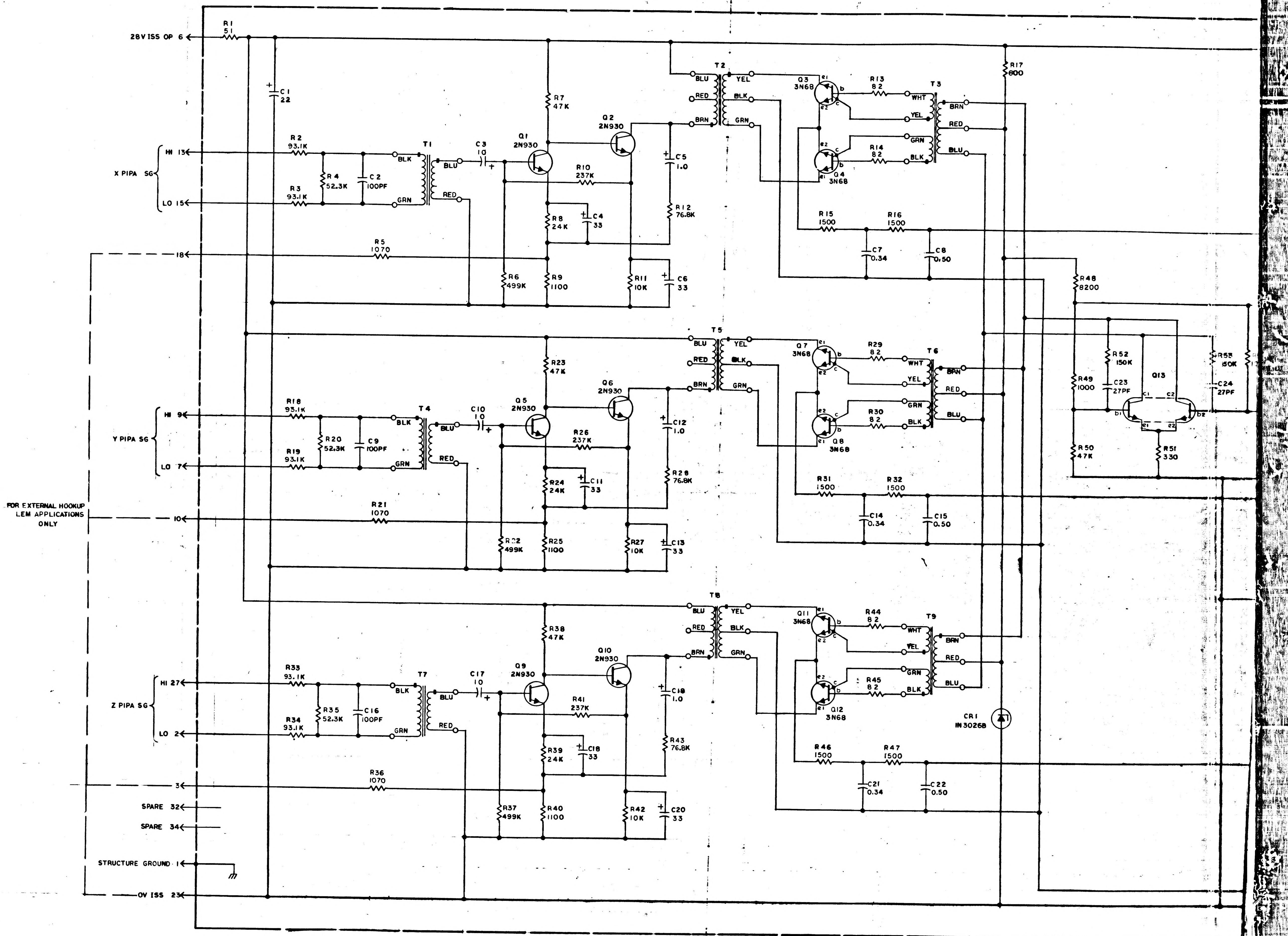
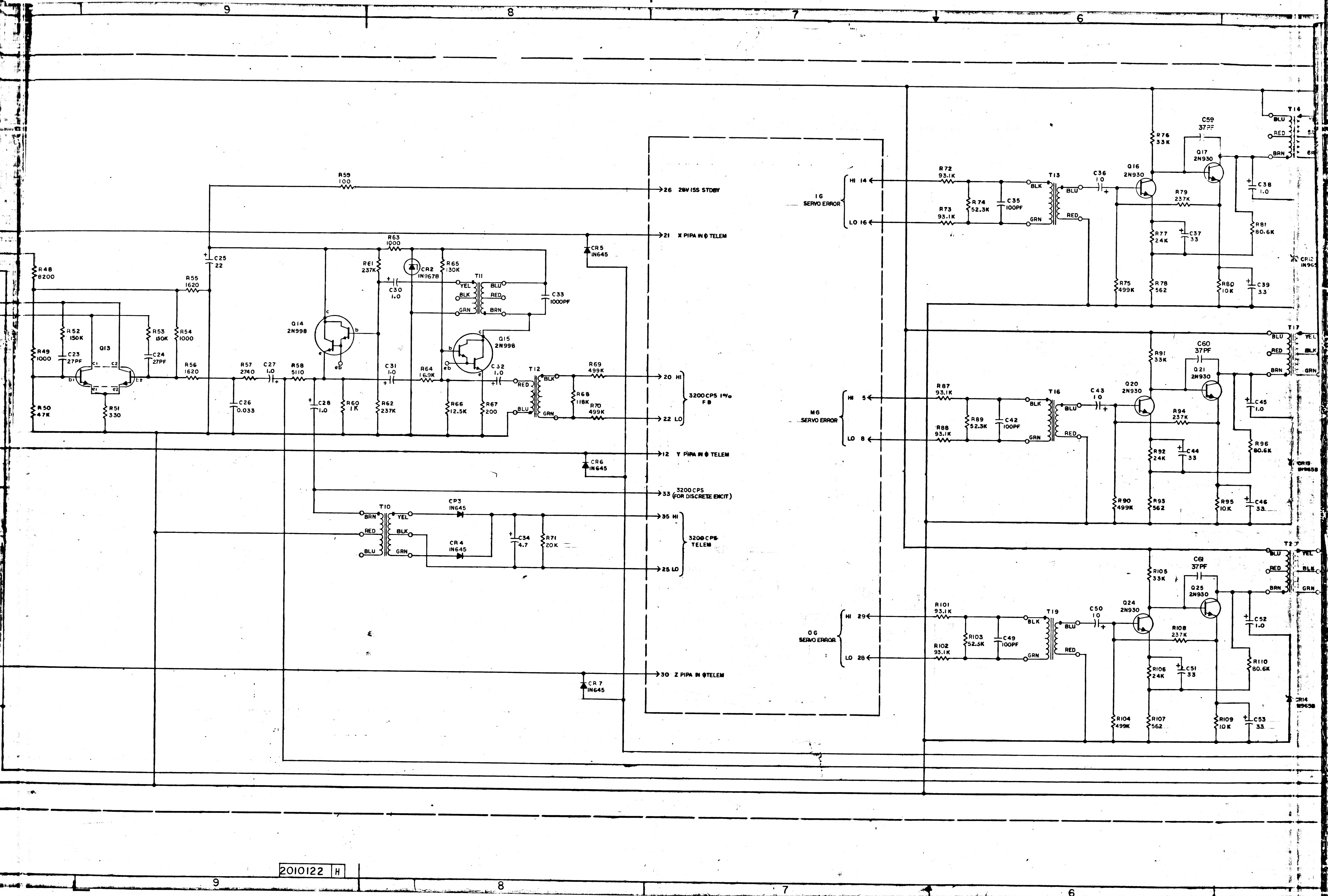

13
12
11
10
D
C
B
A
28V ISS OP 6
R1 51
C1 22
R2 93.1K
R3 93.1K
R4 52.3K
C2 100PF
X PIPA SG
HI 13
LO 15
T1
BLK
GRN
BLU
RED
C3 10
Q1 2N930
Q2 2N930
R7 47K
R10 237K
R8 24K
C4 33
R5 1070
18
R6 499K
R9 1100
R11 10K
C6 33
C5 1.0
R12 76.8K
T2
BLU
RED
BRN
YEL
BLK
GRN
Q3 3N68
Q4 3N68
e1 e2 b c
R13 82
R14 82
T3
WHT
YEL
GRN
BLK
BRN
RED
BLU
R15 1500
R16 1500
C7 0.34
C8 0.50
R17 600
R48 8200
R49 1000
R50 47K
R51 330
R52 150K
R53 150K
C23 27PF
C24 27PF
Q13
c1 c2 b1 b2 e1 e2
Y PIPA SG
HI 9
LO 7
R18 93.1K
R19 93.1K
R20 52.3K
C9 100PF
T4
C10 10
Q5 2N930
Q6 2N930
R23 47K
R26 237K
R24 24K
C11 33
C12 1.0
R28 76.8K
FOR EXTERNAL HOOKUP LEM APPLICATIONS ONLY
10
R21 1070
R22 499K
R25 1100
R27 10K
C13 33
T5
Q7 3N68
Q8 3N68
R29 82
R30 82
T6
R31 1500
R32 1500
C14 0.34
C15 0.50
Z PIPA SG
HI 27
LO 2
R33 93.1K
R34 93.1K
R35 52.3K
C16 100PF
T7
C17 10
Q9 2N930
Q10 2N930
R38 47K
R41 237K
R39 24K
C18 33
C19 1.0
R43 76.8K
3
R36 1070
R37 499K
R40 1100
R42 10K
C20 33
T8
Q11 3N68
Q12 3N68
R44 82
R45 82
T9
CR1 IN3026B
R46 1500
R47 1500
C21 0.34
C22 0.50
SPARE 32
SPARE 34
STRUCTURE GROUND 1
OV ISS 23

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327


9
8
7
6
R59
100
26 28V ISS STDBY
21 X PIPA IN Φ TELEM
R63
1000
CR5
IN645
C25
22
R48
8200
R55
1620
R61
237K
CR2
IN967B
R65
130K
T11
YEL
BLU
BLK
RED
GRN
BRN
C30
1.0
C33
1000PF
Q14
2N998
Q15
2N998
R52
150K
R53
150K
R54
1000
Q13
R49
1000
C23
27PF
C24
27PF
R56
1620
R57
2740
C27
1.0
R58
5110
C31
1.0
R64
16.9K
C32
1.0
T12
R69
499K
20 HI
3200CPS 1%
FB
R68
118K
R70
499K
22 LO
R50
47K
R51
330
C26
0.033
C28
1.0
R60
1K
R62
237K
R66
12.5K
R67
200
12 Y PIPA IN Φ TELEM
CR6
IN645
33 3200CPS (FOR DISCRETE EXCIT)
T10
BRN
RED
BLU
YEL
BLK
GRN
CP3
IN645
CR4
IN645
C34
4.7
R71
20K
35 HI
3200CPS
TELEM
25 LO
30 Z PIPA IN Φ TELEM
CR7
IN645
IG
SERVO ERROR
HI 14
LO 16
R72
93.1K
R73
93.1K
R74
52.3K
C35
100PF
T13
C36
10
Q16
2N930
R76
33K
C59
37PF
Q17
2N930
T14
R79
237K
C38
1.0
R77
24K
C37
33
R81
80.6K
CR12
IN965
R75
499K
R78
562
R80
10K
C39
33
T17
MG
SERVO ERROR
HI 5
LO 8
R87
93.1K
R88
93.1K
R89
52.3K
C42
100PF
T16
C43
10
Q20
2N930
R91
33K
C60
37PF
Q21
2N930
R94
237K
C45
1.0
R92
24K
C44
33
R96
80.6K
CR13
IN965B
R90
499K
R93
562
R95
10K
C46
33
T21
OG
SERVO ERROR
HI 29
LO 28
R101
93.1K
R102
93.1K
R103
52.3K
C49
100PF
T19
C50
10
Q24
2N930
R105
33K
C61
37PF
Q25
2N930
R108
237K
C52
1.0
R106
24K
C51
33
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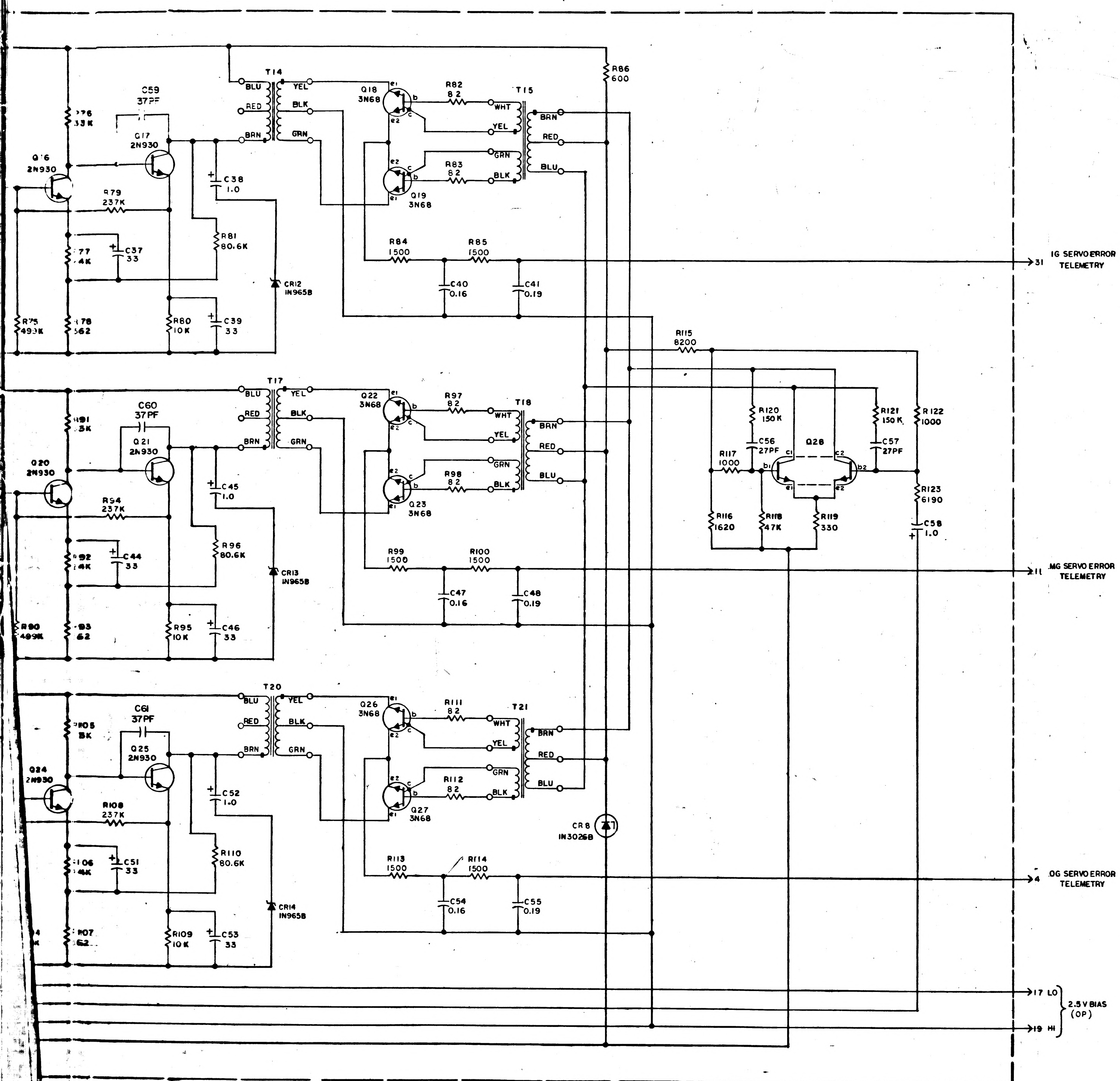
80.6K
CR14
IN965B
R104
499K
R107
562
R109
10K
C53
33



Q16 2N930
R76 33K
C59 37PF
Q17 2N930
R79 237K
C38 1.0
R77 24K
C37 33
R81 80.6K
CR12 IN965B
R75 499K
R78 562
R80 10K
C39 33
T14
BLU YEL RED BLK BRN GRN
Q18 3N68
e1 b e2 c
R82 82
T15
WHT YEL GRN BLK
BRN RED BLU
R83 82
Q19 3N68
R84 1500
R85 1500
C40 0.16
C41 0.19
R86 600
31 IG SERVO ERROR TELEMETRY
R115 8200
Q20 2N930
R91 33K
C60 37PF
Q21 2N930
R94 237K
C45 1.0
R92 24K
C44 33
R96 80.6K
CR13 IN965B
R90 499K
R93 562
R95 10K
C46 33
T17
Q22 3N68
R97 82
T18
R98 82
Q23 3N68
R99 1500
R100 1500
C47 0.16
C48 0.19
11 MG SERVO ERROR TELEMETRY
R120 150K
C56 27PF
R117 1000
Q28
c1 c2 b1 b2 e1 e2
R121 150K
C57 27PF
R122 1000
R123 6190
C58 1.0
R116 1620
R118 47K
R119 330
Q24 2N930
R105 33K
C61 37PF
Q25 2N930
R108 237K
C52 1.0
R106 24K
C51 33
R110 80.6K
CR14 IN965B
R104 499K
R107 562
R109 10K
C53 33
T20
Q26 3N68
R111 82
T21
R112 82
Q27 3N68
CR8 IN3026B
R113 1500
R114 1500
C54 0.16
C55 0.19
4 OG SERVO ERROR TELEMETRY
17 LO
19 HI
2.5 V BIAS (OP)

2010122 H

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
R1	1006750 - 1	RESISTOR	51	2	1/4 W
R2	1010311 - 315		93.1K	1	1/10W
R3	1010311 - 315		93.1K	1	1/10W
R4	1010311 - 291		52.3K	1	1/10W
R5	1010311 - 129		1070	1	1/10W
R6	1010364 - 769		499K	1	1/8 W
R7	1006750 - 72		47K	2	1/4 W
R8	1006750 - 65		24K	2	1/4 W
R9	1010311 - 130		1100	1	1/10W
R10	1010364 - 707		237K	1	1/8 W
R11	1006750 - 56		10 K	2	1/4 W
R12	1010311 - 307		76.8K	1	1/10 W
R13	1006750 - 6		82	2	1/4 W
R14	1006750 - 6		82	2	1/4 W
R15	1008750 - 36		1500	2	1/4 W
R16	1006750 - 36		1500	2	1/4 W
R17	1010604 - 1		600	1	1 W
R18	1010311 - 315		93.1K	1	1/10 W
R19	1010311 - 315		93.1K	1	1/10 W
R20	1010311 - 291		52.3K	1	1/10 W
R21	1010311 - 129		1070	1	1/10 W
R22	1010364 - 769		499K	1	1/8 W
R23	1006750 - 72		47K	2	1/4 W
R24	1006750 - 65		24K	2	1/4 W
R25	1010311 - 130		1100	1	1/10W
R26	1010364 - 707		237K	1	1/8 W
R27	1006750 - 56		10 K	2	1/4 W
R28	1010311 - 307		76.8K	1	1/10 W
R29	1006750 - 6		82	2	1/4 W
R30	1006750 - 6		82	2	1/4 W
R31	1006750 - 36		1500	2	1/4 W
R32	1006750 - 36		1500	2	1/4 W
R33	1010311 - 315		93.1K	1	1/10W
R34	1010311 - 315		93.1K	1	1/10W
R35	1010311 - 291		52.3K	1	1/10W
R36	1010311 - 129		1070	1	1/10W
R37	1010364 - 769		499K	1	1/8 W
R38	1006750 - 72		47K	2	1/4 W
R39	1006750 - 65		24K	2	1/4 W
R40	1010311 - 130		1100	1	1/10 W
R41	1010364 - 707		237K	1	1/8 W
R42	1006750 - 56		10K	2	1/4 W
R43	1010311 - 307		76.8K	1	1/10W
R44	1006750 - 6		82	2	1/4 W
R45	1006750 - 6		82	2	1/4 W
R46	1006750 - 36		1500	2	1/4 W
R47	1006750 - 36		1500	2	1/4 W
R48	1006750 - 54		8200	2	1/4 W
R49	1010311 - 126		1000	1	1 10 W
R50	1006750 - 72		47K	2	1 4 W
R51	1006750 - 20		330	2	1 4 W
R52	1006750 -84		150K	2	1 4 W
R53	1006750 -84		150K	2	1 4 W
R54	1010311 - 126		1000	1	1 10 W
R55	- 146		1620	1	
R56	- 146		1620	1	
R57	- 168		2740	1	
R58	1010311 - 194		5110	1	1/10W
R59	1006750 - 8		100	2	1/4 W
R60	1006760 - 32		1K	2	1/2 W
R61	1010364 - 707		237K	1	1/8 W
R62	1010364 - 707		237K	1	1/8 W
R63	1010311 - 126		1000	1	1/10W
R64	1010311 - 244		16.9 K	1	1/10W
R65	1010364 - 657		130 K	1	1/10W
R66	1010377 - 306		12.5 K	.01	1/10W
R67	1010311 - 59		200	1	1/10W
R68	1010364 - 649		118 K	1	1/8 W
R69	1010364 - 769		499K	1	1/8 W
R70	1010364 - 769		499K	1	1/8 W
R71	1006750 - 63		20K	2	1/4 W
R72	1010311 - 315		93.1 K	1	1/10W
R73	1010311 - 315		93.1 K	1	1/10W
R74	1010311 - 291		52.3K	1	1/10W
R75	1010364 - 769		499 K	1	1/8 W
R76	1006750 - 68		33K	2	1/4 W
R77	1006750 - 65		24K	2	1/4 W
R78	1010311 - 102		562	1	1/10W
R79	1010364 - 707		237K	1	1/8 W
R80	1006750 - 56		10 K	2	1/4 W
R81	1010311 - 309		80.6K	1	1/10W
R82	1006750 - 6		82	2	1/4 W
R83	1006750 - 6		82	2	1/4 W
R84	1006750 - 36		1500	2	1/4 W
R85	1006750 - 36		1500	2	1/4 W
R86	1010604 - 1		600	1	1 W
R87	1010311 - 315		93.1K	1	1/10 W
R88	1010311 - 315		93.1K	1	1/10 W
R89	1010311 - 291		52.3K	1	1/10 W
R90	1010364 - 769		499K	1	1/8 W
R91	1006750 - 68		33K	2	1/4 W
R92	1006750 - 65		24K	2	1/4 W
R93	1010311 - 102		562	1	1/10 W
R94	1010364 - 707		237K	1	1/8 W
R95	1006750 - 56		10K	2	1/4 W
R96	1010311 - 309		80.6K	1	1/10 W
R97	1006750 - 6		82	2	1/4 W
R98	1006750 - 6		82	2	1/4 W
R99	1006750 - 36		1500	2	1/4 W
R100	1006750 - 36		1500	2	1/4 W
R101	1010311 - 315		93.1K	1	1/10 W
R102	1010311 - 315		93.1K	1	1/10 W
R103	1010311 - 291		52.3K	1	1/10 W
R104	1010364 - 769		499K	1	1/8 W
R105	1006750 - 68		33K	2	1/4 W
R106	1006750 - 65		24K	2	1/4 W
R107	1010311 - 102		562	1	1/10W
R108	1010364 - 707		237K	1	1/8 W
R109	1006750 - 56		10K	2	1/4 W
R110	1010311 - 309		80.6K	1	1/10 W
R111	1006750 - 6		82	2	1/4 W
R112	- 6		82	2	1/4 W
R113	- 36		1500	2	1/4 W
R114	- 36		1500	2	1/4 W
R115	1006750 - 54		8200	2	1/4 W
R116	1010311 - 146		1620	1	1/10 W
R117	1010311 - 126		1000	1	1/10 W
R118	1006750 - 72		47K	2	1/4 W
R119	1006750 - 20		330	2	1/4 W
R120	1006750 - 84		150K	2	1/4 W
R121	1006750 - 84		150 K	2	1/4 W
R122	1010311 - 126		1000	1	1/10 W
R123	1010311 - 202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69		1.0	10	35 VDC
C59	1006777-6		37PF	10	100 VDC
C60	1006777-6		37PF	10	100 VDC
C61	1006777-6	CAPACITOR	37PF	10	100VDC
CR1	1010829-11	DIODE	IN3026B		
CR2	1008815-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

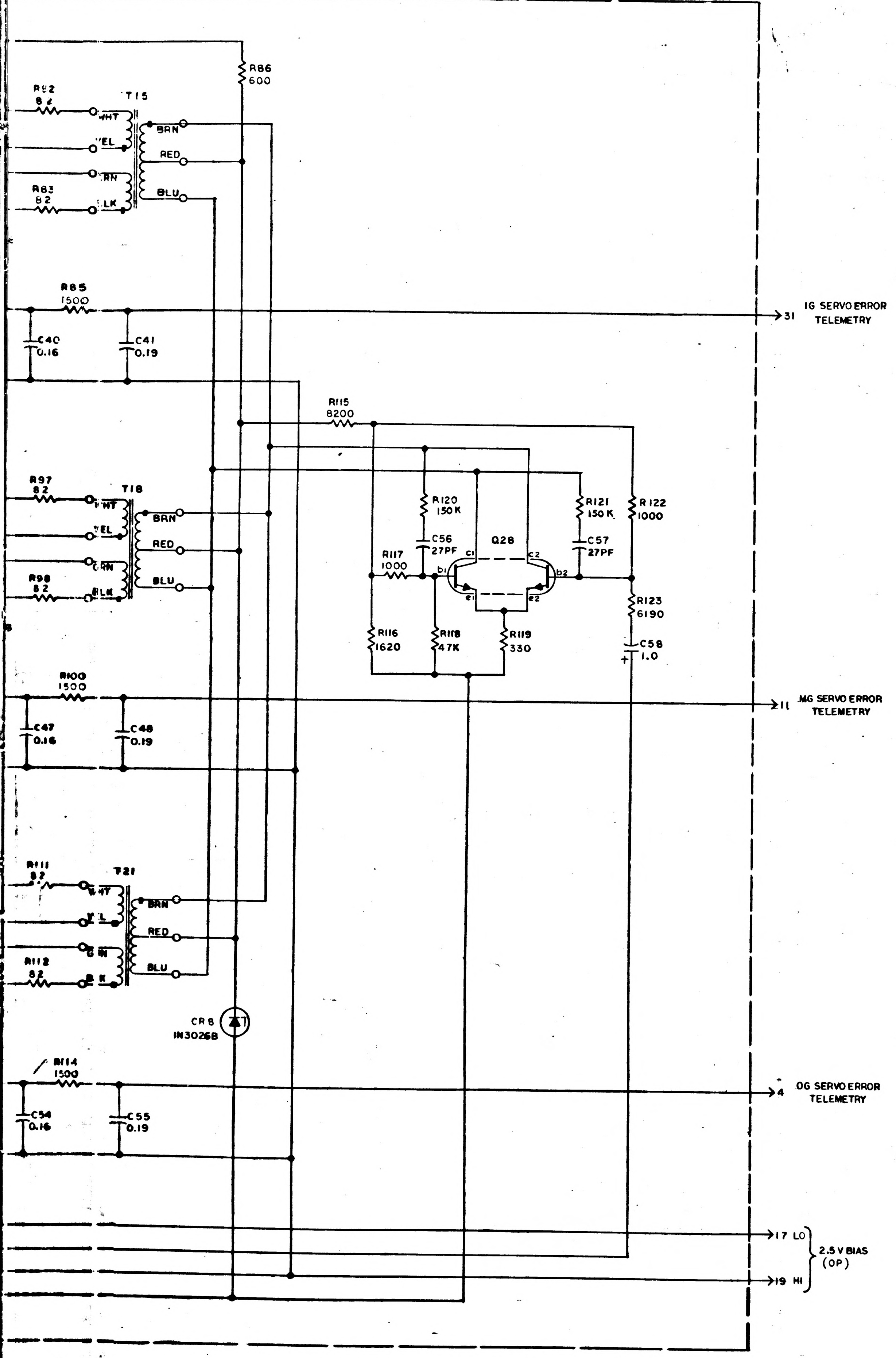
REF DES	PART NO.	
T1	1008832	
T2	1008842	
T3	1008845	
T4	1008832	
T5	1008842	
T6	1008845	
T7	1008832	
T8	1008842	
T9	1008845	
T10	1008842	
T11	1008842	
T12	1008832	
T13	1008832	
T14	1008842	
T15	1008845	
T16	1008832	
T17	1008842	
T18	1008845	
T19	1006832	
T20	1008842	
T21	1008845	TRANSF

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

DRAWN
CHECKED
APPROVED
APPROVED



REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
R1	1006750-1	RESISTOR	51	2	1/4 W
R2	1010311-315		93.1K	1	1/10W
R3	1010311-315		93.1K	1	1/10W
R4	1010311-291		52.3K	1	1/10W
R5	1010311-129		1070	1	1/10W
R6	1010364-769		499K	1	1/8 W
R7	1006750-72		47K	2	1/4 W
R8	1006750-65		24K	2	1/4 W
R9	1010311-130		1100	1	1/10W
R10	1010364-707		237K	1	1/8 W
R11	1006750-56		10K	2	1/4 W
R12	1010311-307		76.8K	1	1/10W
R13	1006750-6		82	2	1/4 W
R14	1006750-6		82	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1006750-36		1500	2	1/4 W
R17	1010604-1		600	1	1 W
R18	1010311-315		93.1K	1	1/10 W
R19	1010311-315		93.1K	1	1/10 W
R20	1010311-291		52.3K	1	1/10 W
R21	1010311-129		1070	1	1/10 W
R22	1010364-769		499K	1	1/8 W
R23	1006750-72		47K	2	1/4 W
R24	1006750-65		24K	2	1/4 W
R25	1010311-130		1100	1	1/10W
R26	1010364-707		237K	1	1/8 W
R27	1006750-56		10K	2	1/4 W
R28	1010311-307		76.8K	1	1/10 W
R29	1006750-6		82	2	1/4 W
R30	1006750-6		82	2	1/4 W
R31	1006750-36		1500	2	1/4 W
R32	1006750-36		1500	2	1/4 W
R33	1010311-315		93.1K	1	1/10W
R34	1010311-315		93.1K	1	1/10W
R35	1010311-291		52.3K	1	1/10W
R36	1010311-129		1070	1	1/10W
R37	1010364-769		499K	1	1/8 W
R38	1006750-72		47K	2	1/4 W
R39	1006750-65		24K	2	1/4 W
R40	1010311-130		1100	1	1/10 W
R41	1010364-707		237K	1	1/8 W
R42	1006750-56		10K	2	1/4 W
R43	1010311-307		76.8K	1	1/10W
R44	1006750-6		82	2	1/4 W
R45	1006750-6		82	2	1/4 W
R46	1006750-36		1500	2	1/4 W
R47	1006750-36		1500	2	1/4 W
R48	1006750-54		8200	2	1/4 W
R49	1010311-126		1000	1	1/10 W
R50	1006750-72		47K	2	1/4 W
R51	1006750-20		330	2	1/4 W
R52	1006750-84		150K	2	1/4 W
R53	1006750-84		150K	2	1/4 W
R54	1010311-126		1000	1	1/10 W
R55	-146		1620	1	
R56	-146		1620	1	
R57	-168		2740	1	
R58	1010311-194		5110	1	1/10W
R59	1006750-8		100	2	1/4 W
R60	1006760-32		1K	2	1/2 W
R61	1010364-707		237K	1	1/8 W
R62	1010364-707		237K	1	1/8 W
R63	1010311-126		1000	1	1/10W
R64	1010311-244		16.9K	1	1/10W
R65	1010364-657		130K	1	1/10W
R66	1010377-306		12.5K	.01	1/10W
R67	1010311-59		200	1	1/10W
R68	1010364-649		118K	1	1/8 W
R69	1010364-769		499K	1	1/8 W
R70	1010364-769		499K	1	1/8 W
R71	1006750-63		20K	2	1/4 W
R72	1010311-315		93.1K	1	1/10W
R73	1010311-315		93.1K	1	1/10W
R74	1010311-291		52.3K	1	1/10W
R75	1010364-769		499K	1	1/8 W
R76	1006750-68		33K	2	1/4 W
R77	1006750-65		24K	2	1/4 W
R78	1010311-102		562	1	1/10W
R79	1010364-707		237K	1	1/8 W
R80	1006750-56		10K	2	1/4 W
R81	1010311-309		80.6K	1	1/10W
R82	1006750-6		82	2	1/4 W
R83	1006750-6		82	2	1/4 W
R84	1006750-36		1500	2	1/4 W
R85	1006750-36		1500	2	1/4 W
R86	1010604-1		600	1	1 W
R87	1010311-315		93.1K	1	1/10 W
R88	1010311-315		93.1K	1	1/10 W
R89	1010311-291		52.3K	1	1/10W
R90	1010364-769		499K	1	1/8 W
R91	1006750-68		33K	2	1/4 W
R92	1006750-65		24K	2	1/4 W
R93	1010311-102		562	1	1/10 W
R94	1010364-707		237K	1	1/8 W
R95	1006750-56		10K	2	1/4 W
R96	1010311-309		80.6K	1	1/10 W
R97	1006750-6		82	2	1/4 W
R98	1006750-6		82	2	1/4 W
R99	1006750-36		1500	2	1/4 W
R100	1006750-36		1500	2	1/4 W
R101	1010311-315		93.1K	1	1/10 W
R102	1010311-315		93.1K	1	1/10 W
R103	1010311-291		52.3K	1	1/10 W
R104	1010364-769		499K	1	1/8 W
R105	1006750-68		33K	2	1/4 W
R106	1006750-65		24K	2	1/4 W
R107	1010311-102		562	1	1/10 W
R108	1010364-707		237K	1	1/8 W
R109	1006750-56		10K	2	1/4 W
R110	1010311-309		80.6K	1	1/10 W
R111	1006750-6		82	2	1/4 W
R112	-6		82	2	1/4 W
R113	-36		1500	2	1/4 W
R114	-36		1500	2	1/4 W
R115	1006750-54		8200	2	1/4 W
R116	1010311-146		1620	1	1/10 W
R117	1010311-126		1000	1	1/10 W
R118	1006750-72		47K	2	1/4 W
R119	1006750-20		330	2	1/4 W
R120	1006750-84		150K	2	1/4 W
R121	1006750-84		150K	2	1/4 W
R122	1010311-126		1000	1	1/10 W
R123	1010311-202	RESISTOR	6190	1	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ± %	RATING
C1	1006755-134	CAPACITOR	22	10	50 VDC
C2	1010409-25		100PF	2	500
C3	1006755-31		10	10	20
C4	1006755-34		33		20
C5	1006755-69		1.0		35
C6	1006755-34		33		20
C7	1010279-7		0.34		6
C8	1010279-9		0.50	10	6
C9	1010409-25		100PF	2	500
C10	1006755-31		10	10	20
C11	1006755-34		33		20
C12	1006755-69		1.0		35
C13	1006755-34		33		20
C14	1010279-7		0.34		6
C15	1010279-9		0.50	10	6
C16	1010409-25		100PF	2	500
C17	1006755-31		10	10	20
C18	1006755-34		33		20
C19	1006755-69		1.0		35
C20	1006755-34		33		20
C21	1010279-7		0.34		6
C22	1010279-9		0.50	10	6
C23	1010409-11		27PF	2	500
C24	1010409-11		27PF	2	500
C25	1006755-134		22	10	50
C26	1010316-19		0.033	1	100
C27	1006755-69		1.0	10	35
C28	-69		1.0		
C30	-69		1.0		
C31	-69		1.0		
C32	1006755-69		1.0	10	35
C33	1010410-17		1000PF	2	300
C34	1006755-77		4.7	10	35
C35	1010409-25		100PF	2	500
C36	1006755-31		10	10	20
C37	1006755-34		33		20
C38	1006755-69		1.0		35
C39	1006755-34		33		20
C40	1010279-3		0.16		6
C41	1010279-4		0.19	10	6
C42	1010409-25		100 PF	2	500
C43	1006755-31		10	10	20
C44	1006755-34		33		20
C45	1006755-69		1.0		35
C46	1006755-34		33		20
C47	1010279-3		0.16		6
C48	1010279-4		0.19	10	6
C49	1010409-25		100PF	2	500
C50	1006755-31		10	10	20
C51	1006755-34		33		20
C52	1006755-69		1.0		35
C53	1006755-34		33		20
C54	1010279-3		0.16		6
C55	1010279-4		0.19	10	6
C56	1010409-11		27PF	2	500
C57	1010409-11		27PF	2	500
C58	1006755-69		1.0	10	35 VDC
C59	1006777-6		37PF	10	100 VDC
C60	1006777-6		37PF	10	100 VDC
C61	1006777-6	CAPACITOR	37PF	10	100VDC
CR1	1010829-11	DIODE	IN3025B		
CR2	1008815-11		IN967B		
CR3	1010837-001		IN645		
CR4	-001		IN645		
CR5	-001		IN645		
CR6	-001		IN645		
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR12	1008815-9	DIODE	IN965B		
CR13	1008815-9	DIODE	IN965B		
CR14	1008815-9	DIODE	IN965B		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367		3N68		
Q13	1010376-3				
Q14	1010342		2N998		
Q15	1010342		2N998		
Q16	1010397-1		2N930		
Q17	1010397-1		2N930		
Q18	1010367		3N68		
Q19	1010367		3N68		
Q20	1010397-1		2N930		
Q21	1010397-1		2N930		
Q22	1010367		3N68		
Q23	1010367		3N68		
Q24	1010397-1		2N930		
Q25	1010397-1		2N930		
Q26	1010367		3N68		
Q27	1010367		3N68		
Q28	1010376-3	TRANSISTOR			

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REPLACES REV-WITH CHANGE PER TDRR 27966	ADL	RPK		
B		REVISED PER TDRR 28631	ADL	LTB	5/13/66	5-17-66
C		REVISED PER TDRR 29133	LTB			6-1-66
D		REVISED PER TDRR 29141	KCH		9 JUN 66	6-14-66
E		REVISED PER TDRR 30152			19 JUL 66	
F		REVISED PER TDRR 30369	EMF	JT	10 AUG 66	
G		REVISED PER TDRR 32326	JD		22 DEC 66	
H		REVISED PER TDRR 32426	KES		13 JAN 67	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008845				
T4	1008832				
T5	1008842				
T6	1008845				
T7	1008832				
T8	1008842				
T9	1008845				
T10	1008842				
T11	1008842				
T12	1008832				
T13	1008832				
T14	1008842				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008845				
T19	1008832				
T20	1008842				
T21	1008845	TRANSFORMER			

4H

REF DWG:
SIGNAL CONDITIONER IRIG & PIPA ASSY
DWG NO. 2007231

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo 30 APRIL 66
CHECKED
APPROVED 11 April 66
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

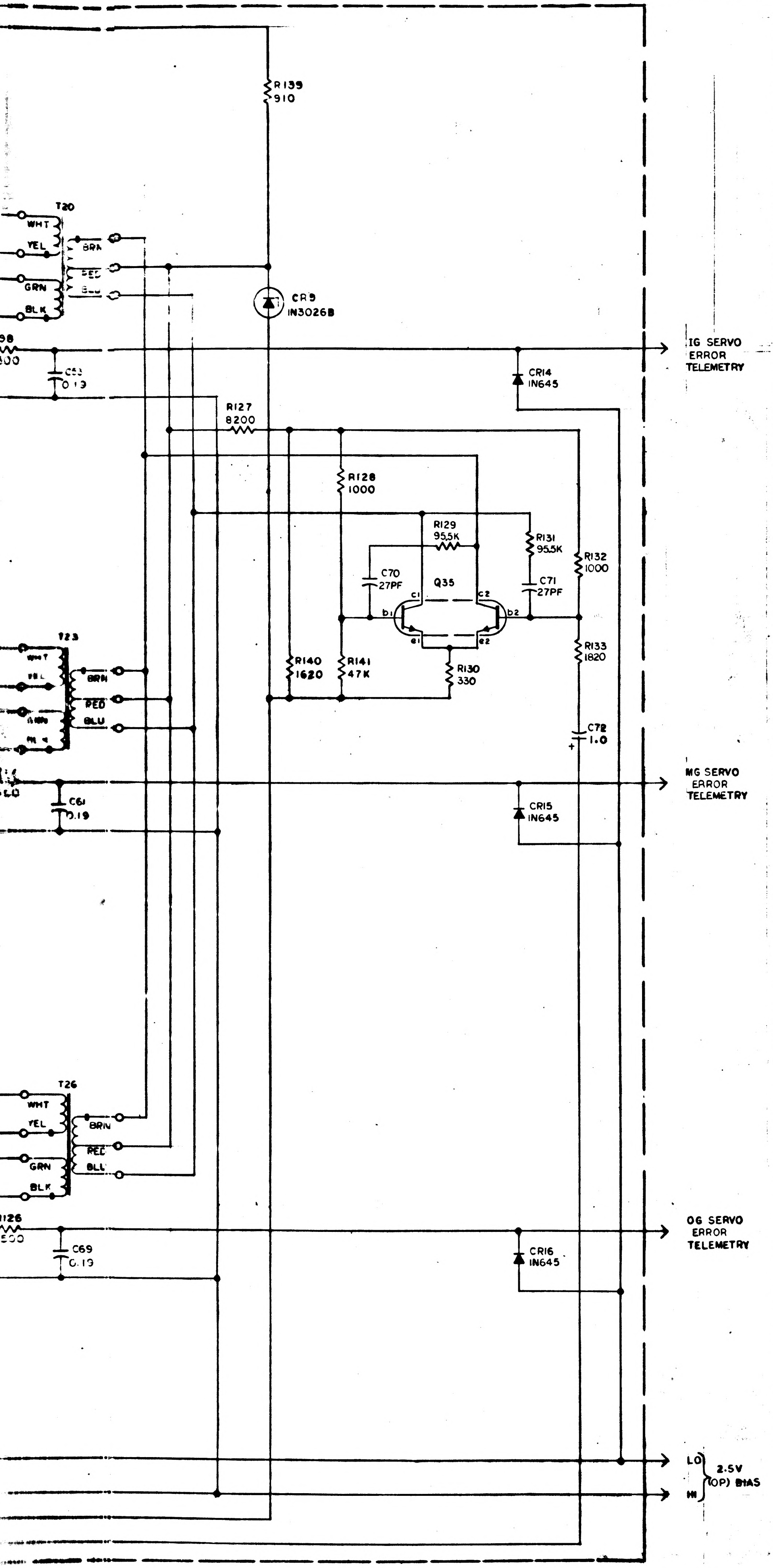
SCHEMATIC
SIGNAL CONDITIONER
IRIG & PIPA

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010122
SCALE — | SHEET

2010122 H

D C B A

REVISIONS 26606



REF DES	PART NO.	DESCRIPTION	VALUE	TOL.	RATING
R1	1006750-1	RESISTOR	51	±2%	1/4W
R2	1010311-315		93.1K	±1%	1/10W
R3	1010311-315		93.1K	±1%	1/10W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-130		1100	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-132		4900	±2%	1/4 W
R11	1010311-315		93.1K	±1%	1/10W
R12	1006750-6		82	±2%	1/4 W
R13	1006750-6		82	±2%	1/4 W
R14	1006750-43		3000	±2%	1/4 W
R15	1006760-31		910	±2%	1/2 W
R16	1006750-6		82	±2%	1/4 W
R17	1006750-6		82	±2%	1/4 W
R18	1006750-36		1500	±2%	1/4 W
R19	1006750-36		1500	±2%	1/4 W
R20	1010311-315		93.1K	±1%	1/10W
R21	1010311-315		93.1K	±1%	1/10W
R22	1010311-291		52.3K	±1%	1/10W
R23	1010364-769		499K	±1%	1/8 W
R24	1006750-72		47K	±2%	1/4 W
R25	1006750-65		24K	±2%	1/4 W
R26	1010311-130		1100	±1%	1/10W
R27	1010364-707		237K	±1%	1/8 W
R28	1006750-132		4900	±2%	1/4 W
R29	1010311-315		93.1K	±1%	1/10W
R30	1006750-6		82	±2%	1/4 W
R31	1006750-6		82	±2%	1/4 W
R32	1006750-43		3000	±2%	1/4 W
R33	1006760-31		910	±2%	1/2 W
R34	1006750-6		82	±2%	1/4 W
R35	1006750-6		82	±2%	1/4 W
R36	1006750-36		1500	±2%	1/4 W
R37	1006750-36		1500	±2%	1/4 W
R38	1010311-315		93.1K	±1%	1/10W
R39	1010311-315		93.1K	±1%	1/10W
R40	1010311-291		52.3K	±1%	1/10W
R41	1010364-769		499K	±1%	1/8 W
R42	1006750-72		47K	±2%	1/4 W
R43	1006750-65		24K	±2%	1/4 W
R44	1010311-130		1100	±1%	1/10W
R45	1010364-707		237K	±1%	1/8 W
R46	1006750-132		4900	±2%	1/4 W
R47	1010311-315		93.1K	±1%	1/10W
R48	1006750-6		82	±2%	1/4 W
R49	-6		82	±2%	1/4 W
R50	-43		3000	±2%	1/4 W
R51	-72		47K	±2%	1/4 W
R52	-6		82	±2%	1/4 W
R53	-6		82	±2%	1/4 W
R54	-36		1500	±2%	1/4 W
R55	-36		1500	±2%	1/4 W
R56	1006750-54		8200	±2%	1/4 W
R57	1010311-126		1000	±1%	1/10W
R58	1006750-163		95.5K	±2%	1/4 W
R59	1006750-20		330	±2%	1/4 W
R60	1006750-163		95.5K	±2%	1/4 W
R61	1010311-126		1000	±1%	1/10W
R62	1010311-146		1620	±1%	1/10W
R63	1010311-168		2740	±1%	1/10W
R64	1010311-126		1000	±1%	1/10W
R65	1006750-163		95.5K	±2%	1/4 W
R66	1006750-20		330	±2%	1/4 W
R67	1006750-163		95.5K	±2%	1/4 W
R68	1010311-126		1000	±1%	1/10W
R69	1010311-98		511	±1%	1/10W
R70	1010311-222		10K	±1%	1/10W
R71	1010267-151		909	±1%	1/10W
R72	1006750-83		130K	±2%	1/4 W
R73	1006750-77		75K	±2%	1/4 W
R74	1010311-126		1000	±1%	1/10W
R75	1010364-735		332K	±1%	1/8 W
R76	1006750-63		20K	±2%	1/4 W
R77	1010311-222		10K	±1%	1/10W
R78	1010311-30		100	±1%	1/10W
R79	1010364-727		301K	±1%	1/8 W
R80	1010364-465		13K	±1%	1/8 W
R81	1010364-649		118K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1010364-769		499K	±1%	1/8 W
R84	1006750-153		37.5K	±2%	1/4 W
R85	1010311-315		93.1K	±1%	1/10W
R86	1010311-315		93.1K	±1%	1/10W
R87	1010311-291		52.3K	±1%	1/10W
R88	1010364-769		499K	±1%	1/8 W
R89	1006750-68		33K	±2%	1/4 W
R90	1006750-65		24K	±2%	1/4 W
R91	1010311-102		562	±1%	1/10W
R92	1010364-707		237K	±1%	1/8 W
R93	1006750-56		10K	±2%	1/4 W
R94	1010311-306		75K	±1%	1/10W
R95	1006750-6		82	±2%	1/4 W
R96	1006750-6		82	±2%	1/4 W
R97	1006750-36		1500	±2%	1/4 W
R98	1006750-36		1500	±2%	1/4 W
R99	1010311-315		93.1K	±1%	1/10W
R100	1010311-315		93.1K	±1%	1/10W
R101	1010311-291		52.3K	±1%	1/10W
R102	1010364-769		499K	±1%	1/8 W
R103	1006750-68		33K	±2%	1/4 W
R104	1006750-65		24K	±2%	1/4 W
R105	1010311-102		562	±1%	1/10W
R106	1010364-707		237K	±1%	1/8 W
R107	1006750-56		10K	±2%	1/4 W
R108	1010311-306		75K	±1%	1/10W
R109	1006750-6		82	±2%	1/4 W
R110	1006750-6		82	±2%	1/4 W
R111	1006750-36		1500	±2%	1/4 W
R112	1006750-36		1500	±2%	1/4 W
R113	1010311-315		93.1K	±1%	1/10W
R114	1010311-315		93.1K	±1%	1/10W
R115	1010311-291		52.3K	±1%	1/10W
R116	1010364-769		499K	±1%	1/8 W
R117	1006750-68		33K	±2%	1/4 W
R118	1006750-65		24K	±2%	1/4 W
R119	1010311-102		562	±1%	1/10W
R120	1010364-707		237K	±1%	1/8 W
R121	1006750-56		10K	±2%	1/4 W
R122	1010311-306		75K	±1%	1/10W
R123	1006750-6		82	±2%	1/4 W
R124	1006750-6		82	±2%	1/4 W
R125	1006750-36		1500	±2%	1/4 W
R126	1006750-36	RESISTOR	1500	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL.	RATING
R127	1006750-54	RESISTOR	8200	±2%	1/4 W
R128	1010311-126		1000	±1%	1/10 W
R129	1006750-163		95.5K	±2%	1/4 W
R130	1006750-20		330	±2%	1/4 W
R131	1006750-163		95.5K	±2%	1/4 W
R132	1010311-126		1000	±1%	1/10 W
R133	1010311-151	RESISTOR	1820	±1%	1/10 W
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	SEE NOTE 2		NOM	—	—
C3	1010409-12		30PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20VDC
C6	1006755-34		33		20VDC
C7	1006755-69		1.0		35VDC
C8	1010279-32		34		6VDC
C10	1010279-7		0.34		6VDC
C11	1010279-9		0.50	±10%	6VDC
C12	SEE NOTE 2		NOM	—	—
C13	1010409-12		30PF	±2%	500VDC
C14	1006755-31		10	±10%	20VDC
C15	1006755-34		33		20VDC
C16	1006755-34		33		20VDC
C17	1006755-69		1.0		35VDC
C18	1010279-32		34		6VDC
C20	1010279-7		0.34		6VDC
C21	1010279-9		0.50	±10%	6VDC
C22	SEE NOTE 2		NOM	—	—
C23-	1010409-12		30PF	±2%	500VDC
C24	1006755-31		10	±10%	20VDC
C25	1006755-34		33		20VDC
C26	1006755-34		33		20VDC
C27	1006755-69		1.0		35VDC
C28	1010279-32		34		6VDC
C30	1010279-7		0.34		6VDC
C31	1010279-9		0.50	±10%	6VDC
C32	1010409-11		27PF	±2%	500VDC
C33	1010409-11		27PF	±2%	500VDC
C34	1010316-17		0.022	±1%	100VDC
C35	1006755-69		1.0	±10%	35VDC
C36	1010409-11		27PF	±2%	500VDC
C37	1010409-11		27PF	±2%	500VDC
C38	1010316-14		0.012	±1%	100VDC
C39	1006755-69		1.0	±10%	35VDC
C40			1.0		
C41			1.0		
C42			1.0		
C43	1006755-69		1.0	±10%	35VDC
C44	1010409-29		150PF	±2%	500VDC
C45	1006755-77		4.7	±10%	35VDC
C46	SEE NOTE 2		NOM	—	—
C47	1010409-12		30PF	±2%	500VDC
C48	1006755-31		10	±10%	20VDC
C49	1006755-34		33		20VDC
C50	1006755-34		33		20VDC
C51	1006755-69		1.0		35VDC
C52	1010279-3		0.16		6VDC
C53	1010279-4		0.19	±10%	6VDC
C54	SEE NOTE 2		NOM	—	—
C55	1010409-12		30PF	±2%	500VDC
C56	1006755-31		10	±10%	20VDC
C57	1006755-34		33		20VDC
C58	1006755-34		33		20VDC
C59	1006755-69		1.0		35VDC
C60	1010279-3		0.16		6VDC
C61	1010279-4		0.19	±10%	6VDC
C62	SEE NOTE 2		NOM	—	—
C63	1010409-12		30PF	±2%	500VDC
C64	1006755-31		10	±10%	20VDC
C65	1006755-34		33		20VDC
C66	1006755-34		33		20VDC
C67	1006755-69		1.0		35VDC
C68	1010279-3		0.16		6VDC
C69	1010279-4		0.19	±10%	6VDC
C70	1010409-11		27PF	±2%	500VDC
C71	1010409-11		27PF	±2%	500VDC
C72	1006755-69		1.0	±10%	35VDC
C73	1006755-89	CAPACITOR	47	±10%	35VDC
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1008842				
T4	1008845				
T5	1008845				
T6	1008832				
T7	1008842				
T8	1008842				
T9	1008845				
T10	1008845				
T11	1008832				
T12	1008842				
T13	1008842				
T14	1008845				
T15	1008845				
T16	1008832				
T17	1008842				
T18	1008832				
T19	1008842				
T20	1008845				
T21	1008832				
T22	1008842				
T23	1008845				
T24	1008832				
T25	1008842				
T26	1008845	TRANSFORMER			
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010367		3N68		
Q6	1010367		3N68		
Q7	1010397-1		2N930		
Q8	1010397-1		2N930		
Q9	1010367		3N68		
Q10	1010367		3N68		
Q11	1010367	TRANSISTOR	3N68		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL.	RATING
Q12	1010367	TRANSISTOR	3N68		
Q13	1010397-1		2N930		
Q14	1010397-1		2N930		
Q15	1010367		3N68		
Q16	1010367		3N68		
Q17	1010367		3N68		
Q18	1010367		3N68		
Q19	1010376-3				
Q20	1010376-3				
Q21	1010397-1		2N930		
Q22	1010397-1		2N930		
Q23	1010397-1		2N930		
Q24	1010397-1		2N930		
Q25	1010367		3N68		
Q26	1010367		3N68		
Q27	1010397-1		2N930		
Q28	1010397-1		2N930		
Q29	1010367		3N68		
Q30	1010367		3N68		
Q31	1010397-1		2N930		
Q32	1010397-1		2N930		
Q33	1010367		3N68		
Q34	1010367		3N68		
Q35	1010376-3	TRANSISTOR			
CR1	1010829-11	DIODE	IN3026B		
CR2	1010830-11		IN967B		
CR3	1010837-001		IN645		
CR4					
CR5					
CR6					
CR7	1010837-001		IN645		
CR8	1010829-11		IN3026B		
CR9	1010829-11		IN3026B		
CR10	1010837-001		IN645		
CR11	1010837-001		IN645		
CR12	1010837-001		IN645		
CR14	1010837-001		IN645		
CR15	1010837-001		IN645		
CR16	1010837-001	DIODE	IN645		
R134	1010311-146	RESISTOR	1620	±1%	1/10 W
R135	1006750-54		8200	±2%	1/4 W
R136	1010311-146		1620	±1%	1/10 W
R137	1006750-72		47K	±2%	1/4 W
R138	1010311-194		5110	±1%	1/10 W
R139	1006760-31		910	±2%	1/2 W
R140	1010311-146		1620	±1%	1/10 W
R141	1006750-72		47K	±2%	1/4 W
R142	1010311-127		1020	±1%	1/10 W
R143	1010311-127		1020	±1%	1/10 W
R144	1010311-127		1020	±1%	1/10 W
R145	1006750-8	RESISTOR	100.	±2%	1/4 W

C2, C12, C22, C22 C46 C54 & C62			
PART NO.	VALUE	RATING	TOL
1010409-1	10 PF	500VDC	±0.25PF
-8	20		±2%
-12	30		
-16	43		
-19	56		
-21	68		
-23	82		
-24	91		
-25	100		
-26	110		
-27	120		
-28	130		
-29	150	500	
-30	160	300	
-31	180		
-32	200		
-33	220		
1010409-34	240 PF	300VDC	±2%

REF DWG:
IRIG AND PIPA SIGNAL CONDITIONER ASSY
DWG NO.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

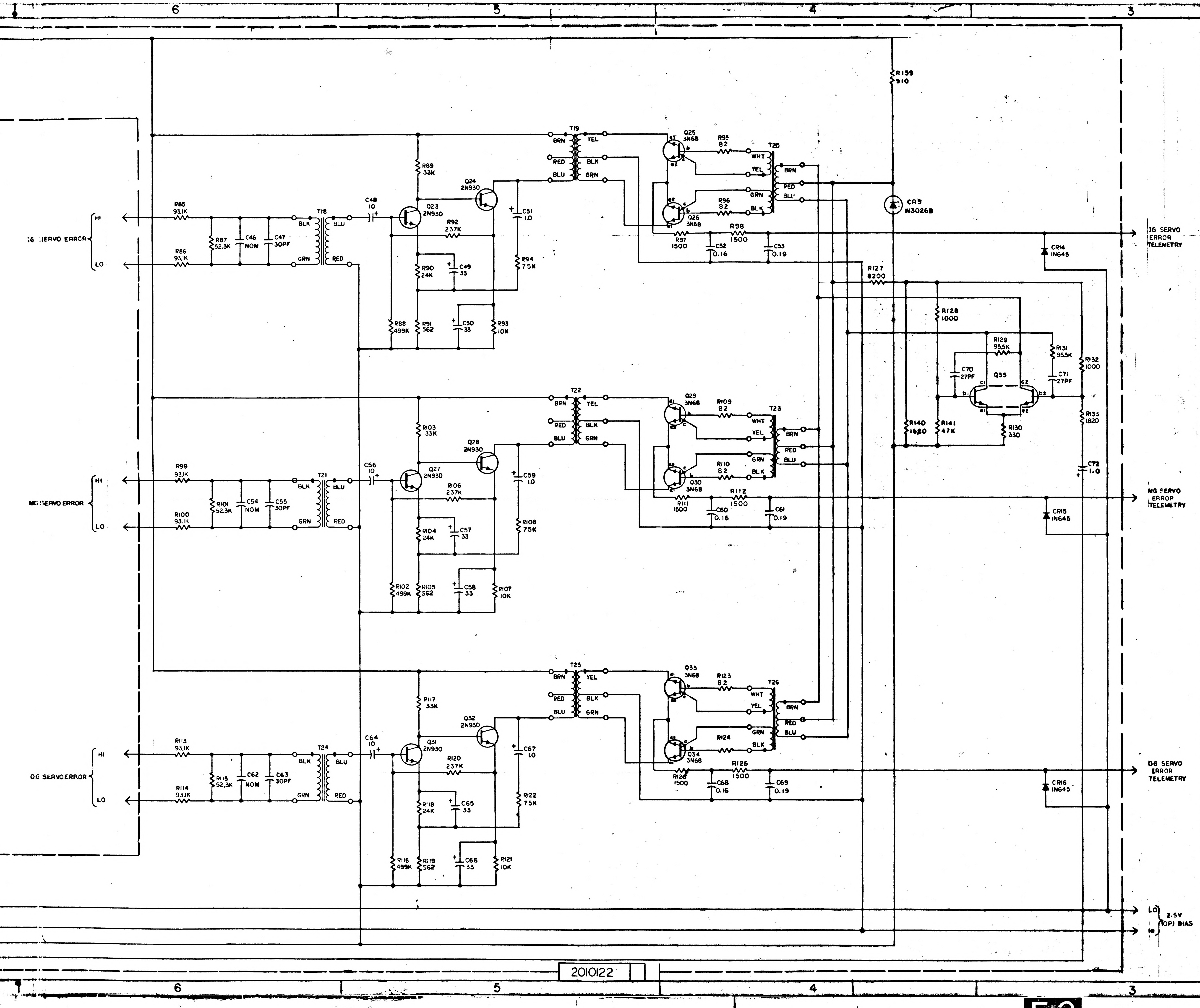
DRAWN B. Romey
CHECKED
APPROVED
APPROVED
APPROVED MIT A.C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
IRIG & PIPA
SIGNAL CONDITIONER

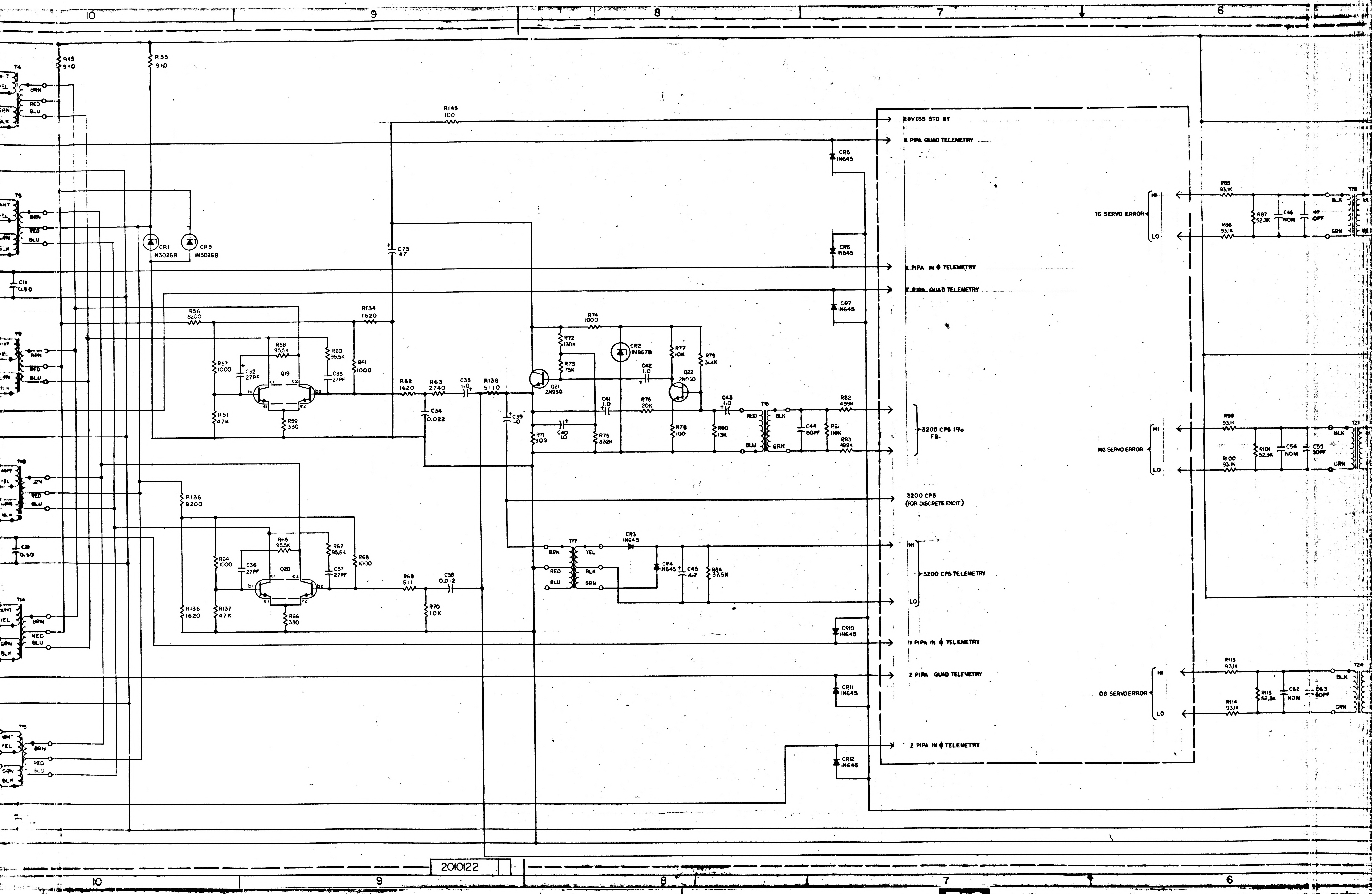
CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010122
SCALE NONE
SHEET 1 OF 1

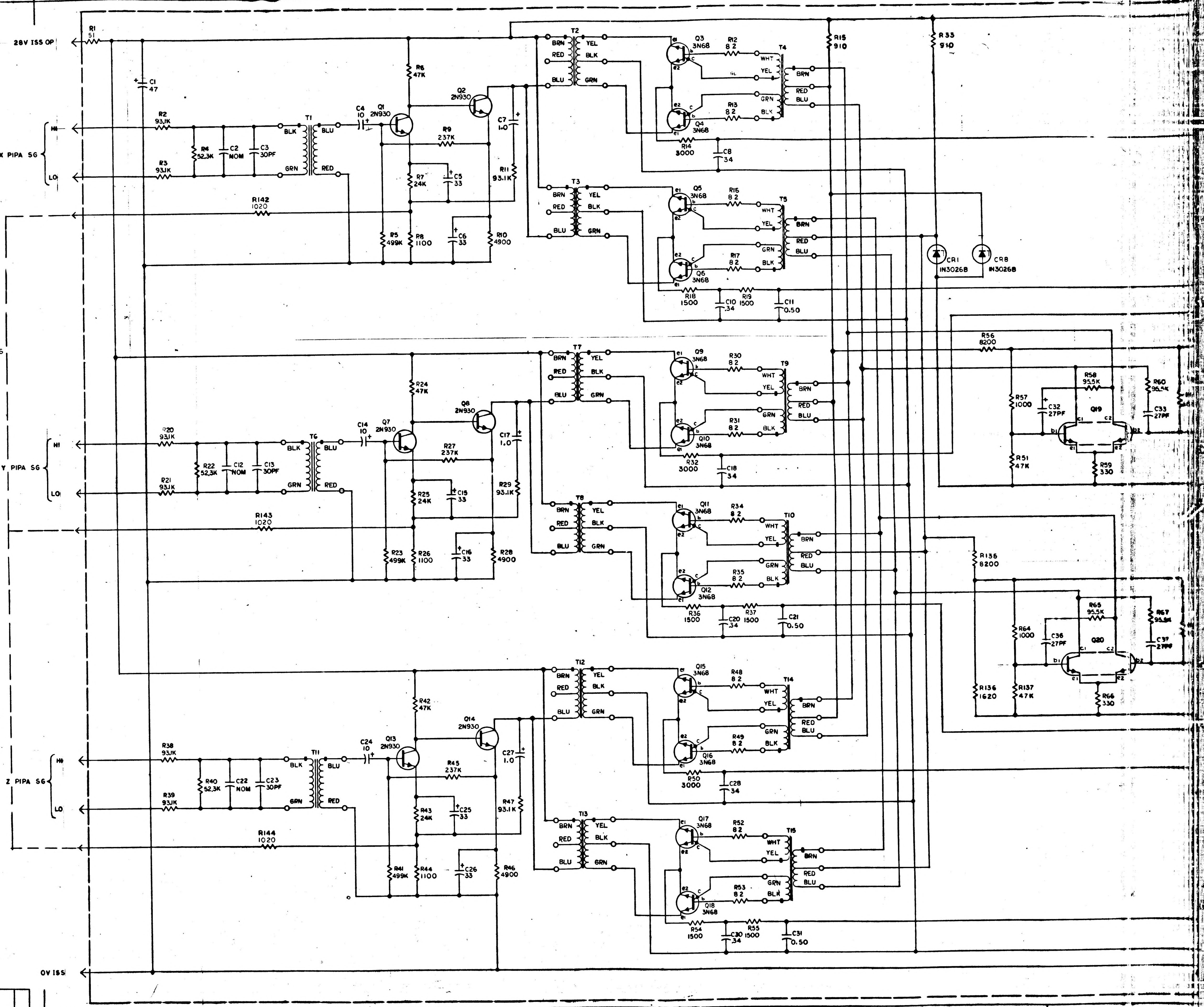
2010122


6
5
4
3
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
HI
LO
R85 93.1K
R86 93.1K
R87 52.3K
C46 NOM
C47 30PF
T18
BLK
BLU
GRN
RED
C48 10
Q23 2N930
Q24 2N930
R89 33K
R92 237K
R90 24K
C49 33
R88 499K
R91 562
C50 33
R93 10K
C51 1.0
R94 75K
T19
BRN
YEL
RED
BLK
BLU
GRN
Q25 3N68
Q26 3N68
R95 82
R96 82
R97 1500
R98 1500
C52 0.16
C53 0.19
T20
WHT
YEL
GRN
BLK
BRN
RED
BLU
R139 910
CR3 1N3026B
CR14 1N645
IG SERVO ERROR TELEMETRY
R127 8200
R128 1000
R129 95.5K
R131 95.5K
C70 27PF
C71 27PF
Q35
R130 330
R132 1000
R133 1820
R140 1620
R141 47K
C72 1.0
R99 93.1K
R100 93.1K
R101 52.3K
C54 NOM
C55 30PF
T21
C56 10
Q27 2N930
Q28 2N930
R103 33K
R106 237K
R104 24K
C57 33
R102 499K
R105 562
C58 33
R107 10K
C59 1.0
R108 75K
T22
Q29 3N68
Q30 3N68
R109 82
R110 82
R111 1500
R112 1500
C60 0.16
C61 0.19
T23
CR15 1N645
MG SERVO ERROR TELEMETRY
R113 93.1K
R114 93.1K
R115 52.3K
C62 NOM
C63 30PF
T24
C64 10
Q31 2N930
Q32 2N930
R117 33K
R120 237K
R118 24K
C65 33
R116 499K
R119 562
C66 33
R121 10K
C67 1.0
R122 75K
T25
Q33 3N68
Q34 3N68
R123 82
R124
R125 1500
R126 1500
C68 0.16
C69 0.19
T26
CR16 1N645
OG SERVO ERROR TELEMETRY
LO
HI
2.5V (OP) BIAS

2010122

REF DES	PART NO.	DESCRIPTION	VALUE	TOL.	RATING	REF DES	PART NO.
R1	1006750 - 1	RESISTOR	51	±2%	1/4 W	R127	1006750-
R2	1010311 - 315		93.1K	±1%	1/10W	R128	1010311 -
R3	1010311 - 315		93.1K	±1%	1/10W	R129	1006750-
R4	1010311 - 291		52.3K	±1%	1/10W	R130	1006750-
R5	1010364 - 769		499K	±1%	1/8 W	R131	1006750-
R6	1006750- 72		47K	±2%	1/4 W	R132	1010311 -
R7	1006750- 65		24K	±2%	1/4 W	R133	1010311 -
R8	1010311- 130		1100	±1%	1/10W		
R9	1010364 - 707		237K	±1%	1/8 W		
R10	1006750 - 132		4900	±2%	1/4 W		
R11	1010311 - 315		93.1K	±1%	1/10W	C1	1006755 - 63
R12	1006750- 6		82	±2%	1/4 W	C2	SEE NOTE 2
R13	1006750- 6		82	±2%	1/4 W	C3	1010409 - 12
R14	1006750- 43		3000	±2%	1/4 W	C4	1006755 - [illegible]
R15	1006760- 31		910	±2%	1/2 W	C5	1006755 - 34
R16	1006750- 6		82	±2%	1/4 W	C6	1006755 - 34
R17	1006750- 6		82	±2%	1/4 W	C7	1006755 - 69
R18	1006750- 36		1500	±2%	1/4 W	C8	1010279 - 32
R19	1006750 - 36		1500	±2%	1/4 W		
R20	1010311 - 315		93.1K	±1%	1/10W	C10	1010279 - 7
R21	1010311 - 315		93.1K	±1%	1/10W	C11	1010279 - 9
R22	1010311 - 291		52.3K	±1%	1/10W	C12	SEE NOTE 2
R23	1010364 - 769		499K	±1%	1/8 W	C13	1010409 - 2
R24	1006750 - 72		47K	±2%	1/4 W	C14	1006755 - 31
R25	1006750 - 65		24K	±2%	1/4 W	C15	1006755 - 34
R26	1010311 - 130		1100	±1%	1/10W	C16	1006755 - 34
R27	1010364 - 707		237K	±1%	1/8 W	C17	1006755 - 69
R28	1006750- 132		4900	±2%	1/4 W	C18	1010279 - 32
R29	1010311- 315		93.1K	±1%	1/10W		
R30	1006750- 6		82	±2%	1/4 W	C20	1010279 - 7
R31	1006750- 6		82	±2%	1/4 W	C21	1010279 - 9
R32	1006750- 43		3000	±2%	1/4 W	C22	SEE NOTE 2
R33	1006760- 31		910	±2%	1/2 W	C23	1010409 - 12
R34	1006750- 6		82	±2%	1/4 W	C24	1006755 - 31
R35	1006750- 6		82	±2%	1/4 W	C25	1006755 - 34
R36	1006750- 36		1500	±2%	1/4 W	C26	1006755 - 34
R37	1006750- 36		1500	±2%	1/4 W	C27	1006755 - 69
R38	1010311 - 315		93.1K	±1%	1/10W	C28	1010279 - 32
R39	1010311 - 315		93.1K	±1%	1/10W		
R40	1010311 - 291		52.3K	±1%	1/10W	C30	1010279 - 7
R41	1010364 - 769		499K	±1%	1/8 W	C31	1010279 - 9
R42	1006750- 72		47K	±2%	1/4 W	C32	1010409 - 11
R43	1006750- 65		24K	±2%	1/4 W	C33	1010409 - 11
R44	1010311 - 130		1100	±1%	1/10W	C34	1010316 - 17
R45	1010364 - 707		237K	±1%	1/8 W	C35	1006755 - [illegible]
R46	1006750- 132		4900	±2%	1/4 W	C36	1010409 - 11
R47	1010311 - 315		93.1K	±1%	1/10W	C37	1010409 - 11
R48	1006750 - 6		82	±2%	1/4 W	C38	1010316 - 14
R49	- 6		82	±2%	1/4 W	C39	1006755 - 69
R50	- 43		3000	±2%	1/4 W	C40	
R51	- 72		47K	±2%	1/4 W	C41	
R52	- 6		82	±2%	1/4 W	C42	
R53	- 6		82	±2%	1/4 W	C43	1006755-
R54	- 36		1500	±2%	1/4 W	C44	1010409 -
R55	- 36		1500	±2%	1/4 W	C45	1006755 -
R56	1006750 - 54		8200	±2%	1/4 W	C46	SEE NOTE
R57	1010311 - 126		1000	±1%	1/10W	C47	1010409 -
R58	1006750 - 163		95.5K	±2%	1/4 W	C48	1006755 -
R59	1006750 - 20		330	±2%	1/4 W	C49	1006755 -
R60	1006750 - 163		95.5K	±2%	1/4 W	C50	1006755 -
R61	1010311 - 126		1000	±1%	1/10W	C51	1006755 -
R62	1010311 - 146		1620	±1%	1/10W	C52	1010279 -
R63	1010311 - 168		2740	±1%	1/10W	C53	1010279 -
R64	1010311 - 126		1000	±1%	1/10W	C54	SEE NOTE
R65	1006750 - 163		95.5K	±2%	1/4 W	C55	1010409
R66	1006750 - 20		330	±2%	1/4 W	C56	1006755
R67	1006750 - 163		95.5K	±2%	1/4 W	C57	1006755 -
R68	1010311 - 126		1000	±1%	1/10W	C58	1006755 -
R69	1010311 - 98		511	±1%	1/10W	C59	1006755 -
R70	1010311 - 222		10K	±1%	1/10W	C60	1010279
R71	1010267 - 151		909	±1%	1/10W	C61	1010279 -
R72	1006750 - 83		130K	±2%	1/4 W	C62	SEE NOTE
R73	1006750- 77		75K	±2%	1/4 W	C63	1010409 -
R74	1010311 - 126		1000	±1%	1/10W	C64	1006755 -
R75	1010364 - 735		332K	±1%	1/8 W	C65	1006755 -
R76	1006750- 63		20K	±2%	1/4 W	C66	1006755 -
R77	1010311 - 222		10K	±1%	1/10W	C67	1006755 -
R78	1010311 - 30		100	±1%	1/10W	C68	1010279 -
R79	1010364 - 727		301K	±1%	1/8 W	C69	1010279 -
R80	1010364 - 465		13K	±1%	1/8 W	C70	1010409 -
R81	1010364 - 649		118K	±1%	1/8 W	C71	1010409 -
R82	1010364 - 769		499K	±1%	1/8 W	C72	1006755 -
R83	1010364 - 769		499K	±1%	1/8 W	C73	1006755 -
R84	1006750 - 153		37.5K	±2%	1/4 W		
R85	1010311 - 315		93.1K	±1%	1/10W		
R86	1010311 - 315		93.1K	±1%	1/10W	T1	1008832
R87	1010311 - 291		52.3K	±1%	1/10W	T2	1008842
R88	1010364 - 769		499K	±1%	1/8 W	T3	1008842
R89	1006750 - 68		33K	±2%	1/4 W	T4	1008845
R90	1006750 - 65		24K	±2%	1/4 W	T5	1008845
R91	1010311 - 102		562	±1%	1/10W	T6	1008832
R92	1010364 - 707		237K	±1%	1/8 W	T7	1008842
R93	1006750 - 56		10K	±2%	1/4 W	T8	1008842
R94	1010311 - 306		75 K	±1%	1/10W	T9	1008845
R95	1006750 - 6		82	±2%	1/4 W	T10	1008845
R96	1006750 - 6		82	±2%	1/4 W	T11	1008832
R97	1006750 - 36		1500	±2%	1/4 W	T12	1008842
R98	1006750 - 36		1500	±2%	1/4 W	T13	1008842
R99	1010311 - 315		93.1K	±1%	1/10W	T14	1008845
R100	1010311 - 315		93.1K	±1%	1/10W	T15	1008845
R101	1010311 - 291		52.3K	±1%	1/10W	T16	1008832
R102	1010364 - 769		499K	±1%	1/8 W	T17	1008842
R103	1006750 - 68		33K	±2%	1/4 W	T18	1008832
R104	1006750 - 65		24K	±2%	1/4 W	T19	1008842
R105	1010311 - 102		562	±1%	1/10W	T20	1008845
R106	1010364 - 707		237K	±1%	1/8 W	T21	1008832
R107	1006750 - 56		10K	±2%	1/4 W	T22	1008842
R108	1010311 - 306		75 K	±1%	1/10W	T23	1008845
R109	1006750 - 6		82	±2%	1/4 W	T24	1008832
R110	1006750 - 6		82	±2%	1/4 W	T25	1008842
R111	1006750 - 36		1500	±2%	1/4 W	T26	1008845
R112	1006750 - 36		1500	±2%	1/4 W		
R113	1010311 - 315		93.1K	±1%	1/10W		
R114	1010311 - 315		93.1K	±1%	1/10W		
R115	1010311 - 291		52.3K	±1%	1/10W		
R116	1010364 - 769		499K	±1%	1/8 W	Q1	1010397 - 1
R117	1006750 - 68		33K	±2%	1/4 W	Q2	1010397 - 1
R118	1006750 - 65		24K	±2%	1/4 W	Q3	1010367
R119	1010311 - 102		562	±1%	1/10W	Q4	1010367
R120	1010364 - 707		237K	±1%	1/8 W	Q5	1010367
R121	1006750 - 56		10K	±2%	1/4 W	Q6	1010367
R122	1010311 - 306		75 K	±1%	1/10W	Q7	1010397 - 1
R123	1006750 - 6		82	±2%	1/4 W	Q8	1010397 - 1
R124	1006750 - 6		82	±2%	1/4 W	Q9	1010367
R125	1006750 - 36		1500	±2%	1/4 W	Q10	1010367
R126	1006750 - 36	RESISTOR	1500	±2%	1/4 W	Q11	1010367


10
9
8
7
6
R45
910
R33
910
T4
WHT
YEL
BRN
RED
BLU
GRN
BLK
T5
CR1
IN3026B
CR8
IN3026B
C11
0.50
T9
T10
T14
T15
C31
0.50
R145
100
C73
47
28VISS STD BY
X PIPA QUAD TELEMETRY
CR5
IN645
CR6
IN645
X PIPA IN ϕ TELEMETRY
Y PIPA QUAD TELEMETRY
CR7
IN645
R56
8200
R134
1620
R57
1000
C32
27PF
R58
95.5K
Q19
R60
95.5K
C33
27PF
R61
1000
R51
47K
R59
330
R62
1620
R63
2740
C35
1.0
R138
5110
C34
0.022
C39
1.0
R74
1000
R72
130K
R73
75K
Q21
2N930
CR2
IN967B
R77
10K
R79
3.01K
C42
1.0
Q22
2N930
C41
1.0
R76
20K
C43
1.0
T16
RED
BLK
BLU
GRN
C44
150PF
R81
118K
R82
499K
R83
499K
R71
909
C40
1.0
R75
332K
R78
100
R80
13K
3200 CPS 1% F.B.
3200 CPS
(FOR DISCRETE EXCIT)
R136
8200
R64
1000
C36
27PF
R65
95.5K
Q20
R67
95.5K
C37
27PF
R68
1000
R69
511
C38
0.012
R70
10K
R136
1620
R137
47K
R66
330
T17
BRN
YEL
RED
BLK
BLU
GRN
CR3
IN645
CR4
IN645
C45
4.7
R84
37.5K
HI
3200 CPS TELEMETRY
LO
CR10
IN645
Y PIPA IN ϕ TELEMETRY
CR11
IN645
Z PIPA QUAD TELEMETRY
CR12
IN645
Z PIPA IN ϕ TELEMETRY
R85
93.1K
T18
IG SERVO ERROR
HI
LO
R87
52.3K
C46
NOM
C47
10PF
R86
93.1K
BLK
GRN
R99
93.1K
T21
MG SERVO ERROR
R101
52.3K
C54
NOM
C55
30PF
R100
93.1K
R113
93.1K
T24
OG SERVO ERROR
R115
52.3K
C62
NOM
C63
30PF
R114
93.1K
2010122
F-2

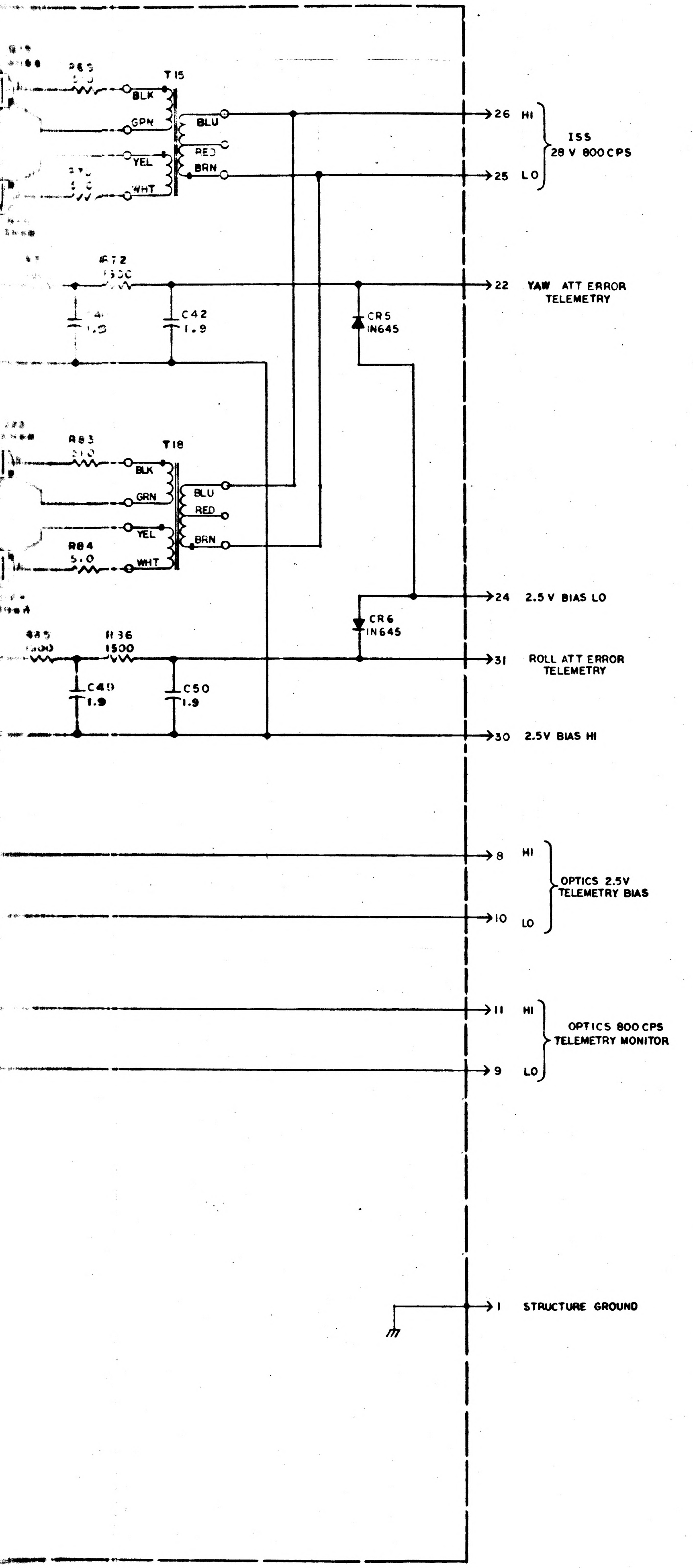

28V ISS OP
R1 51
C1 47
X PIPA SG
HI
LO
R2 93.1K
R3 93.1K
R4 52.3K
C2 NOM
C3 30PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
C7 1.0
R7 24K
C5 33
R11 93.1K
R142 1020
R5 499K
R8 1100
C6 33
R10 4900
T2
BRN
RED
BLU
YEL
BLK
GRN
Q3 3N68
R12 82
Q4 3N68
R13 82
T4
WHT
YEL
GRN
BLK
BRN
RED
BLU
R14 3000
C8 .34
T3
Q5 3N68
R16 82
T5
Q6 3N68
R17 82
R18 1500
C10 .34
R19 1500
C11 0.50
R15 910
R33 910
CR1 1N3026B
CR8 1N3026B
LEM APPLICATIONS ONLY
Y PIPA SG
R20 93.1K
R21 93.1K
R22 52.3K
C12 NOM
C13 30PF
T6
C14 10
Q7 2N930
R24 47K
Q8 2N930
R27 237K
C17 1.0
R25 24K
C15 33
R29 93.1K
R143 1020
R23 499K
R26 1100
C16 33
R28 4900
T7
Q9 3N68
R30 82
T9
Q10 3N68
R31 82
R32 3000
C18 .34
T8
Q11 3N68
R34 82
T10
Q12 3N68
R35 82
R36 1500
C20 .34
R37 1500
C21 0.50
R56 8200
R57 1000
C32 27PF
R58 95.5K
Q19
R60 95.5K
C33 27PF
R51 47K
R59 330
R136 8200
R64 1000
C36 27PF
R65 95.5K
Q20
R67 95.5K
C37 27PF
R136 1620
R137 47K
R66 330
Z PIPA SG
R38 93.1K
R39 93.1K
R40 52.3K
C22 NOM
C23 30PF
T11
C24 10
Q13 2N930
R42 47K
Q14 2N930
R45 237K
C27 1.0
R43 24K
C25 33
R47 93.1K
R144 1020
R41 499K
R44 1100
C26 33
R46 4900
T12
Q15 3N68
R48 82
T14
Q16 3N68
R49 82
R50 3000
C28 .34
T13
Q17 3N68
R52 82
T15
Q18 3N68
R53 82
R54 1500
C30 .34
R55 1500
C31 0.50
0V ISS
13
12
11
10
D
C
B
A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT C2, C12, C22, C46 C54 & C62 PER APPLICABLE P.S. FROM APPROPRIATE CHART

4H

2010122

REVISIONS 25506						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27413				



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 -25	RESISTOR	510	±2%	1/4W
R2	1010364 - 653		124K	±1%	1/8W
R3	1010364 - 653		124K	±1%	1/8W
R4	1010364 - 291		52.3K	±1%	1/8W
R5	1010364 - 769		499K	±1%	1/8W
R6	1006750 - 72		47K	±2%	1/4W
R7	1006750 - 65		24K	±2%	1/4W
R8	1010364 - 217		665	±1%	1/8W
R9	1010364 - 707		237K	±1%	1/8W
R10	1006750 - 56		10K	±2%	1/4W
R11	1010311 - 306		75K	±1%	1/10W
R12	1006750 - 25		510	±2%	1/4W
R13	1006750 - 25		510	±2%	1/4W
R14	1006750 - 36		1500	±2%	1/4W
R15	1006750 - 36		1500	±2%	1/4W
R16	1010364 - 653		124K	±1%	1/8W
R17	1010364 - 653		124K	±1%	1/8W
R18	1010364 - 291		52.3K	±1%	1/8W
R19	1010364 - 769		499K	±1%	1/8W
R20	1006750 - 72		47K	±2%	1/4W
R21	1006750 - 65		24K	±2%	1/4W
R22	1010364 - 217		665	±1%	1/8W
R23	1010364 - 707		237K	±1%	1/8W
R24	1006750 - 56		10K	±2%	1/4W
R25	1010311 - 306		75K	±1%	1/10W
R26	1006750 - 25		510	±2%	1/4W
R27	1006750 - 25		510	±2%	1/4W
R28	1006750 - 36		1500	±2%	1/4W
R29	1006750 - 36		1500	±2%	1/4W
R30	1010364 - 653		124K	±1%	1/8W
R31	1010364 - 653		124K	±1%	1/8W
R32	1010364 - 291		52.3K	±1%	1/8W
R33	1010364 - 769		499K	±1%	1/8W
R34	1006750 - 72		47K	±2%	1/4W
R35	1006750 - 65		24K	±2%	1/4W
R36	1010364 - 131		191	±1%	1/8W
R37	1010364 - 707		237K	±1%	1/8W
R38	1006750 - 56		10K	±2%	1/4W
R39	1010311 - 318		100K	1%	1/10W
R40	1006750 - 25		510	±2%	1/4W
R41	1006750 - 25		510	±2%	1/4W
R42	1006750 - 36		1500	±2%	1/4W
R43	1006750 - 36		1500	±2%	1/4W
R44	1010364 - 653		124K	±1%	1/8W
R45	1010364 - 653		124K	±1%	1/8W
R46	1010364 - 291		52.3K	±1%	1/8W
R47	1010364 - 769		499K	±1%	1/8W
R48	1006750 - 72		47K	±2%	1/4W
R49	1006750 - 65		24K	±2%	1/4W
R50	1010364 - 131		191	±1%	1/8W
R51	1010364 - 707		237	±1%	1/8W
R52	1006750 - 56		10K	±2%	1/4W
R53	1010311 - 318		100K	±1%	1/10W
R54	1006750 - 25		510	±2%	1/4W
R55	- 25		510	±2%	1/4W
R56	- 36		1500	±2%	1/4W
R57	- 36		1500	±2%	1/4W
R58	1006750 - 25		510	±2%	1/4W
R59	1010364 - 653		124	±1%	1/8W
R60	1010364 - 653		124	±1%	1/8W
R61	1010311 - 291		52.3K	±1%	1/10W
R62	1010364 - 769		499K	±1%	1/8W
R63	1006750 - 72		47K	±2%	1/4W
R64	1006750 - 65		24K	±2%	1/4W
R65	1010311 - 109		665	±1%	1/10W
R66	1010364 - 707		237K	±1%	1/8W
R67	1006750 - 56		10K	±2%	1/4W
R68	1010311 - 198		56.2K	±1%	1/10W
R69	1006750 - 25		510	±2%	1/4W
R70	1006750 - 25		510	±2%	1/4W
R71	1006750 - 36		1500	±2%	1/4W
R72	1006750 - 36		1500	±2%	1/4W
R73	1010364 - 653		124K	±1%	1/8W
R74	1010364 - 653		124K	±1%	1/8W
R75	1010311 - 291		52.3K	±1%	1/10W
R76	1010364 - 769		499K	±1%	1/8W
R77	1006750 - 72		47K	±2%	1/4W
R78	1006750 - 65		24K	±2%	1/4W
R79	1010311 - 291		665	±1%	1/10W
R80	1010364 - 707		237K	±1%	1/8W
R81	1006750 - 56		10K	±2%	1/4W
R82	1010311 - 198		56.2K	±1%	1/10W
R83	1006750 - 25		510	±2%	1/4W
R84	1006750 - 25		510	±2%	1/4W
R85	1006750 - 36		1500	±2%	1/4W
R86	1006750 - 36		1500	±2%	1/8W
R87	1006750 - 14		180	±2%	1/4W
R88	SEE NOTE 2		NOM	±1%	1/10W
R89	1010364 -225		732	±1%	1/8W
R90	1010364 -403		6190	±1%	1/8W
R91	1010364 -385	RESISTOR	4990	±1%	1/8W
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323				
T19	1010466				
T20	1010466	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410 -18		1100PF	±2%	300VDC
C3	1010410 - 7		390PF	±2%	500VDC
C4	1006755 - 31		10	±10%	20VDC
C5	1006755 - 34		33		20
C6	1006755 - 69		1.0		35
C7	1006755 - 34		33		20
C8	1010279 - 16		1.9		6
C9	1010279 - 16		1.9	±10%	6
C10	1010410 - 18		1100PF	±2%	300VDC
C11	1010410 - 7		390PF	±2%	500VDC
C12	1006755 - 31		10	±10%	20 VDC
C13	1006755 - 34		33		20
C14	1006755 - 69		1.0		35
C15	1006755 - 34		33		20
C16	1010279 - 16		1.9		6
C17	1010279 - 16		1.9	±10%	6
C18	1010410 - 18		1100PF	±2%	300VDC
C19	1010410 - 5		330PF	±2%	500 VDC
C20	1006755 - 31		10	±10%	20 VDC
C21	1006755 - 34		33		20
C22	1006755 - 69		1.0		35
C23	1006755 - 34		33		20
C24	1010279 - 16		1.9		6
C25	1010279 - 16		1.9	±10%	6
C26	1010410 - 18		1100PF	±2%	300VDC
C27	1010410 - 5		330PF	±2%	500VDC
C28	1006755 - 31		10	±10%	20VDC
C29	1006755 - 34		33		20
C30	1006755 - 69		1.0		35
C31	1006755 - 34		33		20
C32	1010279 - 16		1.9		6
C33	1010279 - 16		1.9		6
C34	1006755 - 89		47	±10%	35
C35	1010410 - 18		1100PF	±2%	300VDC
C36	1010410 - 7		390PF	±2%	500VDC
C37	1006755 - 31		10	±10%	20 VDC
C38	1006755 - 34		33		20
C39	1006755 - 69		1.0		35
C40	1006755 - 34		33		20
C41	1010279 - 16		1.9		6
C42	1010279 - 16		1.9	±10%	6
C43	1010410 - 18		1100PF	±2%	300VDC
C44	1010410 - 7		390PF	±2%	500VDC
C45	1006755 - 31		10	±10%	20 VDC
C46	1006755 - 34		33		20
C47	1006755 - 69		1.0		35
C48	1006755 - 34		33		20
C49	1010279 - 16		1.9		6
C50	1010279 - 16		1.9		6
C61	1006755 - 40		100		20
C52	1006755 - 4		56		6
C53	1006755 - 40		100		20
C54	1006755 - 4	CAPACITOR	56	±10%	6 VDC
CR1	1010837 - 001	DIODE	IN645		
CR2	- 001				
CR3	- 001				
CR4	- 001				
CR5	- 001				
CR6	- 001				
CR7	1010837 - 001		IN645		
CR8	1010259 -000		IN825		
CR9	1010837 - 001	DIODE	IN645		
Q1	1010397 -1	TRANSISTOR	2N930		
Q2	1010397 -1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397 -1	TRANSISTOR	2N930		
Q6	1010397 -1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397 -1	TRANSISTOR	2N930		
Q10	1010397 -1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397 -1	TRANSISTOR	2N930		
Q14	1010397 -1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397 -1	TRANSISTOR	2N930		
Q18	1010397 -1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397 -1	TRANSISTOR	2N930		
Q22	1010397 -1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		

R88	
PART NO.	VALUE
1010364 - 255	1050
- 257	1070
- 259	1100
- 261	1130
- 263	1150
1010364 - 265	1180

REF DWG
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR ASSY
DWG NO. 2007240

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Lee 4 JAN 66
CHECKED 17 Jan 66
APPROVED 17 Jan 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

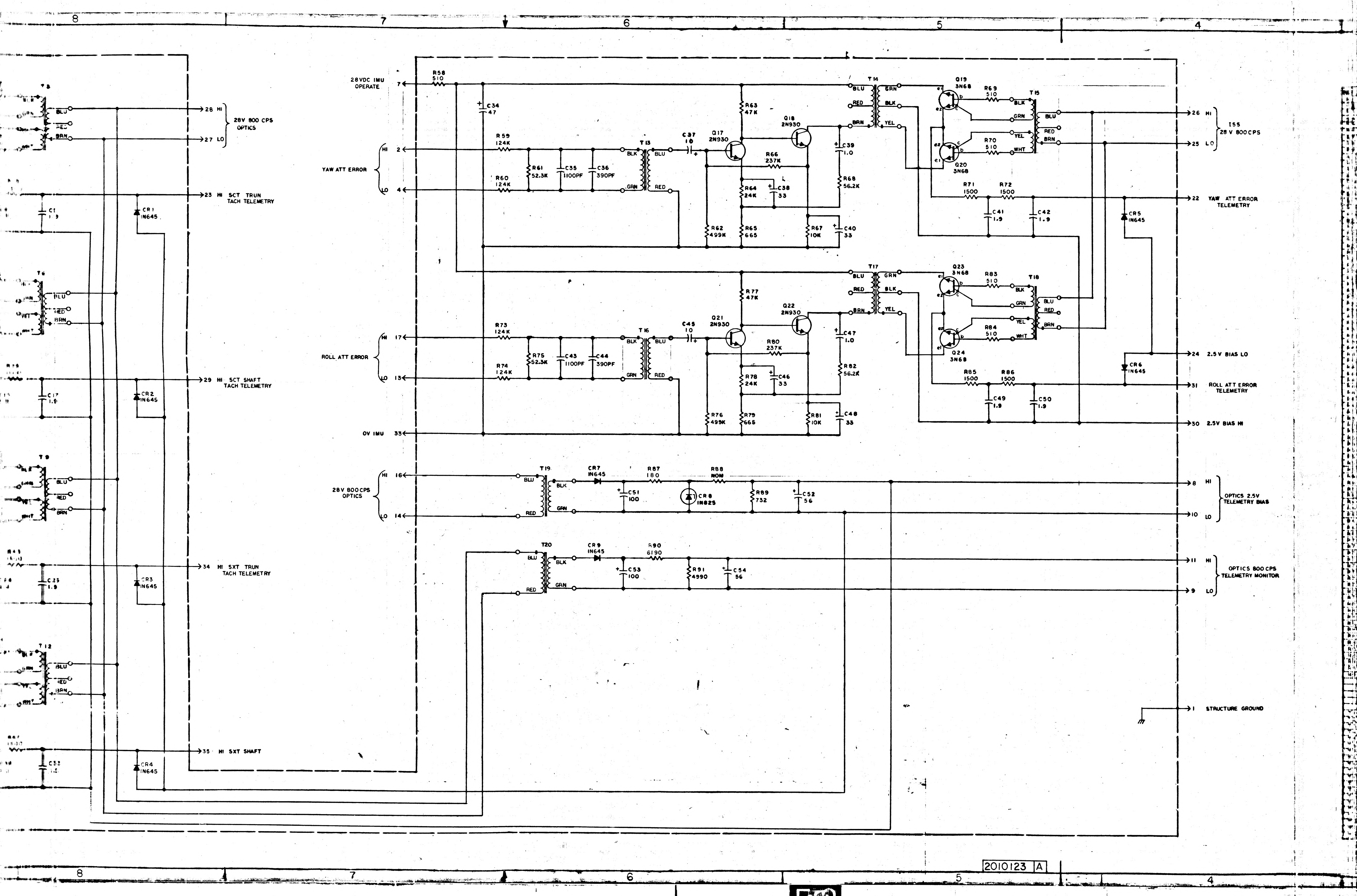
SCHEMATIC
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010123
SCALE —		SHEET 1 OF 1

2010123 A

MASTER

F-8


8
7
6
5
4
T5
BLU
RED
BRN
28 HI
27 LO
28V 800 CPS
OPTICS
C1
1.9
CR1
1N645
23 HI SCT TRUN
TACH TELEMETRY
T6
BLU
RED
BRN
C17
1.9
CR2
1N645
29 HI SCT SHAFT
TACH TELEMETRY
T9
BLU
RED
BRN
C25
1.9
CR3
1N645
34 HI SXT TRUN
TACH TELEMETRY
T12
BLU
RED
BRN
C32
1.9
CR4
1N645
35 HI SXT SHAFT
28VDC IMU
OPERATE
7
R58
510
C34
47
YAW ATT ERROR
HI 2
LO 4
R59
124K
R60
124K
R61
52.3K
C35
1100PF
C36
390PF
T13
BLK
GRN
BLU
RED
C37
10
Q17
2N930
Q18
2N930
R63
47K
R66
237K
R64
24K
C38
33
R62
499K
R65
665
R67
10K
C40
33
C39
1.0
R68
56.2K
T14
BLU
RED
BRN
GRN
BLK
YEL
Q19
3N68
R69
510
Q20
3N68
R70
510
T15
BLK
GRN
YEL
WHT
BLU
RED
BRN
26 HI
25 LO
ISS
28 V 800CPS
R71
1500
R72
1500
C41
1.9
C42
1.9
CR5
1N645
22 YAW ATT ERROR
TELEMETRY
T17
BLU
RED
BRN
GRN
BLK
YEL
Q23
3N68
R83
510
Q24
3N68
R84
510
T18
BLK
GRN
YEL
WHT
BLU
RED
BRN
R77
47K
Q22
2N930
Q21
2N930
ROLL ATT ERROR
HI 17
LO 13
R73
124K
R74
124K
R75
52.3K
C43
1100PF
C44
390PF
T16
BLK
GRN
BLU
RED
C45
10
R80
237K
C46
33
R78
24K
R76
499K
R79
665
R81
10K
C48
33
C47
1.0
R82
56.2K
R85
1500
R86
1500
C49
1.9
C50
1.9
CR6
1N645
24 2.5V BIAS LO
31 ROLL ATT ERROR
TELEMETRY
30 2.5V BIAS HI
OV IMU 33
28V 800CPS
OPTICS
HI 16
LO 14
T19
BLU
RED
BLK
GRN
CR7
1N645
R87
180
R88
NOM
C51
100
CR8
1N825
R89
732
C52
56
8 HI
10 LO
OPTICS 2.5V
TELEMETRY BIAS
T20
BLU
RED
BLK
GRN
CR9
1N645
R90
6190
C53
100
R91
4990
C54
56
11 HI
9 LO
OPTICS 800 CPS
TELEMETRY MONITOR
1 STRUCTURE GROUND
2010123 A

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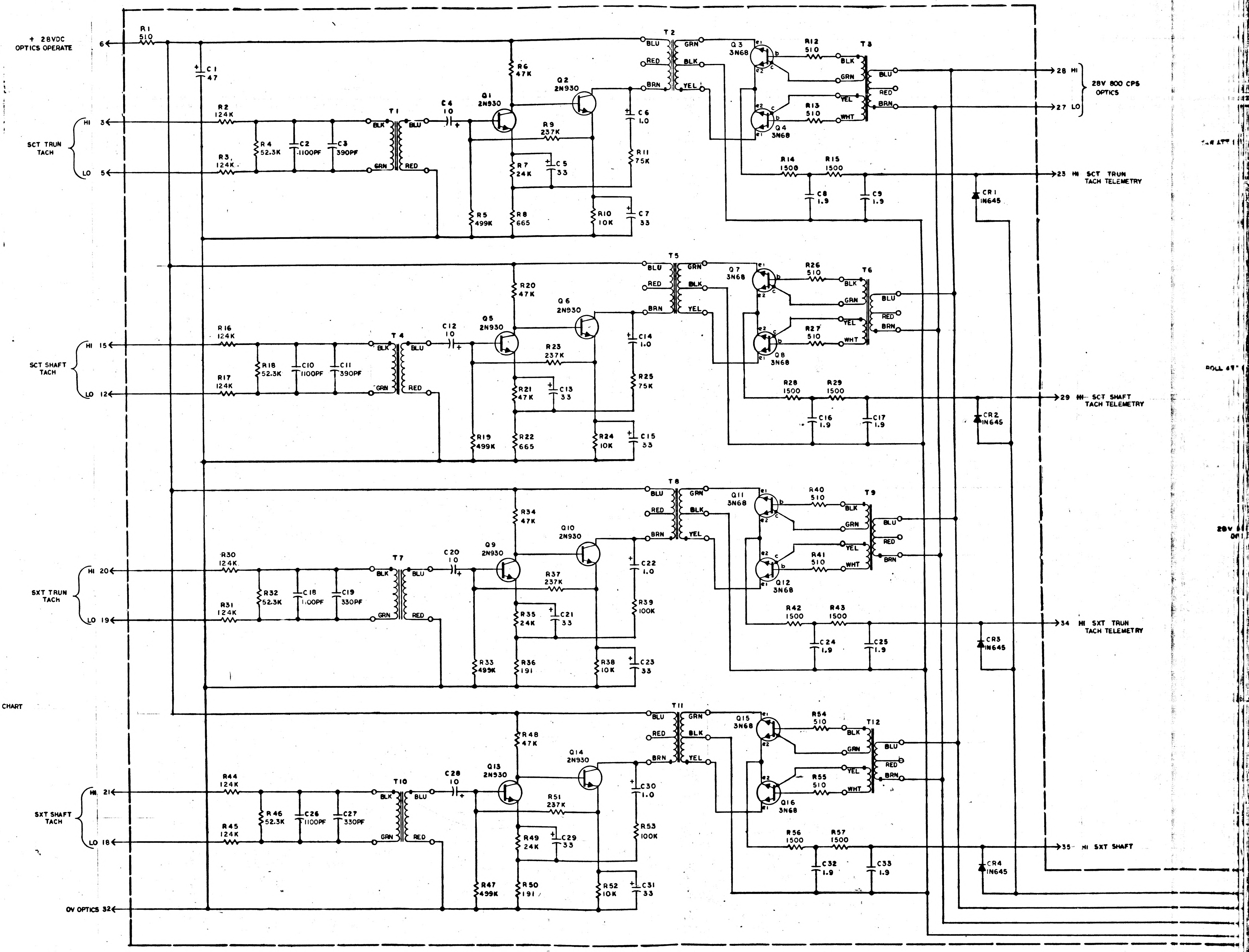
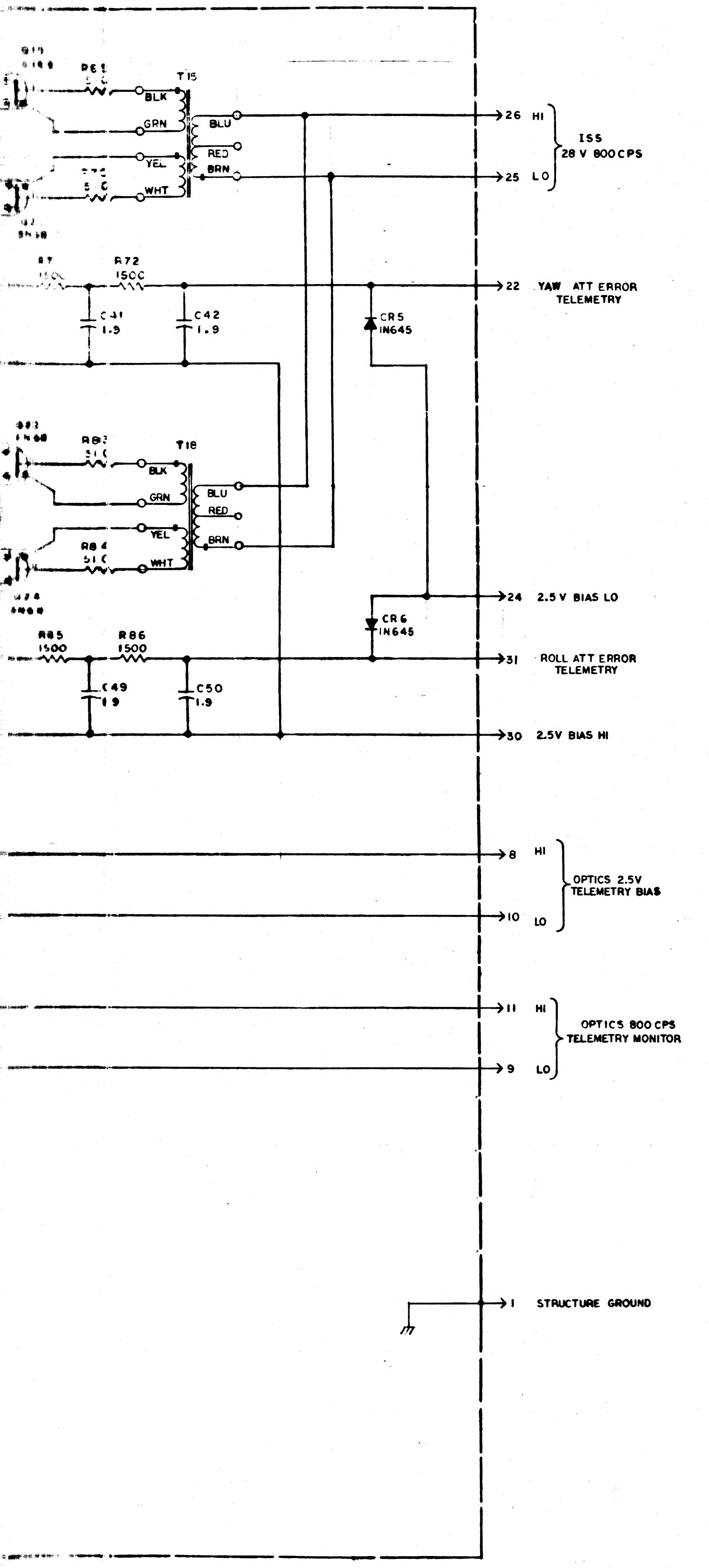

+ 28VDC
OPTICS OPERATE
6
R1 510
C1 47
R2 124K
R3 124K
R4 52.3K
C2 .1100PF
C3 390PF
T1
BLK
BLU
GRN
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 75K
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
WHT
28 HI
27 LO
28V 800 CPS
OPTICS
R14 1500
R15 1500
C8 1.9
C9 1.9
CR1 1N645
23 HI SCT TRUN
TACH TELEMETRY
SCT TRUN
TACH
HI 3
LO 5
SCT SHAFT
TACH
HI 15
LO 12
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R23 237K
R21 47K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 75K
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 1.9
C17 1.9
CR2 1N645
29 HI SCT SHAFT
TACH TELEMETRY
SXT TRUN
TACH
HI 20
LO 19
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 330PF
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
R35 24K
C21 33
R33 499K
R36 191
R38 10K
C23 33
C22 1.0
R39 100K
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 1.9
C25 1.9
CR3 1N645
34 HI SXT TRUN
TACH TELEMETRY
SXT SHAFT
TACH
HI 21
LO 18
R44 124K
R45 124K
R46 52.3K
C26 1100PF
C27 330PF
T10
C28 10
Q13 2N930
R48 47K
Q14 2N930
R51 237K
R49 24K
C29 33
R47 499K
R50 191
R52 10K
C31 33
C30 1.0
R53 100K
T11
Q15 3N68
Q16 3N68
R54 510
R55 510
T12
R56 1500
R57 1500
C32 1.9
C33 1.9
CR4 1N645
35 HI SXT SHAFT
0V OPTICS 32
e1
e2
b
c

3H

3H

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R88 PER APPLICABLE RS. FROM APPROPRIATE CHART

REVISIONS		25506				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27413	APL	APL		
B		REVISED PER TDRR 28563	ADL	LSB	3-11-66	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 - 25	RESISTOR	510	±2%	1/4W
R2	1010364 - 653		124K	±1%	1/8W
R3	1010364 - 653		124K	±1%	1/8W
R4	1010364 - 581		52.3K	±1%	1/8W
R5	1010364 - 769		499K	±1%	1/8W
R6	1006750 - 72		47K	±2%	1/4W
R7	1006750 - 65		24K	±2%	1/4W
R8	1010364 - 217		665	±1%	1/8W
R9	1010364 - 707		237K	±1%	1/8W
R10	1006750 - 56		10K	±2%	1/4W
R11	1010311 - 306		75K	±1%	1/10W
R12	1006750 - 25		510	±2%	1/4W
R13	1006750 - 25		510	±2%	1/4W
R14	1006750 - 36		1500	±2%	1/4W
R15	1006750 - 36		1500	±2%	1/4W
R16	1010364 - 653		124K	±1%	1/8W
R17	1010364 - 653		124K	±1%	1/8W
R18	1010364 - 581		52.3K	±1%	1/8W
R19	1010364 - 769		499K	±1%	1/8W
R20	1006750 - 72		47K	±2%	1/4W
R21	1006750 - 65		24K	±2%	1/4W
R22	1010364 - 217		665	±1%	1/8W
R23	1010364 - 707		237K	±1%	1/8W
R24	1006750 - 56		10K	±2%	1/4W
R25	1010311 - 306		75K	±1%	1/10W
R26	1006750 - 25		510	±2%	1/4W
R27	1006750 - 25		510	±2%	1/4W
R28	1006750 - 36		1500	±2%	1/4W
R29	1006750 - 36		1500	±2%	1/4W
R30	1010364 - 653		124K	±1%	1/8W
R31	1010364 - 653		124K	±1%	1/8W
R32	1010364 - 581		52.3K	±1%	1/8W
R33	1010364 - 769		499K	±1%	1/8W
R34	1006750 - 72		47K	±2%	1/4W
R35	1006750 - 65		24K	±2%	1/4W
R36	1010364 - 131		191	±1%	1/8W
R37	1010364 - 707		237K	±1%	1/8W
R38	1006750 - 56		10K	±2%	1/4W
R39	1010311 - 318		100K	1%	1/10W
R40	1006750 - 25		510	±2%	1/4W
R41	1006750 - 25		510	±2%	1/4W
R42	1006750 - 36		1500	±2%	1/4W
R43	1006750 - 36		1500	±2%	1/4W
R44	1010364 - 653		124K	±1%	1/8W
R45	1010364 - 653		124K	±1%	1/8W
R46	1010364 - 581		52.3K	±1%	1/8W
R47	1010364 - 769		499K	±1%	1/8W
R48	1006750 - 72		47K	±2%	1/4W
R49	1006750 - 65		24K	±2%	1/4W
R50	1010364 - 131		191	±1%	1/8W
R51	1010364 - 707		237	±1%	1/8W
R52	1006750 - 56		10K	±2%	1/4W
R53	1010311 - 318		100K	±1%	1/10W
R54	1006750 - 25		510	±2%	1/4W
R55	- 25		510	±2%	1/4W
R56	- 36		1500	±2%	1/4W
R57	- 36		1500	±2%	1/4W
R58	1006750 - 25		510	±2%	1/4W
R59	1010364 - 653		124	±1%	1/8W
R60	1010364 - 653		124	±1%	1/8W
R61	1010364 - 581		52.3K	±1%	1/8W
R62	1010364 - 769		499K	±1%	1/8W
R63	1006750 - 72		47K	±2%	1/4W
R64	1006750 - 65		24K	±2%	1/4W
R65	1010364 - 217		665	±1%	1/8W
R66	1010364 - 707		237K	±1%	1/8W
R67	1006750 - 56		10K	±2%	1/4W
R68	1010311 - 198		56.2K	±1%	1/10W
R69	1006750 - 25		510	±2%	1/4W
R70	1006750 - 25		510	±2%	1/4W
R71	1006750 - 36		1500	±2%	1/4W
R72	1006750 - 36		1500	±2%	1/4W
R73	1010364 - 653		124K	±1%	1/8W
R74	1010364 - 653		124K	±1%	1/8W
R75	1010364 - 581		52.3K	±1%	1/8W
R76	1010364 - 769		499K	±1%	1/8W
R77	1006750 - 72		47K	±2%	1/4W
R78	1006750 - 65		24K	±2%	1/4W
R79	1010364 - 217		665	±1%	1/8W
R80	1010364 - 707		237K	±1%	1/8W
R81	1006750 - 56		10K	±2%	1/4W
R82	1010311 - 198		56.2K	±1%	1/10W
R83	1006750 - 25		510	±2%	1/4W
R84	1006750 - 25		510	±2%	1/4W
R85	1006750 - 36		1500	±2%	1/4W
R86	1006750 - 36		1500	±2%	1/8W
R87	1006750 - 14		180	±2%	1/4W
R88	SEE NOTE 2		NOM	±1%	1/10W
R89	1010364 - 225		732	±1%	1/8W
R90	1010364 - 403		6190	±1%	1/8W
R91	1010364 - 385	RESISTOR	4990	±1%	1/8W
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323				
T19	1010466				
T20	1010466	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 - 134	CAPACITOR	22	±10%	50VDC
C2	1010410 - 18		1100PF	±2%	300VDC
C3	1010410 - 7		390PF	±2%	500VDC
C4	1006755 - 31		10	±10%	20VDC
C5	1006755 - 34		33		20
C6	1006755 - 69		1.0		35
C7	1006755 - 34		33		20
C8	1010279 - 16		1.9		6
C9	1010279 - 16		1.9	±10%	6
C10	1010410 - 18		1100PF	±2%	300VDC
C11	1010410 - 7		390PF	±2%	500VDC
C12	1006755 - 31		10	±10%	20VDC
C13	1006755 - 34		33		20
C14	1006755 - 69		1.0		35
C15	1006755 - 34		33		20
C16	1010279 - 16		1.9		6
C17	1010279 - 16		1.9	±10%	6
C18	1010410 - 18		1100PF	±2%	300VDC
C19	1010410 - 5		330PF	±2%	500VDC
C20	1006755 - 31		10	±10%	20VDC
C21	1006755 - 34		33		20
C22	1006755 - 69		1.0		35
C23	1006755 - 34		33		20
C24	1010279 - 16		1.9		6
C25	1010279 - 16		1.9	±10%	6
C26	1010410 - 18		1100PF	±2%	300VDC
C27	1010410 - 5		330PF	±2%	500VDC
C28	1006755 - 31		10	±10%	20VDC
C29	1006755 - 34		33		20
C30	1006755 - 69		1.0		35
C31	1006755 - 34		33		20
C32	1010279 - 16		1.9		6
C33	1010279 - 16		1.9		6
C34	1006755 - 134		22	±10%	50
C35	1010410 - 18		1100PF	±2%	300VDC
C36	1010410 - 7		390PF	±2%	500VDC
C37	1006755 - 31		10	±10%	20VDC
C38	1006755 - 34		33		20
C39	1006755 - 69		1.0		35
C40	1006755 - 34		33		20
C41	1010279 - 16		1.9		6
C42	1010279 - 16		1.9	±10%	6
C43	1010410 - 18		1100PF	±2%	300VDC
C44	1010410 - 7		390PF	±2%	500VDC
C45	1006755 - 31		10	±10%	20VDC
C46	1006755 - 34		33		20
C47	1006755 - 69		1.0		35
C48	1006755 - 34		33		20
C49	1010279 - 16		1.9		6
C50	1010279 - 16		1.9		6
C51	1006755 - 40		100		20
C52	1006755 - 4		56		6
C53	1006755 - 40		100		20
C54	1006755 - 4	CAPACITOR	56	±10%	6 VDC
CR1	1010837 - 001	DIODE	IN645		
CR2	- 001				
CR3	- 001				
CR4	- 001				
CR5	- 001				
CR6	- 001				
CR7	1010837 - 001		IN645		
CR8	1010259 - 000		IN825		
CR9	1010837 - 001	DIODE	IN645		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	1010397 - 1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397 - 1	TRANSISTOR	2N930		
Q6	1010397 - 1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397 - 1	TRANSISTOR	2N930		
Q10	1010397 - 1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397 - 1	TRANSISTOR	2N930		
Q14	1010397 - 1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397 - 1	TRANSISTOR	2N930		
Q18	1010397 - 1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397 - 1	TRANSISTOR	2N930		
Q22	1010397 - 1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		

R88	
PART NO.	VALUE
1010364 - 255	1050
- 257	1070
- 259	1100
- 261	1130
- 263	1150
1010364 - 265	1180

REF DWG

SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR ASSY
DWG NO. 2007240

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Lee 4 JAN 66
CHECKED 17 Jan 66
APPROVED 17 Jan 66
APPROVED
APPROVED MIT 1-25-66
APPROVED A. C. METZGER
MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

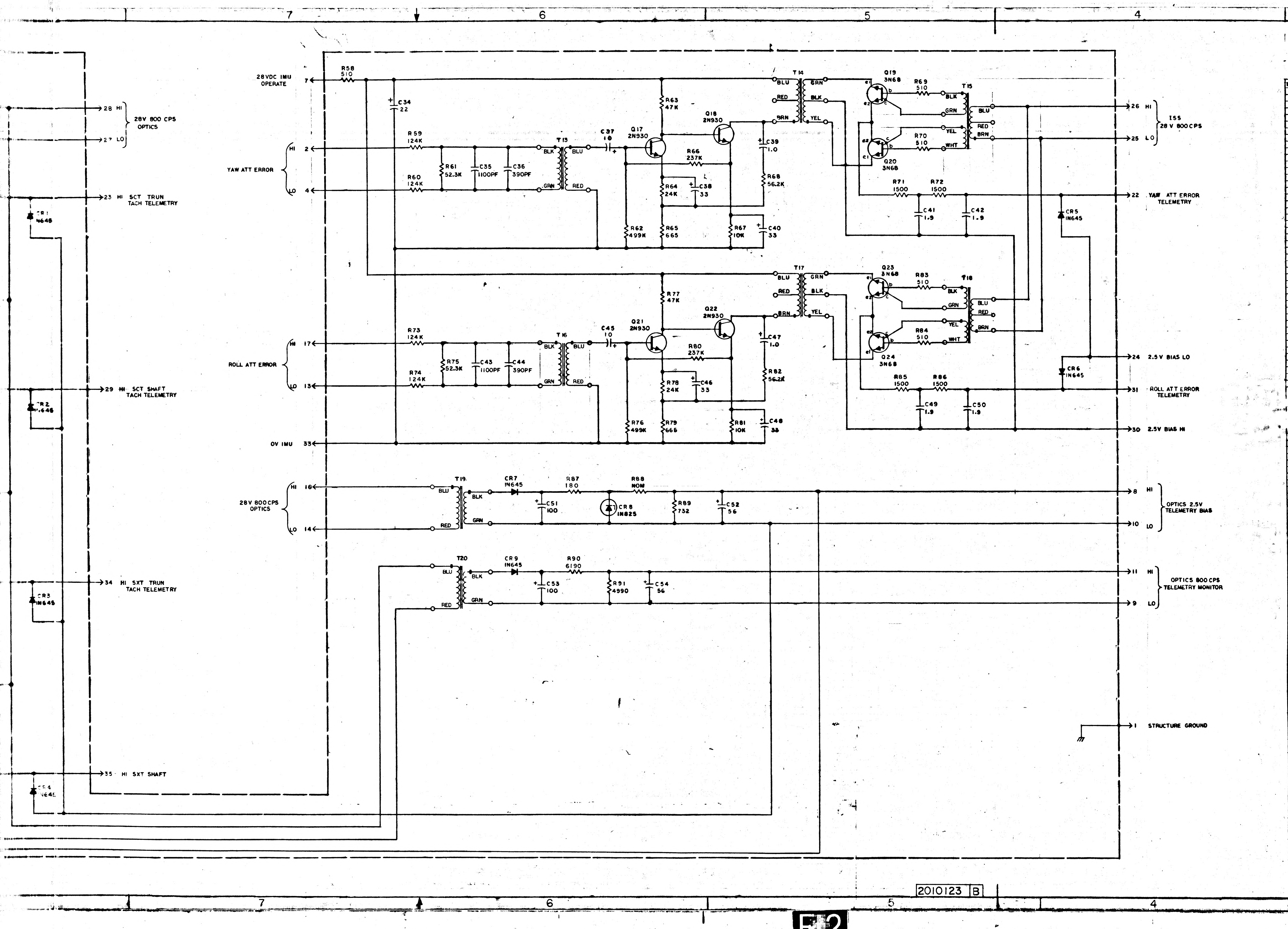
SCHEMATIC

SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010123

SCALE SHEET OF

MASTER

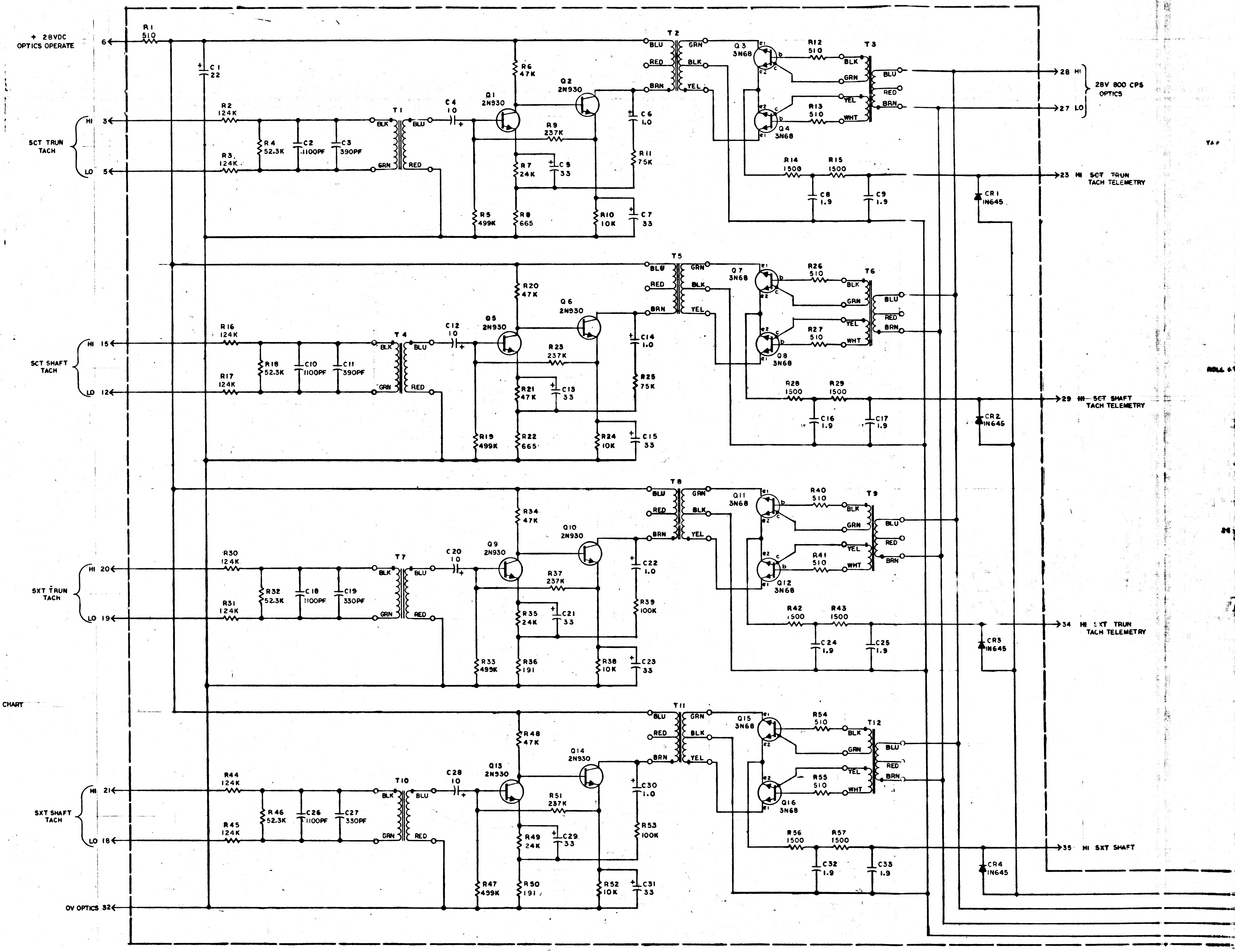

7
6
5
4
28VDC IMU OPERATE
7
R58 510
C34 22
T14
BLU
RED
BRN
GRN
BLK
YEL
Q19 3N68
R69 510
T15
BLK
GRN
YEL
WHT
BLU
RED
BRN
Q20 3N68
R70 510
26 HI
25 LO
ISS 28 V 800 CPS
28 HI
27 LO
28V 800 CPS OPTICS
R63 47K
Q18 2N930
Q17 2N930
C37 10
C39 1.0
R66 237K
R59 124K
YAW ATT ERROR
HI 2
LO 4
R60 124K
R61 52.3K
C35 1100PF
C36 390PF
T13
BLK
BLU
GRN
RED
R64 24K
C38 33
R68 56.2K
R71 1500
R72 1500
C41 1.9
C42 1.9
22 YAW ATT ERROR TELEMETRY
CR5 1N645
23 HI SCT TRUN TACH TELEMETRY
CR1 1N645
R62 499K
R65 665
R67 10K
C40 33
T17
Q23 3N68
R83 510
T18
R77 47K
Q22 2N930
Q21 2N930
C45 10
C47 1.0
R80 237K
ROLL ATT ERROR
HI 17
LO 13
R73 124K
R74 124K
R75 52.3K
C43 1100PF
C44 390PF
T16
R78 24K
C46 33
R82 56.2K
Q24 3N68
R84 510
R85 1500
R86 1500
C49 1.9
C50 1.9
24 2.5V BIAS LO
CR6 1N645
31 ROLL ATT ERROR TELEMETRY
29 HI SCT SHAFT TACH TELEMETRY
CR2 1N645
R76 499K
R79 665
R81 10K
C48 33
0V IMU 33
30 2.5V BIAS HI
28V 800CPS OPTICS
HI 16
LO 14
T19
CR7 1N645
R87 180
R88 NOM
C51 100
CR8 1N825
R89 732
C52 56
8 HI
10 LO
OPTICS 2.5V TELEMETRY BIAS
T20
CR9 1N645
R90 6190
C53 100
R91 4990
C54 56
11 HI
9 LO
OPTICS 800 CPS TELEMETRY MONITOR
34 HI SXT TRUN TACH TELEMETRY
CR3 1N645
1 STRUCTURE GROUND
35 HI SXT SHAFT
CR4 1N645

REF DES	PART NO.		DESCRIPTION
R1	1006750 -	25	RESISTOR
R2	1010364 -	653	
R3	1010364 -	653	
R4	1010364 -	[illegible]	
R5	1010364 -	769	
R6	1006750 -	72	
R7	1006750 -	65	
R8	1010364 -	2.7	
R9	1010364 -	707	
R10	1006750 -	56	
R11	[illegible] -	306	
R12	1006750 -	25	
R13	1006750 -	25	
R14	1006750 -	36	
R15	1006750 -	36	
R16	1010364 -	653	
R17	1010364 -	653	
R18	1010364 -	581	
R19	1010364 -	769	
R20	1006750 -	72	
R21	1006750 -	65	
R22	1010364 -	2.7	
R23	1010364 -	707	
R24	1006750 -	56	
R25	1010311 -	306	
R26	1006750 -	25	
R27	1006750 -	25	
R28	1006750 -	36	
R29	1006750 -	36	
R30	1010364 -	653	
R31	1010364 -	653	
R32	1010364 -	581	
R33	1010364 -	769	
R34	1006750 -	72	
R35	1006750 -	65	
R36	1010364 -	131	
R37	1010364 -	707	
R38	1006750 -	36	
R39	1010311 -	318	
R40	1006750 -	25	
R41	1006750 -	25	
R42	1006750 -	36	
R43	1006750 -	36	
R 4	1010364 -	653	
R45	1010364 -	653	
R4	1010364 -	581	
R4	1010364 -	769	
R48	1006750 -	72	
R49	1006750 -	65	
5	1010364 -	131	
1	1010364 -	707	
52	1006750 -	56	
R53	1010311 -	318	
R54	1006750 -	25	
R55	-	25	
R56	-	36	
R57	-	36	
R58	1006750 -	25	
R59	1010364 -	653	
R60	1010364 -	653	
R61	1010364 -	581	
R62	1010364 -	769	
R63	1006750 -	72	
R64	1006750 -	65	
R65	1010364 -	217	
R66	1010364 -	707	
R67	1006750 -	56	
R68	1010311 -	198	
R69	1006750 -	25	
R70	1006750 -	25	
R71	1006750 -	36	
R72	1006750 -	36	
R73	1010364 -	653	
R74	1010364 -	653	
R75	1010364 -	561	
R76	1010364 -	769	
R77	1006750 -	72	
R78	1006750 -	65	
R79	1010364 -	217	
R80	1010364 -	707	
R81	1006750 -	56	
R82	1010311 -	198	
R83	1006750 -	25	
R84	1006750 -	25	
R85	1006750 -	36	
R86	1006750 -	36	
R87	1006750 -	14	
R88	SEE NOTE	2	
R89	1010364 -	225	
R90	1010364 -	403	
R91	1010364 -	385	RESISTOR
T1	1008832		TRANSFORM
T2	1008842		
T3	1010323		
T4	1008832		
T5	1008842		
T6	1010323		
T7	1008832		
T8	1008842		
T9	1010323		
T10	1008832		
T11	1008842		
T12	1010323		
T13	1008832		
T14	1008842		
T15	1010323		
T16	1008832		
T17	1008842		
T18	1010323		
T19	1010456		
T20	1010466		TRANSF

2010123 B

F-2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

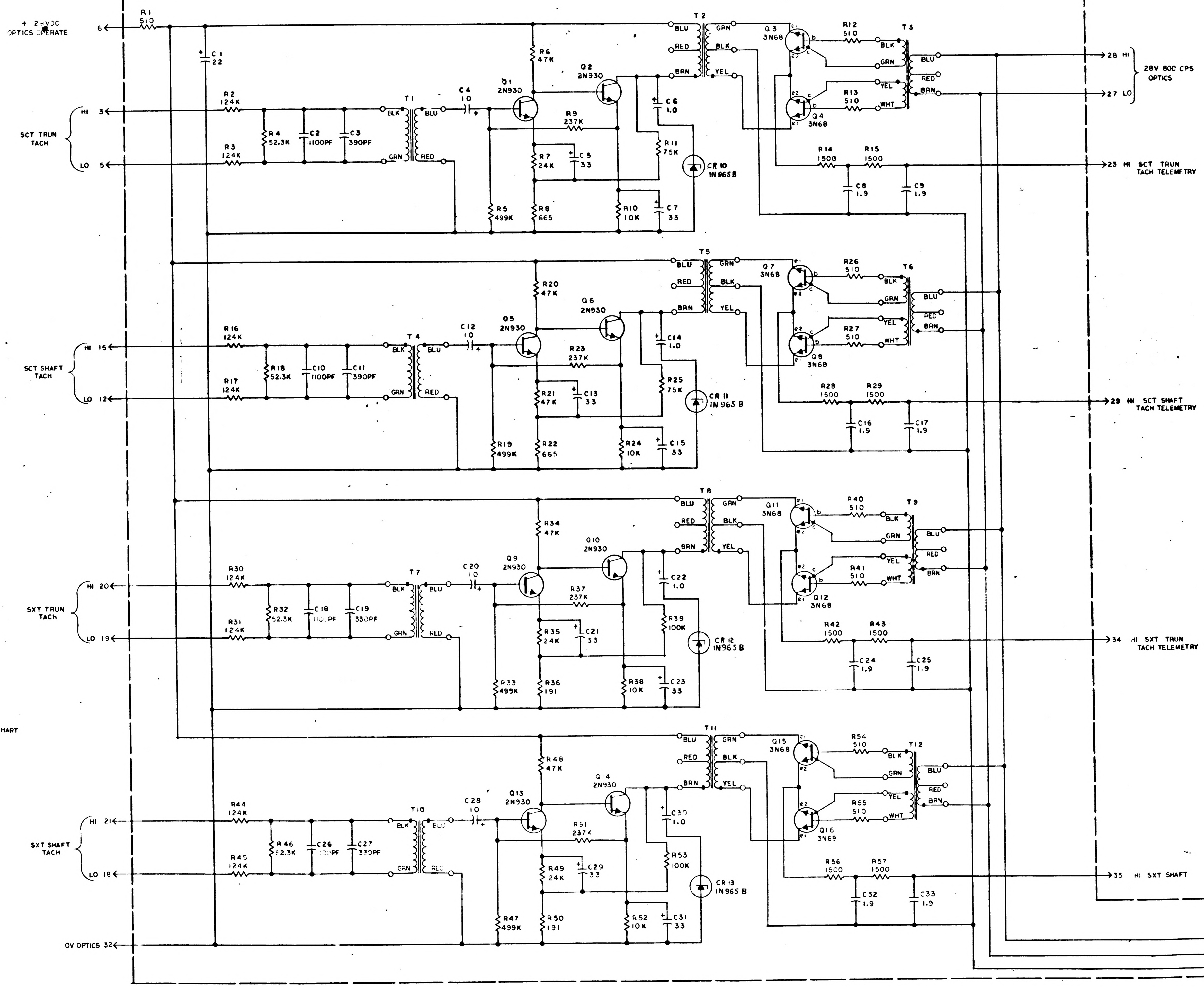


+ 28VDC OPTICS OPERATE 6
R1 510
C1 22
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
SCT TRUN TACH
HI 3
LO 5
T1
BLK
BLU
GRN
RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 75K
T2
BLU GRN
RED BLK
BRN YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK GRN YEL WHT
BLU RED BRN
28 HI
27 LO
28V 800 CPS OPTICS
R14 1500
R15 1500
C8 1.9
C9 1.9
CR1 1N645
23 HI SCT TRUN TACH TELEMETRY
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
SCT SHAFT TACH
HI 15
LO 12
T4
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
R21 47K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 75K
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 1.9
C17 1.9
CR2 1N645
29 HI SCT SHAFT TACH TELEMETRY
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 330PF
SXT TRUN TACH
HI 20
LO 19
T7
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
R35 24K
C21 33
R33 499K
R36 191
R38 10K
C23 33
C22 1.0
R39 100K
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 1.9
C25 1.9
CR3 1N645
34 HI SXT TRUN TACH TELEMETRY
R44 124K
R45 124K
R46 52.3K
C26 1100PF
C27 330PF
SXT SHAFT TACH
HI 21
LO 18
T10
C28 10
Q13 2N930
Q14 2N930
R48 47K
R51 237K
R49 24K
C29 33
R47 499K
R50 191
R52 10K
C31 33
C30 1.0
R53 100K
T11
Q15 3N68
Q16 3N68
R54 510
R55 510
T12
R56 1500
R57 1500
C32 1.9
C33 1.9
CR4 1N645
35 HI SXT SHAFT
OV OPTICS 32

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R88 PER APPLICABLE RS. FROM APPROPRIATE CHART

2010123 B

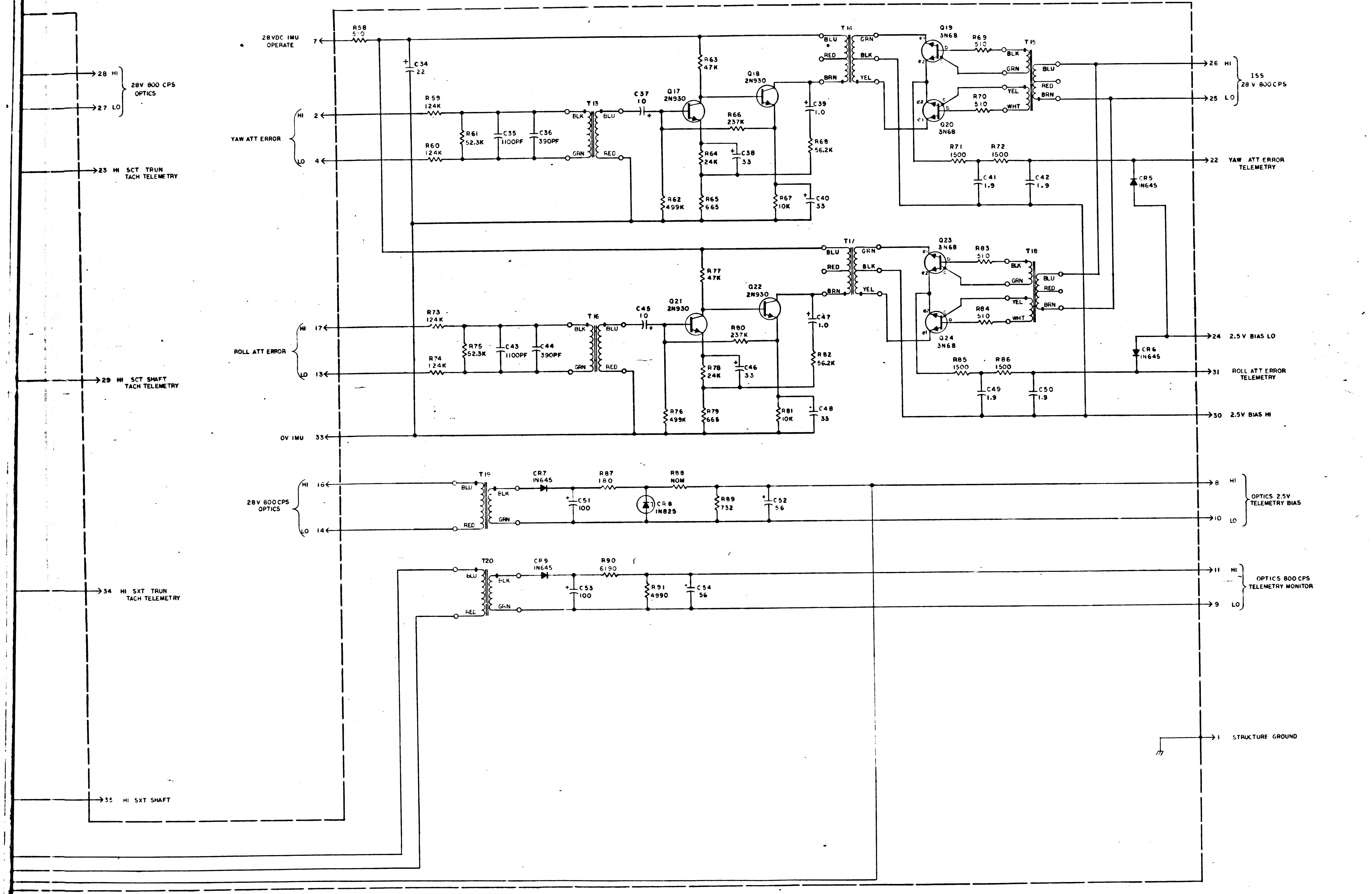
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


+ 28VDC OPTICS OPERATE
6
R1 510
C1 22
SCT TRUN TACH
HI 3
LO 5
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 75K
CR10 IN965B
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
28 HI
27 LO
28V 800 CPS OPTICS
R14 1500
R15 1500
C8 1.9
C9 1.9
23 HI SCT TRUN TACH TELEMETRY
SCT SHAFT TACH
HI 15
LO 12
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R23 237K
R21 47K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 75K
CR11 IN965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 1.9
C17 1.9
29 HI SCT SHAFT TACH TELEMETRY
SXT TRUN TACH
HI 20
LO 19
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 330PF
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
R35 24K
C21 33
R33 499K
R36 191
R38 10K
C23 33
C22 1.0
R39 100K
CR12 IN965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 1.9
C25 1.9
34 HI SXT TRUN TACH TELEMETRY
SXT SHAFT TACH
HI 21
LO 18
R44 124K
R45 124K
R46 52.3K
C26 1100PF
C27 330PF
T10
C28 10
Q13 2N930
R48 47K
Q14 2N930
R51 237K
R49 24K
C29 33
R47 499K
R50 191
R52 10K
C31 33
C30 1.0
R53 100K
CR13 IN965B
T11
Q15 3N68
Q16 3N68
R54 510
R55 510
T12
R56 1500
R57 1500
C32 1.9
C33 1.9
35 HI SXT SHAFT
0V OPTICS 32

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R88 PER APPLICABLE P.S. FROM APPROPRIATE CHART

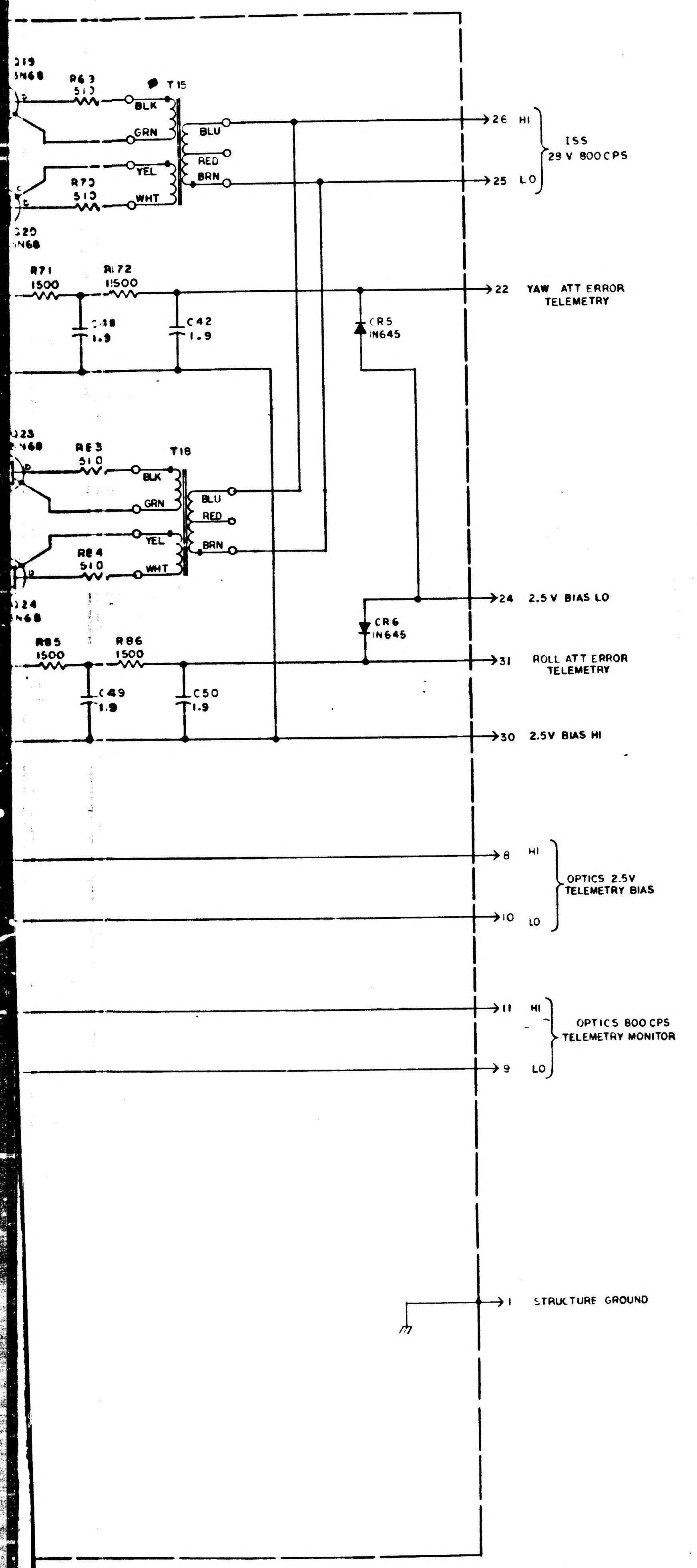
2010123 C

1/2010123


7
6
5
4
28VDC IMU OPERATE
7
R58
510
C34
22
HI 2
LO 4
YAW ATT ERROR
R59
124K
R60
124K
R61
52.3K
C35
1100PF
C36
390PF
T13
BLK
GRN
BLU
RED
C37
10
Q17
2N930
R62
499K
R63
47K
Q18
2N930
R66
237K
R64
24K
C38
33
R65
665
R67
10K
C39
1.0
R68
56.2K
C40
33
T14
BLU
RED
BRN
GRN
BLK
YEL
Q19
3N68
Q20
3N68
e1
e2
b
c
R69
510
R70
510
T15
BLK
GRN
YEL
WHT
BLU
RED
BRN
26 HI
25 LO
ISS
28 V 800 CPS
R71
1500
R72
1500
C41
1.9
C42
1.9
CR5
1N645
22 YAW ATT ERROR TELEMETRY
T17
BLU
RED
BRN
GRN
BLK
YEL
R77
47K
Q22
2N930
Q21
2N930
C45
10
T16
BLK
GRN
BLU
RED
HI 17
LO 13
ROLL ATT ERROR
R73
124K
R74
124K
R75
52.3K
C43
1100PF
C44
390PF
R80
237K
R78
24K
C46
33
R76
499K
R79
665
R81
10K
C47
1.0
R82
56.2K
C48
33
Q23
3N68
Q24
3N68
R83
510
R84
510
T18
BLK
GRN
YEL
WHT
BLU
RED
BRN
R85
1500
R86
1500
C49
1.9
C50
1.9
CR6
1N645
24 2.5 V BIAS LO
31 ROLL ATT ERROR TELEMETRY
30 2.5V BIAS HI
0V IMU 33
28V 800CPS OPTICS
HI 16
LO 14
T19
BLU
RED
BLK
GRN
CR7
1N645
R87
180
R88
NOM
C51
100
CR8
1N825
R89
732
C52
56
8 HI
10 LO
OPTICS 2.5V TELEMETRY BIAS
T20
BLU
RED
BLK
GRN
CR9
1N645
R90
6190
C53
100
R91
4990
C54
56
11 HI
9 LO
OPTICS 800 CPS TELEMETRY MONITOR
1 STRUCTURE GROUND
28 HI
27 LO
28V 800 CPS OPTICS
23 HI SCT TRUN TACH TELEMETRY
29 HI SCT SHAFT TACH TELEMETRY
34 HI SXT TRUN TACH TELEMETRY
35 HI SXT SHAFT

REF DES	PART NO.	DESCRIP
R1	1006750 - 25	RESISTO
R2	1010364 - 653	
R3	1010364 - 653	
R4	1010364 - 58	
R5	1010364 - 769	
R6	1006750 - 72	
R7	1006750 - 65	
R8	1010364 - 217	
R9	1010364 - 707	
R10	1006750 - 56	
R11	1010311 - 306	
R12	1006750 - 25	
R13	1006750 - 25	
R14	1006750 - 36	
R15	1006750 - 36	
R16	1010364 - 653	
R17	1010364 - 653	
R18	1010364 - 581	
R19	1010364 - 769	
R20	1006750 - 72	
R21	1006750 - 65	
R22	1010364 - 217	
R23	1010364 - 707	
R24	1006750 - 56	
R25	1010311 - 306	
R26	1006750 - 25	
R27	1006750 - 25	
R28	1006750 - 36	
R29	1006750 - 36	
R30	1010364 - 653	
R31	1010364 - 653	
R32	1010364 - 581	
R33	1010364 - 769	
R34	1006750 - 72	
R35	1006750 - 65	
R36	1010364 - 131	
R37	1010364 - 707	
R38	1006750 - 56	
R39	1010311 - 318	
R40	1006750 - 25	
R41	1006750 - 25	
R42	1006750 - 36	
R43	1006750 - 36	
R44	1010364 - 653	
R45	1010364 - 653	
R46	1010364 - 581	
R47	1010364 - 769	
R48	1006750 - 72	
R49	1006750 - 65	
R50	1010364 - 131	
R51	1010364 - 707	
R52	1006750 - 56	
R53	1010311 - 318	
R54	1006750 - 25	
R55	- 25	
R56	- 36	
R57	- 36	
R58	1006750 - 25	
R59	1010364 - 653	
R60	1010364 - 653	
R61	1010364 - 561	
R62	1010364 - 769	
R63	1006750 - 72	
R64	1006750 - 65	
R65	1010364 - 217	
R66	1010364 - 707	
R67	1006750 - 56	
R68	1010311 - 198	
R69	1006750 - 25	
R70	1006750 - 25	
R71	1006750 - 36	
R72	1006750 - 36	
R73	1010364 - 653	
R74	1010364 - 653	
R75	1010364 - 561	
R76	1010364 - 769	
R77	1006750 - 72	
R78	1006750 - 65	
R79	1010364 - 217	
R80	1010364 - 707	
R81	1006750 - 56	
R82	1010311 - 198	
R83	1006750 - 25	
R84	1006750 - 25	
R85	1006750 - 36	
R86	1006750 - 36	
R87	1006750 - 14	
R88	SEE NOTE 2	
R89	1010364 - 225	
R90	1010364 - 403	
R91	1010364 - 385	RESIST
T1	1008832	TRANS-
T2	1008842	
T3	1010323	
T4	1008832	
T5	1008842	
T6	1010323	
T7	1008832	
T8	1008842	
T9	1010323	
T10	1008832	
T11	1008842	
T12	1010323	
T13	1008832	
T14	1008842	
T15	1010323	
T16	1008832	
T17	1009842	
T18	1010323	
T19	1010466	
T20	1010466	TRANS

REVISIONS 25506						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27413	ADL	PHL		
B		REVISED PER TDRR 28563	ADL	LBB	9-1-66	
C		REVISED PER TDRR 30282	T.J.C		26 Aug 66	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 – 25	RESISTOR	510	±2%	1/4W
R2	1010364 – 653		124K	±1%	1/8W
R3	1010364 – 653		124K	±1%	1/8W
R4	1010364 – 581		52.3K	±1%	1/8W
R5	1010364 – 769		499K	±1%	1/8W
R6	1006750 – 72		47K	±2%	1/4W
R7	1006750 – 65		24K	±2%	1/4W
R8	1010364 – 217		665	±1%	1/8W
R9	1010364 – 707		237K	±1%	1/8W
R10	1006750 – 56		10K	±2%	1/4W
R11	1010311 – 306		75K	±1%	1/10W
R12	1006750 – 25		510	±2%	1/4W
R13	1006750 – 25		510	±2%	1/4W
R14	1006750 – 36		1500	±2%	1/4W
R15	1006750 – 36		1500	±2%	1/4W
R16	1010364 – 653		124K	±1%	1/8W
R17	1010364 – 653		124K	±1%	1/8W
R18	1010364 – 581		52.3K	±1%	1/8W
R19	1010364 – 769		499K	±1%	1/8W
R20	1006750 – 72		47K	±2%	1/4W
R21	1006750 – 65		24K	±2%	1/4W
R22	1010364 – 217		665	±1%	1/8W
R23	1010364 – 707		237K	±1%	1/8W
R24	1006750 – 56		10K	±2%	1/4W
R25	1010311 – 306		75K	±1%	1/10W
R26	1006750 – 25		510	±2%	1/4W
R27	1006750 – 25		510	±2%	1/4W
R28	1006750 – 36		1500	±2%	1/4W
R29	1006750 – 36		1500	±2%	1/4W
R30	1010364 – 653		124K	±1%	1/8W
R31	1010364 – 653		124K	±1%	1/8W
R32	1010364 – 581		52.3K	±1%	1/8W
R33	1010364 – 769		499K	±1%	1/8W
R34	1006750 – 72		47K	±2%	1/4W
R35	1006750 – 65		24K	±2%	1/4W
R36	1010364 – 131		191	±1%	1/8W
R37	1010364 – 707		237K	±1%	1/8W
R38	1006750 – 56		10K	±2%	1/4W
R39	1010311 – 318		100K	1%	1/10W
R40	1006750 – 25		510	±2%	1/4W
R41	1006750 – 25		510	±2%	1/4W
R42	1006750 – 36		1500	±2%	1/4W
R43	1006750 – 36		1500	±2%	1/4W
R44	1010364 – 653		124K	±1%	1/8W
R45	1010364 – 653		124K	±1%	1/8W
R46	1010364 – 581		52.3K	±1%	1/8W
R47	1010364 – 769		499K	±1%	1/8W
R48	1006750 – 72		47K	±2%	1/4W
R49	1006750 – 65		24K	±2%	1/4W
R50	1010364 – 131		191	±1%	1/8W
R51	1010364 – 707		237	±1%	1/8W
R52	1006750 – 56		10K	±2%	1/4W
R53	1010311 – 318		100K	±1%	1/10W
R54	1006750 – 25		510	±2%	1/4W
R55	– 25		510	±2%	1/4W
R56	– 36		1500	±2%	1/4W
R57	– 36		1500	±2%	1/4W
R58	1006750 – 25		510	±2%	1/4W
R59	1010364 – 653		124	±1%	1/8W
R60	1010364 – 653		124	±1%	1/8W
R61	1010364 – 581		52.3K	±1%	1/8W
R62	1010364 – 769		499K	±1%	1/8W
R63	1006750 – 72		47K	±2%	1/4W
R64	1006750 – 65		24K	±2%	1/4W
R65	1010364 – 217		665	±1%	1/8W
R66	1010364 – 707		237K	±1%	1/8W
R67	1006750 – 56		10K	±2%	1/4W
R68	1010311 – 198		56.2K	±1%	1/10W
R69	1006750 – 25		510	±2%	1/4W
R70	1006750 – 25		510	±2%	1/4W
R71	1006750 – 36		1500	±2%	1/4W
R72	1006750 – 36		1500	±2%	1/4W
R73	1010364 – 653		124K	±1%	1/8W
R74	1010364 – 653		124K	±1%	1/8W
R75	1010364 – 581		52.3K	±1%	1/8W
R76	1010364 – 769		499K	±1%	1/8W
R77	1006750 – 72		47K	±2%	1/4W
R78	1006750 – 65		24K	±2%	1/4W
R79	1010364 – 217		665	±1%	1/8W
R80	1010364 – 707		237K	±1%	1/8W
R81	1006750 – 56		10K	±2%	1/4W
R82	1010311 – 198		56.2K	±1%	1/10W
R83	1006750 – 25		510	±2%	1/4W
R84	1006750 – 25		510	±2%	1/4W
R85	1006750 – 36		1500	±2%	1/4W
R86	1006750 – 36		1500	±2%	1/8W
R87	1006750 – 14		180	±2%	1/4W
R88	SEE NOTE 2		NOM	±1%	1/10W
R89	1010364 – 225		732	±1%	1/8W
R90	1010364 – 403		6190	±1%	1/8W
R91	1010364 – 385	RESISTOR	4930	±1%	1/8W
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323				
T19	1010466				
T20	1010466	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410 – 18		1100PF	±2%	300VDC
C3	1010410 – 7		390PF	±2%	500VDC
C4	1006755 – 31		10	±10%	20VDC
C5	1006755 – 34		33		20
C6	1006755 – 69		1.0		35
C7	1006755 – 34		33		20
C8	1010279 – 16		1.9		6
C9	1010279 – 16		1.9	±10%	6
C10	1010410 – 18		1100PF	±2%	300VDC
C11	1010410 7		390PF	±2%	500VDC
C12	1006755 – 31		10	±10%	20VDC
C13	1006755 – 34		33		20
C14	1006755 – 69		1.0		35
C15	1006755 – 34		33		20
C16	1010279 – 16		1.9		6
C17	1010279 – 16		1.9	±10%	6
C18	1010410 – 18		1100PF	±2%	300VDC
C19	1010410 – 5		330PF	±2%	500VDC
C20	1006755 – 31		10	±10%	20VDC
C21	1006755 – 34		33		20
C22	1006755 – 69		1.0		35
C23	1006755 – 34		33		20
C24	1010279 – 16		1.9		6
C25	1010279 – 16		1.9	±10%	6
C26	1010410 – 18		1100PF	±2%	300VDC
C27	1010410 – 5		330PF	±2%	500VDC
C28	1006755 – 31		10	±10%	20VDC
C29	1006755 – 34		33		20
C30	1006755 – 69		1.0		35
C31	1006755 – 34		33		20
C32	1010279 – 16		1.9		6
C33	1010279 – 16		1.9		6
C34	1006755 – 134		22	±10%	50
C35	1010410 – 18		1100PF	±2%	300VDC
C36	1010410 – 7		390PF	±2%	500VDC
C37	1006755 – 31		10	±10%	20 VDC
C38	1006755 – 34		33		20
C39	1006755 – 69		1.0		35
C40	1006755 – 34		33		20
C41	1010279 – 16		1.9		6
C42	1010279 – 16		1.9	±10%	6
C43	1010410 – 18		1100PF	±2%	300VDC
C44	1010410 – 7		390PF	±2%	500VDC
C45	1006755 – 31		10	±10%	20 VDC
C46	1006755 – 34		33		20
C47	1006755 – 69		1.0		35
C48	1006755 – 34		33		20
C49	1010279 – 16		1.9		6
C50	1010279 – 16		1.9		6
C51	1006755 – 40		100		20
C52	1006755 – 4		56		6
C53	1006755 – 40		100		20
C54	1006755 – 4	CAPACITOR	56	±10%	6 VDC
~~CR1~~	~~1010837 – 001~~	~~DIODE~~	~~1N645~~		
~~CR2~~	~~– 001~~				
~~CR3~~	~~– 001~~				
~~CR4~~	~~– 001~~				
CR5	1010837-001				
CR6	1010837-001				
CR7	1010837-001		1N645		
CR8	1010259-000		1N625		
CR9	1010837 - 001	DIODE	1N645		
CR10	1008815-9	DIODE	1N965 B		
CR11	1008815-9				
CR12	1008815-9				
CR13	1008815-9	DIODE	1N965 B		
Q1	1010397 – 1	TRANSISTOR	2N930		
Q2	1010397 – 1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397 – 1	TRANSISTOR	2N930		
Q6	1010397 – 1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397 – 1	TRANSISTOR	2N930		
Q10	1010397 – 1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397 – 1	TRANSISTOR	2N930		
Q14	1010397 – 1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397 – 1	TRANSISTOR	2N930		
Q18	1010397 – 1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397 – 1	TRANSISTOR	2N930		
Q22	1010397 – 1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		

R88	
PART NO.	VALUE
1010364 – 255	1050
– 257	1070
– 259	1100
– 261	1130
– 263	1150
1010364 – 265	1180

REF DWG
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR ASSY
DWG NO. 2007240

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Lao 4 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010123
SCALE —
SHEET 4 OF

2010123 C

3/2010123

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D

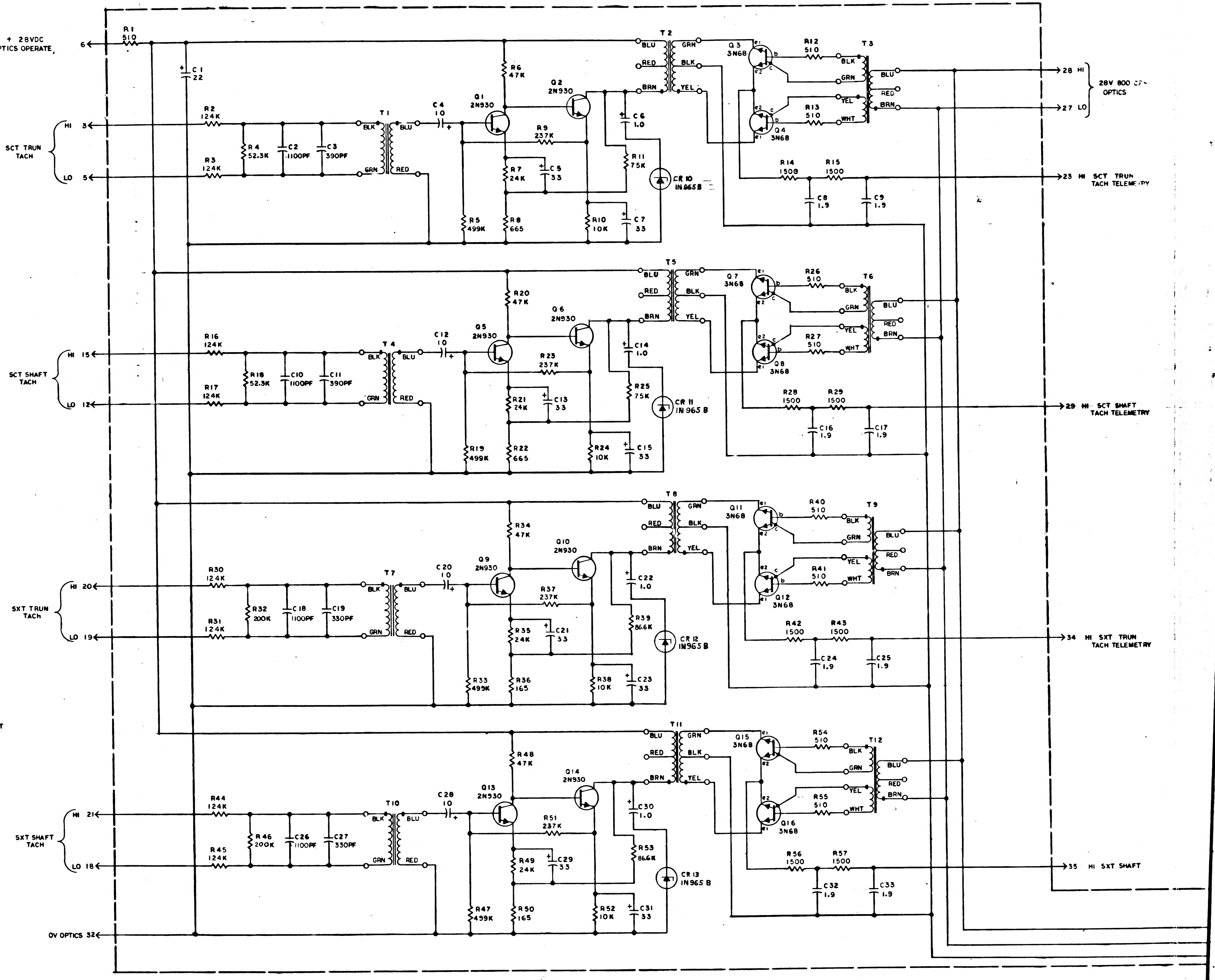
C

B

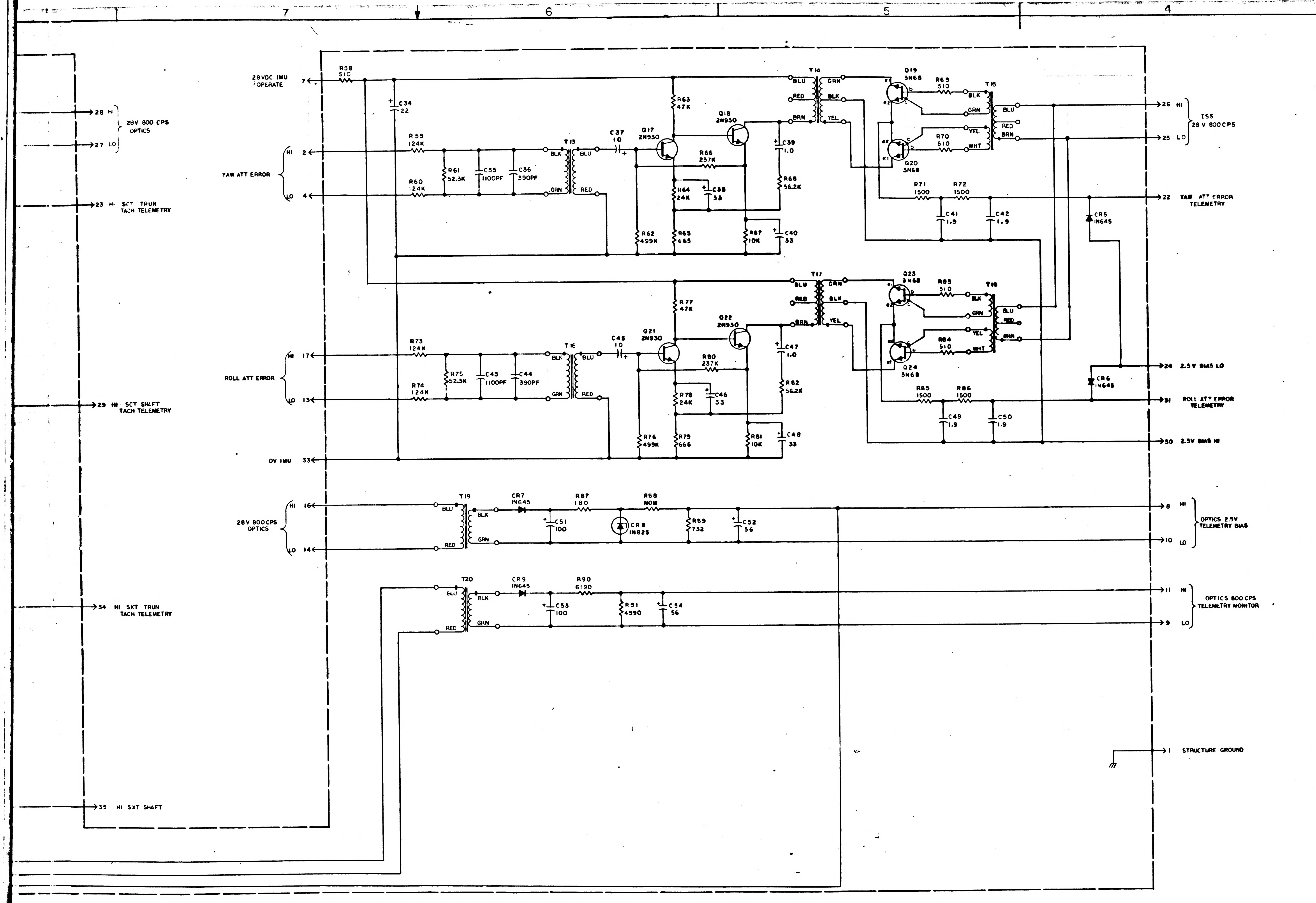
A

3H

3H


+ 28VDC
OPTICS OPERATE
6
R1 510
C1 22
SCT TRUN TACH
HI 3
LO 5
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 75K
CR10 IN965B
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 1.9
C9 1.9
28 HI
27 LO
28V 800 CPS OPTICS
23 HI SCT TRUN TACH TELEMETRY
SCT SHAFT TACH
HI 15
LO 12
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R23 237K
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 75K
CR11 IN965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 1.9
C17 1.9
29 HI SCT SHAFT TACH TELEMETRY
SXT TRUN TACH
HI 20
LO 19
R30 124K
R31 124K
R32 200K
C18 1100PF
C19 330PF
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
R35 24K
C21 33
R33 499K
R36 165
R38 10K
C23 33
C22 1.0
R39 866K
CR12 IN965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 1.9
C25 1.9
34 HI SXT TRUN TACH TELEMETRY
SXT SHAFT TACH
HI 21
LO 18
R44 124K
R45 124K
R46 200K
C26 1100PF
C27 330PF
T10
C28 10
Q13 2N930
R48 47K
Q14 2N930
R51 237K
R49 24K
C29 33
R47 499K
R50 165
R52 10K
C31 33
C30 1.0
R53 86.6K
CR13 IN965B
T11
Q15 3N68
Q16 3N68
R54 510
R55 510
T12
R56 1500
R57 1500
C32 1.9
C33 1.9
35 HI SXT SHAFT
0V OPTICS 32

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R88 PER APPLICABLE RS. FROM APPROPRIATE CHART

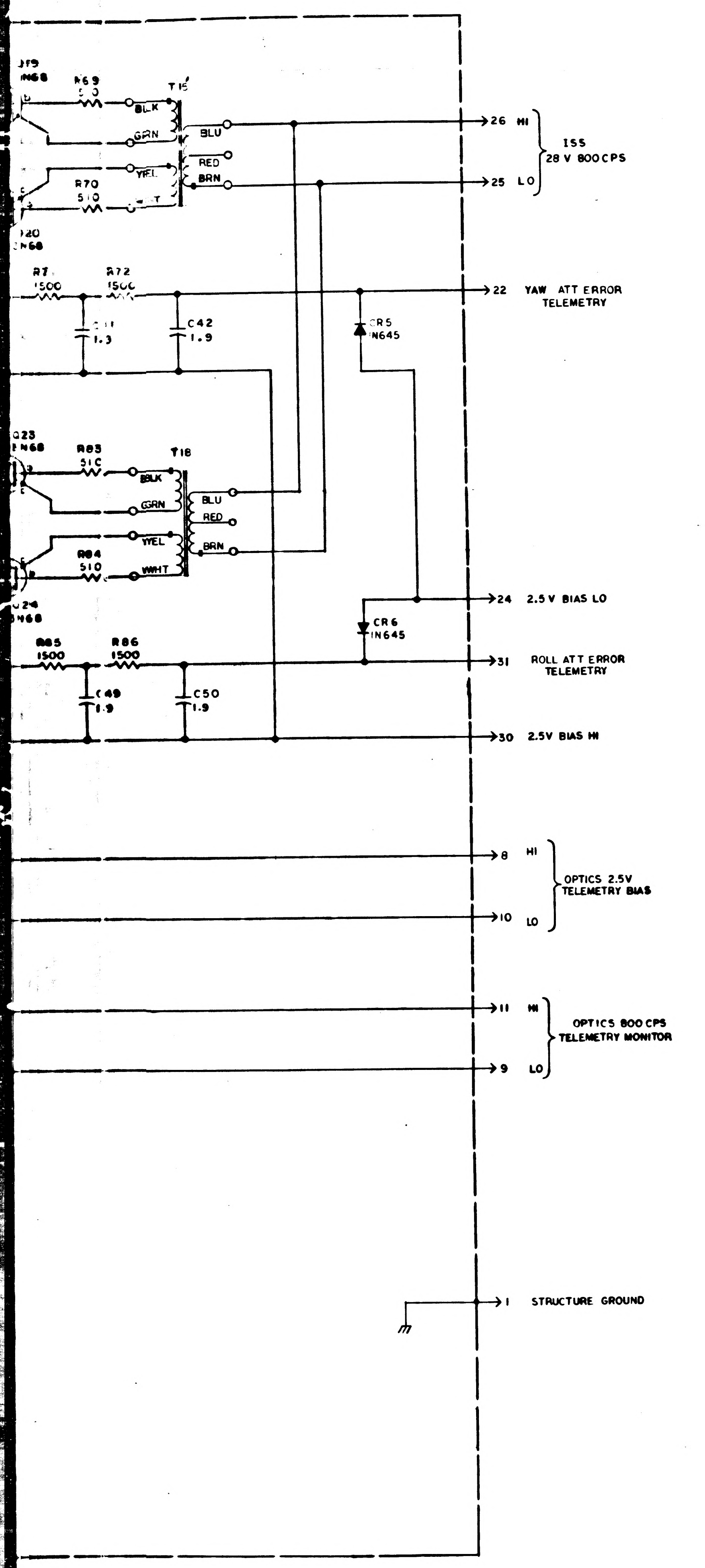

7
6
5
4
28VDC IMU
OPERATE
7
R58
510
C34
22
28 HI
28V 800 CPS
OPTICS
27 LO
23 HI SCT TRUN
TACH TELEMETRY
YAW ATT ERROR
HI 2
LO 4
R59
124K
R60
124K
R61
52.3K
C35
1100PF
C36
390PF
T13
BLK
GRN
BLU
RED
C37
10
Q17
2N930
R63
47K
Q18
2N930
R66
237K
R64
24K
C38
33
R62
499K
R65
665
R67
10K
C40
33
C39
1.0
R68
56.2K
T14
BLU
RED
BRN
GRN
BLK
YEL
Q19
3N68
R69
510
T15
BLK
GRN
YEL
WHT
R70
510
Q20
3N68
BLU
RED
BRN
26 HI
25 LO
IS5
28 V 800CPS
R71
1500
R72
1500
C41
1.9
C42
1.9
22 YAW ATT ERROR
TELEMETRY
CR5
1N645
29 HI SCT SHAFT
TACH TELEMETRY
ROLL ATT ERROR
HI 17
LO 13
R73
124K
R74
124K
R75
52.3K
C43
1100PF
C44
390PF
T16
C45
10
Q21
2N930
R77
47K
Q22
2N930
R80
237K
R78
24K
C46
33
R76
499K
R79
665
R81
10K
C48
33
C47
1.0
R82
56.2K
T17
Q23
3N68
R83
510
T18
R84
510
Q24
3N68
R85
1500
R86
1500
C49
1.9
C50
1.9
CR6
1N645
24 2.5V BIAS LO
31 ROLL ATT ERROR
TELEMETRY
30 2.5V BIAS HI
0V IMU 33
28V 800CPS
OPTICS
HI 16
LO 14
T19
BLU
RED
BLK
GRN
CR7
1N645
R87
180
R88
NOM
C51
100
CR8
1N825
R89
732
C52
56
8 HI
10 LO
OPTICS 2.5V
TELEMETRY BIAS
34 HI SXT TRUN
TACH TELEMETRY
T20
CR9
1N645
R90
6190
C53
100
R91
4990
C54
56
11 HI
9 LO
OPTICS 800 CPS
TELEMETRY MONITOR
35 HI SXT SHAFT
1 STRUCTURE GROUND
7
6
5
4

REF DES	PART NO.	RES
R1	1006750 - 25	RES
R2	1010364 - 653	
R3	1010364 - 653	
R4	1010364 - 581	
R5	1010364 - 769	
R6	1006750 - 72	
R7	1006750 - 65	
R8	1010364 - 217	
R9	1010364 - 707	
R10	1006750 - 56	
R11	1010311 - 306	
R12	1006750 - 25	
R13	1006750 - 25	
R14	1006750 - 36	
R15	1006750 - 36	
R16	1010364 - 653	
R17	1010364 - 653	
R18	1010364 - 581	
R19	1010364 - 769	
R20	1006750 - 72	
R21	1006750 - 65	
R22	1010364 - 217	
R23	1010364 - 707	
R24	1006750 - 56	
R25	1010311 - 306	
R26	1006750 - 25	
R27	1006750 - 25	
R28	1006750 - 36	
R29	1006750 - 36	
R30	1010364 - 653	
R31	1010364 - 653	
R32	1010364 - 693	
R33	1010364 - 769	
R34	1006750 - 72	
R35	1006750 - 65	
R36	1010311 - 51	
R37	1010364 - 707	
R38	1006750 - 56	
R39	1010311 - 312	
R40	1006750 - 25	
R41	1006750 - 25	
R42	1006750 - 36	
R43	1006750 - 36	
R44	1010364 - 653	
R45	1010364 - 653	
R46	1010364 - 693	
R47	1010364 - 769	
R48	1006750 - 72	
R49	1006750 - 65	
R50	1010311 - 51	
R51	1010364 - 707	
R52	1006750 - 56	
R53	1010311 - 312	
R54	1006750 - 25	
R55	- 25	
R56	- 36	
R57	- 36	
R58	1006750 - 25	
R59	1010364 - 653	
R60	1010364 - 653	
R61	1010364 - 581	
R62	1010364 - 769	
R63	1006750 - 72	
R64	1006750 - 65	
R65	1010364 - 217	
R66	1010364 - 707	
R67	1006750 - 56	
R68	1010311 - 198	
R69	1006750 - 25	
R70	1006750 - 25	
R71	1006750 - 36	
R72	1006750 - 36	
R73	1010364 - 653	
R74	1010364 - 653	
R75	1010364 - 581	
R76	1010364 - 769	
R77	1006750 - 72	
R78	1006750 - 65	
R79	1010364 - 217	
R80	1010364 - 707	
R81	1006750 - 56	
R82	1010311 - 198	
R83	1006750 - 25	
R84	1006750 - 25	
R85	1006750 - 36	
R86	1006750 - 36	
R87	1006750 - 14	
R88	SEE NOTE 2	
R89	1010364 - 225	
R90	1010364 - 403	
R91	1010364 - 385	RESIST
T1	1008832	TRANS
T2	1008842	
T3	1010323	
T4	1008832	
T5	1008842	
T6	1010323	
T7	1008832	
T8	1008842	
T9	1010323	
T10	1008832	
T11	1008842	
T12	1010323	
T13	1008832	
T14	1008842	
T15	1010323	
T16	1008832	
T17	1008842	
T18	1010323	
T19	1010466	
T20	1010466	TRANS

2010123 D

2/2010123

REVISIONS 25506						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 27413				
B		REVISED PER TDRR 28565	ADL		9-1-66	
C		REVISED PER TDRR 30282	T.J.C		24 AUG 66	
D		REVISED PER TDRR 30407	EC		SEP 66	



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 — 25	RESISTOR	510	±2%	1/4W
R2	1010364 — 653		124K	±1%	1/8W
R3	1010364 — 653		124K	±1%	1/8W
R4	1010364 — 581		52.3K	±1%	1/8W
R5	1010364 — 769		499K	±1%	1/8W
R6	1006750 — 72		47K	±2%	1/4W
R7	1006750 — 65		24K	±2%	1/4W
R8	1010364 — 217		665	±1%	1/8W
R9	1010364 — 707		237K	±1%	1/8W
R10	1006750 — 56		10K	±2%	1/4W
R11	1010311 — 306		75K	±1%	1/10W
R12	1006750 — 25		510	±2%	1/4W
R13	1006750 — 25		510	±2%	1/4W
R14	1006750 — 36		1500	±2%	1/4W
R15	1006750 — 36		1500	±2%	1/4W
R16	1010364 — 653		124K	±1%	1/8W
R17	1010364 — 653		124K	±1%	1/8W
R18	1010364 — 581		52.3K	±1%	1/8W
R19	1010364 — 769		499K	±1%	1/8W
R20	1006750 — 72		47K	±2%	1/4W
R21	1006750 — 65		24K	±2%	1/4W
R22	1010364 — 217		665	±1%	1/8W
R23	1010364 — 707		237K	±1%	1/8W
R24	1006750 — 56		10K	±2%	1/4W
R25	1010311 — 306		75K	±1%	1/10W
R26	1006750 — 25		510	±2%	1/4W
R27	1006750 — 25		510	±2%	1/4W
R28	1006750 — 36		1500	±2%	1/4W
R29	1006750 — 36		1500	±2%	1/4W
R30	1010364 — 653		124K	±1%	1/8W
R31	1010364 — 653		124K	±1%	1/8W
R32	1010364 — 693		200K	±1%	1/8W
R33	1010364 — 769		499K	±1%	1/8W
R34	1006750 — 72		47K	±2%	1/4W
R35	1006750 — 65		24K	±2%	1/4W
R36	1010311 — 51		165	±1%	1/10W
R37	1010364 — 707		237K	±1%	1/8W
R38	1006750 — 56		10K	±2%	1/4W
R39	1010311 — 312		86.6K	1%	1/10W
R40	1006750 — 25		510	±2%	1/4W
R41	1006750 — 25		510	±2%	1/4W
R42	1006750 — 36		1500	±2%	1/4W
R43	1006750 — 36		1500	±2%	1/4W
R44	1010364 — 653		124K	±1%	1/8W
R45	1010364 — 653		124K	±1%	1/8W
R46	1010364 — 693		200K	±1%	1/8W
R47	1010364 — 769		499K	±1%	1/8W
R48	1006750 — 72		47K	±2%	1/4W
R49	1006750 — 65		24K	±2%	1/4W
R50	1010311 — 51		165	±1%	1/10W
R51	1010364 — 707		237	±1%	1/8W
R52	1006750 — 56		10K	±2%	1/4W
R53	1010311 — 312		86.6K	±1%	1/10W
R54	1006750 — 25		510	±2%	1/4W
R55	— 25		510	±2%	1/4W
R56	— 36		1500	±2%	1/4W
R57	— 36		1500	±2%	1/4W
R58	1006750 — 25		510	±2%	1/4W
R59	1010364 — 653		124	±1%	1/8W
R60	1010364 — 653		124	±1%	1/8W
R61	1010364 — 581		52.3K	±1%	1/8W
R62	1010364 — 769		499K	±1%	1/8W
R63	1006750 — 72		47K	±2%	1/4W
R64	1006750 — 65		24K	±2%	1/4W
R65	1010364 — 217		665	±1%	1/8W
R66	1010364 — 707		237K	±1%	1/8W
R67	1006750 — 56		10K	±2%	1/4W
R68	1010311 — 198		56.2K	±1%	1/10W
R69	1006750 — 25		510	±2%	1/4W
R70	1006750 — 25		510	±2%	1/4W
R71	1006750 — 36		1500	±2%	1/4W
R72	1006750 — 36		1500	±2%	1/4W
R73	1010364 — 653		124K	±1%	1/8W
R74	1010364 — 653		124K	±1%	1/8W
R75	1010364 — 581		52.3K	±1%	1/8W
R76	1010364 — 769		499K	±1%	1/8W
R77	1006750 — 72		47K	±2%	1/4W
R78	1006750 — 65		24K	±2%	1/4W
R79	1010364 — 217		665	±1%	1/8W
R80	1010364 — 707		237K	±1%	1/8W
R81	1006750 — 56		10K	±2%	1/4W
R82	1010311 — 198		56.2K	±1%	1/10W
R83	1006750 — 25		510	±2%	1/4W
R84	1006750 — 25		510	±2%	1/4W
R85	1006750 — 36		1500	±2%	1/4W
R86	1006750 — 36		1500	±2%	1/8W
R87	1006750 — 14		180	±2%	1/4W
R88	SEE NOTE 2		NOM	±1%	1/10W
R89	1010364 — 225		732	±1%	1/8W
R90	1010364 — 403		6190	±1%	1/8W
R91	1010364 — 385	RESISTOR	4990	±1%	1/8W
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323				
T19	1010466				
T20	1010466	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755 — 134	CAPACITOR	22	±10%	50VDC
C2	1010410 — 18		1100PF	±2%	300VDC
C3	1010410 — 7		390PF	±2%	500VDC
C4	1006755 — 31		10	±10%	20VDC
C5	1006755 — 34		33		20
C6	1006755 — 69		1.0		35
C7	1006755 — 34		33		20
C8	1010279 — 16		1.9		6
C9	1010279 — 16		1.9	±10%	6
C10	1010410 — 18		1100PF	±2%	300VDC
C11	1010410 — 7		390PF	±2%	500VDC
C12	1006755 — 31		10	±10%	20VDC
C13	1006755 — 34		33		20
C14	1006755 — 69		1.0		35
C15	1006755 — 34		33		20
C16	1010279 — 16		1.9		6
C17	1010279 — 16		1.9	±10%	6
C18	1010410 — 18		1100PF	±2%	300VDC
C19	1010410 — 5		330PF	±2%	500VDC
C20	1006755 — 31		10	±10%	20VDC
C21	1006755 — 34		33		20
C22	1006755 — 69		1.0		35
C23	1006755 — 34		33		20
C24	1010279 — 16		1.9		6
C25	1010279 — 16		1.9	±10%	6
C26	1010410 — 18		1100PF	±2%	300VDC
C27	1010410 — 5		330PF	±2%	500VDC
C28	1006755 — 31		10	±10%	20VDC
C29	1006755 — 34		33		20
C30	1006755 — 69		1.0		35
C31	1006755 — 34		33		20
C32	1010279 — 16		1.9		6
C33	1010279 — 16		1.9		6
C34	1006755 — 134		22	±10%	50
C35	1010410 — 18		1100PF	±2%	300VDC
C36	1010410 — 7		390PF	±2%	500VDC
C37	1006755 — 31		10	±10%	20VDC
C38	1006755 — 34		33		20
C39	1006755 — 69		1.0		35
C40	1006755 — 34		33		20
C41	1010279 — 16		1.9		6
C42	1010279 — 16		1.9	±10%	6
C43	1010410 — 18		1100PF	±2%	300VDC
C44	1010410 — 7		390PF	±2%	500VDC
C45	1006755 — 31		10	±10%	20VDC
C46	1006755 — 34		33		20
C47	1006755 — 69		1.0		35
C48	1006755 — 34		33		20
C49	1010279 — 16		1.9		6
C50	1010279 — 16		1.9		6
C51	1006755 — 40		100		20
C52	1006755 — 4		56		6
C53	1006755 — 40		100		20
C54	1006755 — 4	CAPACITOR	56	±10%	6 VDC
~~CR1~~	~~1010837 — 001~~	~~DIODE~~	~~1N645~~		
~~CR2~~	~~— 001~~				
~~CR3~~	~~— 001~~				
~~CR4~~	~~— 001~~				
CR5	1010837 — 001				
CR6	1010837 — 001				
CR7	1010837 — 001		IN645		
CR8	1010259 — 000		IN825		
CR9	1010837 — 001	DIODE	IN645		
CR10	1008815 — 9	DIODE	IN965 B		
CR11	1008815 — 9				
CR12	1008815 — 9				
CR13	1008815 — 9	DIODE	IN965 B		
Q1	1010397 — 1	TRANSISTOR	2N930		
Q2	1010397 — 1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397 — 1	TRANSISTOR	2N930		
Q6	1010397 — 1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397 — 1	TRANSISTOR	2N930		
Q10	1010397 — 1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397 — 1	TRANSISTOR	2N930		
Q14	1010397 — 1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397 — 1	TRANSISTOR	2N930		
Q18	1010397 — 1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397 — 1	TRANSISTOR	2N930		
Q22	1010397 — 1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		

R88	
PART NO.	VALUE
1010364 — 255	1050
— 257	1070
— 259	1100
— 261	1130
— 263	1150
1010364 — 265	1180

REF DWG
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR ASSY
DWG NO. 2007240

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. D. Lee 4 JAN 66
CHECKED 17 Jan 66
APPROVED 19 Jan 66
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

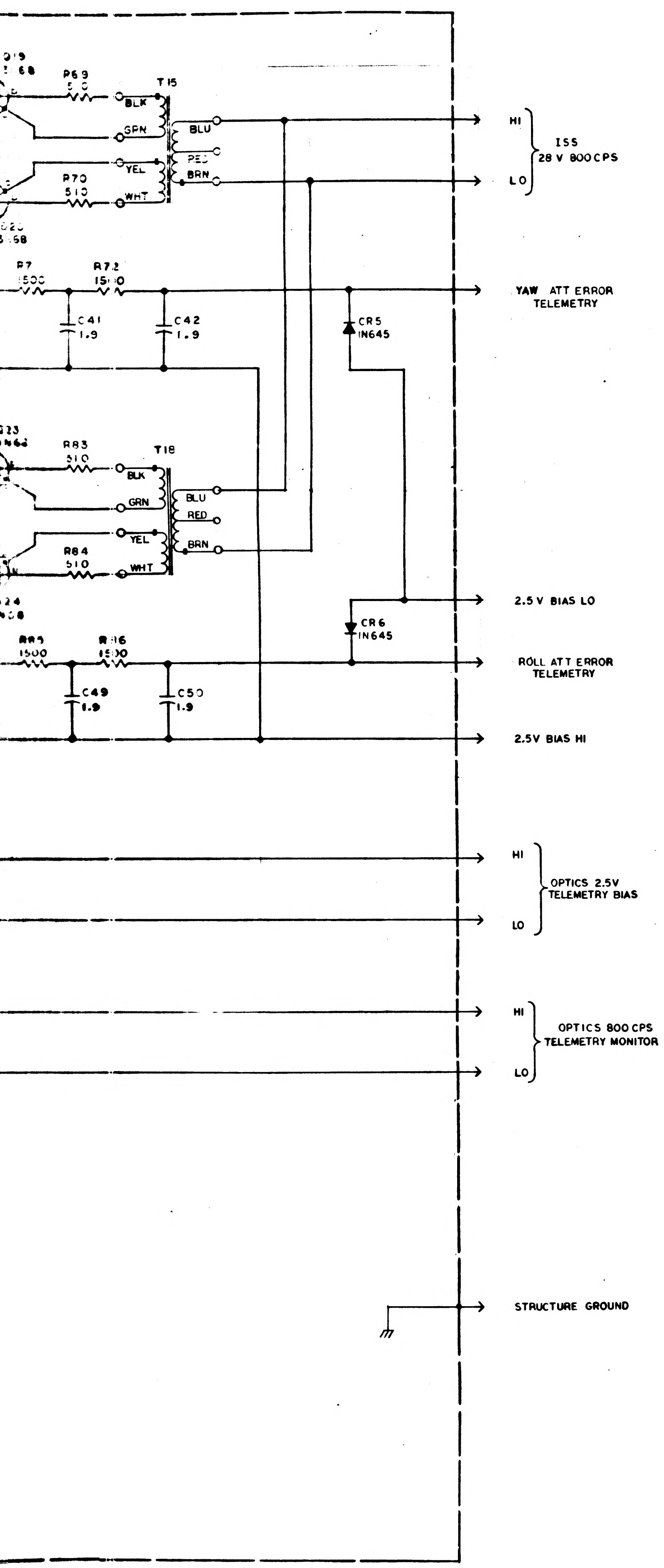
SCHEMATIC
SIGNAL CONDITIONER OPTICS & ATTITUDE ERROR

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010123
SCALE —
SHEET 1 OF 1

2010123 D

3-2010123

REVISIONS 25506						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750 -25	RESISTOR	510	±2%	1/4W
R2	1010364 - 769		499K	±1%	1/8W
R3	1010364 - 769		499K	±1%	1/8W
R4	1010364 - 693		200K	±1%	1/8W
R5	1010364 - 769		499K	±1%	1/8W
R6	1006750 - 72		47K	±2%	1/4W
R7	1006750 - 65		24K	±2%	1/4W
R8	1010364 - 185		453	±1%	1/8W
R9	1010364 - 707		237K	±1%	1/8W
R10	1006750 - 56		10K	±2%	1/4W
R11	SEE NOTE 2		NOM	±1%	1/10W
R12	1006750 - 25		510	±2%	1/4W
R13	1006750 - 25		510	±2%	1/4W
R14	1006750 - 36		1500	±2%	1/4W
R15	1006750 - 36		1500	±2%	1/4W
R16	1010364 - 769		499K	±1%	1/8W
R17	1010364 - 769		499K	±1%	1/8W
R18	1010364 - 693		200K	±1%	1/8W
R19	1010364 - 769		499K	±1%	1/8W
R20	1006750 - 72		47K	±2%	1/4W
R21	1006750 - 65		24K	±2%	1/4W
R22	1010364 - 185		453	±1%	1/8W
R23	1010364 - 707		237K	±1%	1/8W
R24	1006750 - 56		10K	±2%	1/4W
R25	SEE NOTE 2		NOM	±1%	1/10W
R26	1006750 - 25		510	±2%	1/4W
R27	1006750 - 25		510	±2%	1/4W
R28	1006750 - 36		1500	±2%	1/4W
R29	1006750 - 36		1500	±2%	1/4W
R30	1010364 - 769		499K	±1%	1/8W
R31	1010364 - 769		499K	±1 %	1/8W
R32	1010364 - 693		200K	±1 %	1/8W
R33	1010364 - 769		499K	±1%	1/8W
R34	1006750 - 72		47K	±2%	1/4W
R35	1006750 - 65		24K	±2%	1/4W
R36	1010364 - 1		49.9	±1%	1/8W
R37	1010364 - 707		237K	±1%	1/8W
R38	1006750 - 56		10K	±2%	1/4W
R39	SEE NOTE 2		NOM	1%	1/10W
R40	1006750 - 25		510	±2%	1/4W
R41	1006750 - 25		510	±2%	1/4W
R42	1006750 - 36		1500	±2%	1/4W
R43	1006750 - 36		1500	±2%	1/4W
R44	1010364 - 769		499K	±1%	1/8W
R45	1010364 - 769		499K	±1%	1/8W
R46	1010364 - 693		200K	±1%	1/8W
R47	1010364 - 769		499K	±1%	1/8W
R48	1006750 - 72		47K	±2%	1/4W
R49	1006750 - 65		24K	±2%	1/4W
R50	1010364 - 1		49.9	±1%	1/8W
R51	1010364 - 707		237	±1%	1/8W
R52	1006750 - 56		10K	±2%	1/4W
R53	SEE NOTE 2		NOM	±1%	1/10W
R54	1006750 - 25		510	±2%	1/4W
R55	- 25		510	±2%	1/4W
R56	- 36		1500	±2%	1/4W
R57	- 36		1500	±2%	1/4W
R58	1006750 - 25		510	±2%	1/4W
R59	1010364 - 653		124	±1%	1/8W
R60	1010364 - 653		124	±1%	1/8W
R61	1010311 - 291		52.3K	±1%	1/10W
R62	1010364 - 769		499K	±1%	1/8W
R63	1006750 - 72		47K	±2%	1/4W
R64	1006750 - 65		24K	±2%	1/4W
R65	1010311 - 109		665	±1%	1/10W
R66	1010364 - 707		237K	±1%	1/8W
R67	1006750 - 56		10K	±2%	1/4W
R68	SEE NOTE 2		NOM	±1%	1/10W
R69	1006750 - 25		510	±2%	1/4W
R70	1006750 - 25		510	±2%	1/4W
R71	1006750 - 36		1500	±2%	1/4W
R72	1006750 - 36		1500	±2%	1/4W
R73	1010364 - 653		124 K	±1%	1/8W
R74	1010364 - 653		124 K	±1%	1/8W
R75	1010311 - 291		52.3K	±1%	1/10W
R76	1010364 - 769		499K	±1%	1/8W
R77	1006750 - 72		47K	±2%	1/4W
R78	1006750 - 65		24K	±2%	1/4W
R79	1010311 - 291		665	±1%	1/10W
R80	1010364 - 707		237K	±1%	1/8W
R81	1006750 - 56		10K	±2%	1/4W
R82	SEE NOTE 2		NOM	±1%	1/10W
R83	1006750 - 25		510	±2%	1/4W
R84	1006750 - 25		510	±2%	1/4W
R85	1006750 - 36		1500	±2%	1/4W
R86	1006750 - 36		1500	±2%	1/8W
R87	SEE NOTE 2		NOM	±1%	1/8W
R88	SEE NOTE 2		NOM	±1%	1/10W
R89	1010364 -225		732	±1 %	1/8W
R90	1010364 -421		7680	±1 %	1/8W
R91	1010364 -385	RESISTOR	4990	±1%	1/8W
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1008832				
T11	1008842				
T12	1010323				
T13	1008832				
T14	1008842				
T15	1010323				
T16	1008832				
T17	1008842				
T18	1010323				
T19	1010466				
T20	1010466	TRANSFORMER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410 - 9		470UUF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755 - 31		10	±10%	20VDC
C5	1006755 - 34		33		20
C6	1006755 - 69		1.0		35
C7	1006755 - 34		33		20
C8	1010279 - 16		1.9		6
C9	1010279 - 16		1.9	±10%	6
C10	1010410 - 9		470UUF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755 - 31		10	±10%	20 VDC
C13	1006755 - 34		33		20
C14	1006755 - 69		1.0		35
C15	1006755 - 34		33		20
C16	1010279 - 16		1.9		6
C17	1010279 - 16		1.9	±10%	6
C18	1010410 - 9		470 UUF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755 - 31		10	±10%	20 VDC
C21	1006755 - 34		33		20
C22	1006755 - 69		1.0		35
C23	1006755 - 34		33		20
C24	1010279 - 16		1.9		6
C25	1010279 - 16		1.9	±10%	6
C26	1010410 - 9		470UUF	±2%	500VDC
C27	SEE NOTE 2		NOM	±2%	
C28	1006755 - 31		10	±10%	20 VDC
C29	1006755 - 34		33		20
C30	1006755 - 69		1.0		35
C31	1006755 - 34		33		20
C32	1010279 - 16		1.9		6
C33	1010279 - 16		1.9		6
C34	1006755 - 89		47	±10%	35
C35	1010410 - 9		470UUF	±2%	500VDC
C36	SEE NOTE 2		NOM.	±2%	
C37	1006755 - 31		10	±10%	20 VDC
C38	1006755 - 34		33		20
C39	1006755 - 69		1.0		35
C40	1006755 - 34		33		20
C41	1010279 - 16		1.9		6
C42	1010279 - 16		1.9	±10%	6
C43	1010410 - 9		470UUF	±2%	500VDC
C44	SEE NOTE 2		NOM	±2%	
C45	1006755 - 31		10	±10%	20 VDC
C46	1006755 - 34		33		20
C47	1006755 - 69		1.0		35
C48	1006755 - 34		33		20
C49	1010279 - 16		1.9		6
C50	1010279 - 16		1.9		6
C51	1006755 - 40		100		20
C52	1006755 - 4		56		6
C53	1006755 - 40		100		20
C54	1006755 - 4	CAPACITOR	56	±10%	6 VDC
CR1	1010837 - 001	DIODE	IN645		
CR2	- 001				
CR3	- 001				
CR4	- 001				
CR5	- 001				
CR6	- 001				
CR7	1010837 - 001		IN645		
CR8	1010259 - 000		IN825		
CR9	1010837 - 001	DIODE	IN645		
Q1	1010397 - 1	TRANSISTOR	2N930		
Q2	1010397 - 1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397 - 1	TRANSISTOR	2N930		
Q6	1010397 - 1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397 - 1	TRANSISTOR	2N930		
Q10	1010397 - 1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010397 - 1	TRANSISTOR	2N930		
Q14	1010397 - 1	TRANSISTOR	2N930		
Q15	1010367	CHOPPER	3N68		
Q16	1010367	CHOPPER	3N68		
Q17	1010397 - 1	TRANSISTOR	2N930		
Q18	1010397 - 1	TRANSISTOR	2N930		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397 - 1	TRANSISTOR	2N930		
Q22	1010397 - 1	TRANSISTOR	2N930		
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		

C3, C11, C19, C27, C36, C44		
PART NO.	VALUE	RATING
1010410 -1	220UUF	500VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500VDC
-11	560	300VDC
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410 -19	1200UUF	300 VDC

R11, R25, R39, R53, R68, R82	
PART NO.	VALUE
1010311-296	59.0 K
-297	60.4 K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8 K
-304	71.5 K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311 - 314	90.9K

R87	
PART NO.	VALUE
1010364 - 51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364 - 133	243

R88	
PART NO.	VALUE
1010364 - 255	1050
- 257	1070
- 259	1100
- 261	1130
- 263	1150
1010364 - 265	1180

31

REF DWG
OPTICS ASEMBLY DWG NO.

2010123

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

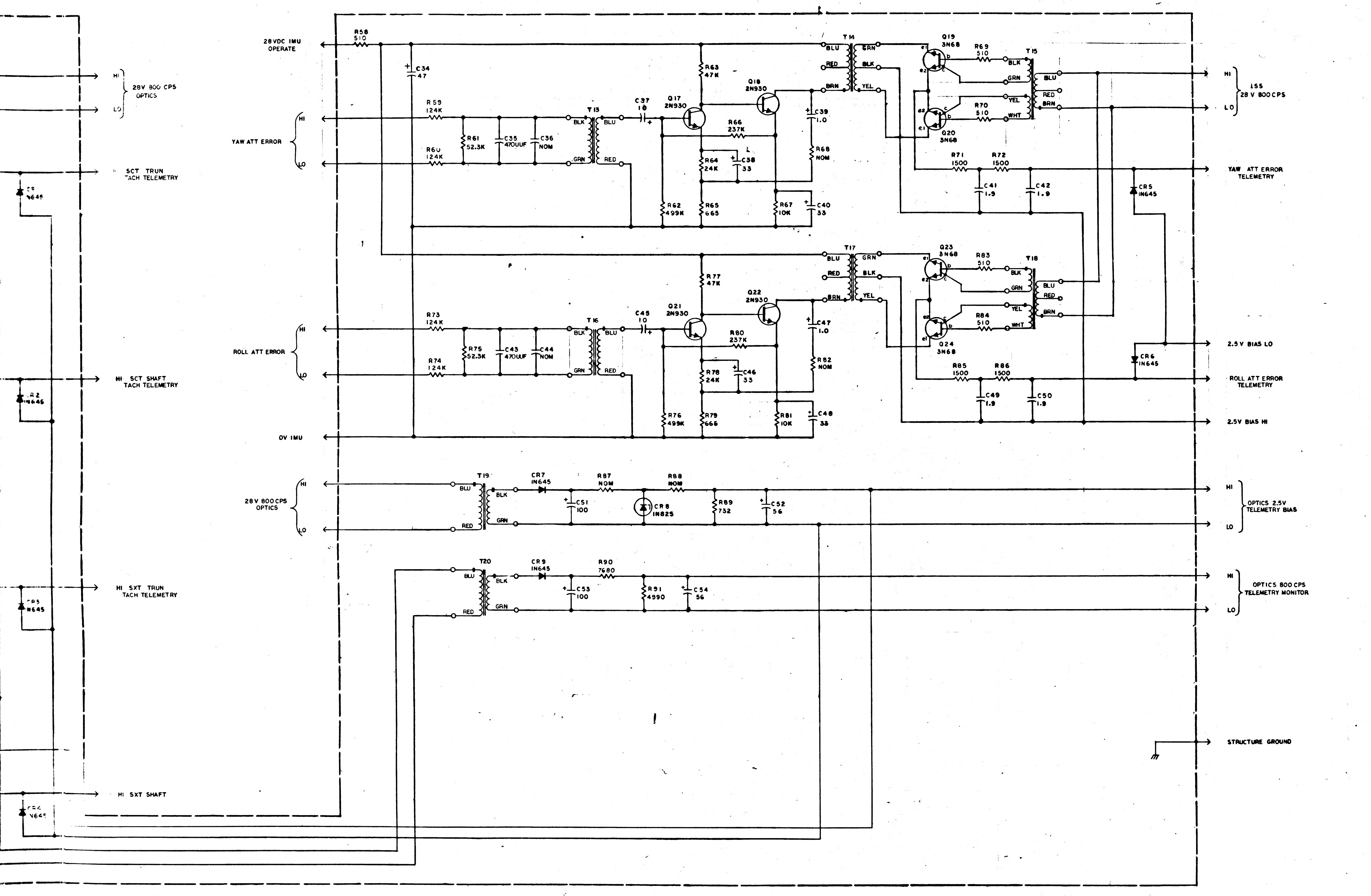
DRAWN A. D. Lee 4 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
OPTICS & ATTITUDE ERROR
SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010123
SCALE —
SHEET 1 OF 1

MASTER


28VDC IMU OPERATE
R58 510
C34 47
28V 800 CPS OPTICS
HI
LO
YAW ATT ERROR
R59 124K
R60 124K
R61 52.3K
C35 470UUF
C36 NOM
T13
BLK
BLU
GRN
RED
C37 10
Q17 2N930
R63 47K
Q18 2N930
R66 237K
R64 24K
C38 33
R62 499K
R65 665
R67 10K
C40 33
C39 1.0
R68 NOM
T14
BLU
RED
BRN
GRN
BLK
YEL
Q19 3N68
Q20 3N68
R69 510
R70 510
T15
BLK
GRN
YEL
WHT
BLU
RED
BRN
15S 28 V 800 CPS
R71 1500
R72 1500
C41 1.9
C42 1.9
YAW ATT ERROR TELEMETRY
CR5 1N645
SCT TRUN TACH TELEMETRY
CR 1N645
T17
Q23 3N68
R83 510
T18
R77 47K
Q22 2N930
ROLL ATT ERROR
R73 124K
R74 124K
R75 52.3K
C43 470UUF
C44 NOM
T16
C45 10
Q21 2N930
R80 237K
R78 24K
C46 33
R82 NOM
C47 1.0
R76 499K
R79 665
R81 10K
C48 33
Q24 3N68
R84 510
R85 1500
R86 1500
C49 1.9
C50 1.9
2.5 V BIAS LO
CR6 1N645
ROLL ATT ERROR TELEMETRY
2.5V BIAS HI
HI SCT SHAFT TACH TELEMETRY
CR2 1N645
0V IMU
28V 800CPS OPTICS
T19
CR7 1N645
R87 NOM
R88 NOM
C51 100
CR8 1N825
R89 732
C52 56
OPTICS 2.5V TELEMETRY BIAS
HI SXT TRUN TACH TELEMETRY
CR3 1N645
T20
CR9 1N645
R90 7680
C53 100
R91 4990
C54 56
OPTICS 800 CPS TELEMETRY MONITOR
STRUCTURE GROUND
HI SXT SHAFT
CR4 1N645

REF DES	PART NO.	DESCRIPTION
R1	1006750 — 25	RESISTOR
R2	1010364 — 769	
R3	1010364 — 769	
R4	1010364 — 693	
R5	1010364 — 739	
R6	1006750 — 72	
R7	1006750 — 65	
R8	1010364 — 83	
R9	1010364 — 707	
R10	1006750 — 56	
R11	SEE NOTE 2	
R12	1006750 — 25	
R13	1006750 — 25	
R14	1006750 — 36	
R15	1006750 — 36	
R16	1010364 — 769	
R17	1010364 — 769	
R18	1010364 — 693	
R19	1010364 — 769	
R20	1006750 — 72	
R21	1006750 — 65	
R22	1010364 — 89	
R23	1010364 — 707	
R24	1006750 — 56	
R25	SEE NOTE 2	
R26	1006750 — 25	
R27	1006750 — 25	
R28	1006750 — 36	
R29	1006750 — 36	
R30	1010364 — 769	
R31	1010364 — 769	
R32	1010364 — 693	
R33	1010364 — 769	
R34	1006750 — 72	
R35	1006750 — 65	
R36	1010364 — 1	
R37	1010364 — 707	
R38	1006750 — 56	
R39	SEE NOTE 2	
R40	1006750 — 25	
R41	1006750 — 25	
R42	1006750 — 36	
R43	1006750 — 36	
R44	1010364 — 769	
R45	1010364 — 769	
R46	1010364 — 693	
R47	1010364 — 769	
R48	1006750 — 72	
R49	1006750 — 65	
R50	1010364 — 1	
R51	1010364 — 70	
R52	1006750 — 56	
R53	SEE NOTE 2	
R54	1006750 — 25	
R55	— 25	
R56	— 36	
R57	— 36	
R58	1006750 — 25	
R59	1010364 — 65	
R60	1010364 — 65	
R61	1010311 — 29	
R62	1010364 — 76	
R63	1006750 — 72	
R64	1006750 — 65	
R65	1010311 — 10	
R66	1010364 — 70	
R67	1006750 — 56	
R68	SEE NOTE 2	
R69	1006750 — 25	
R70	1006750 — 25	
R71	1006750 — 36	
R72	1006750 — 36	
R73	1010364 — 65	
R74	1010364 — 65	
R75	1010311 — 29	
R76	1010364 — 76	
R77	1006750 — 72	
R78	1006750 — 65	
R79	1010311 — 29	
R80	1010364 — 70	
R81	1006750 — 56	
R82	SEE NOTE 2	
R83	1006750 — 25	
R84	1006750 — 25	
R85	1006750 — 36	
R86	1006750 — 36	
R87	SEE NOTE 2	
R88	SEE NOTE 2	
R89	1010364 — 22	
R90	1010364 — 421	
R91	1010364 — 38	RESISTOR
T1	1008832	TRANSFORMER
T2	1008842	
T3	1010323	
T4	1008832	
T5	1008842	
T6	1010323	
T7	1008832	
T8	1008842	
T9	1010323	
T10	1008832	
T11	1008842	
T12	1010323	
T13	1008832	
T14	1008842	
T15	1010323	
T16	1008832	
T17	1008842	
T18	1010323	
T19	1010466	
T20	1010466	TRANSFORMER

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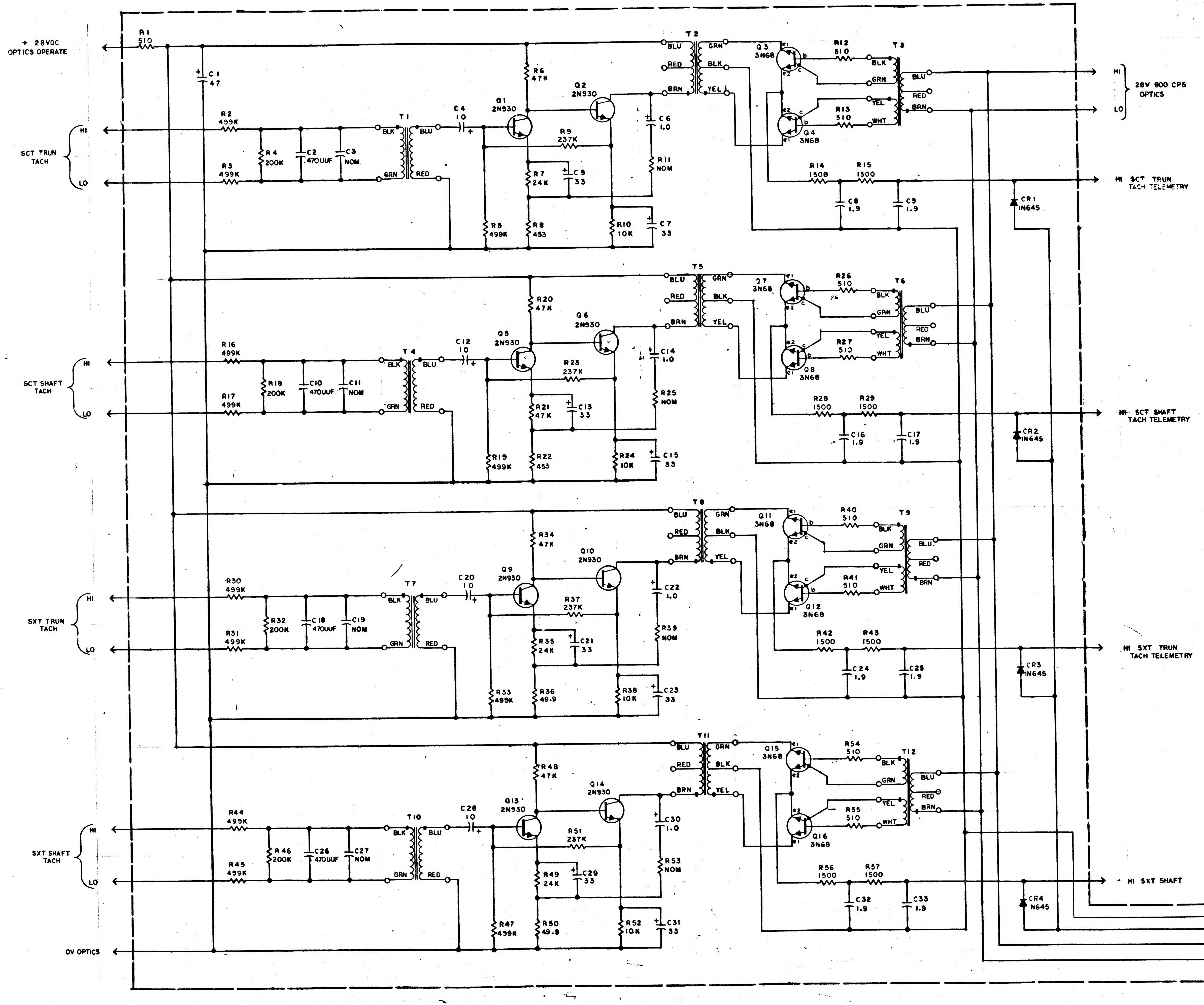
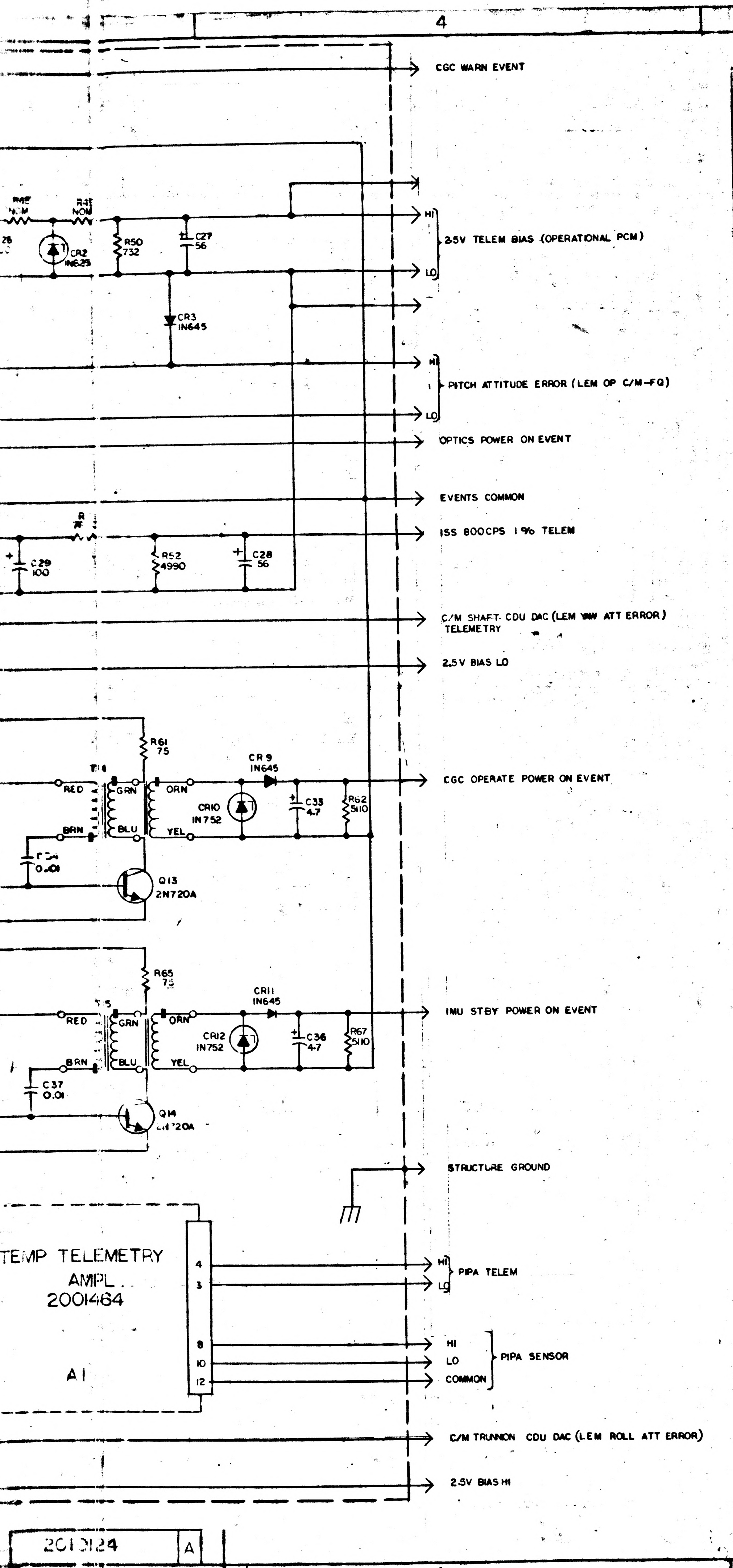

+ 28VDC
OPTICS OPERATE
R1
510
C1
47
SCT TRUN
TACH
HI
LO
R2
499K
R3
499K
R4
200K
C2
470UUF
C3
NOM
T1
BLK
BLU
GRN
RED
C4
10
Q1
2N930
R6
47K
Q2
2N930
R9
237K
R7
24K
C5
33
R5
499K
R8
453
R10
10K
C6
1.0
R11
NOM
C7
33
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3
3N68
Q4
3N68
R12
510
R13
510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
HI
LO
28V 800 CPS
OPTICS
R14
1500
R15
1500
C8
1.9
C9
1.9
CR1
IN645
HI SCT TRUN
TACH TELEMETRY
SCT SHAFT
TACH
R16
499K
R17
499K
R18
200K
C10
470UUF
C11
NOM
T4
C12
10
Q5
2N930
R20
47K
Q6
2N930
R23
237K
R21
47K
C13
33
R19
499K
R22
453
R24
10K
C14
1.0
R25
NOM
C15
33
T5
Q7
3N68
Q8
3N68
R26
510
R27
510
T6
R28
1500
R29
1500
C16
1.9
C17
1.9
CR2
IN645
HI SCT SHAFT
TACH TELEMETRY
SXT TRUN
TACH
R30
499K
R31
499K
R32
200K
C18
470UUF
C19
NOM
T7
C20
10
Q9
2N930
R34
47K
Q10
2N930
R37
237K
R35
24K
C21
33
R33
499K
R36
49.9
R38
10K
C22
1.0
R39
NOM
C23
33
T8
Q11
3N68
Q12
3N68
R40
510
R41
510
T9
R42
1500
R43
1500
C24
1.9
C25
1.9
CR3
IN645
HI SXT TRUN
TACH TELEMETRY
SXT SHAFT
TACH
R44
499K
R45
499K
R46
200K
C26
470UUF
C27
NOM
T10
C28
10
Q13
2N930
R48
47K
Q14
2N930
R51
237K
R49
24K
C29
33
R47
499K
R50
49.9
R52
10K
C30
1.0
R53
NOM
C31
33
T11
Q15
3N68
Q16
3N68
R54
510
R55
510
T12
R56
1500
R57
1500
C32
1.9
C33
1.9
CR4
IN645
HI SXT SHAFT
0V OPTICS
YAW ATT ER
ROLL ATT

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRECRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R53, R68, R82, R87, R88, C3, C11, C19, C27, C36 AND C44 PER APPLICABLE PS FROM APPROPRIATE CHART

2010123


CGC WARN EVENT
2.5V TELEM BIAS (OPERATIONAL PCM)
HI
LO
R50 732
C27 56
CR2 IN625
CR3 IN645
PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
OPTICS POWER ON EVENT
EVENTS COMMON
ISS 800CPS 1% TELEM
C29 100
R52 4990
C28 56
C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY
2.5V BIAS LO
R61 75
T4
RED
GRN
ORN
BRN
BLU
YEL
CR9 IN645
CR10 IN752
C33 4.7
R62 5110
CGC OPERATE POWER ON EVENT
C34 0.01
Q13 2N720A
R65 75
T5
CR11 IN645
CR12 IN752
C36 4.7
R67 5110
IMU STBY POWER ON EVENT
C37 0.01
Q14 2N720A
STRUCTURE GROUND
TEMP TELEMETRY AMPL 2001464
A1
4
3
8
10
12
PIPA TELEM
PIPA SENSOR
HI
LO
COMMON
C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR)
2.5V BIAS HI
2010124 A

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEF NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470 PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-187		464		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210		1/8W
R61	-35		75		
R62	-387		5110		
R63	-35		75		
R64	-267		1210		
R65	1010364-35		75		1/8W
R66	1010363-787		619K		1/4W
R67	1010364-387	RESISTOR	5110	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-29		0.01	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-29	CAPACITCR	0.01	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-12		IN752		
CR11	1010837-001		IN645		
CR12	1010372-12	DIODE	IN752		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R53	
PART NO.	VALUE
1010364-589	57.6K
-591	59.0K
-593	60.4K
-595	61.9K
-597	63.4K
-599	64.9K
-601	66.5K
-603	68.1K
-605	69.8K
-607	71.5K
-609	73.2K
-611	75.0K
-613	76.8K
-615	78.7K
-617	80.6K
-619	82.5K
-621	84.4K
-623	86.6K
-625	88.7K
-627	90.9K
-629	93.1K
-631	95.3K
-633	97.6K
-635	100.0K
-637	102.0K
-639	105.0K
-641	107.0K
-643	110.0K
-645	113.0K
-647	115.0K
-649	118.0K
-651	121.0K
-653	124.0K
-655	127.0K
-657	130.0K
-659	133.0K
-661	137.0K
-663	140.0K
-665	143.0K
-667	147.0K
1010364-669	150.0K

R48	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REVISIONS 25505

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028				

3H

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS ASSY
DWG NO.

E3

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

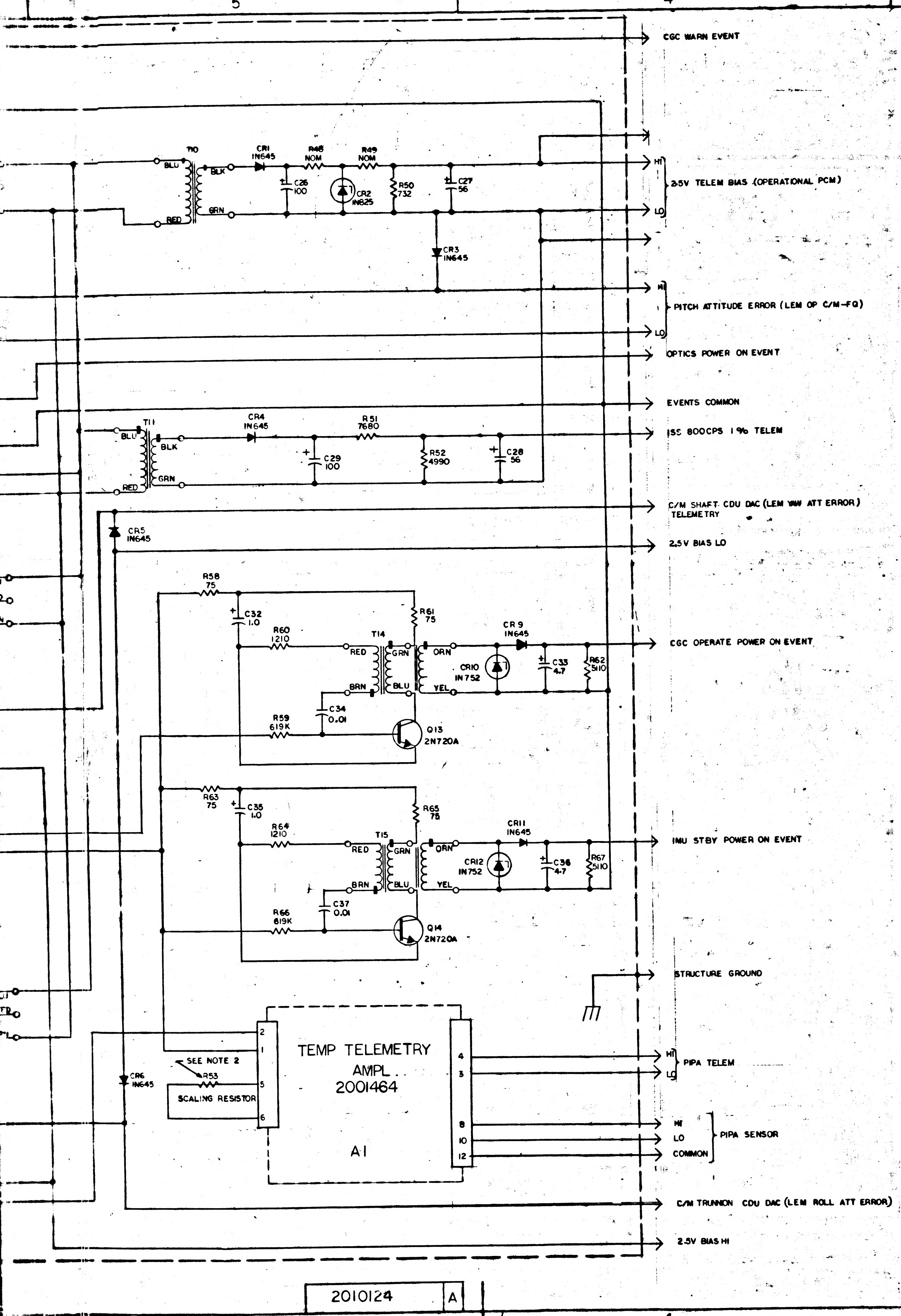
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5V BIAS

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010124

SCALE — SHEET 1 OF 1

2010124 A


CGC WARN EVENT
T10
BLU
BLK
RED
GRN
CR1 1N645
R48 NOM
R49 NOM
C26 100
CR2 1N825
R50 732
C27 56
HI
2.5V TELEM BIAS (OPERATIONAL PCM)
LO
CR3 1N645
HI
PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
LO
OPTICS POWER ON EVENT
EVENTS COMMON
T11
CR4 1N645
R51 7680
C29 100
R52 4990
C28 56
ISS 800CPS 1% TELEM
C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY
CR5 1N645
2.5V BIAS LO
R58 75
C32 1.0
R61 75
R60 1210
T14
RED
GRN
ORN
BRN
BLU
YEL
CR9 1N645
CR10 1N752
C33 4.7
R62 5110
CGC OPERATE POWER ON EVENT
C34 0.01
R59 619K
Q13 2N720A
R63 75
C35 1.0
R65 75
R64 1210
T15
CR11 1N645
CR12 1N752
C36 4.7
R67 5110
IMU STBY POWER ON EVENT
R66 619K
C37 0.01
Q14 2N720A
STRUCTURE GROUND
SEE NOTE 2
R53
SCALING RESISTOR
CR6 1N645
TEMP TELEMETRY AMPL. 2001464
A1
PIPA TELEM
PIPA SENSOR
COMMON
C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR)
2.5V BIAS HI
2010124
A

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470 PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010259-000		1N825		
CR3	1010837-001		1N645		
CR4	1010837-001		1N645		
CR5	1010837-001		1N645		
CR6	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-187		464		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210		1/8W
R61	-35		75		
R62	-387		5110		
R63	-35		75		
R64	-267		1210		
R65	1010364-35		75		1/8W
R66	1010363-787		619K		1/4W
R67	1010364-387	RESISTOR	5110	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-29		0.01	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-29	CAPACITOR	0.01	±10%	200VDC
CR7	1010837-001	DIODE	1N645		
CR8	1010837-001		1N645		
CR9	1010837-001		1N645		
CR10	1010372-12		1N752		
CR11	1010837-001		1N645		
CR12	1010372-12	DIODE	1N752		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R53	
PART NO.	VALUE
1010364-589	57.6K
-591	59.0K
-593	60.4K
-595	61.9K
-597	63.4K
-599	64.9K
-601	66.5K
-603	68.1K
-605	69.8K
-607	71.5K
-609	73.2K
-611	75.0K
-613	76.8K
-615	78.7K
-617	80.6K
-619	82.5K
-621	84.4K
-623	86.6K
-625	88.7K
-627	90.9K
-629	93.1K
-631	95.3K
-633	97.6K
-635	100.0K
-637	102.0K
-639	105.0K
-641	107.0K
-643	110.0K
-645	113.0K
-647	115.0K
-649	118.0K
-651	121.0K
-653	124.0K
-655	127.0K
-657	130.0K
-659	133.0K
-661	137.0K
-663	140.0K
-665	143.0K
-667	147.0K
1010364-669	150.0K

R48	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5 V BIAS ASSY
DWG NO.

SYM	ZONE	DESC	
A		REVISED PER	RR 26018

E2

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
—

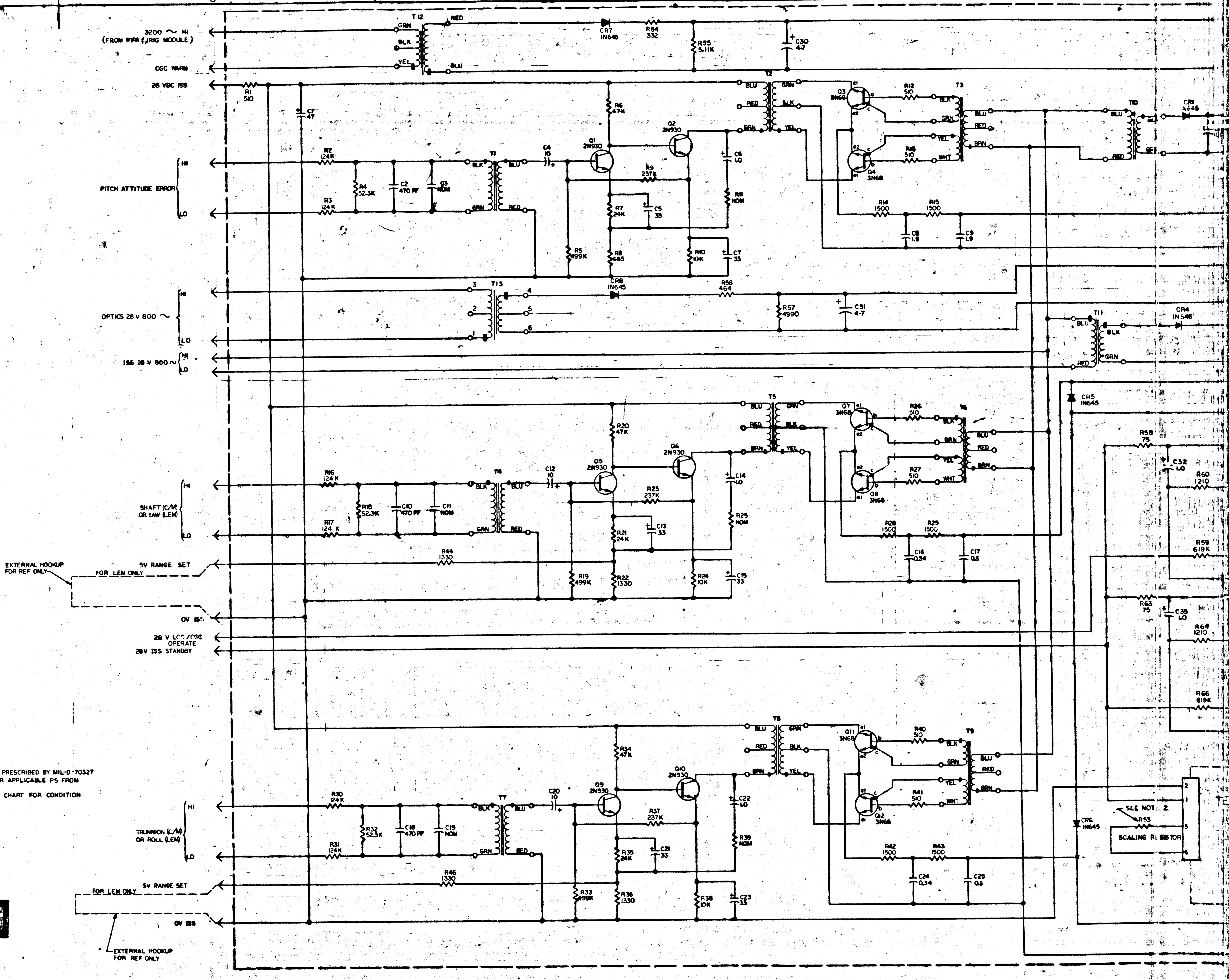
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPA

SCHE
SIGNAL C
D/C PIPA TEM

8(230 J

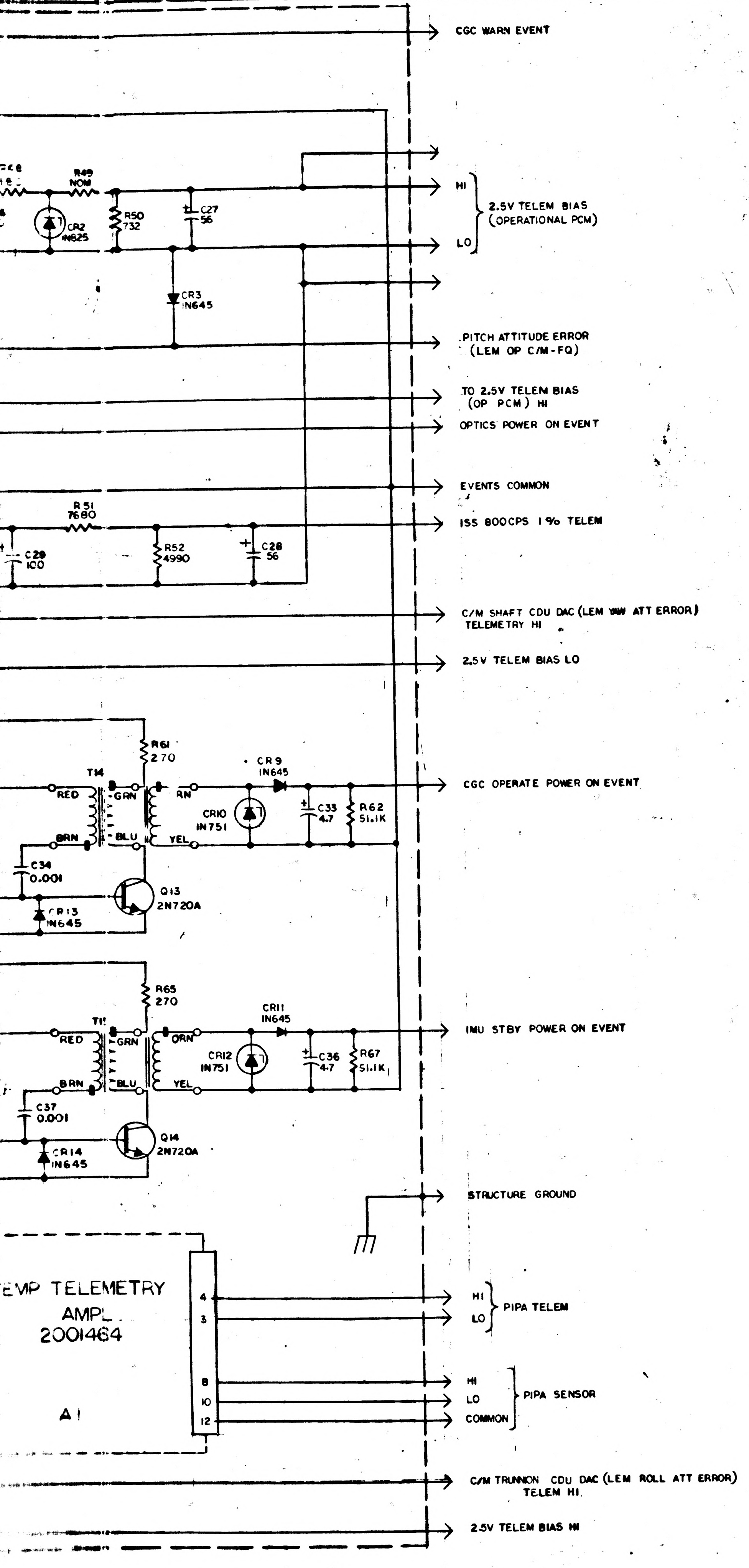

3200 ~ HI (FROM PIPA / IRIG MODULE)
CGC WARN
28 VDC ISS
PITCH ATTITUDE ERROR
HI
LO
OPTICS 28 V 800 ~
HI
LO
ISS 28 V 800 ~
HI
LO
SHAFT (C/M) OR YAW (LEM)
HI
LO
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET
0V ISS
28 V LCC / CGC OPERATE
28V ISS STANDBY
TRUNNION (C/M) OR ROLL (LEM)
HI
LO
FOR LEM ONLY
5V RANGE SET
0V ISS
EXTERNAL HOOKUP FOR REF ONLY
T12
GRN
BLK
YEL
RED
BLU
CR7 1N645
R54 332
R55 5.11K
C30 4.7
R1 510
C1 47
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
R12 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R18 510
Q4 3N68
R14 1500
R15 1500
C8 1.9
C9 1.9
T10
BLU
RED
CR1 1N645
R2 124K
R3 124K
R4 52.3K
C2 470 PF
C3 NOM
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
C6 1.0
R11 NOM
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
T13
3
2
1
4
5
6
CR8 1N645
R56 464
R57 4990
C31 4.7
T11
BLU
RED
BLK
GRN
CR4 1N645
CR5 1N645
R58 75
C32 1.0
R60 1210
R59 619K
T5
BLU
RED
BRN
GRN
BLK
YEL
Q7 3N68
R26 510
T6
BLK
GRN
YEL
WHT
BLU
RED
BRN
R27 510
Q8 3N68
R28 1500
R29 1500
C16 0.34
C17 0.5
R16 124K
R17 124 K
R18 52.3K
C10 470 PF
C11 NOM
T4
BLK
GRN
BLU
RED
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
C14 1.0
R25 NOM
R21 24K
C13 33
R19 499K
R22 1330
R24 10K
C15 33
R44 1330
R63 75
C35 1.0
R64 1210
R66 619K
T8
BLU
RED
BRN
GRN
BLK
YEL
Q11 3N68
R40 510
T9
BLK
GRN
YEL
WHT
BLU
RED
BRN
R41 510
Q12 3N68
R42 1500
R43 1500
C24 0.34
C25 0.5
R30 124K
R31 124K
R32 52.3K
C18 470 PF
C19 NOM
T7
BLK
GRN
BLU
RED
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
C22 1.0
R39 NOM
R35 24K
C21 33
R33 499K
R36 1330
R38 10K
C23 33
R46 1330
CR6 1N645
SEE NOTE 2
R53
SCALING RESISTOR
2
3
5
6
9
8
7
6
5
D
C
B
A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R48, R49, C3, C11 AND C19 PER APPLICABLE PS FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE PS FROM APPROPRIATE CHART FOR CONDITION ACCEL ±2.5°F AS MARKED ON AMPLIFIER 2001464

F-1

2010124	A

REV	REVISIONS 25505					
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028				WR
B		REVISED PER TDRR 26611	BDV			WR


CGC WARN EVENT
R49 NOM
CR2 IN825
R50 732
C27 56
HI
LO
2.5V TELEM BIAS (OPERATIONAL PCM)
CR3 IN645
PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
TO 2.5V TELEM BIAS (OP PCM) HI
OPTICS POWER ON EVENT
EVENTS COMMON
R51 7680
ISS 800CPS 1% TELEM
C29 100
R52 4990
C28 56
C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
2.5V TELEM BIAS LO
R61 270
T14
RED
GRN
BRN
BLU
RN
YEL
CR9 IN645
CR10 IN751
C33 4.7
R62 51.1K
CGC OPERATE POWER ON EVENT
C34 0.001
Q13 2N720A
CR13 IN645
R65 270
T15
RED
GRN
BRN
BLU
ORN
YEL
CR11 IN645
CR12 IN751
C36 4.7
R67 51.1K
IMU STBY POWER ON EVENT
C37 0.001
Q14 2N720A
CR14 IN645
STRUCTURE GROUND
EMP TELEMETRY AMPL 2001464
A1
4
3
HI
LO
PIPA TELEM
8
10
12
HI
LO
COMMON
PIPA SENSOR
C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
2.5V TELEM BIAS HI
B

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470 PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270.	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R53
1008878-093 THRU 1008878-214

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP, 2.5 BIAS AND EVENTS
DWG NO- 2007233

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

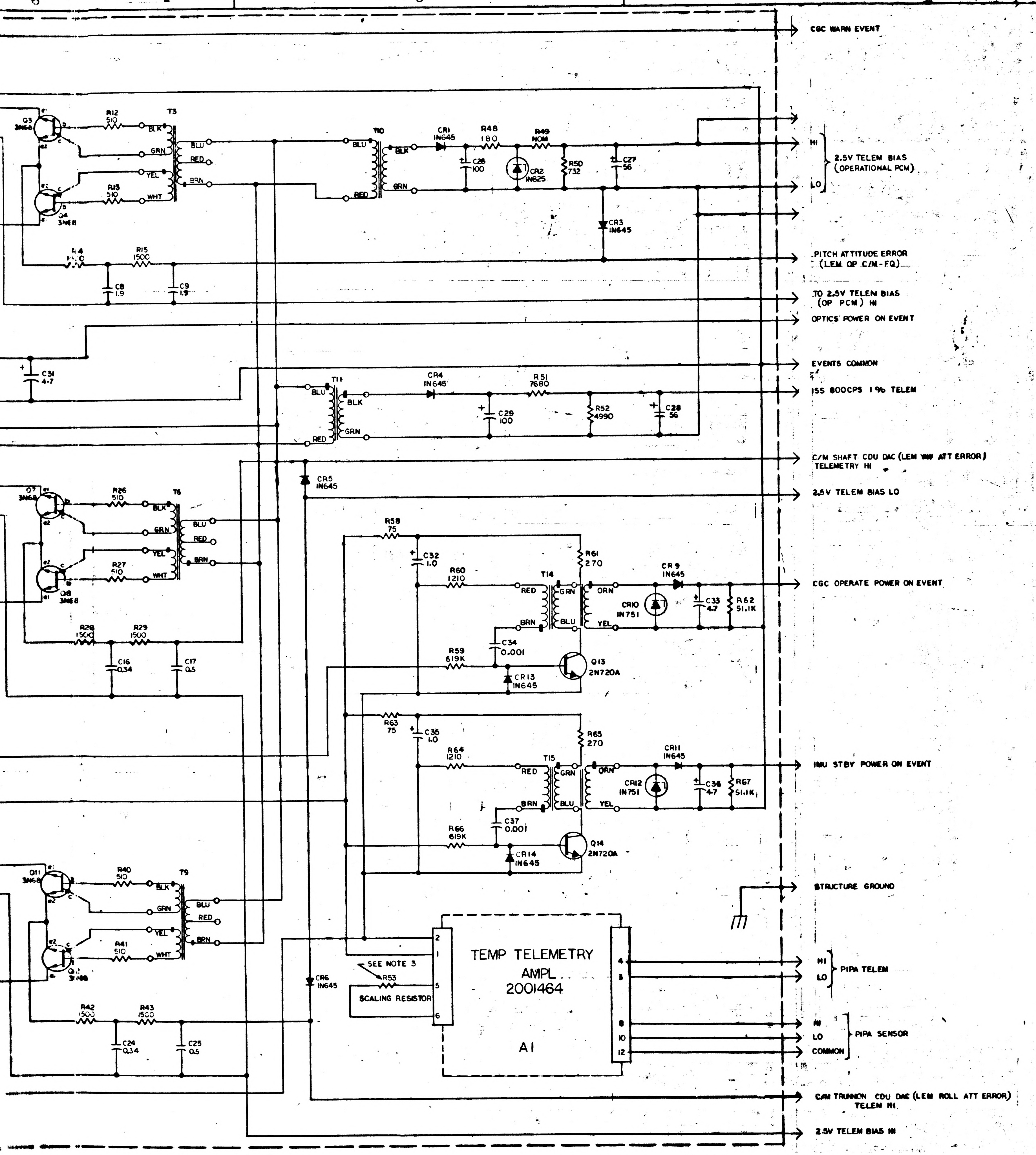
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT 1-25-66
APPROVED MSC A. C. METZGER
DATE

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5V BIAS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE —
SHEET 1 OF 1

2010124 B


Q3 3N68
R12 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R13 510
Q4 3N68
R14
R15 1500
C8 1.9
C9 1.9
C31 4.7
T10
CR1 1N645
R48 180
R49 NOM
C26 100
CR2 1N825
R50 732
C27 56
CR3 1N645
T11
CR4 1N645
R51 7680
C29 100
R52 4990
C28 56
CR5 1N645
Q7 3N68
R26 510
T6
R27 510
Q8 3N68
R28 1500
R29 1500
C16 0.34
C17 0.5
R58 75
C32 1.0
R61 270
R60 1210
T14
CR9 1N645
CR10 1N751
C33 4.7
R62 51.1K
C34 0.001
R59 619K
CR13 1N645
Q13 2N720A
R63 75
C35 1.0
R65 270
R64 1210
T15
CR11 1N645
CR12 1N751
C36 4.7
R67 51.1K
C37 0.001
R66 619K
CR14 1N645
Q14 2N720A
Q11 3N68
R40 510
T9
R41 510
Q12 3N68
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR
TEMP TELEMETRY AMPL. 2001464
A1
R42 1500
R43 1500
C24 0.34
C25 0.5
CGC WARN EVENT
HI
LO
2.5V TELEM BIAS (OPERATIONAL PCM)
PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
TO 2.5V TELEM BIAS (OP PCM) HI
OPTICS POWER ON EVENT
EVENTS COMMON
ISS 800CPS 1% TELEM
C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
2.5V TELEM BIAS LO
CGC OPERATE POWER ON EVENT
IMU STBY POWER ON EVENT
STRUCTURE GROUND
HI
LO
PIPA TELEM
HI
LO
COMMON
PIPA SENSOR
C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
2.5V TELEM BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20 VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470 PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010259-000		1N825		
CR3	1010837-001		1N645		
CR4	1010837-001		1N645		
CR5	1010837-001		1N645		
CR6	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	1N645		
CR8	1010837-001		1N645		
CR9	1010837-001		1N645		
CR10	1010372-11		1N751		
CR11	1010837-001		1N645		
CR12	1010372-11		1N751		
CR13	1010837-001		1N645		
CR14	1010837-001	DIODE	1N645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R53
1008878 - 093 THRU 1008878 - 214

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

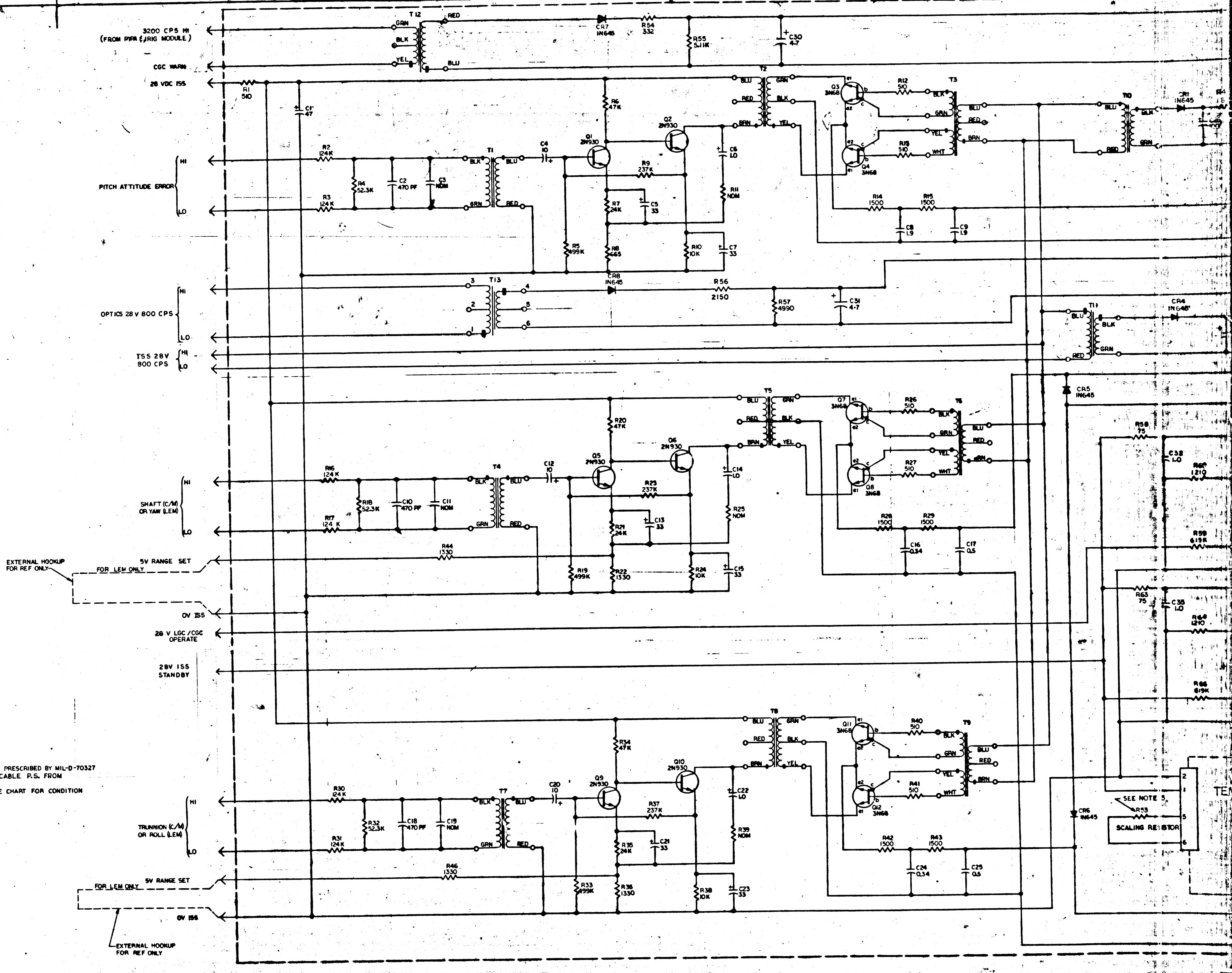
REF DWG:
DAC PIPA
DWG NO. 3

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANG
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY	USED ON
APPLICATION	

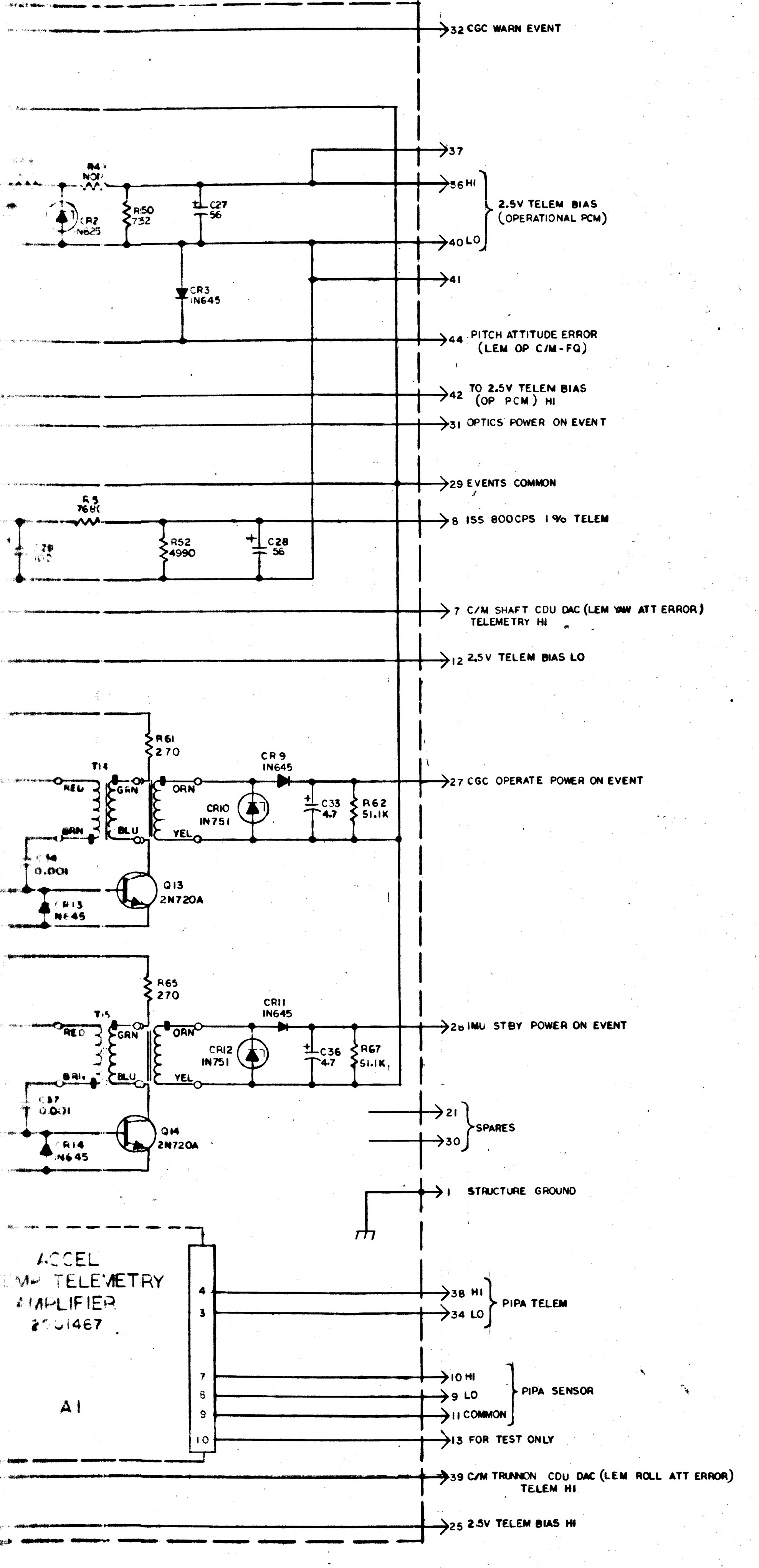
2010124 B


3200 CPS HI (FROM PIPA (JRIG MODULE)
CGC WARN
28 VDC ISS
PITCH ATTITUDE ERROR
HI
LO
OPTICS 28 V 800 CPS
TSS 28V 800 CPS
SHAFT (C/M) OR YAW (LEM)
5V RANGE SET
FOR LEM ONLY
EXTERNAL HOOKUP FOR REF ONLY
0V ISS
28 V LGC/CGC OPERATE
28V ISS STANDBY
TRUNNION (C/M) OR ROLL (LEM)
0V ISS
T12
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T13
Q1 2N930
Q2 2N930
Q3 3N68
Q4 3N68
Q5 2N930
Q6 2N930
Q7 3N68
Q8 3N68
Q9 2N930
Q10 2N930
Q11 3N68
Q12 3N68
CR1 1N645
CR4 1N645
CR5 1N645
CR6 1N645
CR7 1N645
CR8 1N645
R1 510
R2 124K
R3 124K
R4 52.3K
R5 499K
R6 47K
R7 24K
R8 665
R9 237K
R10 10K
R11 NOM
R12 510
R13 510
R14 1500
R15 1500
R16 124K
R17 124K
R18 52.3K
R19 499K
R20 47K
R21 24K
R22 1330
R23 237K
R24 10K
R25 NOM
R26 510
R27 510
R28 1500
R29 1500
R30 124K
R31 124K
R32 52.3K
R33 499K
R34 47K
R35 24K
R36 1330
R37 237K
R38 10K
R39 NOM
R40 510
R41 510
R42 1500
R43 1500
R44 1330
R46 1330
R54 332
R55 5.11K
R56 2150
R57 4990
R58 75
R60 1210
R63 75
R64 1210
R59 619K
R65 619K
C1 47
C2 470 PF
C3 NOM
C4 10
C5 33
C6 1.0
C7 33
C8 1.9
C9 1.9
C10 470 PF
C11 NOM
C12 10
C13 33
C14 1.0
C15 33
C16 0.34
C17 0.5
C18 470 PF
C19 NOM
C20 10
C21 33
C22 1.0
C23 33
C24 0.34
C25 0.5
C30 4.7
C31 4.7
C32 1.0
C35 1.0
BLU
GRN
RED
BLK
YEL
BRN
WHT
SEE NOTE 3
R53
SCALING RESISTOR
TEM
9
8
7
6
5
D
C
B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R49, C3 C11 & C19 PER APPLICABLE P.S. FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE PS FROM APPROPRIATE CHART FOR CONDITION ACCEL ±2.5°F AS MARKED ON AMPLIFIER 2001464

2010124 B


32 CGC WARN EVENT
37
R4 NOM
CR2 IN825
R50 732
C27 56
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
CR3 IN645
41
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
R51 7680
R52 4990
C28 56
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
R61 270
CR9 IN645
T14
RED
GRN
ORN
BLU
YEL
BRN
CR10 IN751
C33 4.7
R62 51.1K
27 CGC OPERATE POWER ON EVENT
C34 0.001
CR13 IN645
Q13 2N720A
R65 270
CR11 IN645
T15
CR12 IN751
C36 4.7
R67 51.1K
26 IMU STBY POWER ON EVENT
C37 0.001
CR14 IN645
Q14 2N720A
21
30
SPARES
1 STRUCTURE GROUND
ACCEL
TELEMETRY
AMPLIFIER
2001467
A1
4
3
7
8
9
10
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±.1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20 VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

REVISIONS 25505

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028				WK
B		REVISED PER TDRR 26611				WK
C		REVISED PER TDRR 27412				WK

R53
1008878 - 093 THRU 1008878 - 214

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP, 2.5 BIAS AND EVENTS
DWG NO. 2007233

MASTER

3H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

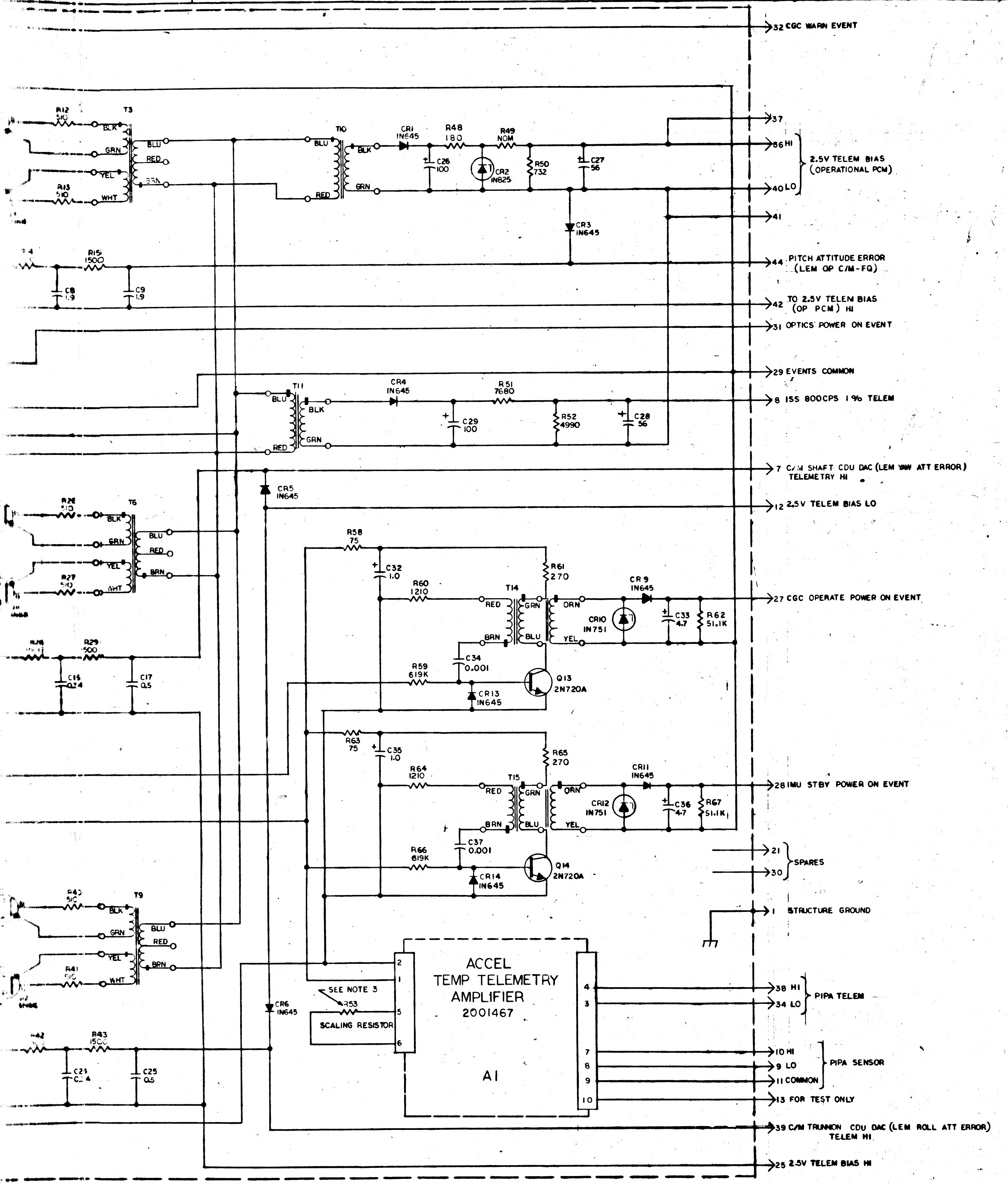
DRAWN
CHECKED
APPROVED
APPROVED

APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER DAC PIPA TEMP AND 2.5 V BIAS

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010124
SCALE —— | SHEET 1 OF 1


32 CGC WARN EVENT
37
36 HI
2.5V TELEM BIAS (OPERATIONAL PCM)
40 LO
41
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
27 CGC OPERATE POWER ON EVENT
28 IMU STBY POWER ON EVENT
21
30
SPARES
1 STRUCTURE GROUND
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI
ACCEL TEMP TELEMETRY AMPLIFIER 2001467
A1
SEE NOTE 3
R53
SCALING RESISTOR
T3
T10
T11
T6
T14
T15
T9
R12 510
R13 510
R15 1500
C8 1.9
C9 1.9
CR1 IN645
R48 180
R49 NOM
C26 100
CR2 IN825
R50 732
C27 56
CR3 IN645
CR4 IN645
R51 7680
C29 100
R52 4990
C28 56
CR5 IN645
R26 510
R27 510
R58 75
C32 1.0
R61 270
R60 1210
CR9 IN645
CR10 IN751
C33 4.7
R62 51.1K
C34 0.001
R59 619K
CR13 IN645
Q13 2N720A
R29 1500
C16 0.34
C17 0.5
R63 75
C35 1.0
R65 270
R64 1210
CR11 IN645
CR12 IN751
C36 4.7
R67 51.1K
C37 0.001
R66 619K
CR14 IN645
Q14 2N720A
R40 510
R41 510
CR6 IN645
R43 1500
C24 0.34
C25 0.5
BLK
GRN
YEL
WHT
BLU
RED
BRN
ORN

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20 VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

R53
1008873 - 093 THRU 1008878 - 214

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF D[illegible]
CA[illegible] TEMP, 2.5 [illegible]
DWG NO 2007233

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING

MATERIAL

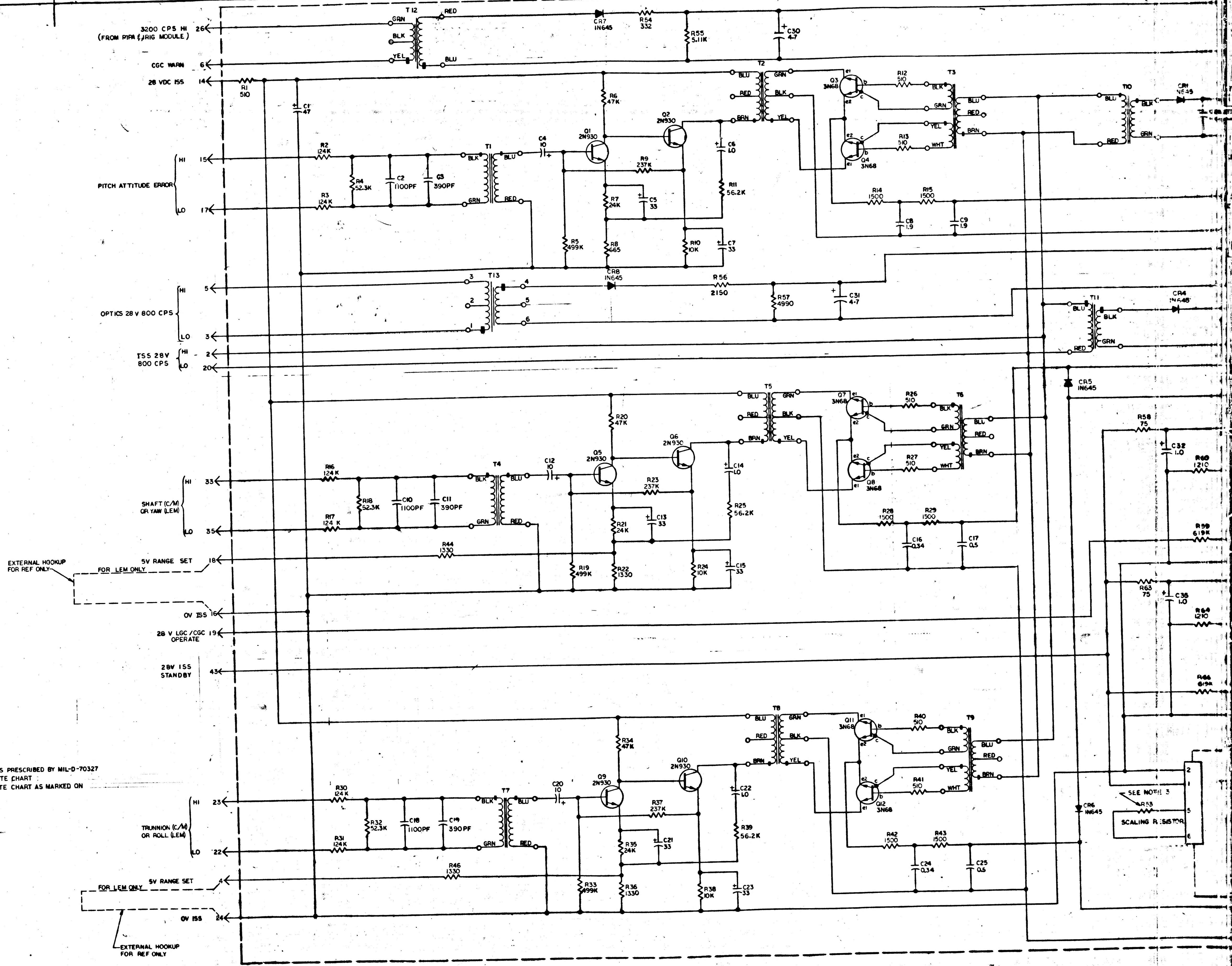
NEXT ASSY	USED ON
APPLICATION	

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT

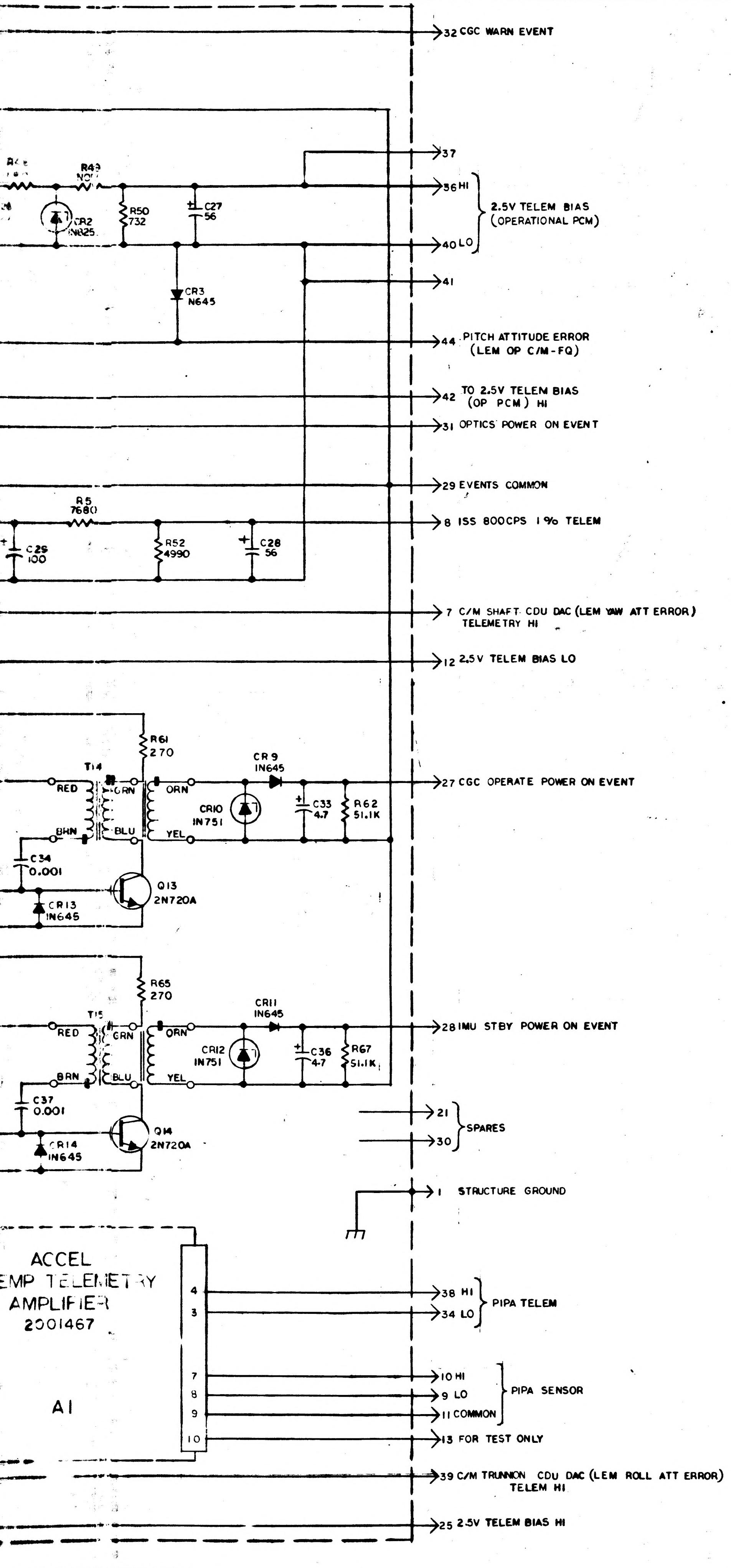
MASTER

2010124 C

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15 LO 17
OPTICS 28 V 800 CPS HI 5 LO 3
ISS 28V 800 CPS HI 2 LO 20
SHAFT (C/M) OR YAW (LEM) HI 33 LO 35
5V RANGE SET 18
FOR LEM ONLY
EXTERNAL HOOKUP FOR REF ONLY
OV ISS 16
28 V LGC/CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23 LO 22
5V RANGE SET 4
FOR LEM ONLY
OV ISS 24
EXTERNAL HOOKUP FOR REF ONLY
T12 GRN BLK YEL RED BLU
CR7 1N645
R54 332
R55 5.11K
C30 4.7
R1 510
C1 47
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1 BLK GRN BLU RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R7 24K
R8 665
R5 499K
R9 237K
C5 33
R10 10K
C7 33
C6 1.0
R11 56.2K
T2 BLU RED BRN GRN BLK YEL
Q3 3N68
Q4 3N68
e1 e2 b c
R12 510
R13 510
T3 BLK GRN YEL WHT BLU RED BRN
R14 1500
R15 1500
C8 1.9
C9 1.9
T10 BLU RED BLK GRN
CR1 1N645
T13 1 2 3 4 5 6
CR8 1N645
R56 2150
R57 4990
C31 4.7
T11 BLU RED BLK GRN
CR4 1N645
CR5 1N645
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4 BLK GRN BLU RED
C12 10
Q5 2N930
Q6 2N930
R20 47K
R21 24K
R22 1330
R19 499K
R23 237K
C13 33
R24 10K
C15 33
C14 1.0
R25 56.2K
R44 1330
T5 BLU RED BRN GRN BLK YEL
Q7 3N68
Q8 3N68
R26 510
R27 510
T6 BLK GRN YEL WHT BLU RED BRN
R28 1500
R29 1500
C16 0.34
C17 0.5
R58 75
C32 1.0
R60 1210
R59 619K
R63 75
C35 1.0
R64 1210
R66 619K
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 390PF
T7 BLK GRN BLU RED
C20 10
Q9 2N930
Q10 2N930
R34 47K
R35 24K
R36 1330
R33 499K
R37 237K
C21 33
R38 10K
C23 33
C22 1.0
R39 56.2K
R46 1330
T8 BLU RED BRN GRN BLK YEL
Q11 3N68
Q12 3N68
R40 510
R41 510
T9 BLK GRN YEL WHT BLU RED BRN
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR
2 1 5 6

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R49 PER APPLICABLE R.S. FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE R.S. FROM APPROPRIATE CHART AS MARKED ON AMPLIFIER 201467


32 CGC WARN EVENT
R48
R49 NOM
R50 732
CR2 IN825
C27 56
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
41
CR3 IN645
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
R5 7680
C29 100
R52 4990
C28 56
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
R61 270
T14
RED
GRN
BHN
BLU
ORN
YEL
CR9 IN645
CR10 IN751
C33 4.7
R62 51.1K
27 CGC OPERATE POWER ON EVENT
C34 0.001
Q13 2N720A
CR13 IN645
R65 270
T15
RED
GRN
BRN
BLU
ORN
YEL
CR11 IN645
CR12 IN751
C36 4.7
R67 51.1K
28 IMU STBY POWER ON EVENT
C37 0.001
Q14 2N720A
CR14 IN645
21
30
SPARES
1 STRUCTURE GROUND
ACCEL
EMP TELEMETRY
AMPLIFIER
2001467
A1
4
3
7
8
9
10
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

2010124 D

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270.	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

REVISIONS 25505

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028			15 Feb 66	WK
B		REVISED PER TDRR 26611	DDL			WK
C		REVISED PER TDRR 2742	DDL			WK
D		REVISED PER TDRR 27780	DDL	LTB	1/6/66	WK.

R53
1008878 - 048 THRU 1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

3H

REF DWG:
DAC PIPA TEMP, 2.5 BIAS AND EVENTS
DWG NO. 2007233

2010124 D

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING

MATERIAL
——

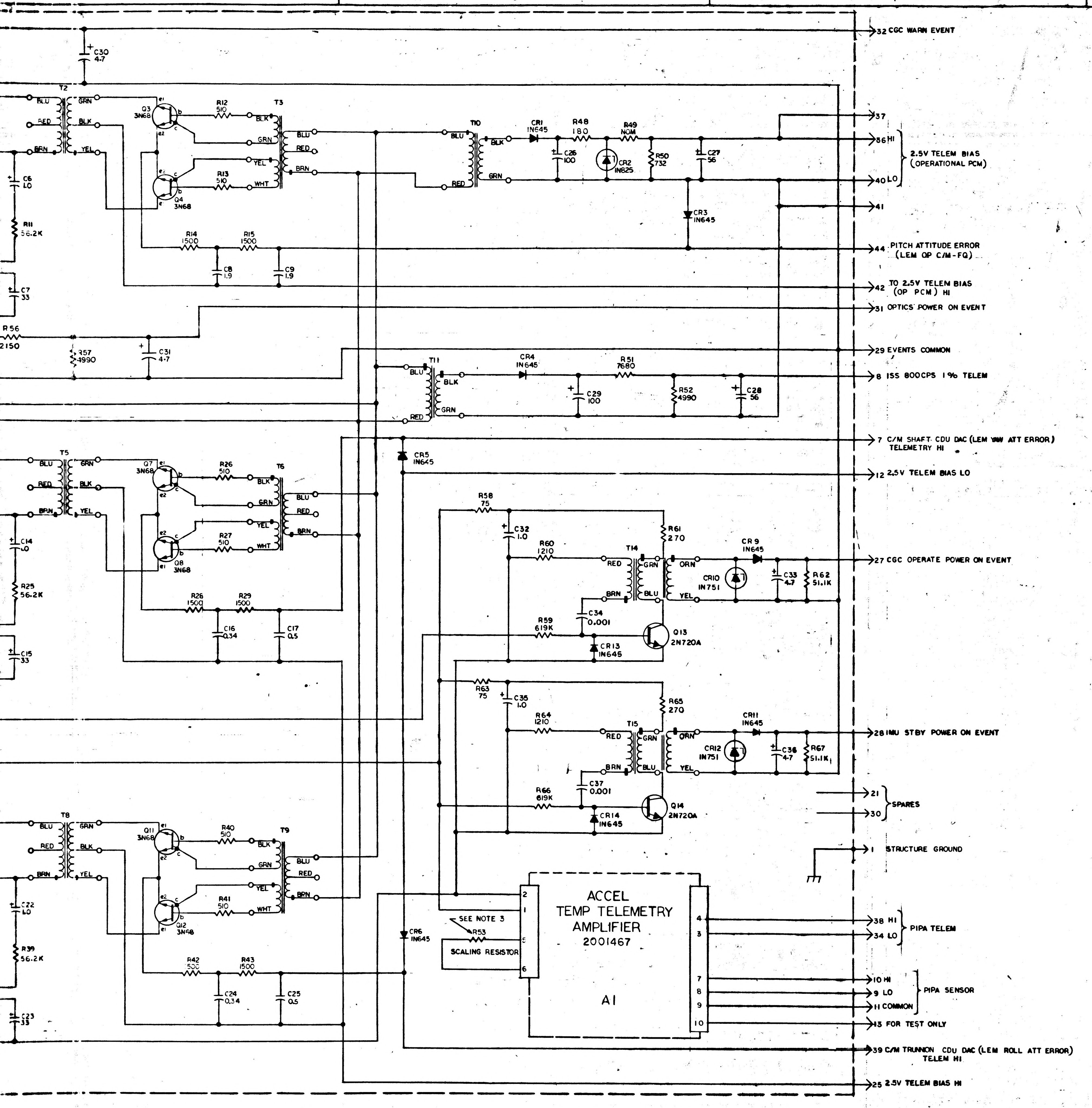
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5 V BIAS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE ——
SHEET 1 OF 1


C30
4.7
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3
3N68
e1
e2
b
c
R12
510
R13
510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
Q4
3N68
C6
1.0
R11
56.2K
R14
1500
R15
1500
C8
1.9
C9
1.9
C7
33
R56
2150
R57
4990
C31
4.7
T10
BLU
BLK
GRN
RED
CR1
IN645
R48
180
R49
NOM
C26
100
CR2
IN825
R50
732
C27
56
CR3
IN645
T11
BLU
BLK
GRN
RED
CR4
IN645
R51
7680
C29
100
R52
4990
C28
56
CR5
IN645
T5
Q7
3N68
R26
510
T6
R27
510
Q8
3N68
C14
1.0
R25
56.2K
R28
1500
R29
1500
C16
0.34
C17
0.5
C15
33
R58
75
C32
1.0
R60
1210
T14
RED
GRN
BRN
BLU
ORN
YEL
R61
270
CR9
IN645
CR10
IN751
C33
4.7
R62
51.1K
C34
0.001
R59
619K
Q13
2N720A
CR13
IN645
R63
75
C35
1.0
R64
1210
T15
R65
270
CR11
IN645
CR12
IN751
C36
4.7
R67
51.1K
C37
0.001
R66
619K
Q14
2N720A
CR14
IN645
T8
Q11
3N68
R40
510
T9
R41
510
Q12
3N68
C22
1.0
R39
56.2K
R42
1500
R43
1500
C24
0.34
C25
0.5
C23
33
CR6
IN645
SEE NOTE 3
R53
SCALING RESISTOR
ACCEL
TEMP TELEMETRY
AMPLIFIER
2001467
A1
1
2
3
4
5
6
7
8
9
10
32 CGC WARN EVENT
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
41
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
27 CGC OPERATE POWER ON EVENT
28 IMU STBY POWER ON EVENT
21
30
SPARES
1 STRUCTURE GROUND
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-159	RESISTOR	332	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

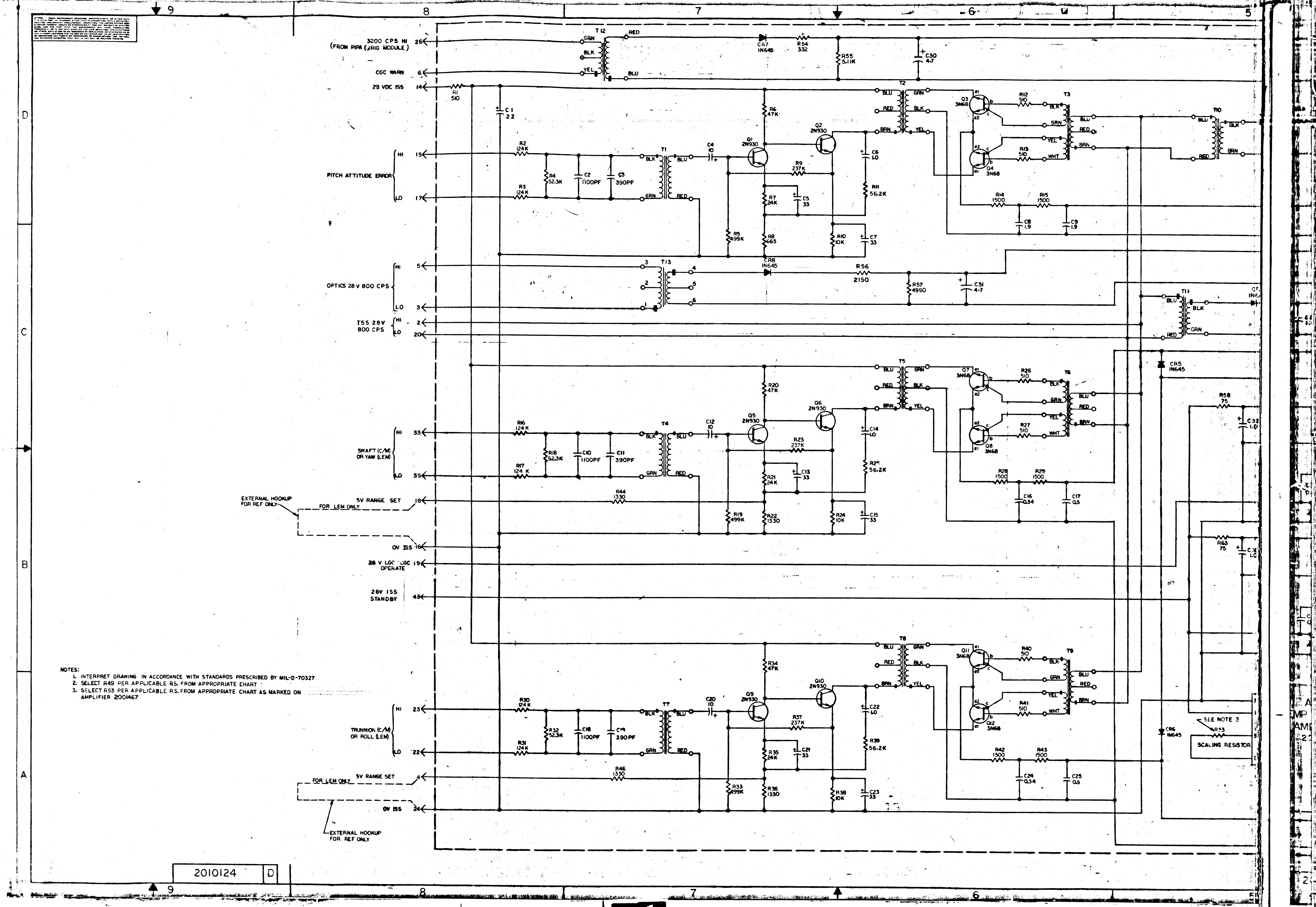
R53
1008878-048 THRU 1008878-086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

MASTER

NO. OF ASSY	
APPLICATION	

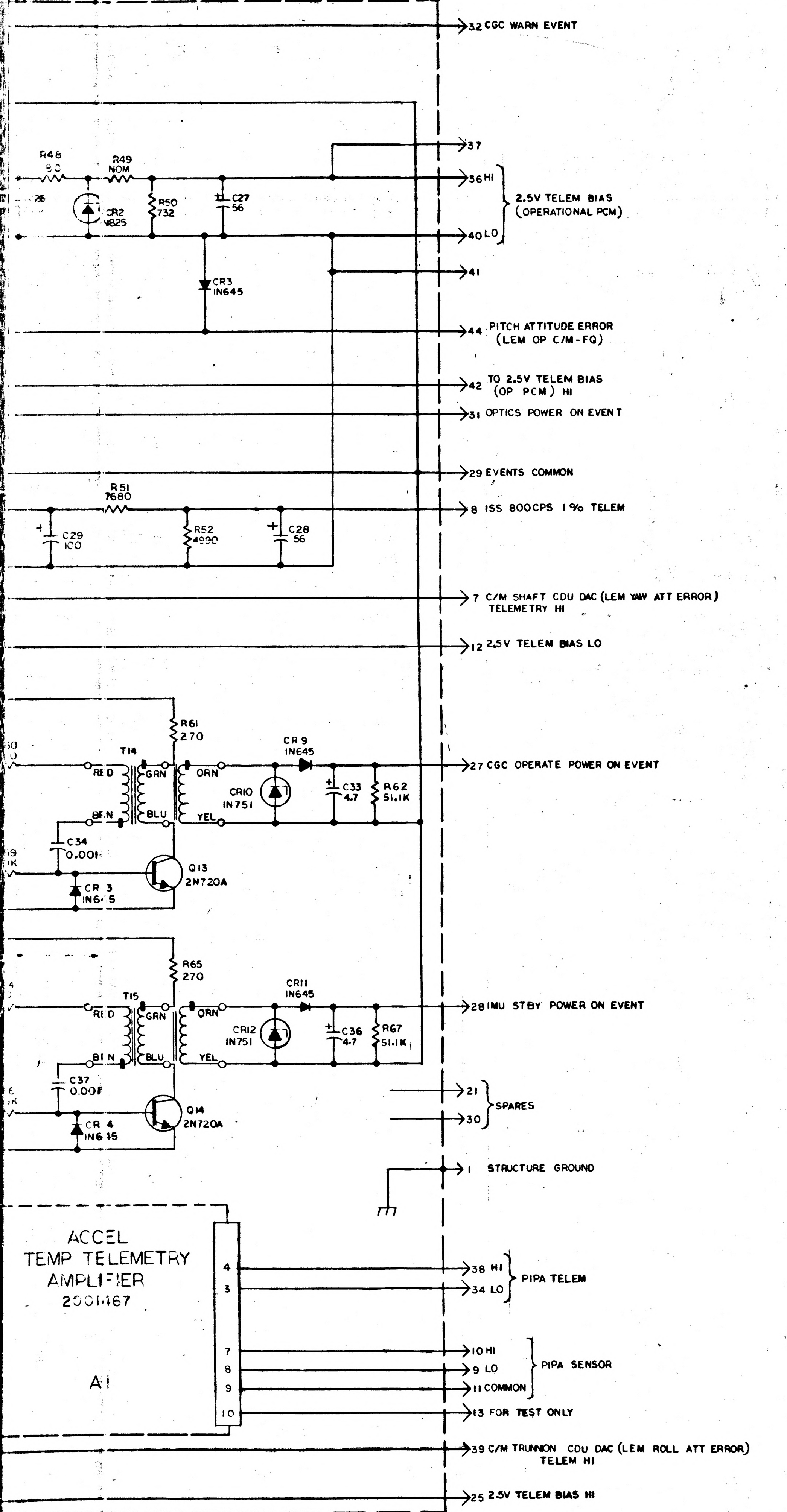
2010124 D


9
8
7
6
5
D
C
B
A
3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15
LO 17
OPTICS 28 V 800 CPS HI 5
LO 3
TSS 28V 800 CPS HI 2
LO 20
SHAFT (C/M) OR YAW (LEM) HI 33
LO 35
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET 18
0V ISS 16
28 V LGC / CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23
LO 22
5V RANGE SET 4
FOR LEM ONLY
0V ISS 24
EXTERNAL HOOKUP FOR REF ONLY
T12 GRN BLK YEL RED BLU
CR7 1N645
R54 332
R55 5.11K
C30 4.7
R1 510
C1 22
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1 BLK GRN BLU RED
C4 10
Q1 2N930
Q2 2N930
R5 499K
R6 47K
R7 24K
R8 665
R9 237K
R10 10K
R11 56.2K
C5 33
C6 1.0
C7 33
T2 BLU RED BRN GRN BLK YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3 BLK GRN YEL WHT BLU RED BRN
T10 BLU RED BLK GRN
R14 1500
R15 1500
C8 1.9
C9 1.9
T13 3 2 1 4 5 6
CR8 1N645
R56 2150
R57 4990
C31 4.7
T11 BLU RED BLK GRN
CR5 1N645
T4 BLK GRN BLU RED
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
C12 10
Q5 2N930
Q6 2N930
R19 499K
R20 47K
R21 24K
R22 1330
R23 237K
R24 10K
R25 56.2K
C13 33
C14 1.0
C15 33
T5 BLU RED BRN GRN BLK YEL
Q7 3N68
Q8 3N68
R26 510
R27 510
T6 BLK GRN YEL WHT BLU RED BRN
R28 1500
R29 1500
C16 0.34
C17 0.5
R44 1330
R58 75
C32 1.0
R63 75
T7 BLK GRN BLU RED
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 390PF
C20 10
Q9 2N930
Q10 2N930
R33 499K
R34 47K
R35 24K
R36 1330
R37 237K
R38 10K
R39 56.2K
C21 33
C22 1.0
C23 33
T8 BLU RED BRN GRN BLK YEL
Q11 3N68
Q12 3N68
R40 510
R41 510
T9 BLK GRN YEL WHT BLU RED BRN
R42 1500
R43 1500
C24 0.34
C25 0.5
R46 1330
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R49 PER APPLICABLE R.S. FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE P.S. FROM APPROPRIATE CHART AS MARKED ON AMPLIFIER 2001467

2010124 D


R48
180
R49
NOM
CR2
IN825
R50
732
C27
56
CR3
IN645
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
41
32 CGC WARN EVENT
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
R51
7680
C29
100
R52
4990
C28
56
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
R61
270
T14
RED
GRN
BRN
BLU
ORN
YEL
CR9
IN645
CR10
IN751
C33
4.7
R62
51.1K
27 CGC OPERATE POWER ON EVENT
C34
0.001
Q13
2N720A
CR 3
IN645
R65
270
T15
RED
GRN
BLN
BLU
ORN
YEL
CR11
IN645
CR12
IN751
C36
4.7
R67
51.1K
28 IMU STBY POWER ON EVENT
C37
0.001
Q14
2N720A
CR 4
IN645
21
30
SPARES
1 STRUCTURE GROUND
ACCEL TEMP TELEMETRY AMPLIFIER 2001467
A1
4
3
7
8
9
10
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-233	RESISTOR	806	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2W
R62	1010364-579		51.1K	±1%	1/8W
R63	1010364-35		75	±1%	1/8W
R64	1010364-267		1210	±1%	1/8W
R65	1006760-18		270	±2%	1/2W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

REVISIONS 25505

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028	[illegible]	[illegible]	15 Feb 66	WR
B		REVISED PER TDRR 26611	DDL	[illegible]	[illegible]	WR
C		REVISED PER TDRR 27412	DDL	[illegible]	[illegible]	WR
D		REVISED PER TDRR 27780	DDL	LTB	7/8/66	WR
E		REVISED PER TDRR 27972	LTB		7/26/66	WR

R53
1008878 - 048 THRU 1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER ASSY
DWG NO 2007233

3H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] 18 JAN 66
CHECKED [illegible] 20 Jan 66
APPROVED [illegible] 20 Jan 66
APPROVED
APPROVED MIT [illegible] 14-5-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5 V BIAS

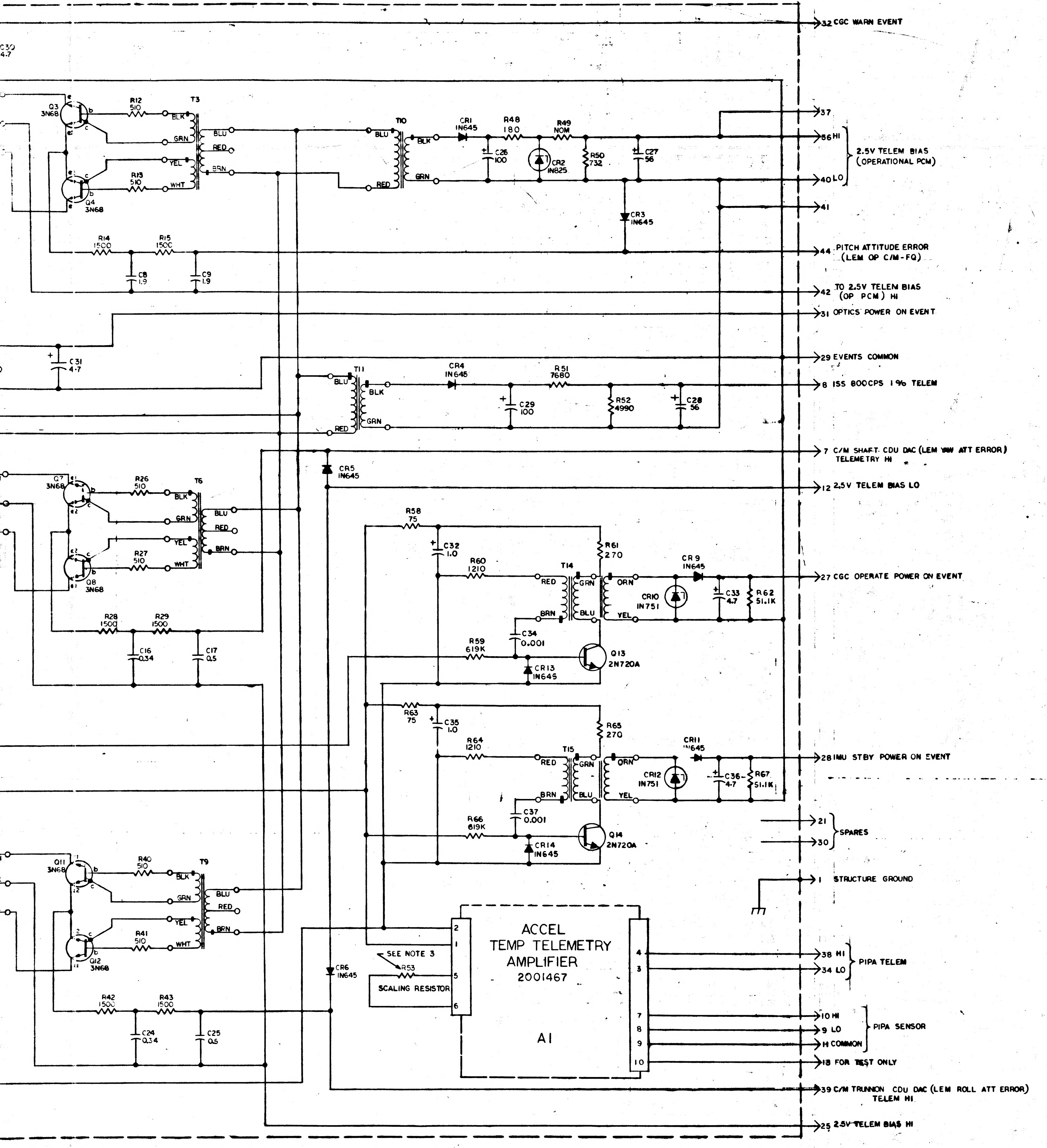
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE —
SHEET 1 OF 1

2010124 E

2010124 E

F3

MASTER


C30
4.7
Q3
3N68
R12
510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R13
510
Q4
3N68
R14
1500
R15
1500
C8
1.9
C9
1.9
C31
4.7
T10
BLU
RED
BLK
GRN
CR1
IN645
R48
180
R49
NOM
C26
100
CR2
IN825
R50
732
C27
56
CR3
IN645
T11
BLU
RED
BLK
GRN
CR4
IN645
R51
7680
C29
100
R52
4990
C28
56
CR5
IN645
Q7
3N68
R26
510
T6
Q8
3N68
R27
510
R28
1500
R29
1500
C16
0.34
C17
0.5
R58
75
C32
1.0
R60
1210
R61
270
T14
ORN
YEL
CR9
IN645
CR10
IN751
C33
4.7
R62
51.1K
C34
0.001
R59
619K
CR13
IN645
Q13
2N720A
R63
75
C35
1.0
R64
1210
R65
270
T15
CR11
IN645
CR12
IN751
C36
4.7
R67
51.1K
C37
0.001
R66
619K
CR14
IN645
Q14
2N720A
Q11
3N68
R40
510
T9
Q12
3N68
R41
510
R42
1500
R43
1500
C24
0.34
C25
0.5
CR6
IN645
ACCEL
TEMP TELEMETRY
AMPLIFIER
2001467
A1
SEE NOTE 3
R53
SCALING RESISTOR
1 2 3 4 5 6 7 8 9 10
32 CGC WARN EVENT
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
41
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
27 CGC OPERATE POWER ON EVENT
28 IMU STBY POWER ON EVENT
21
30
SPARES
1 STRUCTURE GROUND
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
H COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-233	RESISTOR	806	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

R53
1008878 - 048 THRU 1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC
SIGN
CWG

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECI
DIMENSIONS ARE IN INCH
CAPACITOR VALUES ARE I
RESISTOR VALUES ARE IN
TOLERANCES ON
FRACTIONS DECIMALS
± ±
DO NOT SCALE THIS DRAW
MATERIAL

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NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

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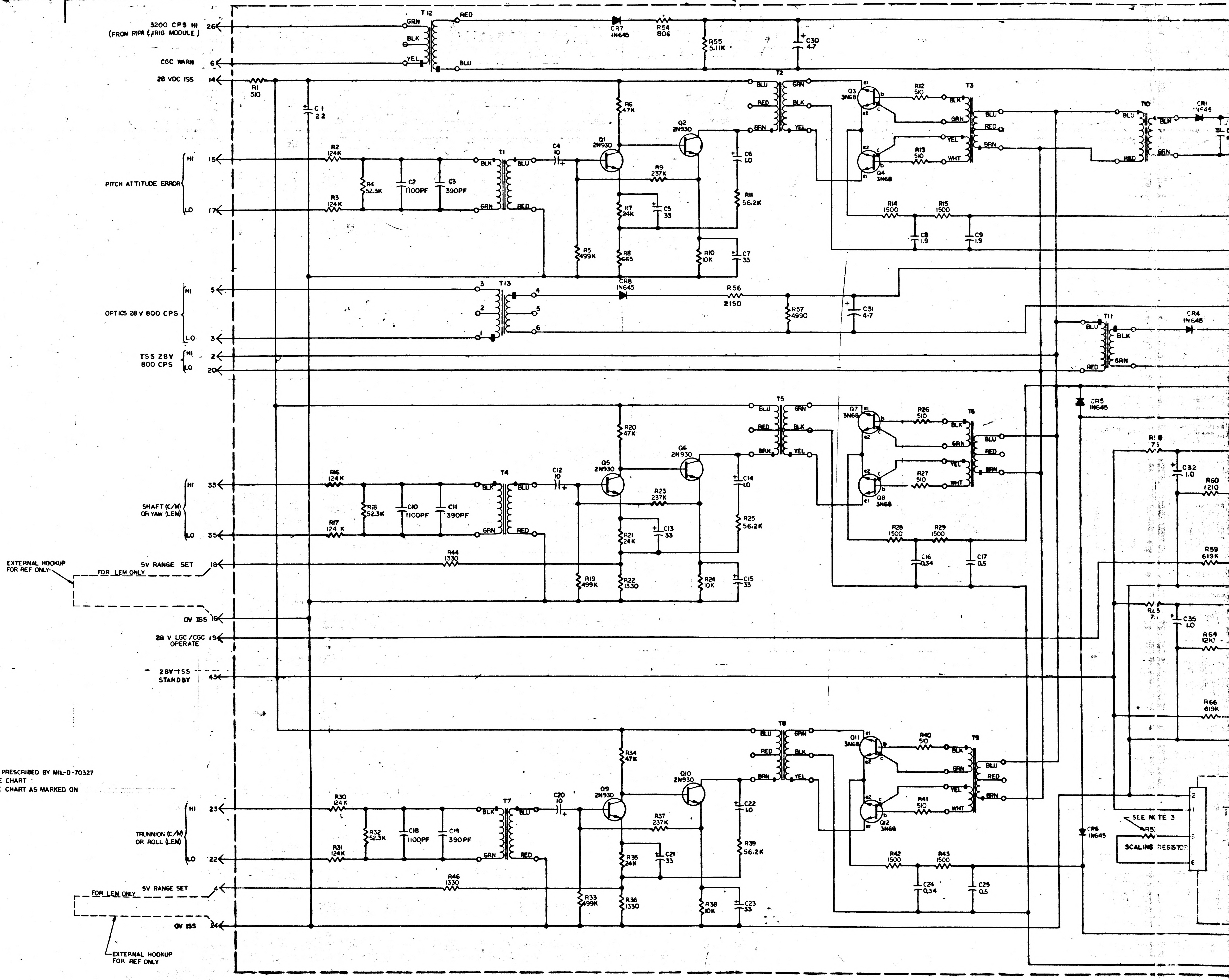
3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15 LO 17
OPTICS 28 V 800 CPS HI 5 LO 3
TSS 28V 800 CPS HI 2 LO 20
SHAFT (C/M) OR YAW (LEM) HI 33 LO 35
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET 18
0V ISS 16
28 V LGC/CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23 LO 22
5V RANGE SET 4
0V ISS 24
T12 GRN BLK YEL RED BLU
CR7 1N645
R54 806
R55 5.11K
C30 4.7
R1 510
C1 22
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1 BLK GRN BLU RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 56.2K
T2 BLU RED BRN GRN BLK YEL
Q3 3N68
Q4 3N68
e1 e2 b c
R12 510
R13 510
T3 BLK GRN YEL WHT BLU RED BRN
R14 1500
R15 1500
C8 1.9
C9 1.9
T10 BLU RED BLK GRN
CR1 1N645
T13 3 2 1 4 5 6
CR8 1N645
R56 2150
R57 4990
C31 4.7
T11 BLU RED BLK GRN
CR4 1N645
CR5 1N645
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4 BLK GRN BLU RED
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
R21 24K
C13 33
R19 499K
R22 1330
R24 10K
C15 33
C14 1.0
R25 56.2K
R44 1330
T5 BLU RED BRN GRN BLK YEL
Q7 3N68
Q8 3N68
R26 510
R27 510
T6 BLK GRN YEL WHT BLU RED BRN
R28 1500
R29 1500
C16 0.34
C17 0.5
R58 75
C32 1.0
R60 1210
R59 619K
R63 75
C35 1.0
R64 1210
R66 619K
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 390PF
T7 BLK GRN BLU RED
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
R35 24K
C21 33
R33 499K
R36 1330
R38 10K
C23 33
C22 1.0
R39 56.2K
R46 1330
T8 BLU RED BRN GRN BLK YEL
Q11 3N68
Q12 3N68
R40 510
R41 510
T9 BLK GRN YEL WHT BLU RED BRN
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR
2 1 5 6

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R49 PER APPLICABLE RS. FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE P.S. FROM APPROPRIATE CHART AS MARKED ON AMPLIFIER 2001467

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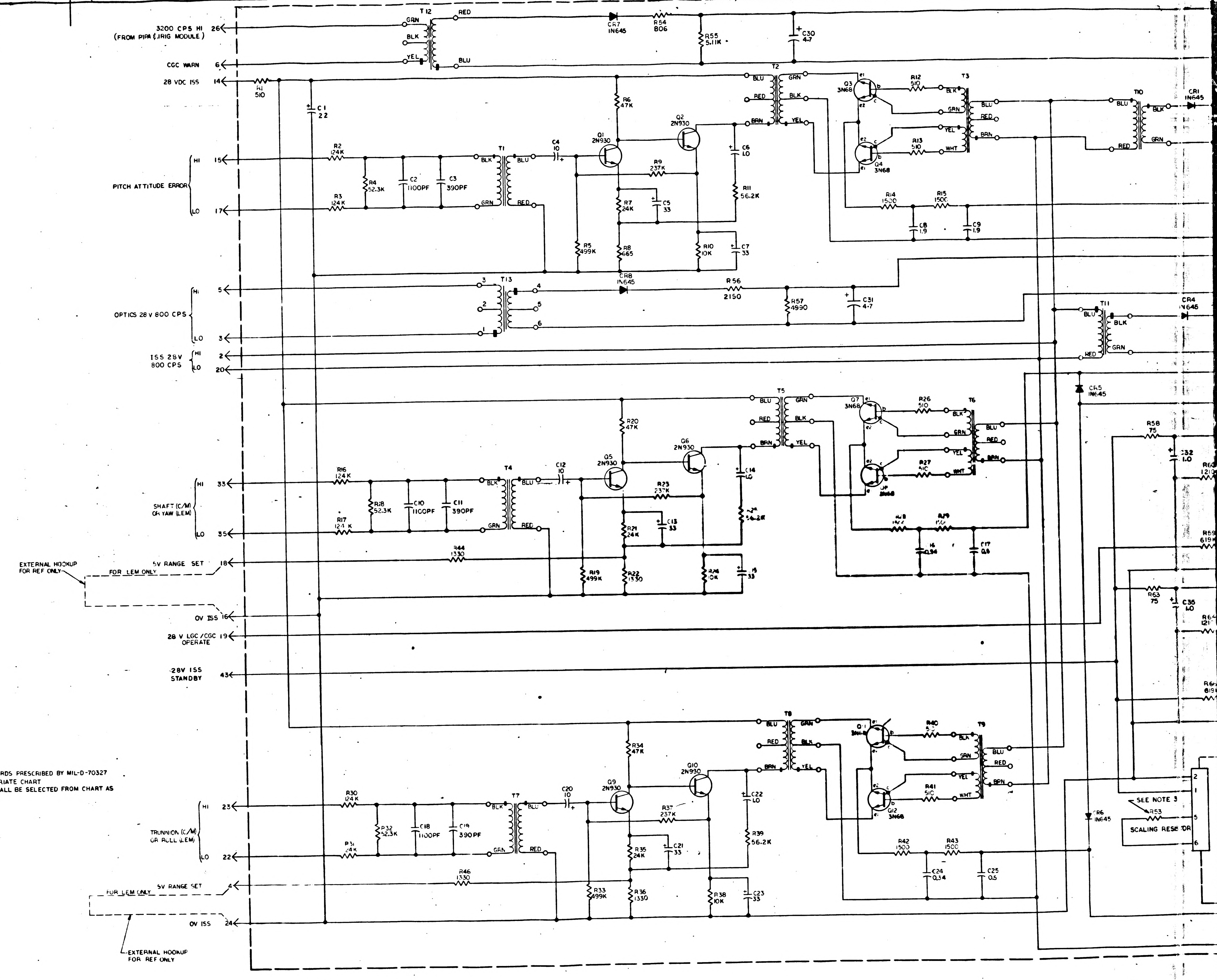
WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15
LO 17
OPTICS 28 V 800 CPS HI 5
LO 3
ISS 28V 800 CPS HI 2
LO 20
SHAFT (C/M) OR YAW (LEM) HI 33
LO 35
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET 18
0V ISS 16
28 V LGC/CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23
LO 22
5V RANGE SET 4
0V ISS 24
T12
CR7 1N645
R54 806
R55 5.11K
C30 4.7
R1 510
C1 22
T2
Q3 3N68
R12 510
T3
Q4 3N68
R13 510
T10
CR1 1N645
R6 47K
Q1 2N930
Q2 2N930
C6 1.0
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
T1
C4 10
R9 237K
R11 56.2K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
R14 1500
R15 1500
C8 1.9
C9 1.9
T13
CR8 1N645
R56 2150
R57 4990
C31 4.7
T11
CR4 1N645
CR5 1N645
T5
Q7 3N68
R26 510
T6
R27 510
Q8 3N68
R20 47K
Q5 2N930
Q6 2N930
C14 1.0
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4
C12 10
R23 237K
R25 56.2K
R21 24K
C13 33
R44 1330
R19 499K
R22 1330
R24 10K
C15 33
R28 1500
R29 1500
C16 0.34
C17 0.5
R58 75
C32 1.0
R63 75
C35 1.0
T8
Q11 3N68
R40 510
T9
R41 510
Q12 3N68
R34 47K
Q9 2N930
Q10 2N930
C22 1.0
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 390PF
T7
C20 10
R37 237K
R39 56.2K
R35 24K
C21 33
R46 1330
R33 499K
R36 1330
R38 10K
C23 33
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR
BLU
RED
GRN
BLK
YEL
BRN
WHT

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R49 PER APPLICABLE RS. FROM APPROPRIATE CHART
3. R53 AND A1 ARE MATCHED COMPONENTS. R53 SHALL BE SELECTED FROM CHART AS MARKED ON A1.

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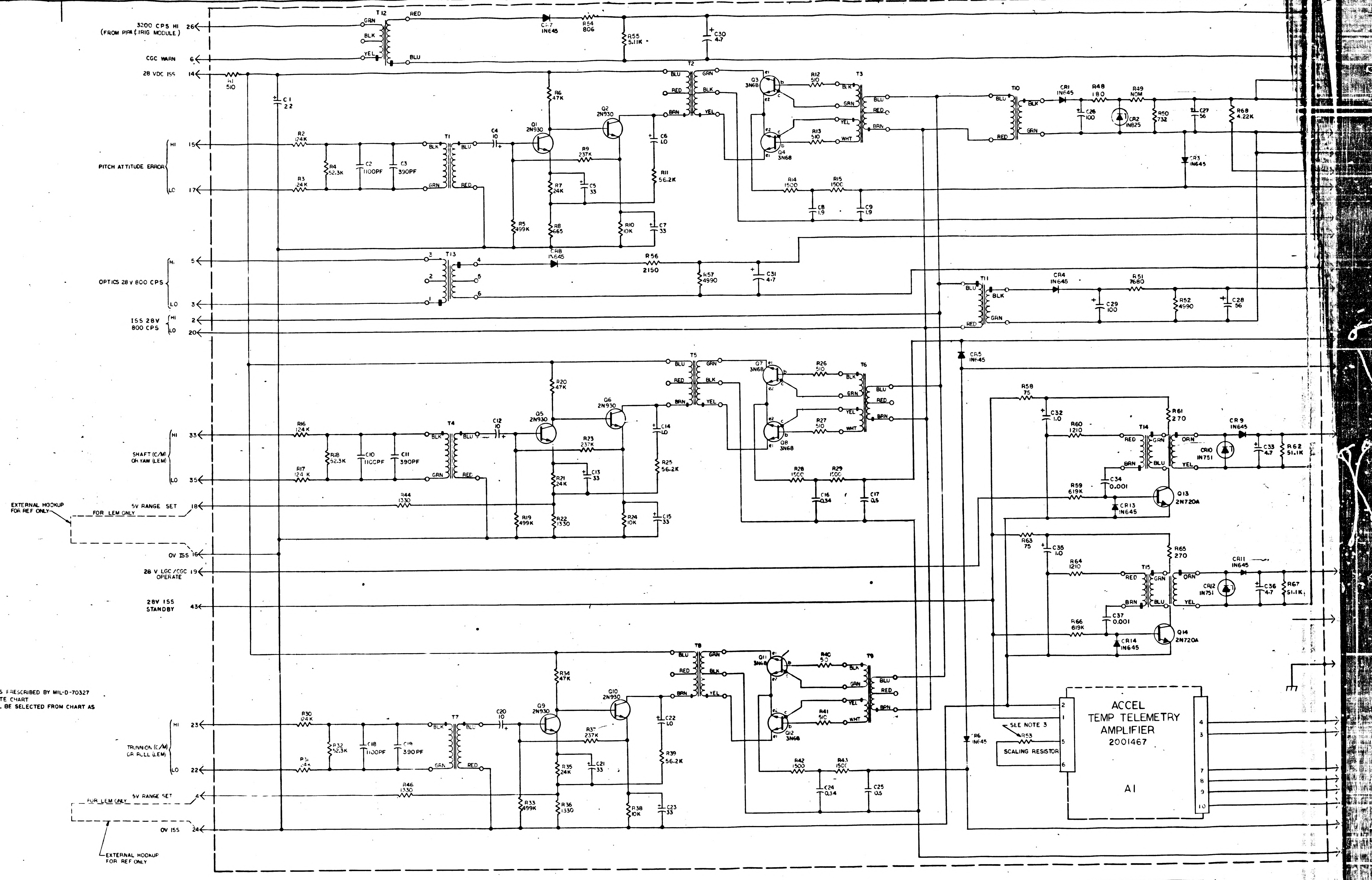
TH STANDARDS PRESCRIBED BY MIL-D-70327
PPROPRIATE CHART
TS. R53 SHALL BE SELECTED FROM CHART AS



3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15 LO 17
OPTICS 28 V 800 CPS HI 5 LO 3
ISS 28V 800 CPS HI 2 LO 20
SHAFT (C/M) OR YAW (LEM) HI 33 LO 35
5V RANGE SET 18
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
0V ISS 16
28 V LGC/CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23 LO 22
5V RANGE SET 4
FOR LEM ONLY
0V ISS 24
EXTERNAL HOOKUP FOR REF ONLY
T12 GRN BLK YEL RED BLU
CR7 1N645
R54 806
R55 5.11K
C30 4.7
R1 510
C1 22
R6 47K
Q1 2N930
Q2 2N930
R2 124K
R3 24K
R4 52.3K
C2 1100PF
C3 390PF
T1 BLK BLU GRN RED
C4 10
R9 237K
C6 1.0
R7 24K
C5 33
R11 56.2K
R5 499K
R8 665
R10 10K
C7 33
T2 BLU RED BRN GRN BLK YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3 BLK GRN YEL WHT BLU RED BRN
R14 1500
R15 1500
C8 1.9
C9 1.9
T10 BLU RED BLK GRN
CR1 1N645
R48 180
R49 NOM
C26 100
CR2 1N825
R50 732
C27 56
R68 4.22K
CR3 1N645
T13 1 2 3 4 5 6
CR8 1N645
R56 2150
R57 4990
C31 4.7
T11 BLU RED BLK GRN
CR4 1N645
R51 7680
C29 100
R52 4990
C28 56
CR5 1N645
R20 47K
Q5 2N930
Q6 2N930
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 390PF
T4
C12 10
R23 237K
C14 1.0
R21 24K
C13 33
R25 56.2K
R44 1330
R19 499K
R22 1330
R24 10K
C15 33
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.34
C17 0.5
R58 75
C32 1.0
R60 1210
R61 270
T14 RED GRN BRN BLU ORN YEL
CR9 1N645
CR10 1N751
C33 4.7
R62 51.1K
C34 0.001
R59 619K
CR13 1N645
Q13 2N720A
R63 75
C35 1.0
R64 1210
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CR11 1N645
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C36 4.7
R67 51.1K
C37 0.001
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Q9 2N930
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R30 124K
R31 24K
R32 52.3K
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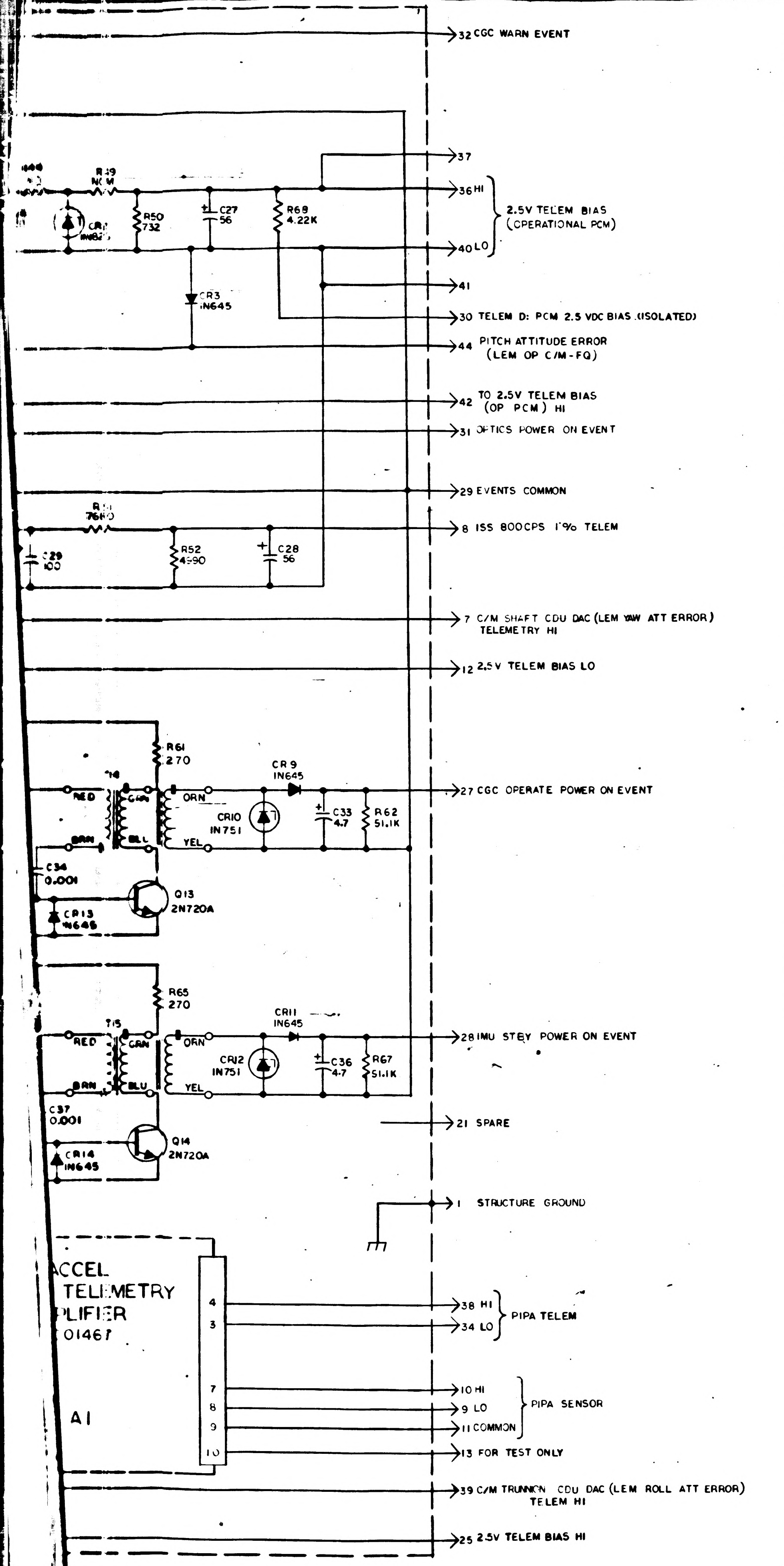
C19 390PF
T7
C20 10
R37 237K
C22 1.0
R35 24K
C21 33
R39 56.2K
R46 1330
R33 499K
R36 1330
R38 10K
C23 33
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 1N645
SEE NOTE 3
R53
SCALING RESISTOR
ACCEL TEMP TELEMETRY AMPLIFIER 2001467
A1
1 2 5 6 4 3 7 8 9 10

2010124 F

2010124 F

8 7 6 5

2/2010124


32 CGC WARN EVENT
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
41
30 TELEM D: PCM 2.5 VDC BIAS (ISOLATED)
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
27 CGC OPERATE POWER ON EVENT
28 IMU STBY POWER ON EVENT
21 SPARE
1 STRUCTURE GROUND
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI
R49 NOM
CR2 IN825
R50 732
C27 56
R69 4.22K
CR3 IN645
R51 7680
C29 100
R52 4990
C28 56
R61 270
T14
RED
GRN
BRN
BLU
ORN
YEL
CR9 IN645
CR10 IN751
C33 4.7
R62 51.1K
C34 0.001
Q13 2N720A
CR13 IN645
R65 270
T15
CR11 IN645
CR12 IN751
C36 4.7
R67 51.1K
C37 0.001
Q14 2N720A
CR14 IN645
ACCEL TELEMETRY PLIFIER 01467
A1
4
3
7
8
9
10

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
[illegible]	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±.1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-233	RESISTOR	806	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
R68	1010311-186	RESISTOR	4.22K	±1%	1/10W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	IN645		
CR8	1010837-001		IN645		
CR9	1010837-001		IN645		
CR10	1010372-11		IN751		
CR11	1010837-001		IN645		
CR12	1010372-11		IN751		
CR13	1010837-001		IN645		
CR14	1010837-001	DIODE	IN645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

REVISIONS 25505						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028				
B		REVISED PER TDRR 26611	ADL			
C		REVISED PER TDRR 27412	ADL			
D		REVISED PER TDRR 27780	ADL	LTB	1/11/66	
E		REVISED PER TDRR 27972	LTB			
F		REVISED PER TDRR 30232	M.A.		28-11-66	

R53
1008878 - 048 THRU 1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER ASSY
DWG NO 2007233

3H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

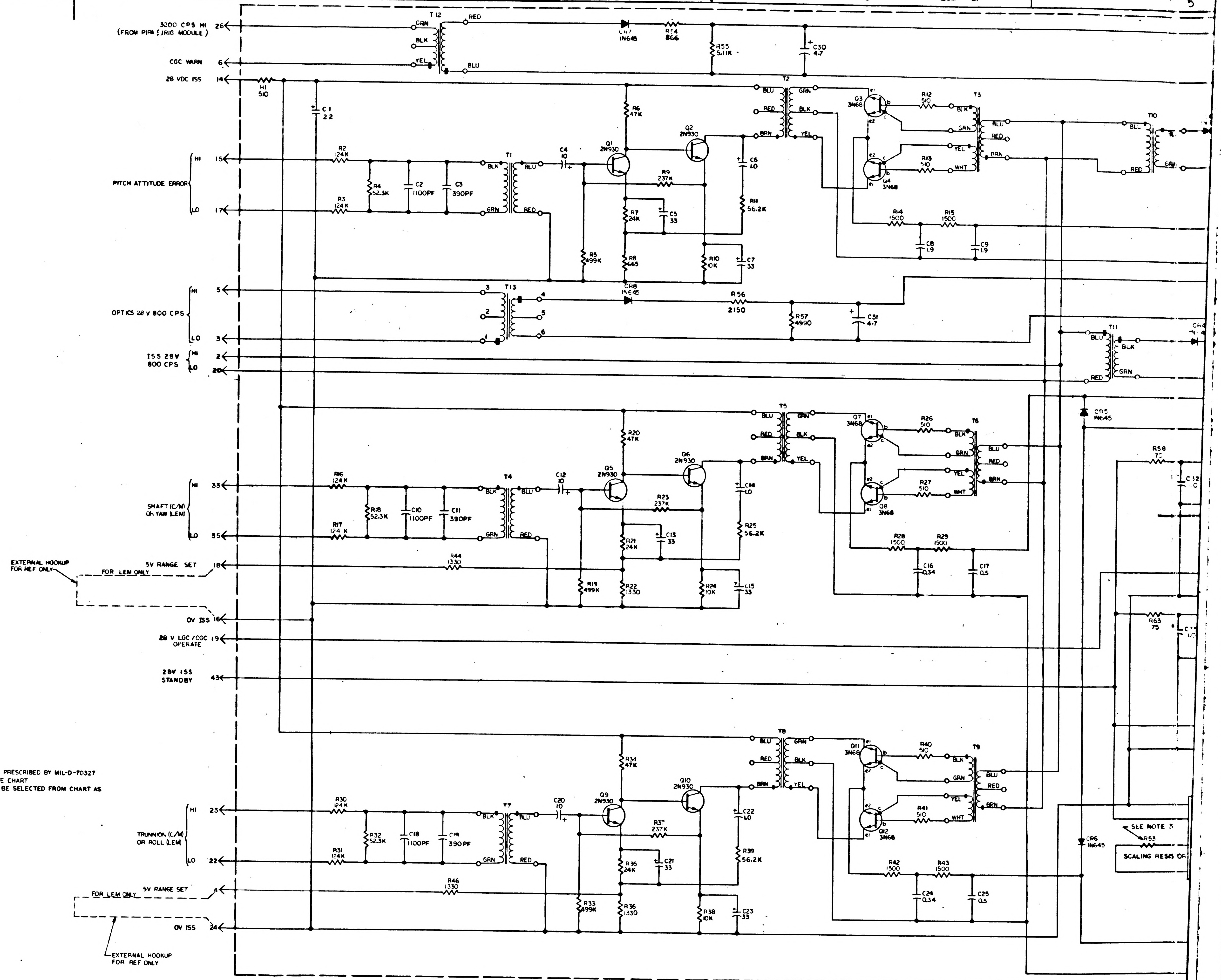
DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5V BIAS

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE —
SHEET 1 OF 1

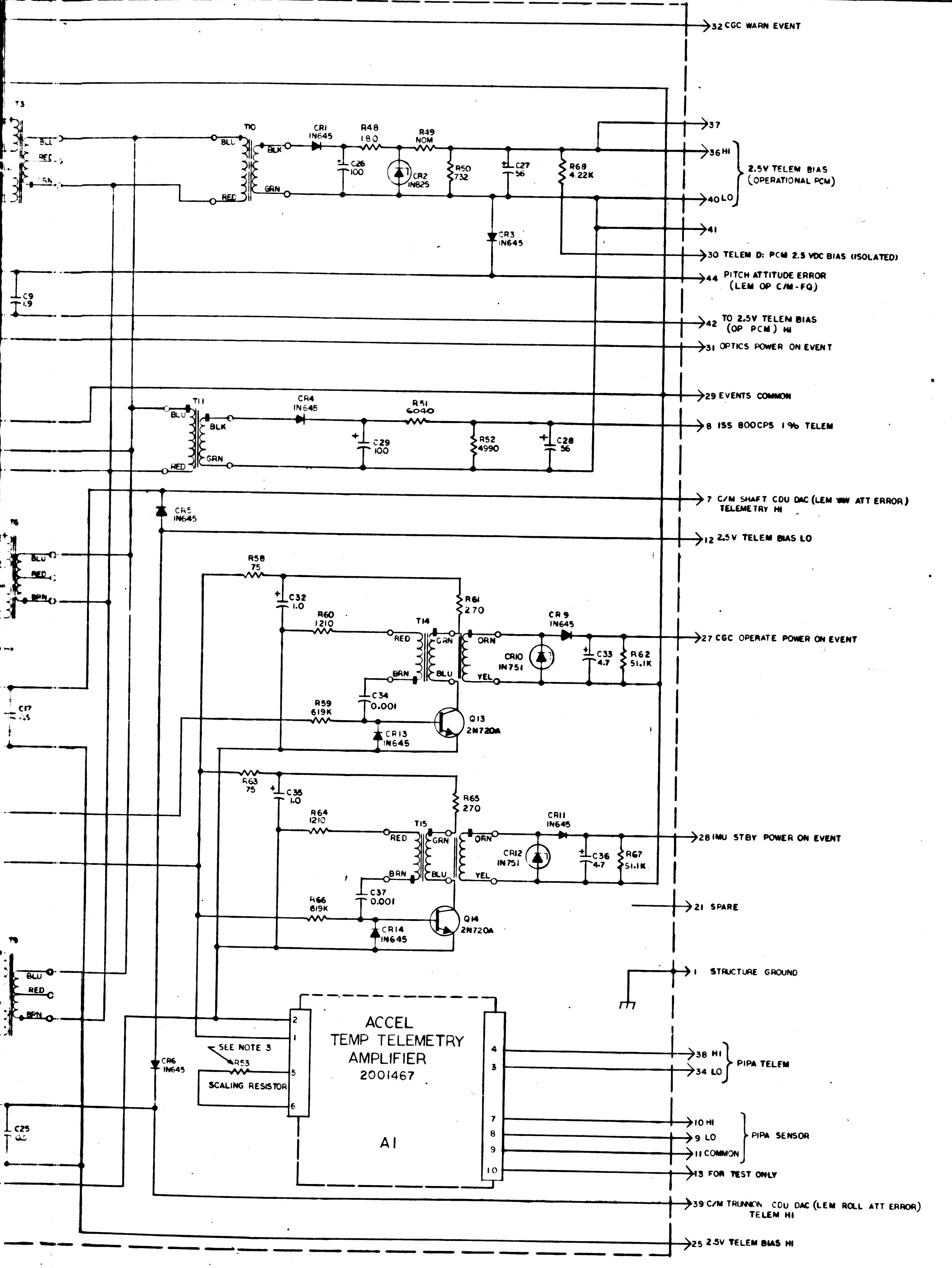
3/2010124


9
8
7
6
5
D
C
B
A
3200 CPS HI (FROM PIPA & IRIG MODULE) 26
CGC WARN 6
28 VDC ISS 14
PITCH ATTITUDE ERROR HI 15 LO 17
OPTICS 28 V 800 CPS HI 5 LO 3
ISS 28V 800 CPS HI 2 LO 20
SHAFT (C/M) OR YAW (LEM) HI 33 LO 35
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET 18
0V ISS 16
28 V LGC/CGC OPERATE 19
28V ISS STANDBY 43
TRUNNION (C/M) OR ROLL (LEM) HI 23 LO 22
5V RANGE SET 4
0V ISS 24
T12
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T13
GRN
BLK
YEL
RED
BLU
BRN
WHT
CR7 1N645
R54 866
R55 5.11K
C30 4.7
R1 510
C1 22
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 390PF
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
R7 24K
C5 33
C6 1.0
R11 56.2K
R5 499K
R8 665
R10 10K
C7 33
Q3 3N68
Q4 3N68
R12 510
R13 510
R14 1500
R15 1500
C8 1.9
C9 1.9
CR8 1N645
R56 2150
R57 4990
C31 4.7
R20 47K
Q5 2N930
Q6 2N930
R16 124K
R17 124 K
R18 52.3K
C10 1100PF
C11 390PF
C12 10
R23 237K
R21 24K
C13 33
C14 1.0
R25 56.2K
R44 1330
R19 499K
R22 1330
R24 10K
C15 33
Q7 3N68
Q8 3N68
R26 510
R27 510
R28 1500
R29 1500
C16 0.34
C17 0.5
CR5 1N645
R58 75
C32 1.0
R63 75
R34 47K
Q9 2N930
Q10 2N930
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 390PF
C20 10
R37 237K
R35 24K
C21 33
C22 1.0
R39 56.2K
R46 1330
R33 499K
R36 1330
R38 10K
C23 33
Q11 3N68
Q12 3N68
R40 510
R41 510
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 1N645
SEE NOTE 3
R53
SCALING RESIS OR

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R49 PER APPLICABLE RS. FROM APPROPRIATE CHART
3. R53 AND A1 ARE MATCHED COMPONENTS. R53 SHALL BE SELECTED FROM CHART AS MARKED ON A1.

2010124 G



32 CGC WARN EVENT
T3
BLU
RED
BRN
T10
BLU
BLK
RED
GRN
CR1
1N645
R48
180
R49
NOM
C26
100
CR2
1N825
R50
732
C27
56
R68
4.22K
37
36 HI
40 LO
2.5V TELEM BIAS (OPERATIONAL PCM)
CR3
1N645
41
30 TELEM D: PCM 2.5 VDC BIAS (ISOLATED)
C9
1.9
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
T11
BLU
BLK
RED
GRN
CR4
1N645
R51
6040
C29
100
R52
4990
C28
56
8 ISS 800CPS 1% TELEM
CR5
1N645
7 C/M SHAFT CDU DAC (LEM YAW ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
T6
BLU
RED
BRN
R58
75
C32
1.0
R61
270
R60
1210
T14
RED
GRN
BRN
BLU
ORN
YEL
CR9
1N645
CR10
1N751
C33
4.7
R62
51.1K
27 CGC OPERATE POWER ON EVENT
C34
0.001
R59
619K
CR13
1N645
Q13
2N720A
C17
0.5
R63
75
C35
1.0
R65
270
R64
1210
T15
RED
GRN
BRN
BLU
ORN
YEL
CR11
1N645
CR12
1N751
C36
4.7
R67
51.1K
28 IMU STBY POWER ON EVENT
C37
0.001
R66
619K
CR14
1N645
Q14
2N720A
21 SPARE
1 STRUCTURE GROUND
T9
BLU
RED
BRN
ACCEL TEMP TELEMETRY AMPLIFIER 2001467
A1
SEE NOTE 3
R53
SCALING RESISTOR
CR6
1N645
C25
0.5
2
1
5
6
4
3
7
8
9
10
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750 56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750 25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-401		6040	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±.1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20 VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010259-000		1N825		
CR3	1010837-001		1N645		
CR4	1010837-001		1N645		
CR5	1010837-001		1N645		
CR6	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R54	1010364-239	RESISTOR	866	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
R68	1010311-186	RESISTOR	4.22K	±1%	1/10W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	1N645		
CR8	1010837-001		1N645		
CR9	1010837-001		1N645		
CR10	1010372-11		1N751		
CR11	1010837-001		1N645		
CR12	1010372-11		1N751		
CR13	1010837-001		1N645		
CR14	1010837-001	DIODE	1N645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

R53
1008878 - 048 THRU 1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER ASSY
DWG NO 2007233

QTY REQD	PART OR IDENTIFYING

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
———

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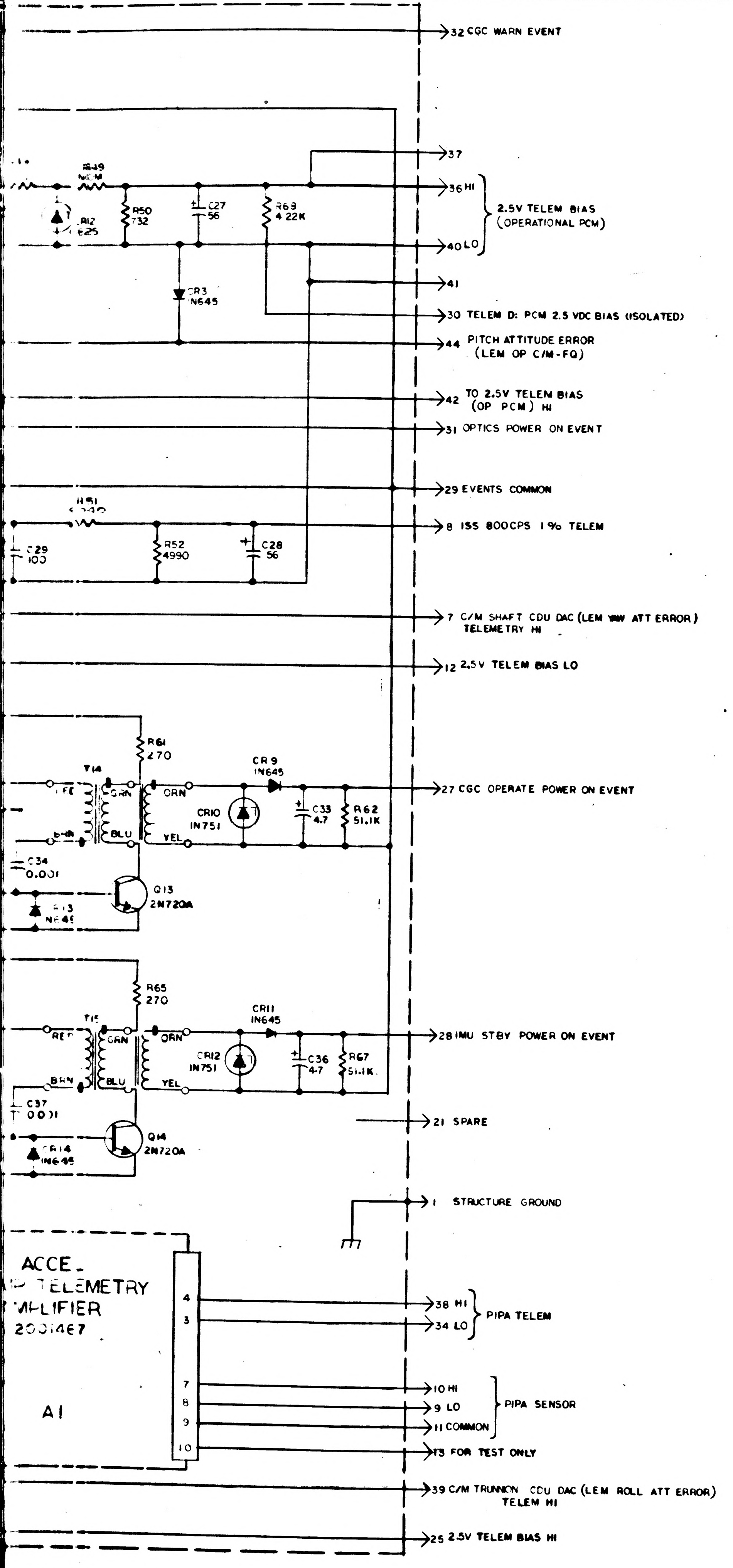
2010124 G

2/2010124


32 CGC WARN EVENT
37
36 HI
2.5V TELEM BIAS (OPERATIONAL PCM)
40 LO
41
30 TELEM D: PCM 2.5 VDC BIAS (ISOLATED)
44 PITCH ATTITUDE ERROR (LEM OP C/M-FQ)
42 TO 2.5V TELEM BIAS (OP PCM) HI
31 OPTICS POWER ON EVENT
29 EVENTS COMMON
8 ISS 800CPS 1% TELEM
7 C/M SHAFT CDU DAC (LEM ATT ERROR) TELEMETRY HI
12 2.5V TELEM BIAS LO
27 CGC OPERATE POWER ON EVENT
28 IMU STBY POWER ON EVENT
21 SPARE
1 STRUCTURE GROUND
38 HI
34 LO
PIPA TELEM
10 HI
9 LO
11 COMMON
PIPA SENSOR
13 FOR TEST ONLY
39 C/M TRUNNION CDU DAC (LEM ROLL ATT ERROR) TELEM HI
25 2.5V TELEM BIAS HI
R49 NOM
R12 825
R50 732
C27 56
R68 4.22K
CR3 1N645
R51
R52 4990
C28 56
C29 100
R61 270
T14
CR9 1N645
CR10 1N751
C33 4.7
R62 51.1K
C34 0.001
Q13 2N720A
CR13 1N645
R65 270
T15
CR11 1N645
CR12 1N751
C36 4.7
R67 51.1K
C37 0.001
Q14 2N720A
CR14 1N645
ORN
GRN
BLU
YEL
RED
BRN
ACCEL TELEMETRY AMPLIFIER 2001467
A1
4
3
7
8
9
10

REF DES	PART NO	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-294		56.2K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750 25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-294		56.2K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-294		56.2K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	1006750-14	RESISTOR	180	±2%	1/4 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-401		6040	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 3	RESISTOR	NOM	±1%	1/8 W
C1	1006755-134	CAPACITOR	22	±10%	50VDC
C2	1010410-18		1100PF	±2%	300VDC
C3	1010410-007		390PF	±2%	500VDC
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-18		1100PF	±2%	300VDC
C11	1010410-007		390PF	±2%	500VDC
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-18		1100PF	±2%	300VDC
C19	1010410-007		390PF	±2%	500VDC
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010259-000		1N825		
CR3	1010837-001		1N645		
CR4	1010837-001		1N645		
CR5	1010837-001		1N645		
CR6	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001467	AMPLIFIER			

REF DES	PART NO.	DESCRIPTION	VALUE.	TOL	RATING
R54	1010364-239	RESISTOR	866	±1%	1/8 W
R55	-387		5110		
R56	-315		2150		
R57	-385		4990		
R58	1010364-35		75		1/8W
R59	1010363-787		619K		1/4W
R60	1010364-267		1210	±1%	1/8W
R61	1006760-18		270	±2%	1/2 W
R62	1010364-579		51.1K	±1%	1/8 W
R63	1010364-35		75	±1%	1/8 W
R64	1010364-267		1210	±1%	1/8 W
R65	1006760-18		270	±2%	1/2 W
R66	1010363-787		619K	±1%	1/4W
R67	1010364-579	RESISTOR	51.1K	±1%	1/8W
R68	1010311-186	RESISTOR	4.22K	±1%	1/10W
C30	1006755-10	CAPACITOR	4.7	±10%	10VDC
C31	1006755-10		4.7	±10%	10VDC
C32	1010393-029		1.0	±10%	50
C33	1010393-037		4.7	±10%	50
C34	1010359-17		0.001	±10%	200
C35	1010393-029		1.0	±10%	50
C36	1010393-037		4.7	±10%	50
C37	1010359-17	CAPACITOR	0.001	±10%	200VDC
CR7	1010837-001	DIODE	1N645		
CR8	1010837-001		1N645		
CR9	1010837-001		1N645		
CR10	1010372-11		1N751		
CR11	1010837-001		1N645		
CR12	1010372-11		1N751		
CR13	1010837-001		1N645		
CR14	1010837-001	DIODE	1N645		
Q13	1010357-1	TRANSISTOR	2N720A		
Q14	1010357-1	TRANSISTOR	2N720A		
T12	1010326	TRANSFORMER			
T13	1010282				
T14	1010310				
T15	1010310	TRANSFORMER			

REVISIONS 25505

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26028				
B		REVISED PER TDRR 26611				
C		REVISED PER TDRR 2742				
D		REVISED PER TDRR 27780				
E		REVISED PER TDRR 27972				
F		REVISED PER TDRR 30232			28 JUL 66	
G		REVISED PER TDRR 30237			17 AUG 66	

R53
1008878 - 048
THRU
1008878 - 086

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS
SIGNAL CONDITIONER ASSY
DWG NO 2007233

3H

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING
MATERIAL
——

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APPROVED
APPROVED
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DATE

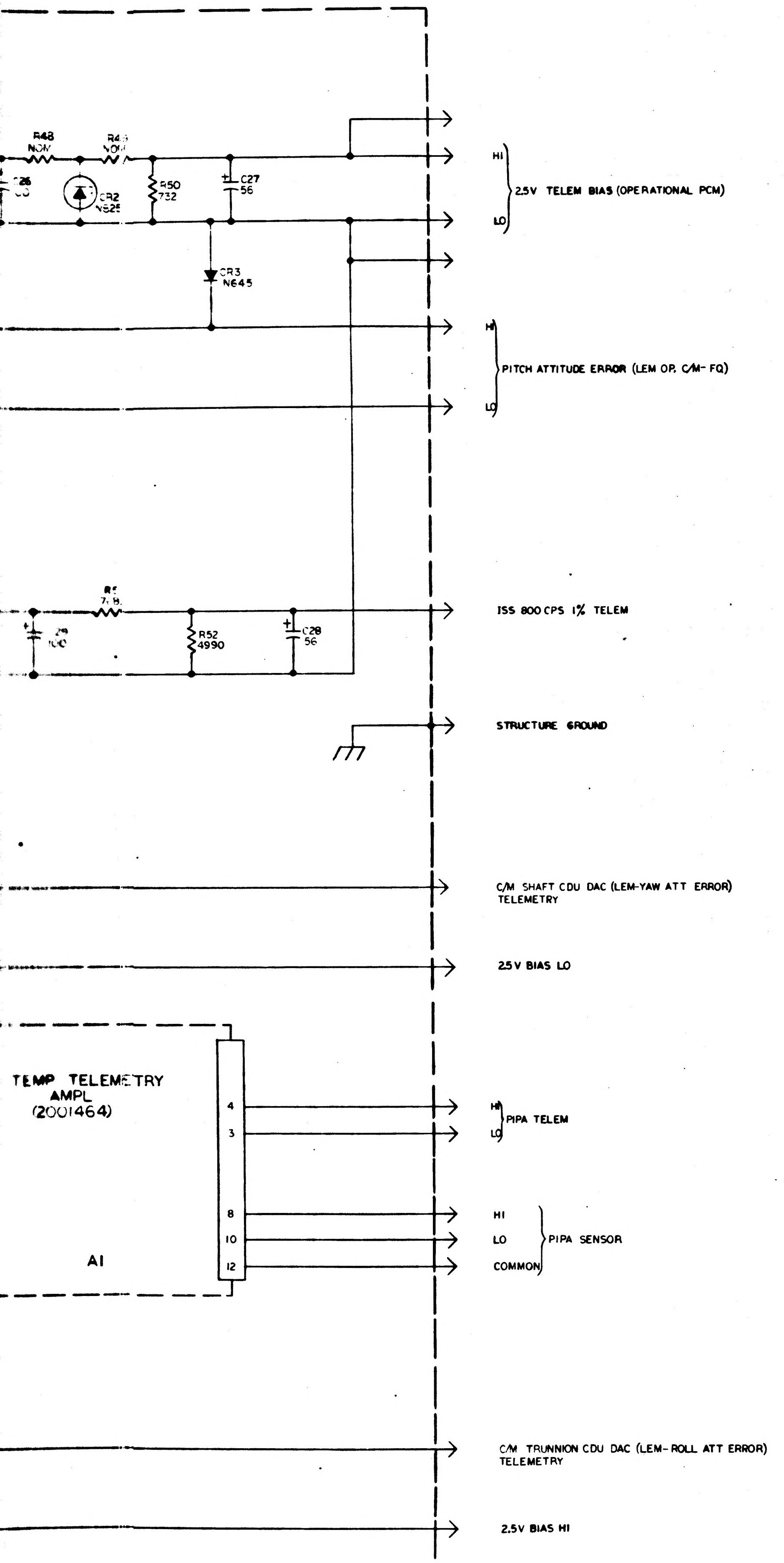
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5 V BIAS

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010124
SCALE ——
SHEET 1 OF 1

2010124 G

3/2010124



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35 VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470 PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R53	
PART NO.	VALUE
1010364-589	57.6K
-591	59.0K
-593	60.4K
-595	61.9K
-597	63.4K
-599	64.9K
-601	66.5K
-603	68.1K
-605	69.8K
-607	71.5K
-609	73.2K
-611	75.0K
-613	76.8K
-615	78.7K
-617	80.6K
-619	82.5K
-621	84.4K
-623	86.6K
-625	88.7K
-627	90.9K
-629	93.1K
-631	95.3K
-633	97.6K
-635	100.0K
-637	102.0K
-639	105.0K
-641	107.0K
-643	110.0K
-645	113.0K
-647	115.0K
-649	118.0K
-651	121.0K
-653	124.0K
-655	127.0K
-657	130.0K
-659	133.0K
-661	137.0K
-663	140.0K
-665	143.0K
-667	147.0K
1010364-669	150.0K

R48	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5V BIAS ASSY
DWG NO.

REVISIONS 25505						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

3H

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± —— ± —— ± ——
DO NOT SCALE THIS DRAWING
MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 18 MAY 66
CHECKED 20 MAY 66
APPROVED
APPROVED
APPROVED MIT M G Morley 1-25-66
APPROVED MSC A. C. METZGER
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
DAC PIPA TEMP AND 2.5 V BIAS

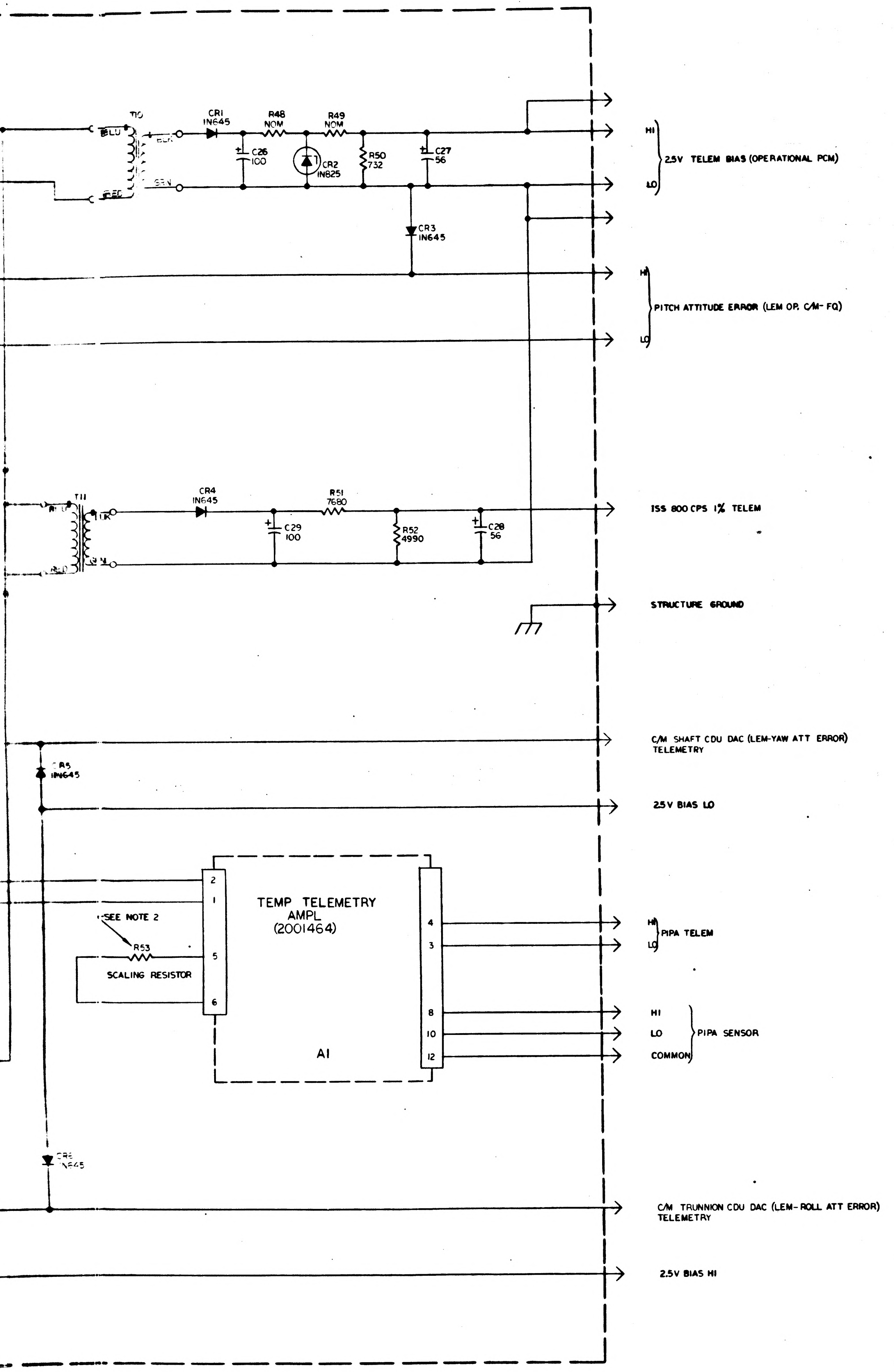
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE ——
SHEET 1 OF 1

2010124

2010124

REVISIONS

SYM	ZONE	DESCRIPTION


T10
BLU
BLK
RED
GRN
CR1
IN645
R48
NOM
R49
NOM
C26
100
CR2
IN825
R50
732
C27
56
CR3
IN645
HI
LO
2.5V TELEM BIAS (OPERATIONAL PCM)
HI
LO
PITCH ATTITUDE ERROR (LEM OP. C/M- FQ)
T11
BLU
BLK
RED
GRN
CR4
IN645
C29
100
R51
7680
R52
4990
C28
56
ISS 800 CPS 1% TELEM
STRUCTURE GROUND
C/M SHAFT CDU DAC (LEM-YAW ATT ERROR) TELEMETRY
CR5
IN645
2.5V BIAS LO
TEMP TELEMETRY AMPL (2001464)
A1
2
1
5
6
4
3
8
10
12
SEE NOTE 2
R53
SCALING RESISTOR
HI
LO
PIPA TELEM
HI
LO
COMMON
PIPA SENSOR
CR6
IN645
C/M TRUNNION CDU DAC (LEM-ROLL ATT ERROR) TELEMETRY
2.5V BIAS HI

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-138		1330	±1%	1/10W
R23	1010364-707		237K	±1%	1/8W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-138		1330	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010311-138	RESISTOR	1330	±1%	1/10 W
R46	1010311-138	RESISTOR	1330	±1%	1/10 W
R48	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
R49	SEE NOTE 2		NOM	±1%	1/8 W
R50	1010364-225		732	±1%	1/8 W
R51	1010364-421		7680	±1%	1/8 W
R52	1010364-385		4990	±1%	1/8 W
R53	SEE NOTE 2	RESISTOR	NOM	±1%	1/8 W
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470 PF	±2%	500VDC
C3	SEE NOTE 2		NOM	±2%	
C4	1006755-31		10	±10%	20VDC
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-16		1.9		6
C9	1010279-16		1.9	±10%	6 VDC
C10	1010410-9		470PF	±2%	500VDC
C11	SEE NOTE 2		NOM	±2%	
C12	1006755-31		10	±10%	20 VDC
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-106		0.34		15
C17	1010279-108		0.5	±10%	15 VDC
C18	1010410-9		470 PF	±2%	500VDC
C19	SEE NOTE 2		NOM	±2%	
C20	1006755-31		10	±10%	20VDC
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-106		0.34		15
C25	1010279-108		0.5		15
C26	1006755-40		100		20
C27	1006755-4		56		6
C28	1006755-4		56		6
C29	1006755-40	CAPACITOR	100	±10%	20VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010259-000		IN825		
CR3	1010837-001		IN645		
CR4	1010837-001		IN645		
CR5	1010837-001		IN645		
CR6	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010466	TRANSFORMER			
A1	2001464	AMPLIFIER			

C3, C11 AND C19		
PART NO.	VALUE	RATING
1010410-1	220 PF	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200 PF	300 VDC

R11, R25 AND R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9 K
-299	63.4 K
-300	64.9 K
-301	66.5 K
-302	68.1 K
-303	69.8K
-304	71.5 K
-305	73.2 K
-306	75.0 K
-307	76.8 K
-308	78.7 K
-309	80.6 K
-310	82.5 K
-311	84.5 K
-312	86.6 K
-313	88.7 K
1010311-314	90.9 K

R53	
PART NO.	VALUE
1010364-589	57.6K
-591	59.0K
-593	60.4K
-595	61.9 K
-597	63.4 K
-599	64.9 K
-601	66.5 K
-603	68.1 K
-605	69.8 K
-607	71.5 K
-609	73.2 K
-611	75.0 K
-613	76.8 K
-615	78.7 K
-617	80.6K
-619	82.5K
-621	84.4K
-623	86.6 K
-625	88.7 K
-627	90.9 K
-629	93.1 K
-631	95.3 K
-633	97.6 K
-635	100.0K
-637	102.0K
-639	105.0K
-641	107.0 K
-643	110.0 K
-645	113.0 K
-647	115.0 K
-649	118.0 K
-651	121.0 K
-653	124.0 K
-655	127.0 K
-657	130.0K
-659	133.0 K
-661	137.0 K
-663	140.0K
-665	143.0K
-667	147.0K
1010364-669	150.0K

R48	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R49	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
DAC PIPA TEMP AND 2.5 V BIAS ASSY
DWG NO.

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

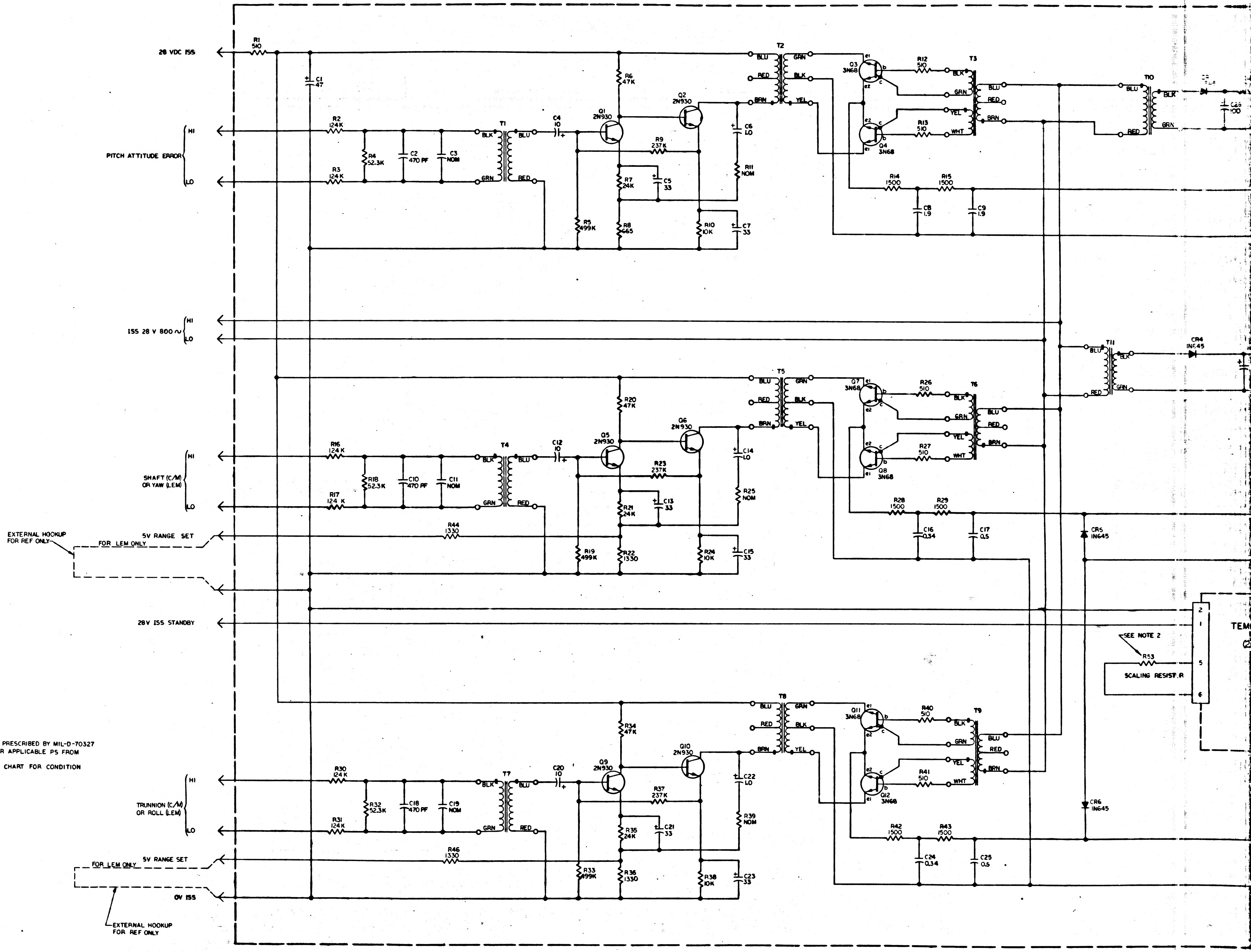
DRAWN 10 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT W G Marley
APPROVED MSC A. C. METZGER
DATE

MANNED SPA ECRAFT CENTER
HOUS ON, TEXAS

SCHE ATIC
SIGNAL NER
DAC PIPA TEM AN 5 V BIA

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010124
SCALE —
SHEET

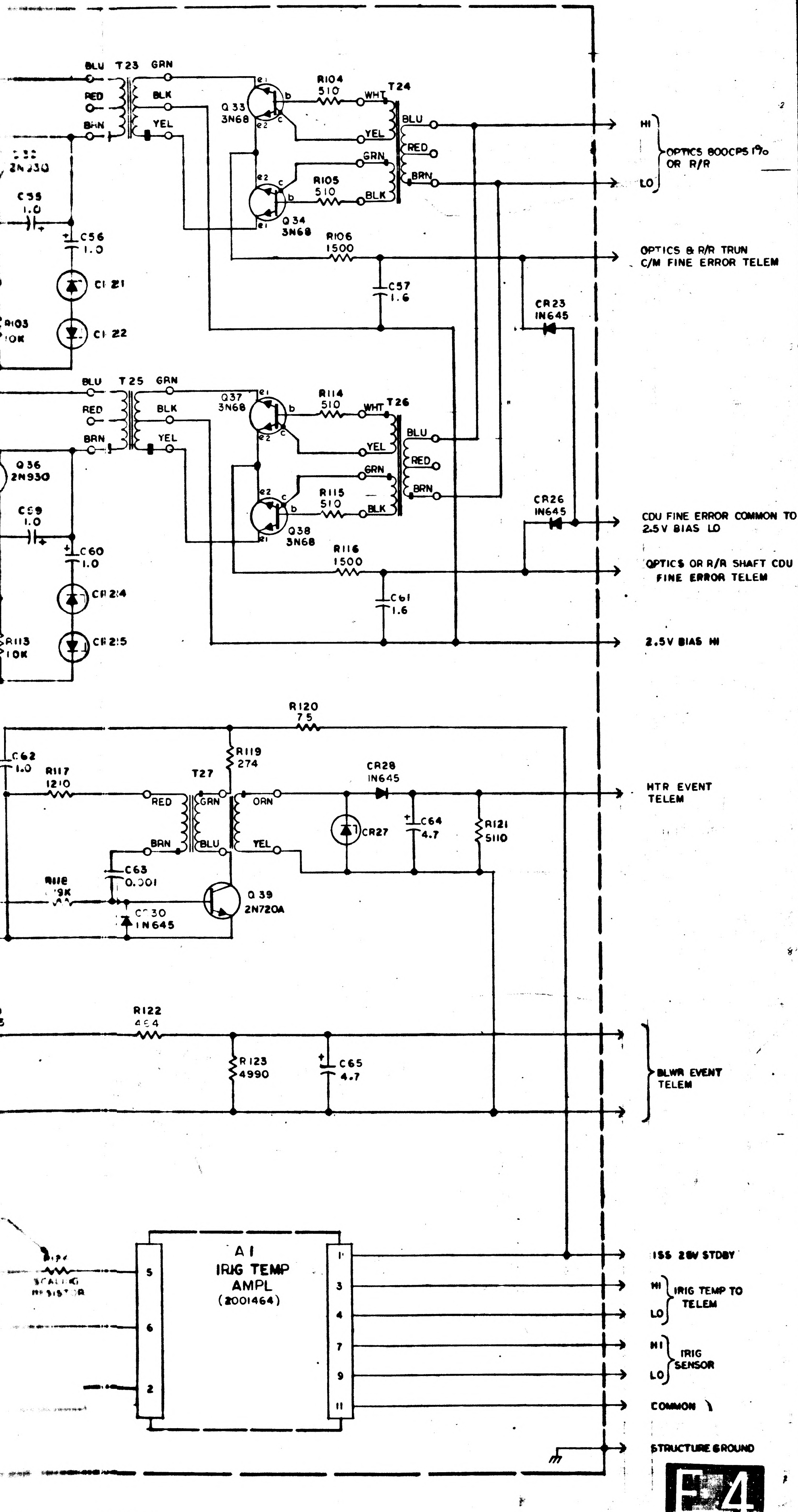
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


28 VDC ISS
R1 510
C1 47
PITCH ATTITUDE ERROR
HI
LO
R2 124K
R3 124K
R4 52.3K
C2 470 PF
C3 NOM
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
Q2 2N930
R5 499K
R6 47K
R7 24K
R8 665
R9 237K
C5 33
C6 LO
R10 10K
R11 NOM
C7 33
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
e1 e2 b c
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 1.9
C9 1.9
T10
BLU
RED
BLK
GRN
C26 100
ISS 28 V 800 ~
HI
LO
T11
CR4 IN645
T4
R16 124 K
R17 124 K
R18 52.3K
C10 470 PF
C11 NOM
C12 10
Q5 2N930
Q6 2N930
R19 499K
R20 47K
R21 24K
R22 1330
R23 237K
C13 33
C14 LO
R24 10K
R25 NOM
C15 33
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.34
C17 0.5
CR5 IN645
SHAFT (C/M) OR YAW (LEM)
EXTERNAL HOOKUP FOR REF ONLY
FOR LEM ONLY
5V RANGE SET
R44 1330
28V ISS STANDBY
SEE NOTE 2
R53
SCALING RESISTOR
2 1 5 6
TEM
T7
TRUNNION (C/M) OR ROLL (LEM)
R30 124 K
R31 124 K
R32 52.3K
C18 470 PF
C19 NOM
C20 10
Q9 2N930
Q10 2N930
R33 499K
R34 47K
R35 24K
R36 1330
R37 237K
C21 33
C22 LO
R38 10K
R39 NOM
C23 33
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.34
C25 0.5
CR6 IN645
FOR LEM ONLY
5V RANGE SET
R46 1330
0V ISS
EXTERNAL HOOKUP FOR REF ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R48, R49, C3, C11 AND C19 PER APPLICABLE PS FROM APPROPRIATE CHART
3. SELECT R53 PER APPLICABLE PS FROM APPROPRIATE CHART FOR CONDITION ACCEL ±2.5°F AS MARKED ON AMPLIFIER 2001464

2010124



E-4

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-25	RESISTOR	510	± 2%	1/4 W
R 2	1010364-653		124K	± 1%	1/8 W
R 3	1010364-653		124K	± 1%	1/8 W
R 4	1010311-291		52.3K	± 1%	1/10 W
R 5	1010364-769		499K	± 1%	1/8 W
R 6	1006750-72		47K	± 2%	1/4 W
R 7	1006750-65		24K	± 2%	1/4 W
R 8	1010311-109		665	± 1%	1/10 W
R 9	1010364-707		237K	± 1%	1/8 W
R10	1006750-56		10K	± 2%	1/4 W
R11	SEE NOTE 2		NOM	± 1%	1/10 W
R12	1006750-25		510	± 2%	1/4 W
R13	1006750-25		510	± 2%	1/4 W
R14	1006750-36		1500	± 2%	1/4 W
R15	1006750-36		1500	± 2%	1/4 W
R16	1010364-653		124K	± 1%	1/8 W
R17	1010364-653		124K	± 1%	1/8 W
R18	1010311-291		52.3K	± 1%	1/10 W
R19	1010364-769		499K	± 1%	1/8 W
R20	1006750-72		47K	± 2%	1/4 W
R21	1006750-65		24K	± 2%	1/4 W
R22	1010311-109		665	± 1%	1/10 W
R23	1010364-707		237K	± 1%	1/8 W
R24	1006750-56		10K	± 2%	1/4 W
R25	SEE NOTE 2		NOM	± 1%	1/10 W
R26	1006750-25		510	± 2%	1/4 W
R27	1006750-25		510	± 2%	1/4 W
R28	1006750-36		1500	± 2%	1/4 W
R29	1006750-36		1500	± 2%	1/4 W
R30	1010364-653		124K	± 1%	1/8 W
R31	1010364-653		124K	± 1%	1/8 W
R32	1010311-291		52.3K	± 1%	1/10 W
R33	1010364-769		499K	± 1%	1/8 W
R34	1006750-72		47K	± 2%	1/4 W
R35	1006750-65		24K	± 2%	1/4 W
R36	1010311-109		665	± 1%	1/10 W
R37	1010364-707		237K	± 1%	1/8 W
R38	1006750-56		10K	± 2%	1/4 W
R39	SEE NOTE 2		NOM	± 1%	1/10 W
R40	1006750-25		510	± 2%	1/4 W
R41	1006750-25		510	± 2%	1/4 W
R42	1006750-36		1500	± 2%	1/4 W
R43	1006750-36		1500	± 2%	1/4 W
R44	1010364-225		732	± 1%	1/8 W
R45	SEE NOTE 2		NOM	± 1%	1/8 W
R46	SEE NOTE 2		NOM	± 1%	1/8 W
R47	1010364-411		6810	± 1%	1/8 W
R48	1010364-411		6810	± 1%	1/8 W
R49	1010364-495		18.7K	± 1%	1/8 W
R50	1010364-769		499K	± 1%	1/8 W
R51	1006750-72		47K	± 2%	1/4 W
R52	1006750-65		24K	± 2%	1/4 W
R53	1010311-167		2670	± 1%	1/10 W
R54	1010364-707		237K	± 1%	1/8 W
R55	1006750-56		10K	± 2%	1/4 W
R56	1010311-306		75K	± 1%	1/10 W
R57	1006750-1		51	± 2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	± 2%	1/4 W
R63	1010364-411		6810	± 1%	1/8 W
R64	1010364-411		6810	± 1%	1/8 W
R65	1010364-495		18.7K	± 1%	1/8 W
R66	1010364-769		499K	± 1%	1/8 W
R67	1006750-72		47K	± 2%	1/4 W
R68	1006750-65		24K	± 2%	1/4 W
R69	1010311-167		2670	± 1%	1/10 W
R70	1010364-707		237K	± 1%	1/8 W
R71	1006750-56		10K	± 2%	1/4 W
R72	1010311-306		75K	± 1%	1/10 W
R73	1006750-1		51	± 2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	± 2%	1/4 W
R79	1010364-453		11.3K	± 1%	1/8 W
R80	1010364-453		11.3K	± 1%	1/8 W
R81	1010364-449		10.7K	± 1%	1/8 W
R82	1010364-769		499K	± 1%	1/8 W
R83	1006750-72		47K	± 2%	1/4 W
R84	1006750-65		24K	± 2%	1/4 W
R85	1010311-167		2670	± 1%	1/10 W
R86	1010364-707		237K	± 1%	1/8 W
R87	1006750-56		10K	± 2%	1/4 W
R88	1010311-306		75K	± 1%	1/10 W
R89	1006750-1		51	± 2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	± 2%	1/4 W
R96	1010364-735		332K	± 1%	1/8 W
R97	1010364-673		158K	± 1%	1/8 W
R98	1010364-707		237K	± 1%	1/8 W
R99	1010364-769		499K	± 1%	1/8 W
R100	1006750-72		47K	± 2%	1/4 W
R101	1006750-65		24K	± 2%	1/4 W
R102	1010364-735		332K	± 1%	1/8 W
R103	1006750-56		10K	± 2%	1/4 W
R104	1006750-25		510	± 2%	1/4 W
R105	1006750-25		510	± 2%	1/4 W
R106	1006750-36		1500	± 2%	1/4 W
R107	1010364-735		332K	± 1%	1/8 W
R108	1010364-769		499K	± 1%	1/6 W
R109	1010364-707		237K	± 1%	1/8 W
R110	1006750-72		47K	± 2%	1/4 W
R111	1006750-65		24K	± 2%	1/4 W
R112	1010364-735		332K	± 1%	1/8 W
R113	1006750-56		10K	± 2%	1/4 W
R114	1006750-25		510	± 2%	1/4 W
R115	1006750-25		510	± 2%	1/4 W
R116	1006750-36		1500	± 2%	1/4 W
R117	1010364-267		1210	± 1%	1/8 W
R118	1010368-787		619K		1/4 W
R119	1010452-101		274		1 W
R120	1010364-35		75		1/8 W
R121	1010364-387		5110		1/8 W
R122	1010364-187		464		1/8 W
R123	1010364-385		4990		1/8 W
R124	SEE NOTE 3		NOM	± 1%	1/8 W
R125	1006750-30		820	± 2%	1/4 W
R126	1006750-30	RESISTOR	820	± 2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470PF	± 2	500
C3	SEE NOTE 2		NOM	± 2	—
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-9		470PF	± 2	500
C11	SEE NOTE 2		NOM	± 2	—
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-9		470PF	± 2 %	500
C19	SEE NOTE 2		NOM	± 2 %	—
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	± 2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	± 2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	± 2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	± 5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		IN645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		IN645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		IN645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		IN645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29	1010837-001		IN645		
CR30	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
Q25	1010367	CHOPPER	3N68		
Q26	1010367	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367	CHOPPER	3N68		
Q30	1010367	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367	CHOPPER	3N68		
Q34	1010367	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367	CHOPPER	3N68		
Q38	1010367	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
A1	2001464	AMPLIFIER			

C3, C11, C19		
PART NO.	VALUE	RATING
1010410-1	220	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200	300VDC

R46	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R11, R25, R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

R124	
PART NO.	VALUE
1010364-471	14 K
-473	14.3K
-475	14.7K
-477	15 K
-479	15.4K
-481	15.8K
-483	16.2K
-485	16.5K
1010364-487	16.9K

REVISIONS 25828

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & IX SINE
GIMBAL RESOLVER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN a. Di Leo
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. Q. METZGER
APPROVED MSC
DATE

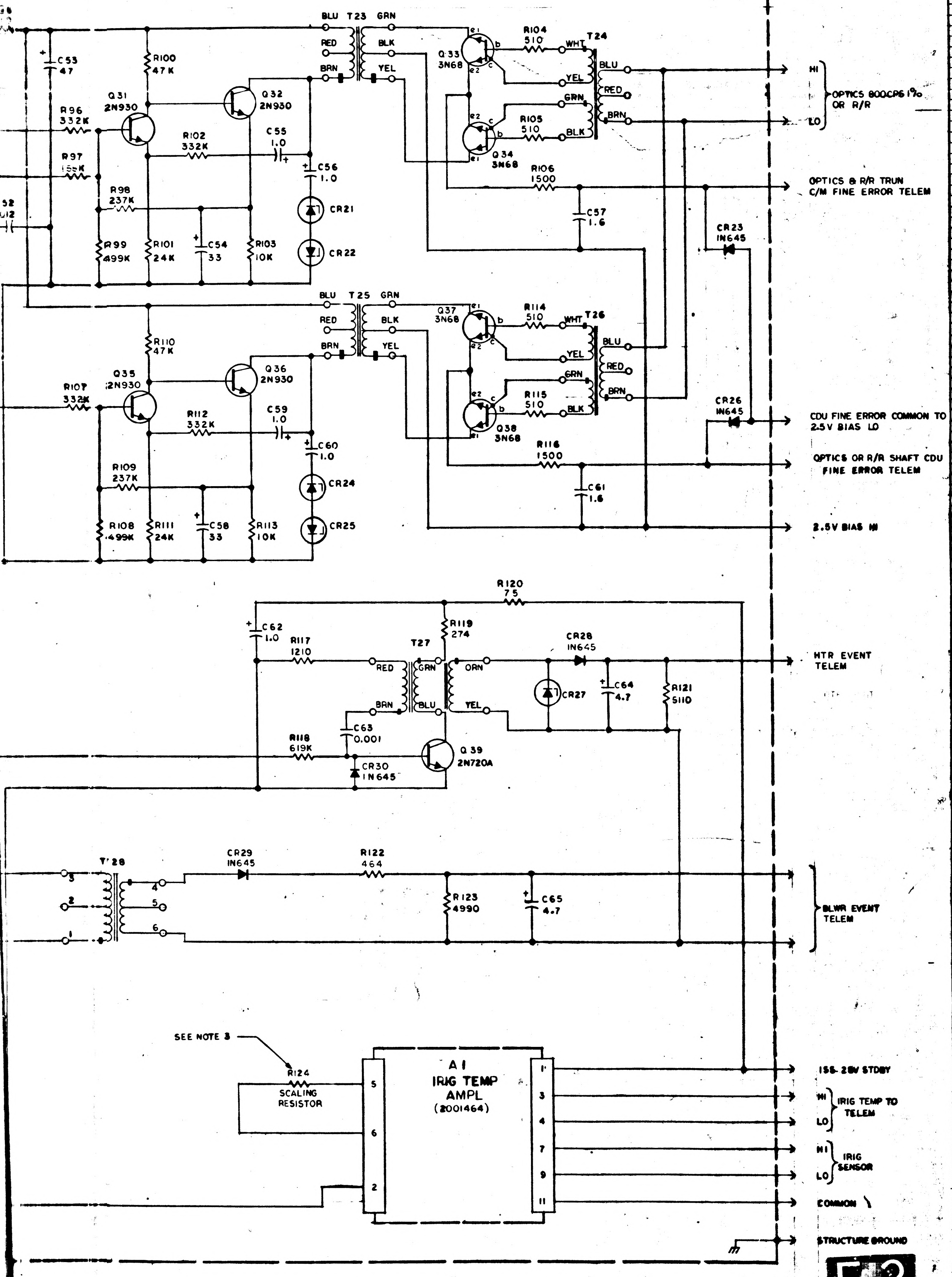
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & IX SINE GIMBAL RSVR

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010125

SCALE — SHEET 1 OF 1

2010125 A


5
4
3
2
C53 47
R100 47K
R96 332K
Q31 2N930
Q32 2N930
R97 158K
R102 332K
C55 1.0
C56 1.0
R98 237K
CR21
CR22
R99 499K
R101 24K
C54 33
R103 10K
BLU T23 GRN
RED
BLK
BRN
YEL
Q33 3N68
R104 510
WHT T24
YEL
GRN
BLU
RED
BRN
BLK
R105 510
Q34 3N68
R106 1500
C57 1.6
CR23 IN645
HI
LO
OPTICS 800CPS 1% OR R/R
OPTICS & R/R TRUN C/M FINE ERROR TELEM
BLU T25 GRN
Q37 3N68
R114 510
WHT T26
R110 47K
R107 332K
Q35 2N930
Q36 2N930
R112 332K
C59 1.0
C60 1.0
CR24
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CR25
R115 510
Q38 3N68
R116 1500
C61 1.6
CR26 IN645
CDU FINE ERROR COMMON TO 2.5V BIAS LO
OPTICS OR R/R SHAFT CDU FINE ERROR TELEM
2.5V BIAS HI
R120 75
C62 1.0
R117 1210
R119 274
T27
RED
GRN
ORN
CR28 IN645
BRN
BLU
YEL
CR27
C64 4.7
R121 5110
HTR EVENT TELEM
R118 619K
C63 0.001
CR30 IN645
Q39 2N720A
T'28
CR29 IN645
R122 464
R123 4990
C65 4.7
BLWR EVENT TELEM
SEE NOTE 3
R124 SCALING RESISTOR
A1 IRIG TEMP AMPL (2001464)
15S 28V STDBY
HI IRIG TEMP TO TELEM LO
HI IRIG SENSOR LO
COMMON
STRUCTURE GROUND

2010125 A

E3

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	10C6750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	SEE NOTE 2		NOM	±1%	1/8 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	↓ -36		1500	↓	↓
R62	10C6750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	↓ -36		1500	↓	↓
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R97	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	↓ -36		1500	↓	↓
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010368-787		619K		1/4 W
R119	1010452-101		274		1 W
R120	1010364-35		75		1/8 W
R121	1010364-387		5110		1/8 W
R122	1010364-187		464		1/8W
R123	1010364-385		4990	↓	1/8W
R124	SEE NOTE 3		NOM	±1%	1/8W
R125	1006750-30	↓	820	±2%	1/4W
R126	1006750-30	RESISTOR	820	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470PF	±2	500
C3	SEE NOTE 2		NOM	±2	—
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28	↓	6
C9	1010279-4		0.19	±10%	6
C10	1010410-9		470PF	±2	500
C11	SEE NOTE 2		NOM	±2	—
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9	↓	6
C17	1010279-16		1.9	±10%	6
C18	1010410-9		470PF	±2%	500
C19	SEE NOTE 2		NOM	±2%	—
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100	↓	20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19	↓	6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19	↓	6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28	↓	6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6	↓	15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037	↓	4.7	±10%	50 ↓
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		IN645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		IN645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		IN645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		IN645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29	1010837-001	↓	IN645		
CR30	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
Q25	1010367	CHOPPER	3N68		
Q26	1010367	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367	CHOPPER	3N68		
Q30	1010367	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367	CHOPPER	3N68		
Q34	1010367	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367	CHOPPER	3N68		
Q38	1010367	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310	↓			
T28	1010282	TRANSFORMER			
A1	2001464	AMPLIFIER			

C3, C11, C19		
PART NO.	VALUE	RATING
1010410-1	220	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	↓
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
↓ -18	1100	↓ ↓
1010410-19	1200	300VDC

R46	
PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
↓ -129	232
1010364-133	243

R11, R25, R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
↓ -313	88.7K
1010311-314	90.9K

R45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
↓ -263	1150
1010364-265	1180

R124	
PART NO.	VALUE
1010364-471	14 K
-473	14.3K
-475	14.7K
-477	15 K
-479	15.4K
-481	15.8K
-483	16.2K
↓ -485	16.5K
1010364-487	16.9K

REVISIONS 2581 F

SYM	ZONE	DESCRIPTION	DR		DATE	
A		REVISED PER TDRR 30030	A			KK

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

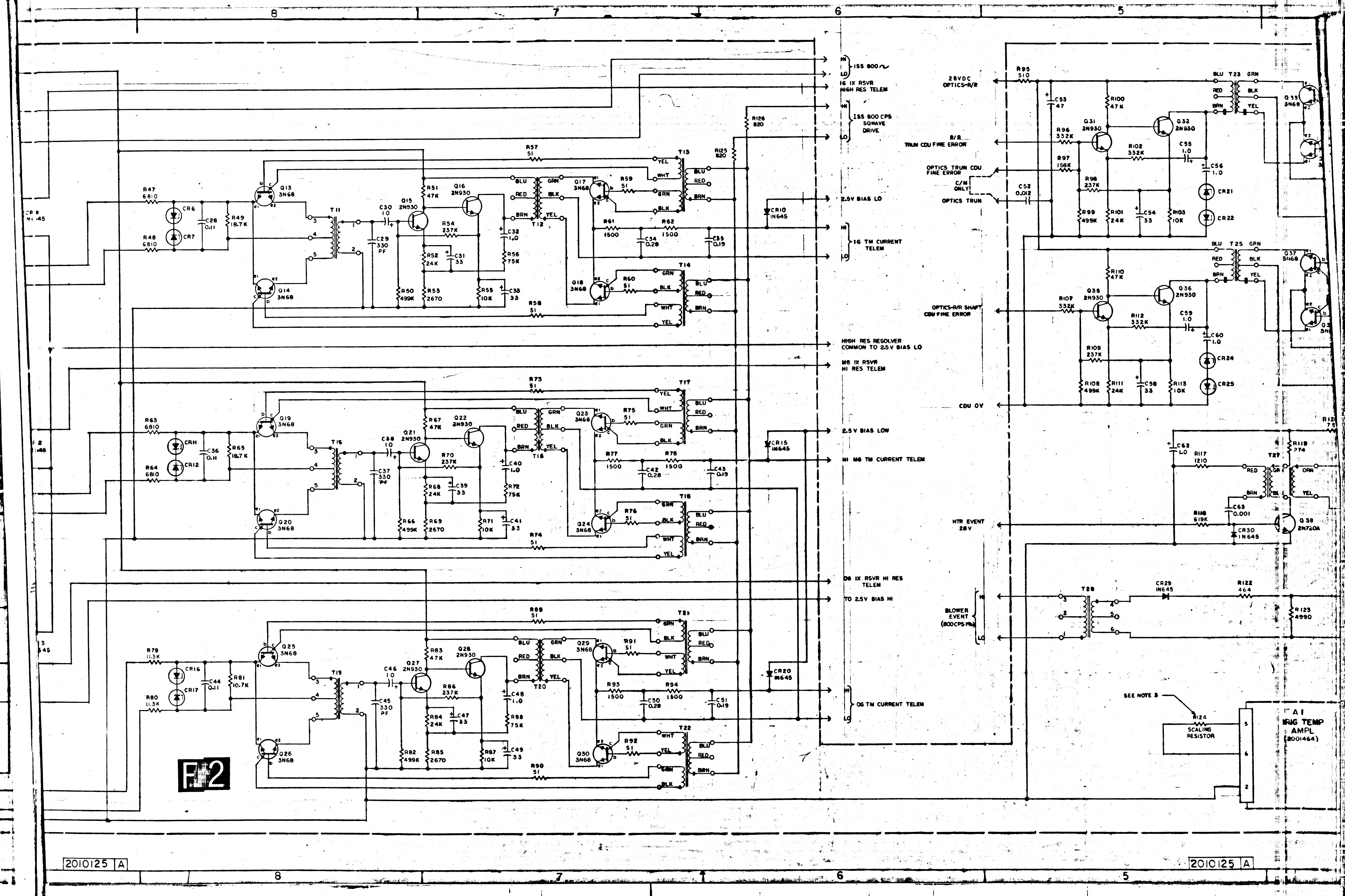
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

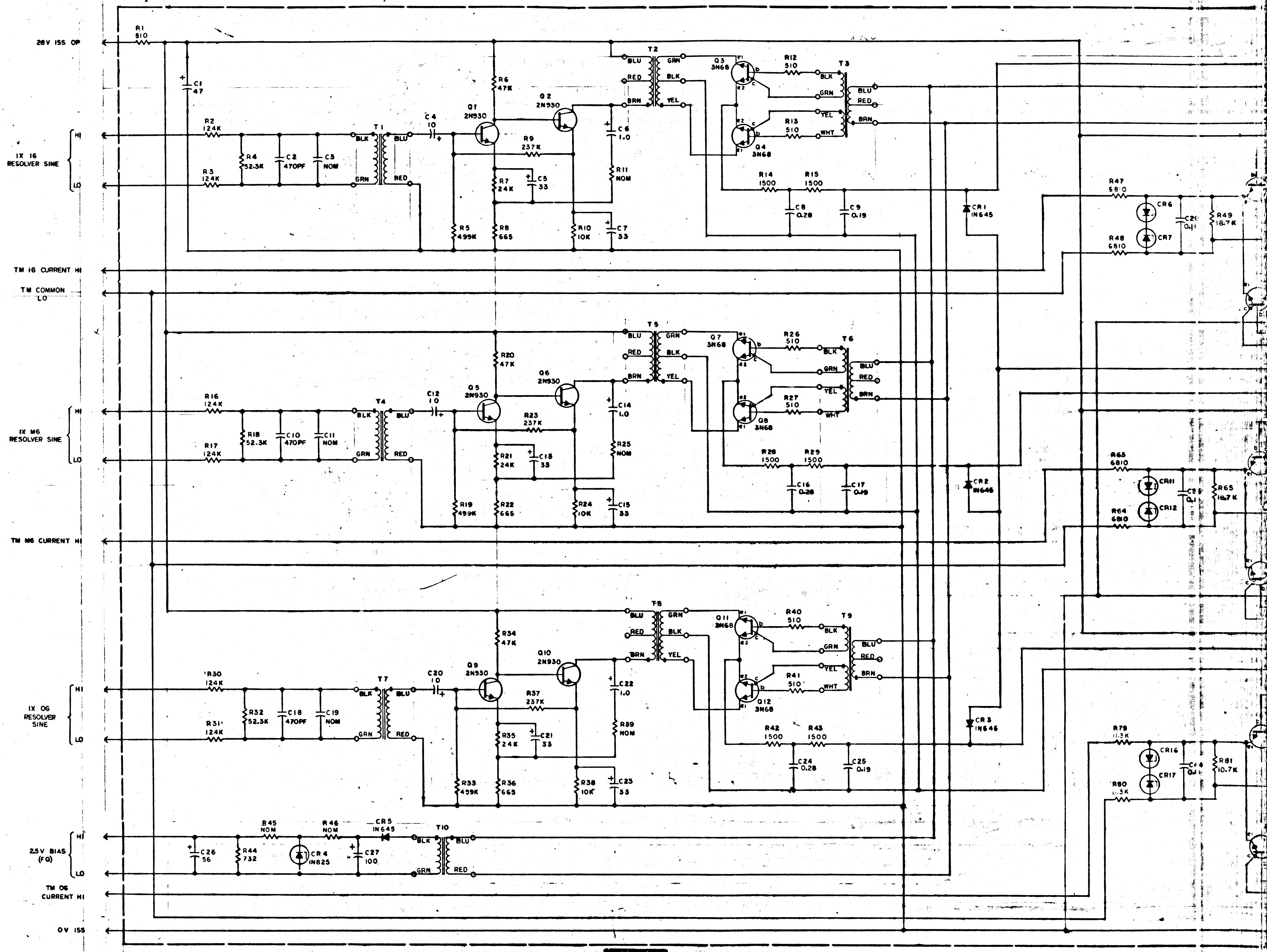
DRAWN A. Di doo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT W Ryder A. L. METZGER
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RESOLVER

CODE IDENT NO. 80230 SIZE J DRAWING NO. 2010125
SCALE —

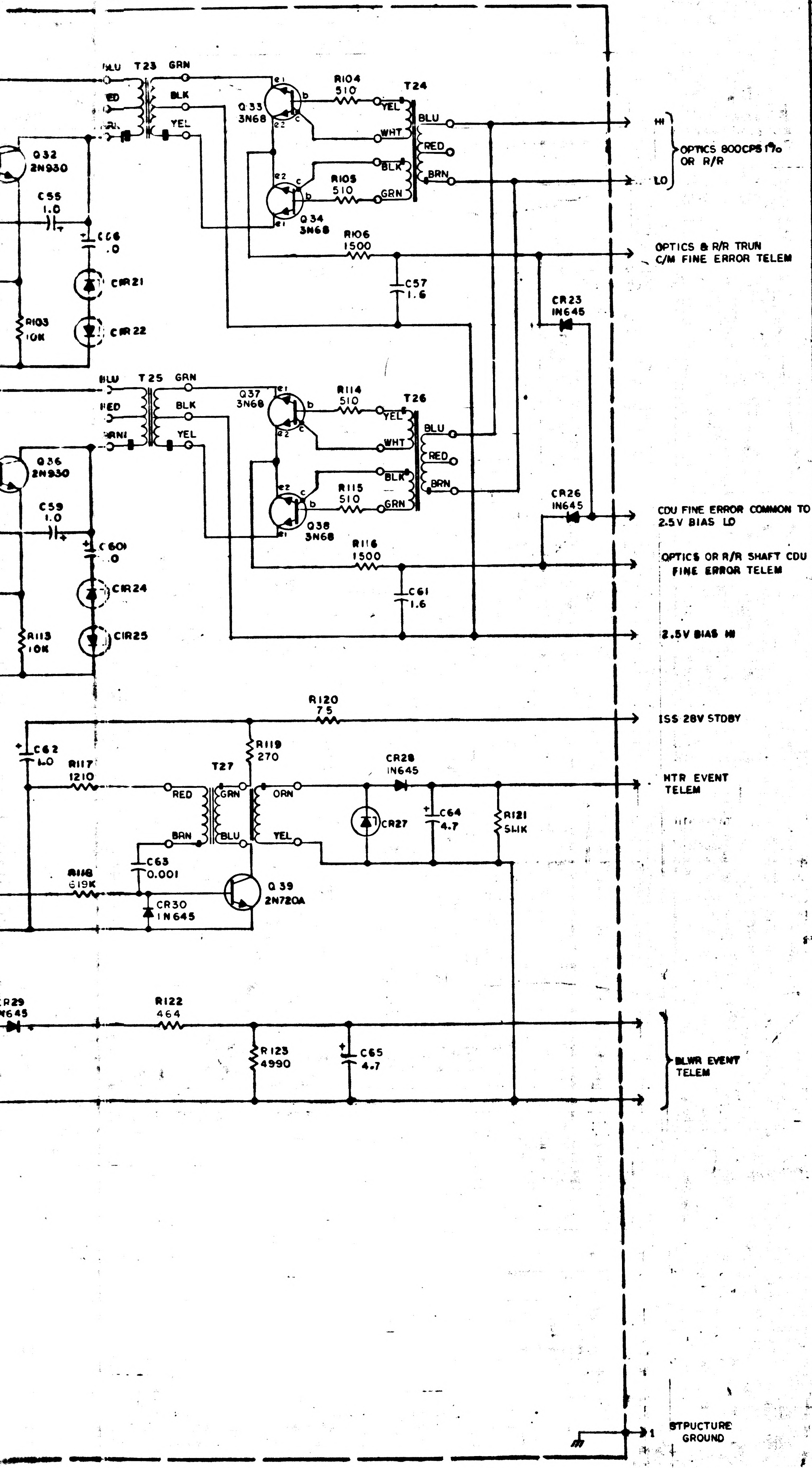

8
7
6
5
ISS 800~
HI
LO
16 IX RSVR
HIGH RES TELEM
ISS 800 CPS
SQWAVE
DRIVE
2.5V BIAS LO
16 TM CURRENT
TELEM
HIGH RES RESOLVER
COMMON TO 2.5V BIAS LO
M6 IX RSVR
HI RES TELEM
2.5V BIAS LOW
HI M6 TM CURRENT TELEM
O6 IX RSVR HI RES
TELEM
TO 2.5V BIAS HI
O6 TM CURRENT TELEM
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 1.0
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
T12
BLU
RED
BRN
GRN
BLK
YEL
WHT
R57 51
R58 51
T13
T14
Q17 3N68
Q18 3N68
R59 51
R60 51
R61 1500
R62 1500
C34 0.28
C35 0.19
R125 820
R126 820
CR10 1N645
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 1.0
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
T16
R73 51
R74 51
T17
T18
Q23 3N68
Q24 3N68
R75 51
R76 51
R77 1500
R78 1500
C42 0.28
C43 0.19
CR15 1N645
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 1.0
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
T20
R89 51
R90 51
T21
T22
Q29 3N68
Q30 3N68
R91 51
R92 51
R93 1500
R94 1500
C50 0.28
C51 0.19
CR20 1N645
F2
28VDC
OPTICS-R/R
R95 510
C53 47
R100 47K
Q31 2N930
Q32 2N930
BLU T23 GRN
RED
BLK
BRN
YEL
Q33 3N68
R/R
TRUN CDU FINE ERROR
R96 332K
R102 332K
C55 1.0
C56 1.0
OPTICS TRUN CDU
FINE ERROR
C/M
ONLY
OPTICS TRUN
R97 158K
C52 0.012
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
CR21
CR22
BLU T25 GRN
Q37 3N68
R110 47K
Q35 2N930
Q36 2N930
OPTICS-R/R SHAFT
CDU FINE ERROR
R107 332K
R112 332K
C59 1.0
C60 1.0
R109 237K
CR24
CR25
R108 499K
R111 24K
C58 33
R113 10K
CDU OV
C62 1.0
R117 1210
T27
R119 274
ORN
HTR EVENT
28V
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
BLOWER
EVENT
(800CPS 1Φ)
T28
CR29 1N645
R122 464
R123 4990
SEE NOTE 3
R124
SCALING
RESISTOR
A1
RIG TEMP
AMPL
(2001464)
2010125 A
2010125 A


12
11
10
9
D
C
B
A
28V ISS OP
R1 510
C1 47
R2 124K
R3 124K
R4 52.3K
C2 470PF
C3 NOM
1X 16 RESOLVER SINE
HI
LO
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R5 499K
R6 47K
R7 24K
C5 33
R8 665
R9 237K
Q2 2N930
C6 1.0
R11 NOM
R10 10K
C7 33
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
CR6
CR7
C20 0.11
R49 18.7K
TM 16 CURRENT HI
TM COMMON LO
R16 124K
R17 124K
R18 52.3K
C10 470PF
C11 NOM
1X M6 RESOLVER SINE
T4
C12 10
Q5 2N930
R19 499K
R20 47K
R21 24K
C13 33
R22 665
R23 237K
Q6 2N930
C14 1.0
R25 NOM
R24 10K
C15 33
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
CR11
CR12
R65 18.7K
TM M6 CURRENT HI
R30 124K
R31 124K
R32 52.3K
C18 470PF
C19 NOM
1X 06 RESOLVER SINE
T7
C20 10
Q9 2N930
R33 499K
R34 47K
R35 24K
C21 33
R36 665
R37 237K
Q10 2N930
C22 1.0
R39 NOM
R38 10K
C23 33
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
CR16
CR17
R81 10.7K
2.5V BIAS (FQ)
C26 56
R44 732
CR4 1N825
R45 NOM
R46 NOM
C27 100
CR5 1N645
T10
TM 06 CURRENT HI
0V ISS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R45, R46, C3, C11, C19 PER APPLICABLE P.S. FROM APPROPRIATE CHART
3. SELECT R124 PER APPLICABLE P.S. FROM APPROPRIATE CHART FOR CONDITIONS 1RIG ± 4.0°F AS MARKED ON AMPLIFIER 2001464

2010125 | A



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-187		464	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-30		820	±2%	1/4 W
R126	1006750-30	RESISTOR	820	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470PF	±2	500
C3	SEE NOTE 2		NOM	±2	—
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-9		470PF	±2	500
C11	SEE NOTE 2		NOM	±2	—
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-9		470PF	±2%	500
C19	SEE NOTE 2		NOM	±2%	—
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010837-001		1N645		
CR3	1010837-001		1N645		
CR4	1010259-000		1N825		
CR5	1010837-001		1N645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		1N645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		1N645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		1N645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		1N645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		1N645		
CR27	1010372-12				
CR28	1010837-001		1N645		
CR29	1010837-001		1N645		
CR30	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
Q25	1010367	CHOPPER	3N68		
Q26	1010367	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367	CHOPPER	3N68		
Q30	1010367	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367	CHOPPER	3N68		
Q34	1010367	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367	CHOPPER	3N68		
Q38	1010367	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	101028.	TRANSFORMER			

C3, C11, C19		
PART NO.	VALUE	RATING
1010410-1	220	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200	300VDC

R11, R25, R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				WK
B		REVISED PER TDRR 26612				WK

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

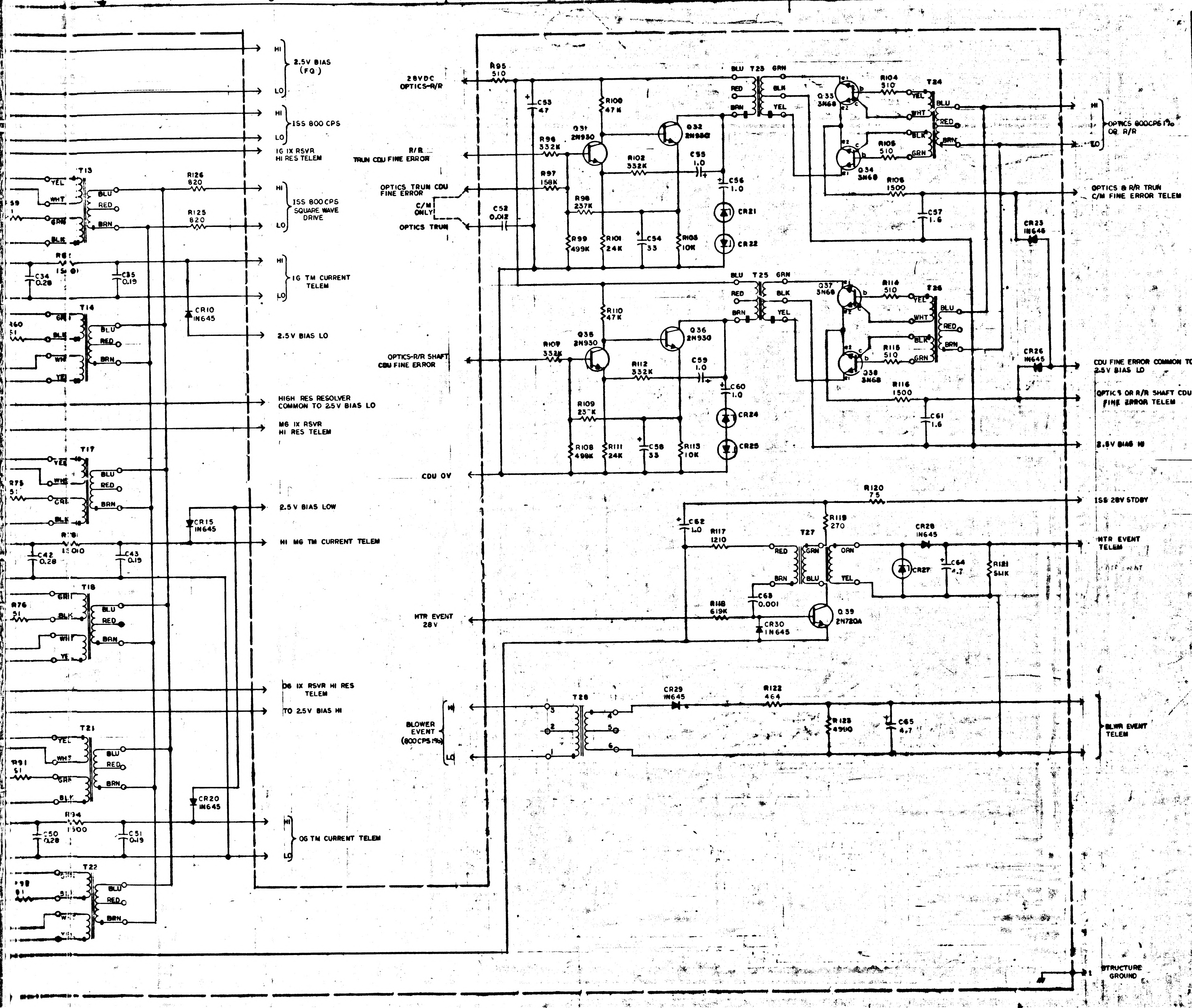
DRAWN a. D. ...
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kuyler
A. C. METZGER
APPROVED NASA
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

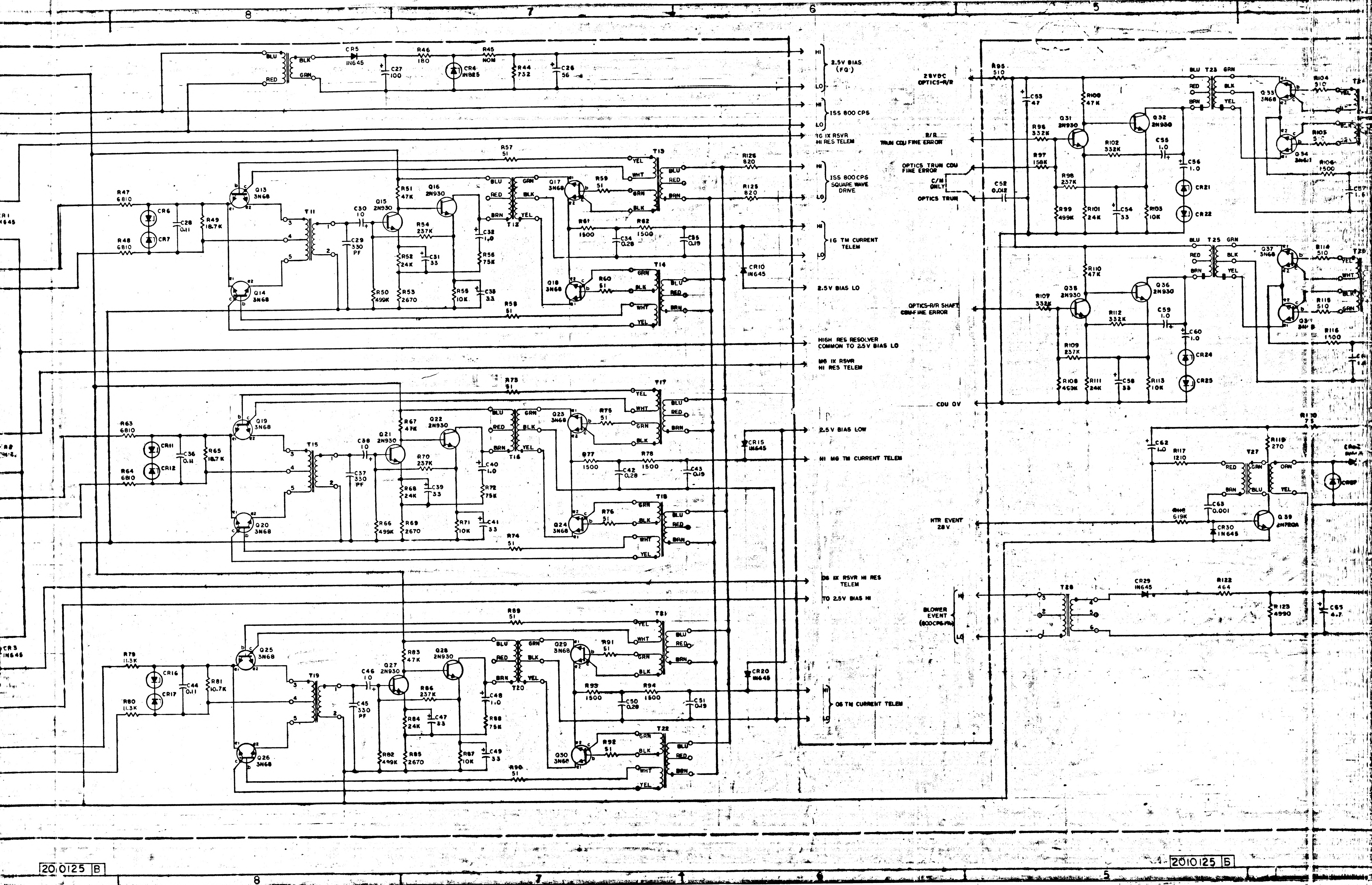
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE —
SHEET 1 OF 1

2010125 B

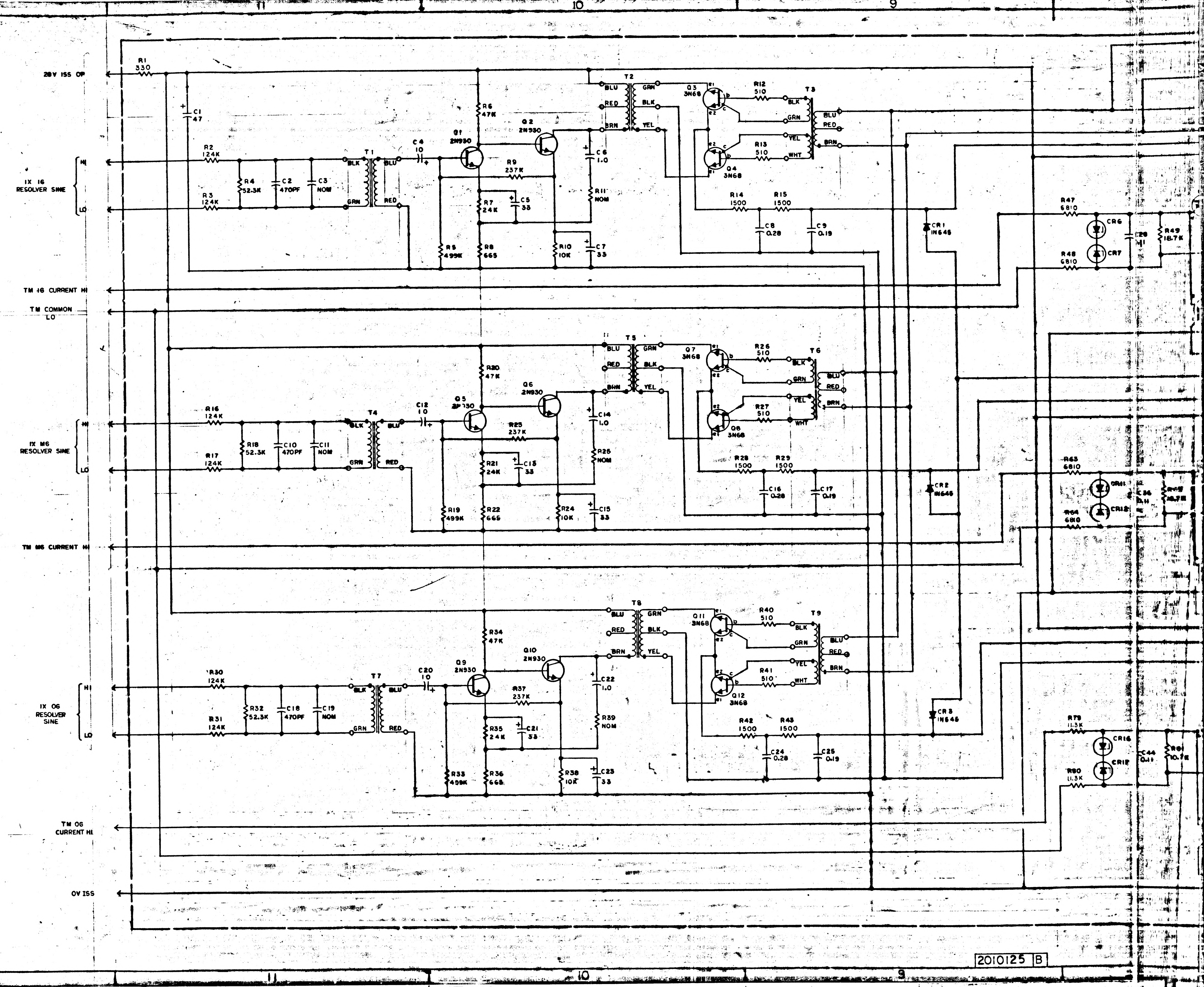

6
5
4
3
2
HI
2.5V BIAS (FQ)
LO
HI
ISS 800 CPS
LO
IG IX RSVR HI RES TELEM
T13
YEL
WHT
GRN
BLK
BLU
RED
BRN
R126 820
HI
ISS 800 CPS SQUARE WAVE DRIVE
R125 820
LO
R81 15.0
C34 0.28
C35 0.19
HI
IG TM CURRENT TELEM
LO
T14
CR10 1N645
2.5V BIAS LO
HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
M6 IX RSVR HI RES TELEM
T17
R75 51
2.5V BIAS LOW
CR15 1N645
HI M6 TM CURRENT TELEM
R81 15.010
C42 0.28
C43 0.19
T18
R76
D6 IX RSVR HI RES TELEM
TO 2.5V BIAS HI
T21
R91 51
CR20 1N645
R94 1500
C50 0.28
C51 0.19
HI
OG TM CURRENT TELEM
LO
T22
28VDC OPTICS-R/R
R95 510
C53 47
R100 47K
Q31 2N930
Q32 2N930
R96 332K
R/R TRUN CDU FINE ERROR
R97 158K
R102 332K
C55 1.0
C56 1.0
OPTICS TRUN CDU FINE ERROR
C/M ONLY
OPTICS TRUN
C52 0.012
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
CR21
CR22
BLU T23 GRN
RED
BLK
BRN
YEL
Q33 3N68
R104 510
T24
YEL
WHT
BLU
RED
BLK
BRN
GRN
R105 510
Q34 3N68
R106 1500
C57 1.6
CR23 1N645
HI
OPTICS 800CPS 1% OR R/R
LO
OPTICS & R/R TRUN C/M FINE ERROR TELEM
BLU T25 GRN
RED
BLK
BRN
YEL
Q37 3N68
R114 510
T26
R110 47K
Q35 2N930
Q36 2N930
R109 332K
OPTICS-R/R SHAFT CDU FINE ERROR
R112 332K
C59 1.0
C60 1.0
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CR24
CR25
R115 510
Q38 3N68
R116 1500
C61 1.6
CR26 1N645
CDU FINE ERROR COMMON TO 2.5V BIAS LO
OPTICS OR R/R SHAFT CDU FINE ERROR TELEM
2.5V BIAS HI
CDU 0V
R120 75
ISS 28V STDBY
C62 1.0
R117 1210
R119 270
T27
RED
GRN
BRN
BLU
ORN
YEL
CR28 1N645
CR27
C64 4.7
R121 51.1K
HTR EVENT TELEM
R118 619K
C63 0.001
Q39 2N720A
CR30 1N645
HTR EVENT 28V
T28
CR29 1N645
R122 464
R123 4990
C65 4.7
HI
BLOWER EVENT (800CPS 1%)
LO
BLWR EVENT TELEM
STRUCTURE GROUND

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-4[illegible]		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-187		464	±1%	1/8W
R123	1010364-385		4990	±1%	1/8W
R125	1006750-30		820	±2%	1/4W
R126	1006750-30	RESISTOR	820	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	4	±10%	35V
C2	1010410-9		4 0PF	±2	500
C3	SEE NOTE 2		N M	±2	—
C4	1006755-31		1	±10%	20
C5	1006755-34		3		20
C6	1006755-69		1.		35
C7	1006755-34		3		20
C8	1010279-6		.28		6
C9	1010279-4		0 19	±10%	6
C10	1010410-9		4 0PF	±2	500
C11	SEE NOTE 2		N M	±2	—
C12	1006755-31		1	±10%	20
C13	1006755-34		3		20
C14	1006755-69		1.		35
C15	1006755-34		3		20
C16	1010279-16		1. 9		6
C17	1010279-16		1. 9	±10%	6
C18	1010410-9		4 0PF	±2%	500
C19	SEE NOTE 2		N M	±2%	—
C20	1006755-31		1	±10%	20
C21	1006755-34		3		20
C22	1006755-69		1 0		35
C23	1006755-34		3		20
C24	1010279-6		.28		6
C25	1010279-4		.19		6
C26	1006755-4		6		6
C27	1006755-40		00		20
C28	1010279-100		.11	±10%	15
C29	1010410-5		30PF	±2%	500
C30	1006755-31		1	±10%	20
C31	1006755-34		3		20
C32	1006755-69		0		35
C33	1006755-34		3		20
C34	1010279-6		.28		6
C35	1010279-4		.19		6
C36	1010279-100		.11	±10%	15
C37	1010410-5		30PF	±2%	500
C38	1006755-31		1	±10%	20
C39	1006755-34		3		20
C40	1006755-69		0		35
C41	1006755-34		3		20
C42	1010279-6		.28		6
C43	1010279-4		.19		6
C44	1010279-100		.11	±10%	15
C45	1010410-5		30PF	±2%	500
C46	1006755-31		0	±10%	20
C47	1006755-34		3		20
C48	1006755-69		0		35
C49	1006755-34		3		20
C50	1010279-6		.28		6
C51	1010279-4		.19	±10%	6
C52	1010264-14		.012	±5%	200
C53	1006755-89		7	±10%	35
C54	1006755-34		3		20
C55	1006755-69		.0		35
C56	1006755-69		.0		35
C57	1010279-114		.6		15
C58	1006755-34		3		20
C59	1006755-118		.0		50
C60	1006755-119		.0		50
C61	1010279-114		.6		15
C62	1010393-029		.0	±10%	35
C63	1010359-17		0.00[illegible]	±10%	20
C64	1010393-037		4.7	±1[illegible]	50
C65	1006755-10	CAPACITOR	4.7	10%	[illegible]
CR1	1010837-001	DIODE	1N645		
CR2	1010837-001		1N645		
CR3	1010837-001		1N645		
CR4	1010259-000		1N825		
CR5	1010837-001		1N645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		1N645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		1N645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		1N645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		1N645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		1N645		
CR27	1010372-12				
CR28	1010837-001		1N645		
CR29	1010837-001		1N645		
CR30	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

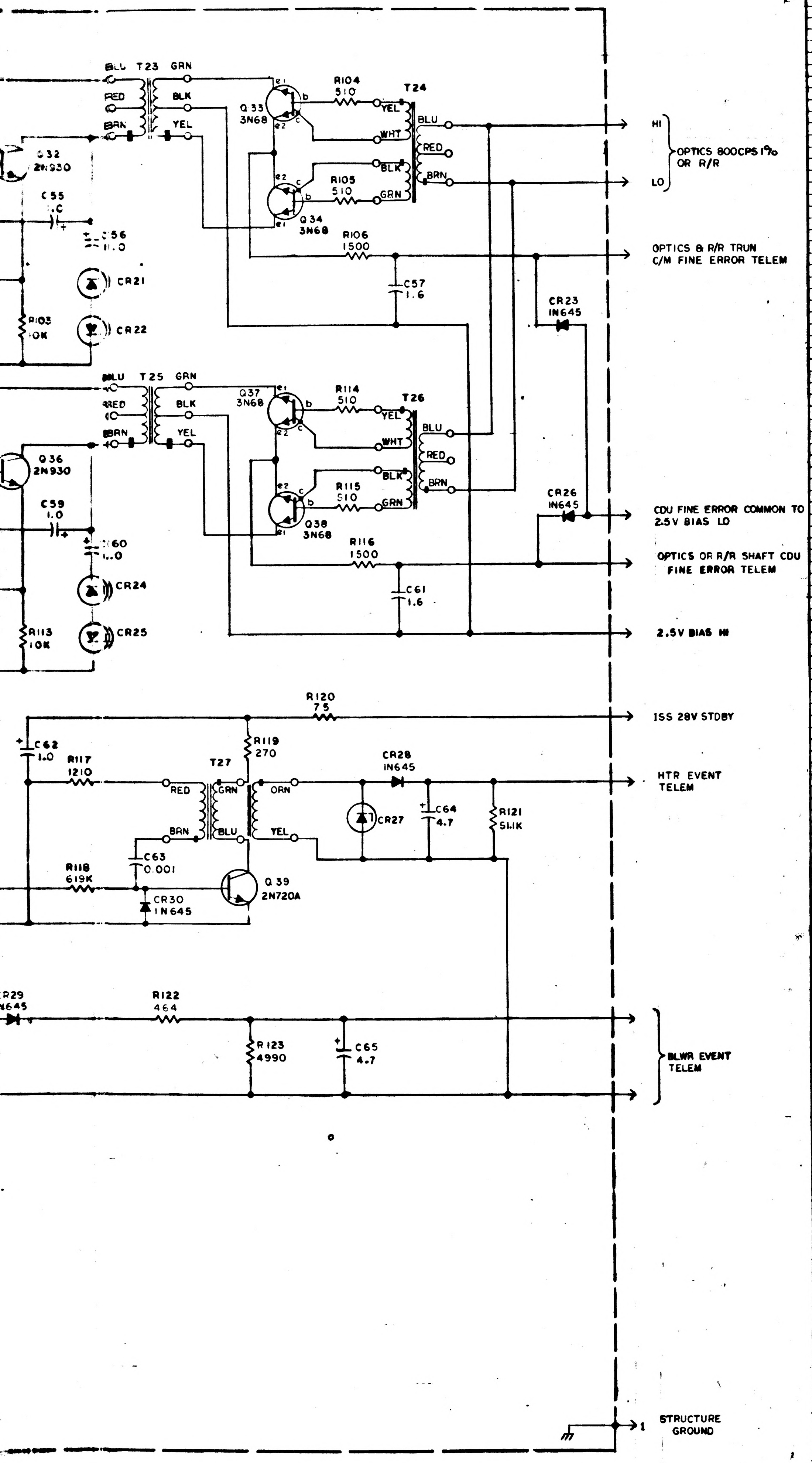


8
7
6
5
2.5V BIAS (FQ)
HI
LO
ISS 800 CPS
1G 1X RSVR HI RES TELEM
ISS 800CPS SQUARE WAVE DRIVE
1G TM CURRENT TELEM
2.5V BIAS LO
HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
MG 1X RSVR HI RES TELEM
2.5V BIAS LOW
HI MG TM CURRENT TELEM
OG 1X RSVR HI RES TELEM
TO 2.5V BIAS HI
OG TM CURRENT TELEM
28VDC OPTICS-R/R
R/R TRUN CDU FINE ERROR
OPTICS TRUN CDU FINE ERROR
C/M ONLY
OPTICS TRUN
OPTICS-R/R SHAFT CDU FINE ERROR
CDU 0V
MTR EVENT 28V
BLOWER EVENT (800CPS-FM)
CR5 1N645
R46 180
R45 NOM
C27 100
CR4 1N825
R44 732
C26 56
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21
T22
T23
T25
T27
T28
Q13 3N68
Q14 3N68
Q15 2N930
Q16 2N930
Q17 3N68
Q18 3N68
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
Q25 3N68
Q26 3N68
Q27 2N930
Q28 2N930
Q29 3N68
Q30 3N68
Q31 2N930
Q32 2N930
Q33 3N68
Q35 2N930
Q36 2N930
Q37 3N68
Q39 2N1780A
R47 6810
R48 6810
R49 18.7K
R63 6810
R64 6810
R65 18.7K
R79 11.3K
R80 11.3K
R81 10.7K
R126 820
R125 820
CR10 1N645
CR15 1N645
CR20 1N645
CR29 1N645
CR30 1N645
R122 464
R123 4990
C65 4.7
R95 510
C53 47
R117 1210
R116 619K
C63 0.001
R119 270
C62 1.0
BLU
RED
BLK
GRN
YEL
WHT
BRN
ORN


12
11
10
9
D
C
B
A
28V ISS OP
R1 330
C1 47
R2 124K
R3 124K
R4 52.3K
C2 470PF
C3 NOM
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 NOM
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
CR6
CR7
C28 .41
R49 18.7K
1X 16 RESOLVER SINE
HI
LO
TM 16 CURRENT HI
TM COMMON LO
1X M6 RESOLVER SINE
R16 124K
R17 124K
R18 52.3K
C10 470PF
C11 NOM
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R25 237K
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 NOM
T5
BHN
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
CR11
CR12
C36 0.11
TM M6 CURRENT HI
1X 06 RESOLVER SINE
R30 124K
R31 124K
R32 52.3K
C18 470PF
C19 NOM
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
C22 1.0
R39 NOM
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
TM 06 CURRENT HI
0V ISS
2010125 B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R45, C3, C11, C19 PER APPLICABLE P.S. FROM APPROPRIATE CHART



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	↓ -36		1500	↓	↓
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	↓ -36		1500	↓	↓
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	↓ -36		1500	↓	↓
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-187		464	±1%	1/8W
R123	1010364-385		4990	±1%	1/8W
R125	1006750-30	↓	820	±2%	1/4W
R126	1006750-30	RESISTOR	820	±2%	1/4W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28	↓	6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9	↓	6
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100	↓	20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19	↓	6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19	↓	6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-3		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28	↓	6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-L18		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6	↓	15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037	↓	4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		IN645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		IN645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		IN645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		IN645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32	↓	↓	↓		
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
Q25	1010367	CHOPPER	3N68		
Q26	1010367	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367	CHOPPER	3N68		
Q30	1010367	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367	CHOPPER	3N68		
Q34	1010367	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367	CHOPPER	3N68		
Q38	1010367	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310	↓			
T28	1010282	TRANSFORMER			

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				
B		REVISED PER TDRR 26612	ADL			
C		REVISED PER TDRR 27172				

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
↓ -263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

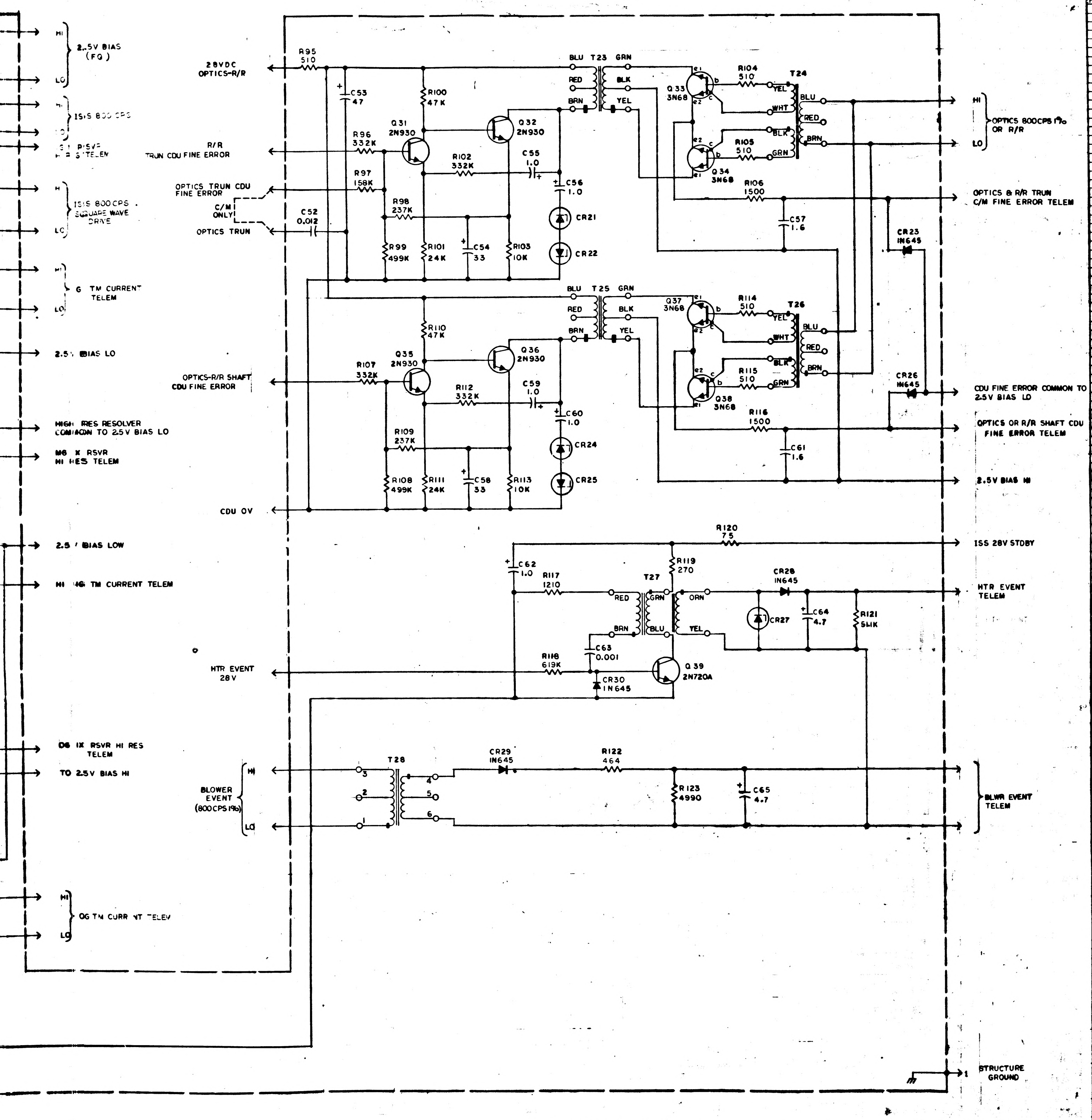
DRAWN a. Di deo 13 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010125
SCALE — | SHEET 1 OF 1

2010125 C


6
5
4
HI
2..5V BIAS
(FQ)
LO
HI
IS/S 800 CPS
LO
R/R
TRUN CDU FINE ERROR
OPTICS TRUN CDU
FINE ERROR
C/M
ONLY
OPTICS TRUN
HI
ISIS 800 CPS
SQUARE WAVE
DRIVE
LO
HI
G TM CURRENT
TELEM
LO
2.5V BIAS LO
HIGH RES RESOLVER
COMMON TO 2.5V BIAS LO
M6 X RSVR
HI RES TELEM
2.5 V BIAS LOW
HI MG TM CURRENT TELEM
OG IX RSVR HI RES
TELEM
TO 2.5V BIAS HI
HI
OG TM CURRENT TELEM
LO
28VDC
OPTICS-R/R
R95
510
C53
47
R100
47K
Q31
2N930
Q32
2N930
R96
332K
R97
158K
R98
237K
R102
332K
C55
1.0
C56
1.0
C52
0.012
R99
499K
R101
24K
C54
33
R103
10K
CR21
CR22
BLU
T23
GRN
RED
BLK
BRN
YEL
Q33
3N68
R104
510
T24
YEL
WHT
BLU
RED
BRN
BLK
GRN
R105
510
Q34
3N68
R106
1500
C57
1.6
CR23
IN645
HI
OPTICS 800CPS 1%
OR R/R
LO
OPTICS & R/R TRUN
C/M FINE ERROR TELEM
OPTICS-R/R SHAFT
CDU FINE ERROR
R107
332K
Q35
2N930
R110
47K
Q36
2N930
R112
332K
C59
1.0
C60
1.0
R109
237K
CR24
R108
499K
R111
24K
C58
33
R113
10K
CR25
BLU
T25
GRN
Q37
3N68
R114
510
T26
R115
510
Q38
3N68
R116
1500
C61
1.6
CR26
IN645
CDU FINE ERROR COMMON TO
2.5V BIAS LO
OPTICS OR R/R SHAFT CDU
FINE ERROR TELEM
2.5V BIAS HI
CDU OV
R120
75
ISS 28V STDBY
C62
1.0
R117
1210
R119
270
T27
RED
GRN
ORN
BRN
BLU
YEL
CR28
IN645
C64
4.7
R121
51.1K
CR27
HTR EVENT
TELEM
HTR EVENT
28V
C63
0.001
R118
619K
CR30
IN645
Q39
2N720A
BLOWER
EVENT
(800CPS 1%)
HI
LO
T28
CR29
IN645
R122
464
R123
4990
C65
4.7
BLWR EVENT
TELEM
STRUCTURE
GROUND
1
2
3
4
5
6

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-187		464	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-30		820	±2%	1/4 W
R126	1006750-30	RESISTOR	820	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6.
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		IN645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		IN645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		IN645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		IN645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE
Q23	1010367	CHOPPER	3N68
Q24	1010367	CHOPPER	3N68
Q25	1010367	CHOPPER	3N68
Q26	1010367	CHOPPER	3N68
Q27	1010397-1	TRANSISTOR	2N930
Q28	1010397-1	TRANSISTOR	2N930
Q29	1010367	CHOPPER	3N68
Q30	1010367	CHOPPER	3N68
Q31	1010397-1	TRANSISTOR	2N930
Q32	1010397-1	TRANSISTOR	2N930
Q33	1010367	CHOPPER	3N68
Q34	1010367	CHOPPER	3N68
Q35	1010397-1	TRANSISTOR	2N930
Q36	1010397-1	TRANSISTOR	2N930
Q37	1010367	CHOPPER	3N68
Q38	1010367	CHOPPER	3N68
Q39	1010357-1	TRANSISTOR	2N720A
T1	1008832	TRANSFORMER	
T2	1008842		
T3	1010323		
T4	1008832		
T5	1008842		
T6	1010323		
T7	1008832		
T8	1008842		
T9	1010323		
T10	1010466		
T11	1010710		
T12	1008842		
T13	1010323		
T14	1010323		
T15	1010710		
T16	1008842		
T17	1010323		
T18	1010323		
T19	1010710		
T20	1008842		
T21	1010323		
T22	1010323		
T23	1008842		
T24	1010323		
T25	1008842		
T26	1010323		
T27	1010310		
T28	1010282	TRANSFORMER	

PART NO.
1010364-
-
-
-
-
1010364-

UNLESS OTHERWISE

DIMENSIONS ARE IN

CAPACITOR VALUES ARE

RESISTOR VALUES ARE

TOLERANCES ON

FRACTIONS

±

DO NOT SCALE THIS

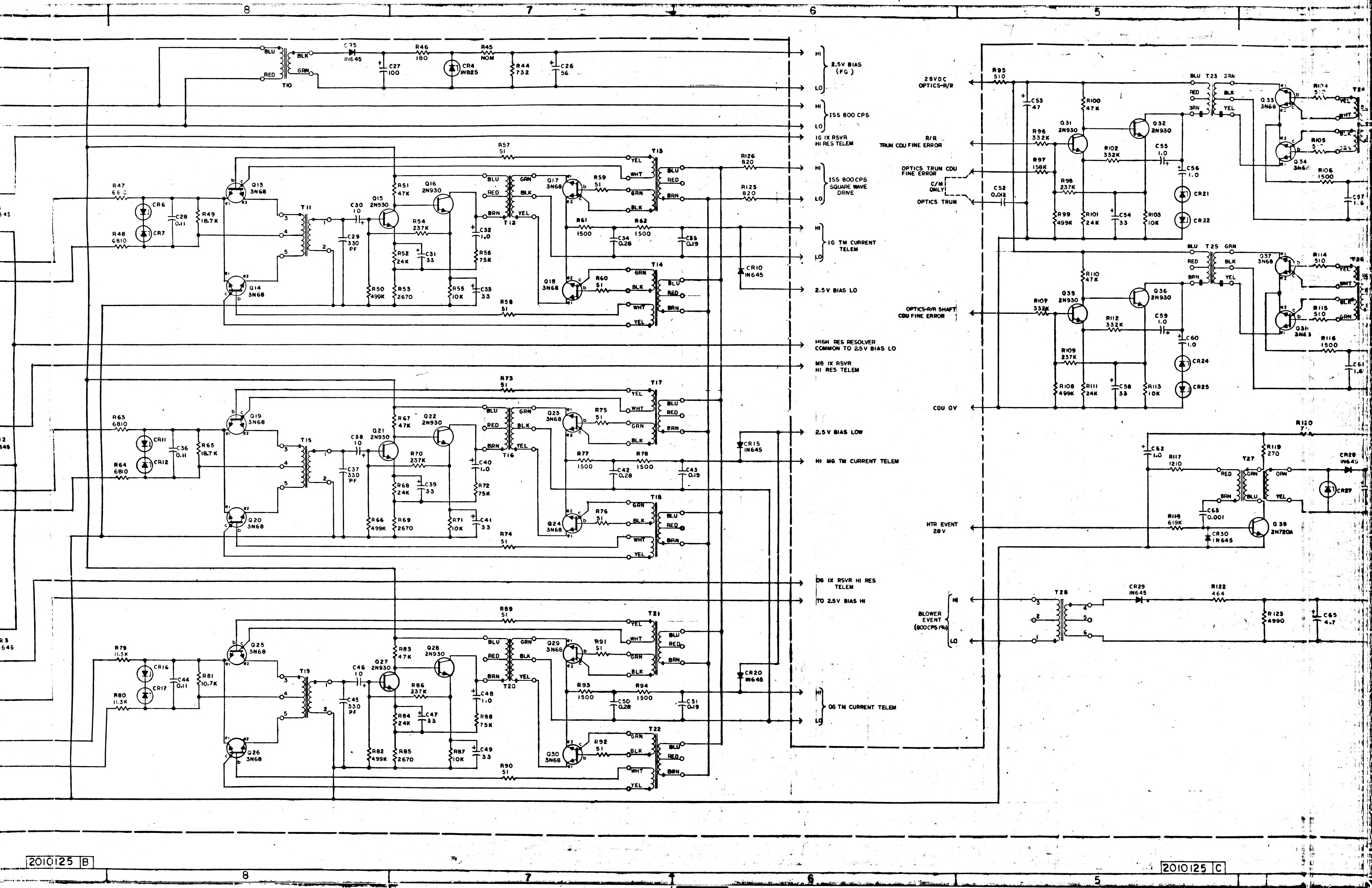
MATERIAL

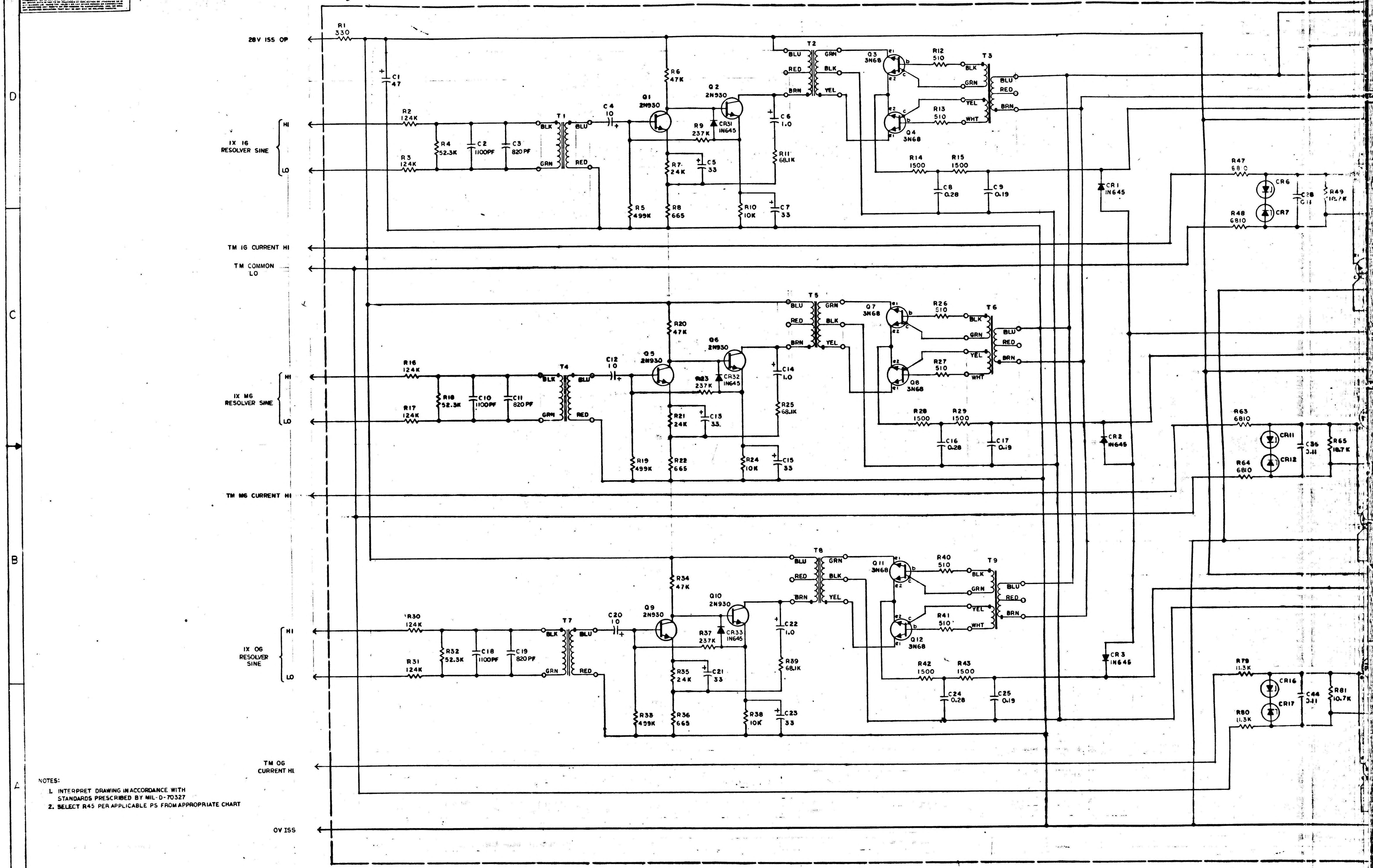
NEXT ASSY

USED ON

APPLICATION

2010125 C


8
7
6
5
T10
BLU
RED
BLK
GRN
CR5 1N645
C27 100
R46 180
CR4 1N825
R45 NOM
R44 732
C26 56
HI
LO
2.5V BIAS (FG)
ISS 800 CPS
1G 1X RSVR HI RES TELEM
R57 51
T13
Q13 3N68
Q14 3N68
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C32 1.0
R56 75K
C33 33
T12
Q17 3N68
R59 51
R61 1500
C34 0.28
R62 1500
C35 0.19
R126 820
R125 820
ISS 800CPS SQUARE WAVE DRIVE
1G TM CURRENT TELEM
CR10 1N645
2.5V BIAS LO
Q18 3N68
R60 51
T14
R58 51
HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
MG 1X RSVR HI RES TELEM
R73 51
T17
Q19 3N68
Q20 3N68
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C40 1.0
R72 75K
C41 33
T16
Q23 3N68
R75 51
R77 1500
C42 0.28
R78 1500
C43 0.19
2.5V BIAS LOW
CR15 1N645
HI MG TM CURRENT TELEM
Q24 3N68
R76 51
T18
R74 51
OG 1X RSVR HI RES TELEM
TO 2.5V BIAS HI
R89 51
T21
Q25 3N68
Q26 3N68
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C48 1.0
R88 75K
C49 33
T20
Q29 3N68
R91 51
R93 1500
C50 0.28
R94 1500
C51 0.19
CR20 1N645
OG TM CURRENT TELEM
Q30 3N68
R92 51
T22
R90 51
YEL
WHT
28VDC OPTICS-R/R
R95 510
C53 47
R100 47K
Q31 2N930
Q32 2N930
T23
Q33 3N68
Q34 3N68
R104 510
R105 510
T24
R106 1500
R96 332K
R/R TRUN CDU FINE ERROR
R102 332K
C55 1.0
C56 1.0
OPTICS TRUN CDU FINE ERROR
C/M ONLY
OPTICS TRUN
C52 0.012
R97 158K
R98 237K
CR21
CR22
R99 499K
R101 24K
C54 33
R103 10K
C57 1.6
T25
Q37 3N68
Q38 3N68
R114 510
R115 510
T26
R116 1500
R110 47K
Q35 2N930
Q36 2N930
OPTICS-R/R SHAFT CDU FINE ERROR
R107 332K
R112 332K
C59 1.0
C60 1.0
R109 237K
CR24
CR25
R108 499K
R111 24K
C58 33
R113 10K
C61 1.6
CDU 0V
R120
C62 1.0
R117 1210
R119 270
T27
ORN
CR28 1N645
CR27
HTR EVENT 28V
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
BLOWER EVENT (800CPS 1Φ)
T28
CR29 1N645
R122 464
R123 4990
C65 4.7
2010125 B
2010125 C



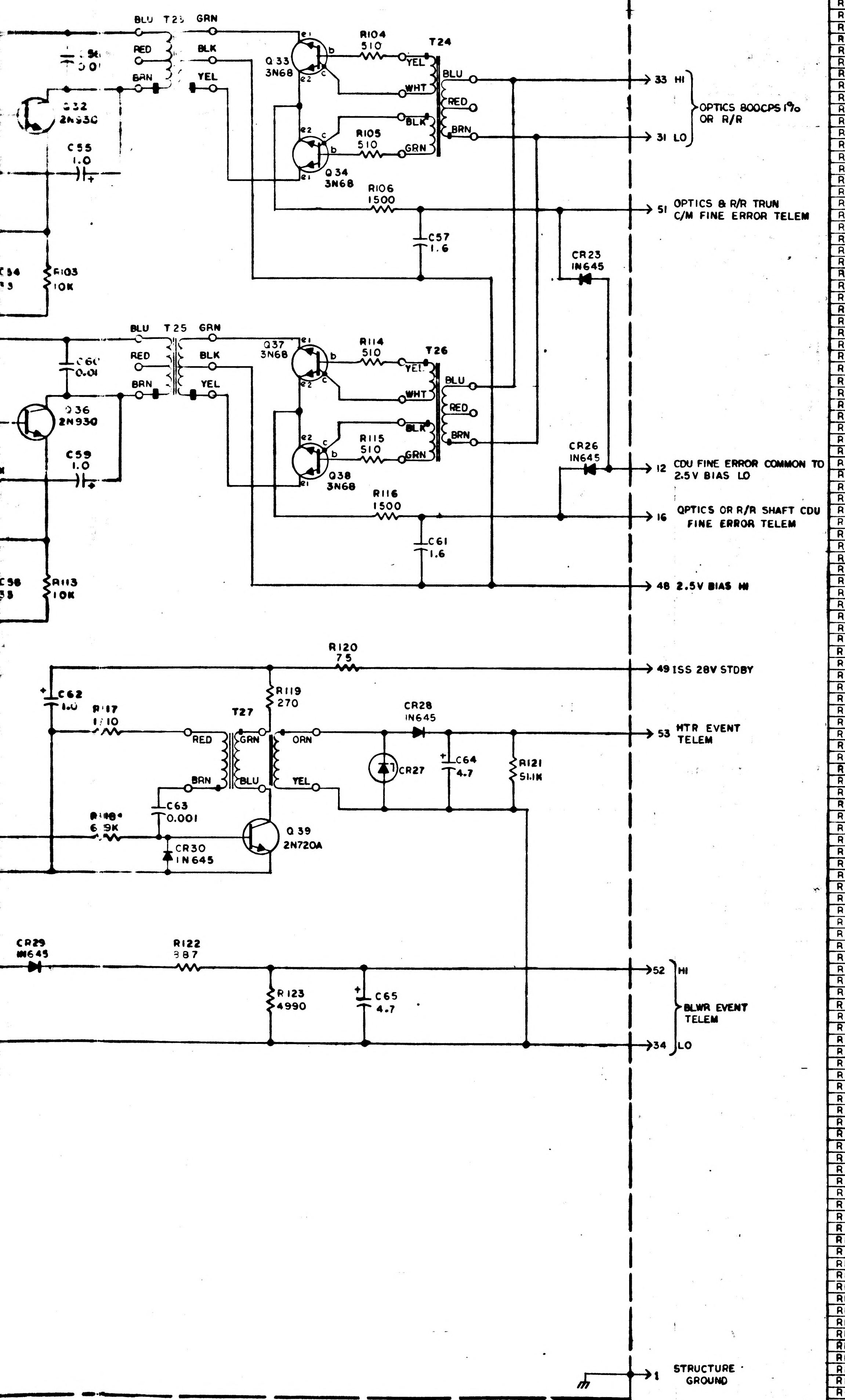
28V ISS OP
R1 330
C1 47
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C6 1.0
R11 68.1K
C7 33
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 10.7K
1X 16 RESOLVER SINE
HI
LO
TM 16 CURRENT HI
TM COMMON LO
T5
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R23 237K
CR32 1N645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C14 1.0
R25 68.1K
C15 33
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 10.7K
1X M6 RESOLVER SINE
TM M6 CURRENT HI
T8
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
CR33 1N645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C22 1.0
R39 68.1K
C23 33
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
1X 06 RESOLVER SINE
TM 06 CURRENT HI
0V ISS
12
11
10
9
D
C
B
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 B

4 3 2



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	[illegible]	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-241		887	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-30		820	±2%	1/4 W
R126	1006750-30		820	±2%	1/4 W
R127	1010311-255	RESISTOR	22.1K	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6.
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2 %	300
C19	1010410-15		820 PF	±2 %	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-180		1.0		50
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR10	1010837-001	DIODE	IN645		
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR15	1010837-001	DIODE	IN645		
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR20	1010837-001	DIODE	IN645		
CR23	1010837-001	DIODE	IN645		
CR26	1010837-001	DIODE	IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
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T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				WR
B		REVISED PER TDRR 26612				WR
C		REVISED PER TDRR 27172		LSS		WR
D		REVISED PER TDRR 29140		LSB		

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE GIMBAL RESOLVER ASSY
DWG NO. 2007239

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

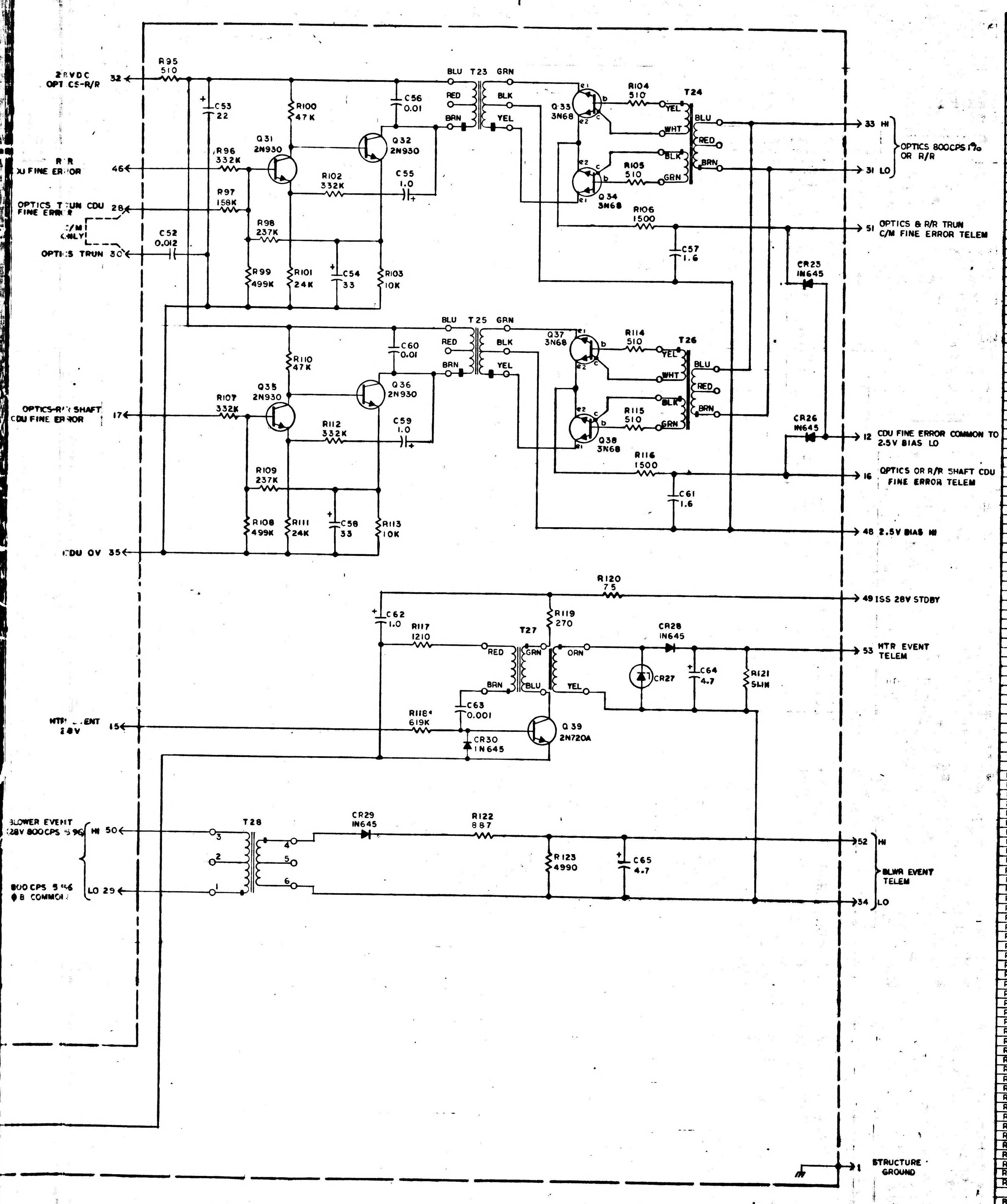
DRAWN a. D. Loo 25 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT W. Kupfer
A. C. METZGER
APPROVED MSC

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE —
SHEET 1 OF 1

2010125 D

5-4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R95 510
C53 22
R100 47K
Q31 2N930
Q32 2N930
C56 0.01
BLU T23 GRN
RED
BLK
BRN
YEL
Q33 3N68
R104 510
T24
YEL
BLU
WHT
RED
BLK
BRN
GRN
Q34 3N68
R105 510
R106 1500
33 HI
31 LO
OPTICS 800CPS 1% OR R/R
51 OPTICS & R/R TRUN C/M FINE ERROR TELEM
C57 1.6
CR25 IN645
R/R CU FINE ERROR 46
R96 332K
R97 158K
R98 237K
R102 332K
C55 1.0
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
C52 0.012
OPTICS TRUN 30
R99 499K
R101 24K
C54 33
R103 10K
BLU T25 GRN
RED
BLK
BRN
YEL
C60 0.01
R110 47K
Q35 2N930
Q36 2N930
Q37 3N68
R114 510
T26
YEL
BLU
WHT
RED
BLK
BRN
GRN
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
R112 332K
C59 1.0
Q38 3N68
R115 510
R116 1500
CR26 IN645
12 CDU FINE ERROR COMMON TO 2.5V BIAS LO
16 OPTICS OR R/R SHAFT CDU FINE ERROR TELEM
C61 1.6
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
48 2.5V BIAS HI
CDU OV 35
R120 75
49 ISS 28V STDBY
C62 1.0
R119 270
R117 1210
T27
RED
GRN
ORN
BRN
BLU
YEL
CR28 IN645
53 HTR EVENT TELEM
C64 4.7
CR27
R121 51.1K
C63 0.001
R118* 619K
HTR EVENT 28V 15
CR30 IN645
Q39 2N720A
BLOWER EVENT 28V 800CPS 5% HI 50
T28
1
2
3
4
5
6
CR29 IN645
R122 887
R123 4990
C65 4.7
52 HI
BLWR EVENT TELEM
34 LO
800CPS 5% ØB COMMON LO 29
STRUCTURE GROUND 1

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
P82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-241		887	±1%	1/8W
R123	1010364-385		4990	±1%	1/8W
R125	1006750-30		820	±2%	1/4W
R126	1006750-30		820	±2%	1/4W
R127	1010311-255	RESISTOR	22.1K	±1%	1/10W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6.
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-180		1.0		50
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR10	1010837-001	DIODE	IN645		
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR15	1010837-001	DIODE	IN645		
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR20	1010837-001	DIODE	IN645		
CR23	1010837-001	DIODE	IN645		
CR26	1010837-001	DIODE	IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG
SIGNAL CONDITIONER TORQUE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN a. ...
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

TORQ
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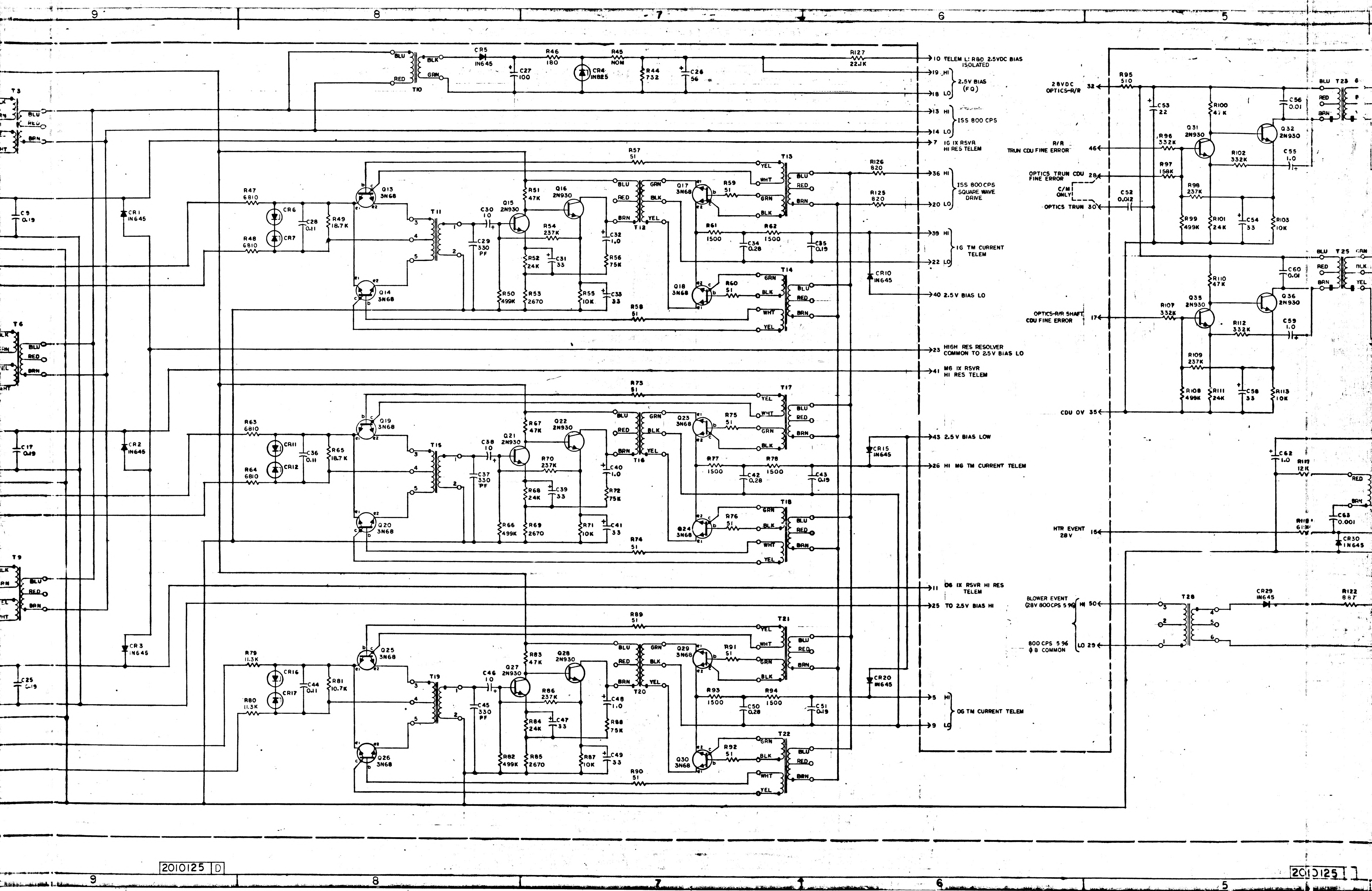
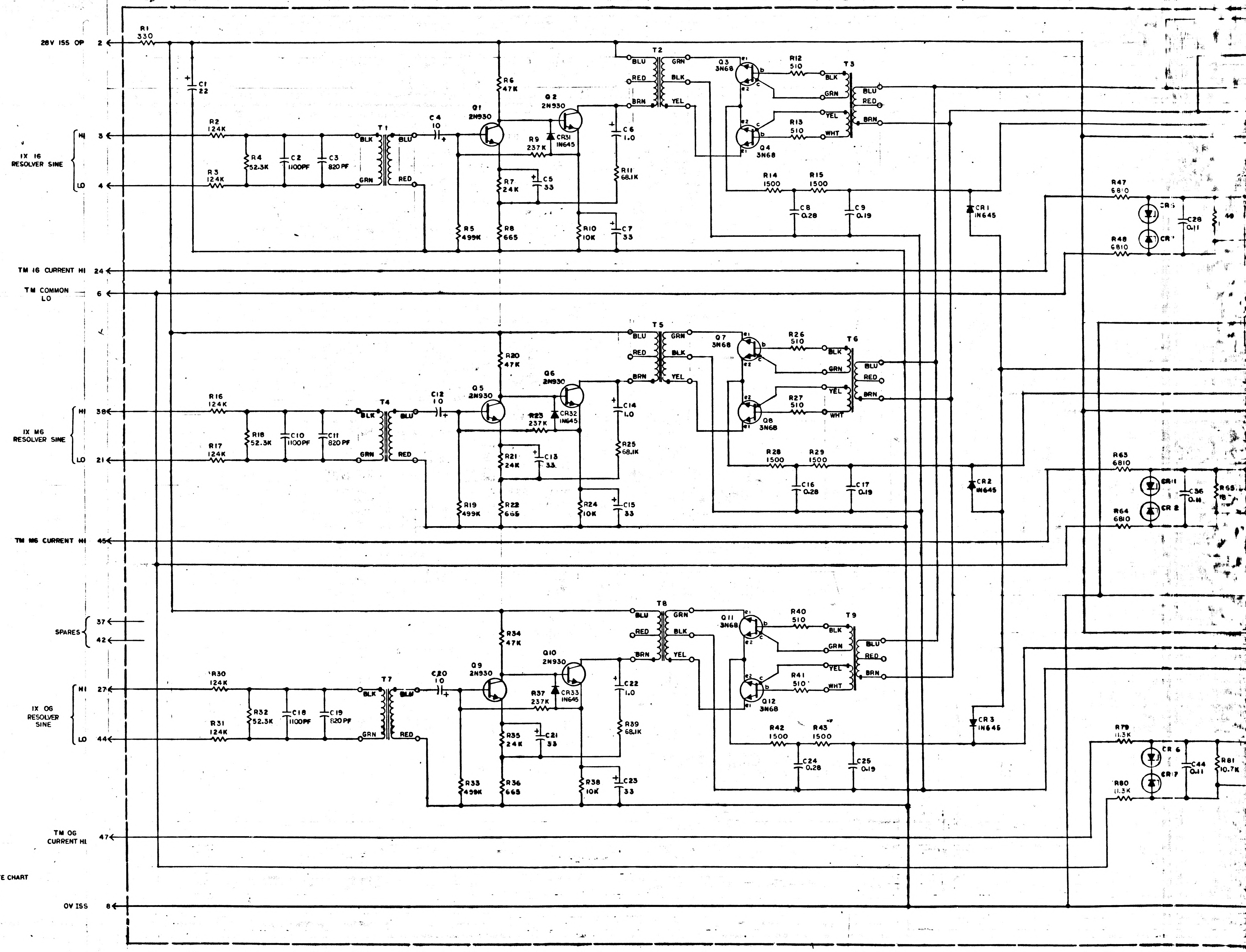
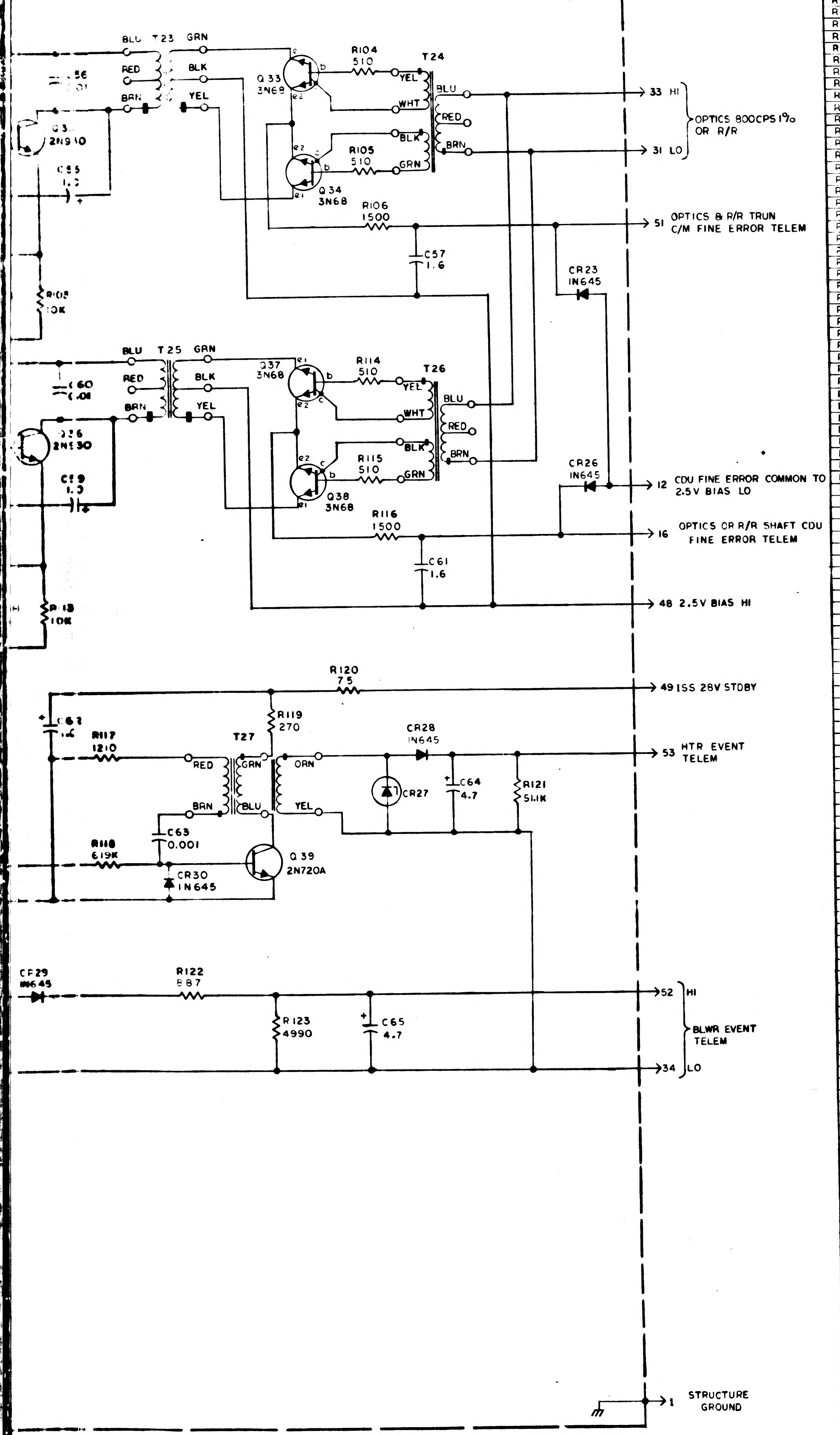
2010125 D


9
8
7
6
5
T3
T6
T9
BLU
RED
BRN
C9 0.19
C17 0.19
C25 0.19
CR1 1N645
CR2 1N645
CR3 1N645
T10
BLU
RED
BLK
GRN
CR5 1N645
R46 180
R45 NOM
C27 100
CR4 1N825
R44 732
C26 56
R127 22.1K
10 TELEM L: R80 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
ISS 800 CPS
7 1G 1X RSVR HI RES TELEM
R57 51
T13
YEL
WHT
GRN
BLK
BLU
RED
BRN
R126 820
R125 820
36 HI
20 LO
ISS 800CPS SQUARE WAVE DRIVE
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
T12
Q17 3N68
R59 51
R61 1500
R62 1500
C34 0.28
C35 0.19
39 HI
22 LO
1G TM CURRENT TELEM
T14
Q18 3N68
R60 51
R58 51
CR10 1N645
40 2.5V BIAS LO
23 HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
41 M6 1X RSVR HI RES TELEM
R73 51
T17
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
T16
Q23 3N68
R75 51
R77 1500
R78 1500
C42 0.28
C43 0.19
CR15 1N645
43 2.5V BIAS LOW
26 HI M6 TM CURRENT TELEM
T18
Q24 3N68
R76 51
R74 51
11 0G 1X RSVR HI RES TELEM
25 TO 2.5V BIAS HI
R89 51
T21
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
T20
Q29 3N68
R91 51
R93 1500
R94 1500
C50 0.28
C51 0.19
CR20 1N645
5 HI
9 LO
0G TM CURRENT TELEM
T22
Q30 3N68
R92 51
R90 51
28VDC OPTICS-R/R 32
R95 510
C53 22
R100 47K
C56 0.01
T23
Q31 2N930
Q32 2N930
R96 332K
R102 332K
C55 1.0
R/R TRUN CDU FINE ERROR 46
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
C52 0.012
R97 158K
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
T25
C60 0.01
R110 47K
Q35 2N930
Q36 2N930
R107 332K
R112 332K
C59 1.0
OPTICS-R/R SHAFT CDU FINE ERROR 17
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CDU 0V 35
C62 1.0
R117 12K
C63 0.001
R118 61.9K
CR30 1N645
HTR EVENT 28V 15
BLOWER EVENT (28V 800CPS 5.96) HI 50
800 CPS 5.96 ϕB COMMON LO 29
T28
CR29 1N645
R122 887
2010125 D
2010125


28V ISS OP 2
R1 330
C1 22
IX 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 68.1K
T2
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
C28 0.11
TM 16 CURRENT HI 24
TM COMMON LO 6
IX M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R20 47K
Q6 2N930
R23 237K
CR32 1N645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 68.1K
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
C36 0.11
TM M6 CURRENT HI 45
SPARES 37 42
IX OG RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R34 47K
Q10 2N930
R37 237K
CR33 1N645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
C22 1.0
R39 68.1K
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
CR6
CR7
C44 0.11
R81 10.7K
TM OG CURRENT HI 47
OV ISS 8
YEL
WHT
BRN
e1
e2
b
c

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-241		887	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-25		510	±2%	1/4 W
R126	1006750-25		510	±2%	1/4 W
R127	1010311-255	RESISTOR	22.1K	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-180		1.0		50
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR10	1010837-001	DIODE	IN645		
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR15	1010837-001	DIODE	IN645		
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR20	1010837-001	DIODE	IN645		
CR23	1010837-001	DIODE	IN645		
CR26	1010837-001	DIODE	IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVAL
A		REVISED PER TDRR 26030	A	PPK	[illegible]	WR
B		REVISED PER TDRR 26612	ADL	PPK	[illegible]	WR
C		REVISED PER TDRR 27172	[illegible]	[illegible]	3/6/66	WK
D		REVISED PER TDRR 29140	A	LS8	5/24/66	[illegible]
E		REVISED PER TDRR 29604	3.	RWH	21-[illegible]-66	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

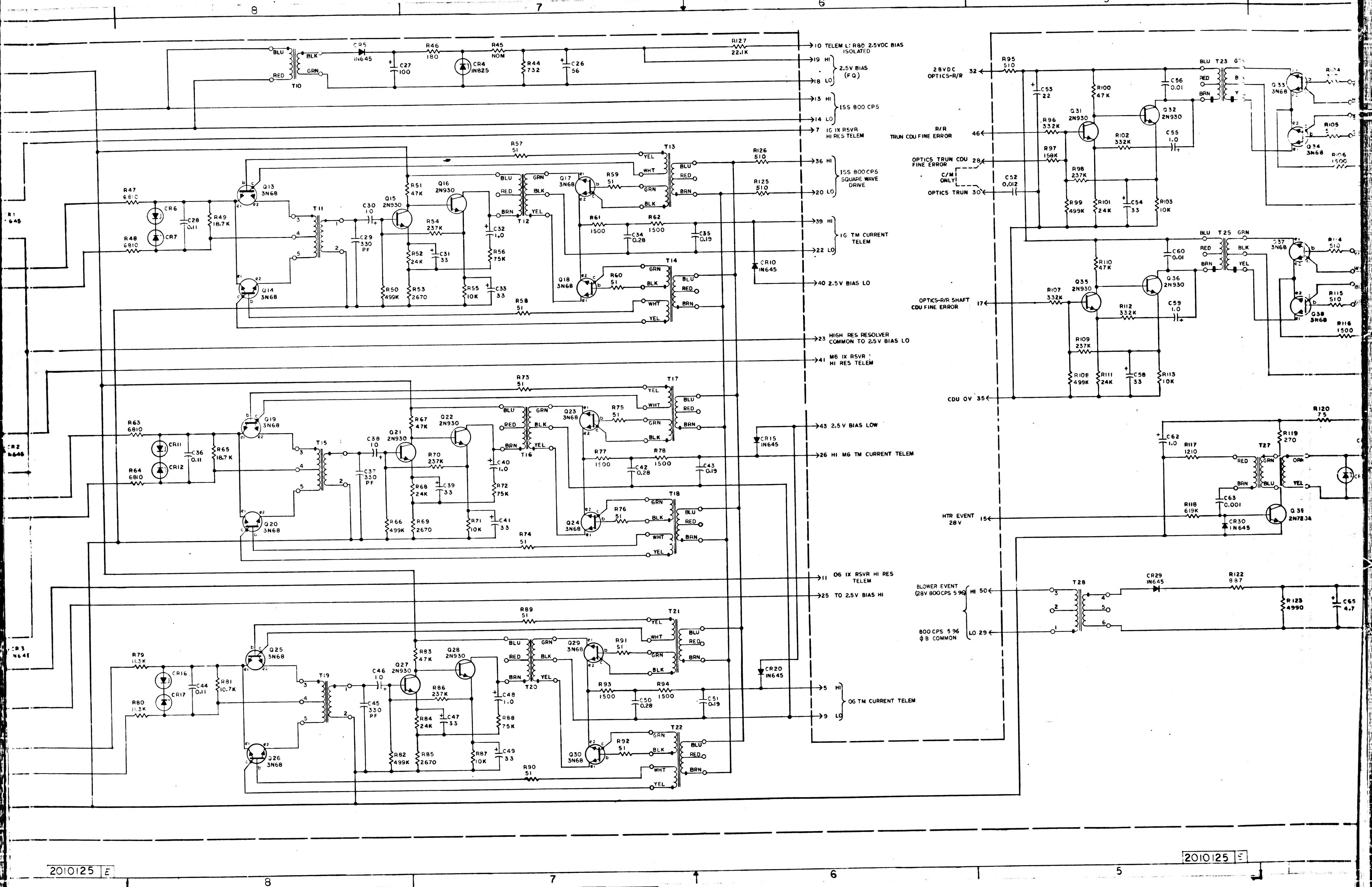
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Di Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE —
SHEET 1 OF 1


8
7
6
5
10 TELEM LI R80 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
1SS 800 CPS
7 1G IX RSVR HI RES TELEM
36 HI
20 LO
1SS 800CPS SQUARE WAVE DRIVE
39 HI
22 LO
1G TM CURRENT TELEM
40 2.5V BIAS LO
23 HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
41 MG IX RSVR HI RES TELEM
43 2.5 V BIAS LOW
26 HI MG TM CURRENT TELEM
11 OG IX RSVR HI RES TELEM
25 TO 2.5V BIAS HI
5 HI
9 LO
OG TM CURRENT TELEM
T10
CR5 1N645
R46 180
R45 NOM
CR4 1N825
R44 732
C26 56
C27 100
R127 22.1K
BLU
RED
BLK
GRN
R57 51
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
T12
Q17 3N68
R59 51
Q18 3N68
R60 51
R61 1500
R62 1500
C34 0.28
C35 0.19
T13
T14
R126 510
R125 510
CR10 1N645
R58 51
WHT
YEL
BRN
R73 51
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
T16
Q23 3N68
R75 51
Q24 3N68
R76 51
R77 1500
R78 1500
C42 0.28
C43 0.19
T17
T18
CR15 1N645
R74 51
R89 51
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
T20
Q29 3N68
R91 51
Q30 3N68
R92 51
R93 1500
R94 1500
C50 0.28
C51 0.19
T21
T22
CR20 1N645
R90 51
28VDC OPTICS-R/R 32
R95 510
C53 22
R100 47K
C56 0.01
T23
Q31 2N930
Q32 2N930
Q33 3N68
Q34 3N68
R105
R106 1500
R/R TRUN CDU FINE ERROR 46
R96 332K
R97 158K
R102 332K
C55 1.0
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
C52 0.012
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
T25
R110 47K
C60 0.01
Q35 2N930
Q36 2N930
Q37 3N68
Q38 3N68
R115 510
R116 1500
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
R112 332K
C59 1.0
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CDU OV 35
R120 75
C62 1.0
R117 1210
R119 270
T27
ORN
HTR EVENT 28 V 15
R118 619K
C63 0.001
CR30 1N645
Q39 2N723A
BLOWER EVENT (28V 800CPS 5.9) HI 50
800 CPS 5.9 ΦB COMMON LO 29
T28
CR29 1N645
R122 887
R123 4990
C65 4.7
2010125 E
2010125 E

2/2010125

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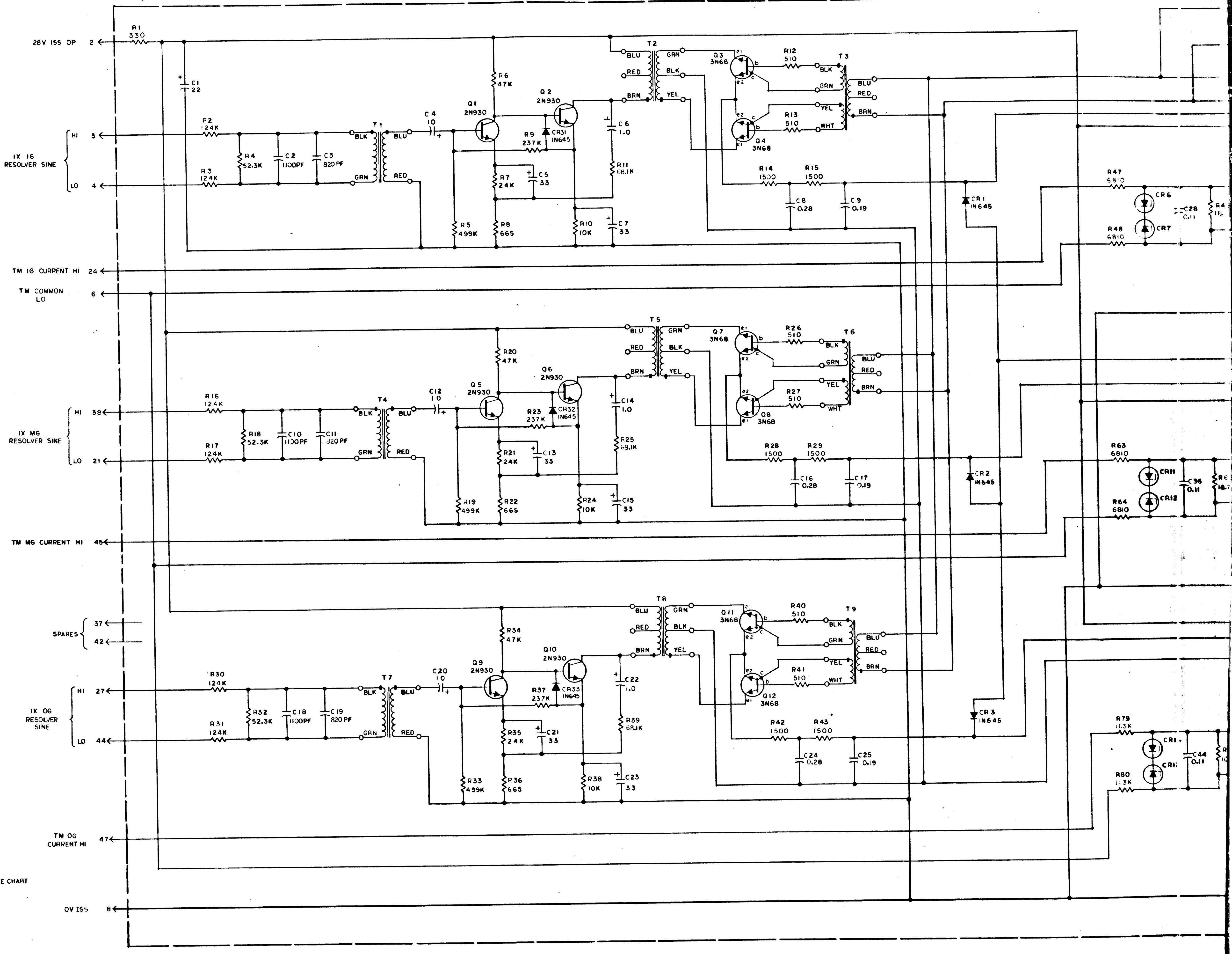
12
11
10
9
D
C
B
A
28V ISS OP 2
R1 330
C1 22
R2 124K
R3 124K
1X 16 RESOLVER SINE
HI 3
LO 4
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
BLU
GRN
RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 68.1K
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
CR6
CR7
C28 0.11
TM 1G CURRENT HI 24
TM COMMON LO 6
R16 124K
R17 124K
1X MG RESOLVER SINE
HI 38
LO 21
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
CR32 1N645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 68.1K
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
CR11
CR12
C36 0.11
TM MG CURRENT HI 45
SPARES 37 42
R30 124K
R31 124K
1X OG RESOLVER SINE
HI 27
LO 44
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
CR33 1N645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
C22 1.0
R39 68.1K
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
C44 0.11
TM OG CURRENT HI 47
OV ISS 8

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 E

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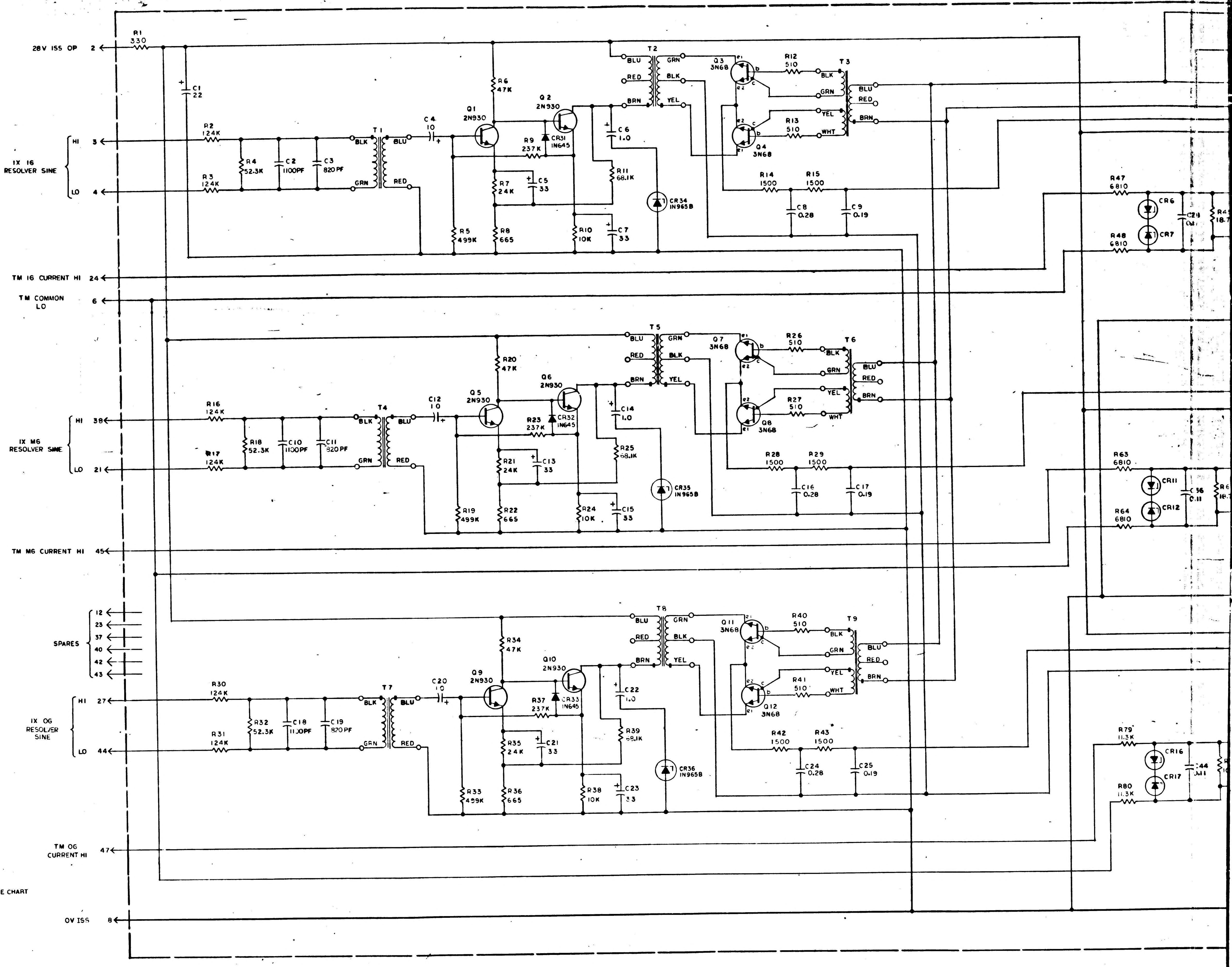
28V ISS OP 2
R1 330
C1 22
IX 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
BLU
GRN
RED
C4 10
Q1 2N930
R6 47K
Q2 2N930
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 68.1K
CR34 1N965B
T2
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
YEL
WHT
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
TM 16 CURRENT HI 24
TM COMMON LO 6
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
IX M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 1.0
Q5 2N930
R20 47K
Q6 2N930
R23 237K
CR32 1N645
C14 1.0
R25 68.1K
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
CR35 1N965B
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
TM M6 CURRENT HI 45
SPARES
12
23
37
40
42
43
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
IX 0G RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 1.0
Q9 2N930
R34 47K
Q10 2N930
R37 237K
CR33 1N645
C22 1.0
R39 68.1K
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
CR36 1N965B
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
TM 0G CURRENT HI 47
OV ISS 8
D
C
B
A
10
9

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 F

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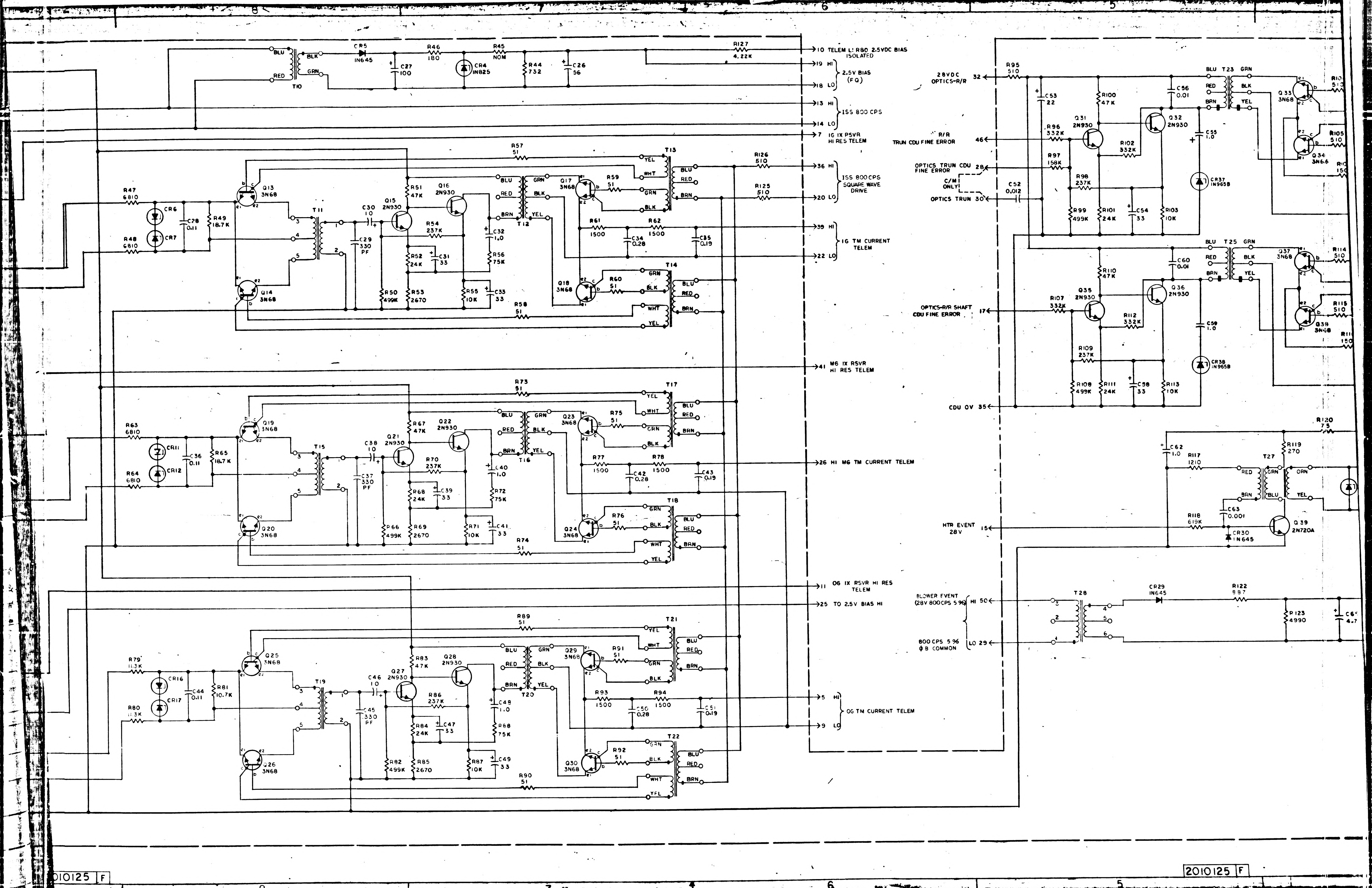
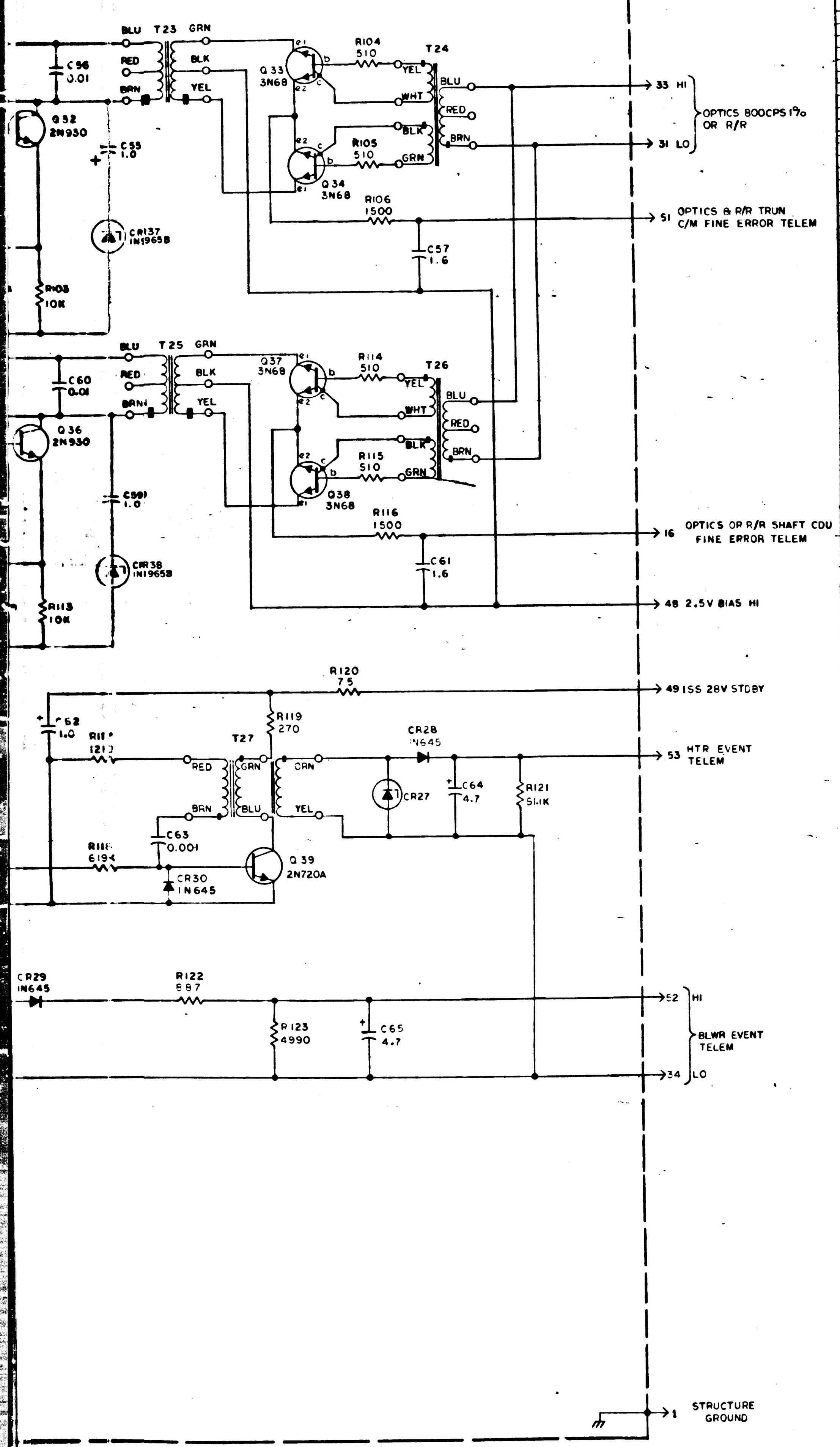

8
7
6
5
T10
BLU
RED
BLK
GRN
CR5 1N645
R46 180
R45 NOM
C27 100
CR4 1N825
R44 732
C26 56
R127 4.22K
10 TELEM L: R80 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
ISS 800 CPS
7 IG IX RSVR HI RES TELEM
R57 51
T13
R126 510
R125 510
36 HI
20 LO
ISS 800 CPS SQUARE WAVE DRIVE
Q13 3N68
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
C32 1.0
R56 75K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
T12
Q17 3N68
R59 51
R61 1500
R62 1500
C34 0.28
C35 0.19
39 HI
22 LO
IG TM CURRENT TELEM
Q14 3N68
Q18 3N68
R60 51
T14
R58 51
41 M6 IX RSVR HI RES TELEM
R73 51
T17
Q19 3N68
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
C40 1.0
R72 75K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
T16
Q23 3N68
R75 51
R77 1500
R78 1500
C42 0.28
C43 0.19
26 HI MG TM CURRENT TELEM
Q20 3N68
Q24 3N68
R76 51
T18
R74 51
11 OG IX RSVR HI RES TELEM
25 TO 2.5V BIAS HI
R89 51
T21
Q25 3N68
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
C48 1.0
R88 75K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
T20
Q29 3N68
R91 51
R93 1500
R94 1500
C50 0.28
C51 0.19
5 HI
9 LO
OG TM CURRENT TELEM
Q26 3N68
Q30 3N68
R92 51
T22
R90 51
YEL
WHT
GRN
BLK
BLU
RED
BRN
28VDC OPTICS-R/R 32
R95 510
C53 22
R100 47K
C56 0.01
T23
Q33 3N68
Q34 3N68
R105 510
46 R/R TRUN CDU FINE ERROR
R96 332K
Q31 2N930
Q32 2N930
R102 332K
C55 1.0
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
R97 158K
R98 237K
CR37 1N965B
C52 0.012
OPTICS TRUN 30
R99 499K
R101 24K
C54 33
R103 10K
R110 47K
C60 0.01
T25
Q37 3N68
R114 510
R115 510
Q38 3N68
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
Q35 2N930
Q36 2N930
R112 332K
C59 1.0
R109 237K
CR38 1N965B
R108 499K
R111 24K
C58 33
R113 10K
CDU 0V 35
R120 75
C62 1.0
R119 270
R117 1210
T27
ORN
HTR EVENT 28V 15
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
BLOWER EVENT (28V 800CPS 5 96) HI 50
800 CPS 5 96 ϕB COMMON LO 29
T28
CR29 1N645
R122 897
R123 4990
C6 4.7



2010125 F

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-241		887	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-25		510	±2%	1/4 W
R126	1006750-25		510	±2%	1/4 W
R127	1010311-186	RESISTOR	4.22	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-69		1.0		35
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR4	1010259-000	DIODE	IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR27	1010372-12	DIODE			
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
CR34	1008815-9	DIODE	IN965B		
CR35	1008815-9	DIODE	IN965B		
CR36	1008815-9	DIODE	IN965B		
CR37	1008815-9	DIODE	IN965B		
CR38	1008815-9	DIODE	IN965B		

REVISIONS 25827

LTR	ZONE	DESCRIPTION	BY	CHK	DATE	APPR
A		REVISED PER TDRR 26030				
B		REVISED PER TDRR 26612				
C		REVISED PER TDRR 27172				
D		REVISED PER TDRR 29140				
E		REVISED PER TDRR 28606			21 JUN 66	
F		REVISED PER TDRR 30281			8 AUG 66	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

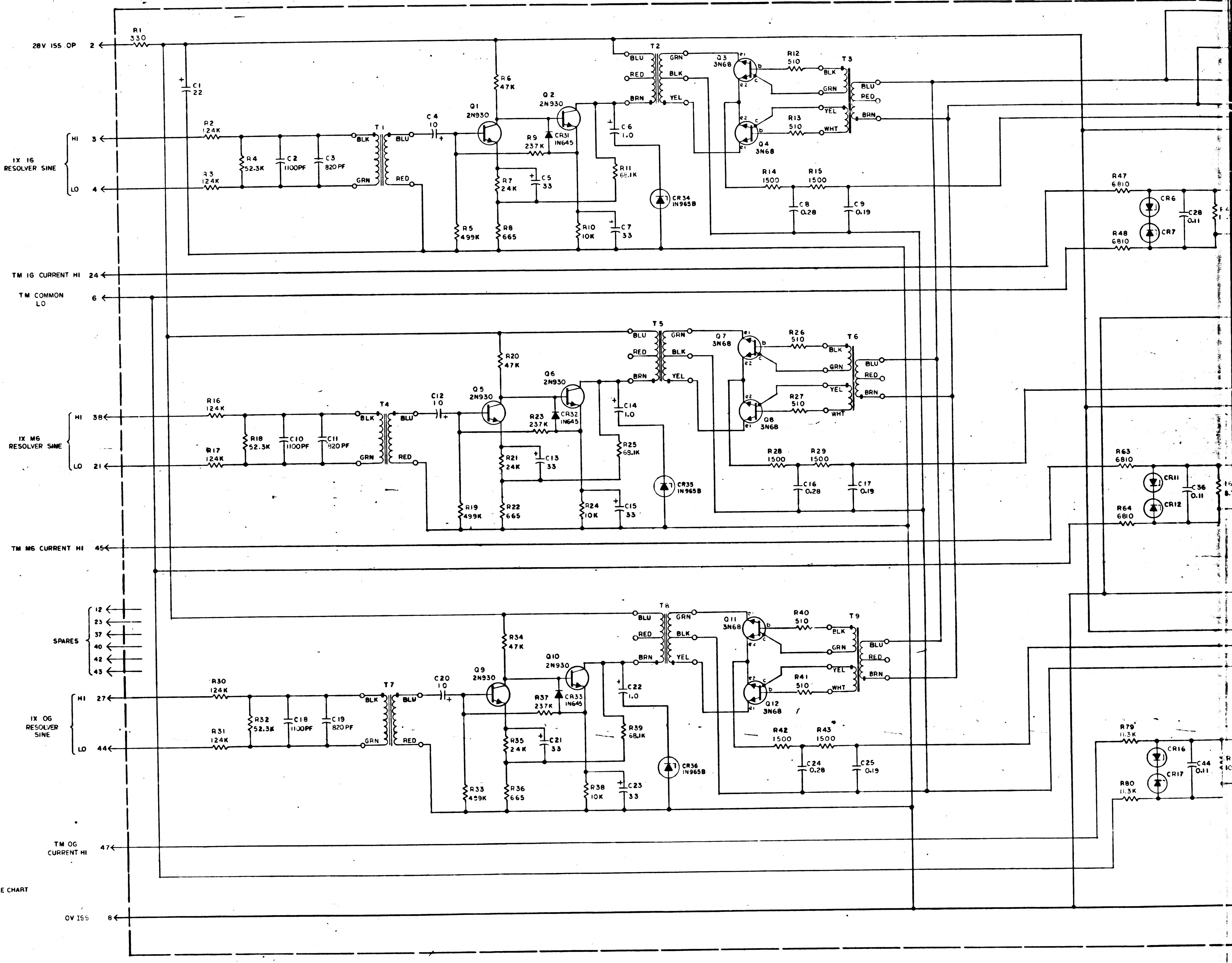
SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE
SHEET 1

2010125 F

3/2010125

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


28V ISS OP 2
R1 330
C1 22
IX IG RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R5 499K
R6 47K
R7 24K
R8 665
C5 33
Q2 2N930
R9 237K
CR31 1N645
R10 10K
C7 33
R11 68.1K
C6 1.0
CR34 1N965B
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
C28 0.11
TM IG CURRENT HI 24
TM COMMON LO 6
IX MG RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R19 499K
R20 47K
R21 24K
R22 665
C13 33
Q6 2N930
R23 237K
CR32 1N645
R24 10K
C15 33
R25 68.1K
C14 1.0
CR35 1N965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
C36 0.11
TM MG CURRENT HI 45
SPARES
12
23
37
40
42
43
IX OG RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R33 499K
R34 47K
R35 24K
R36 665
C21 33
Q10 2N930
R37 237K
CR33 1N645
R38 10K
C23 33
R39 68.1K
C22 1.0
CR36 1N965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
TM OG CURRENT HI 47
OV ISS 8

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

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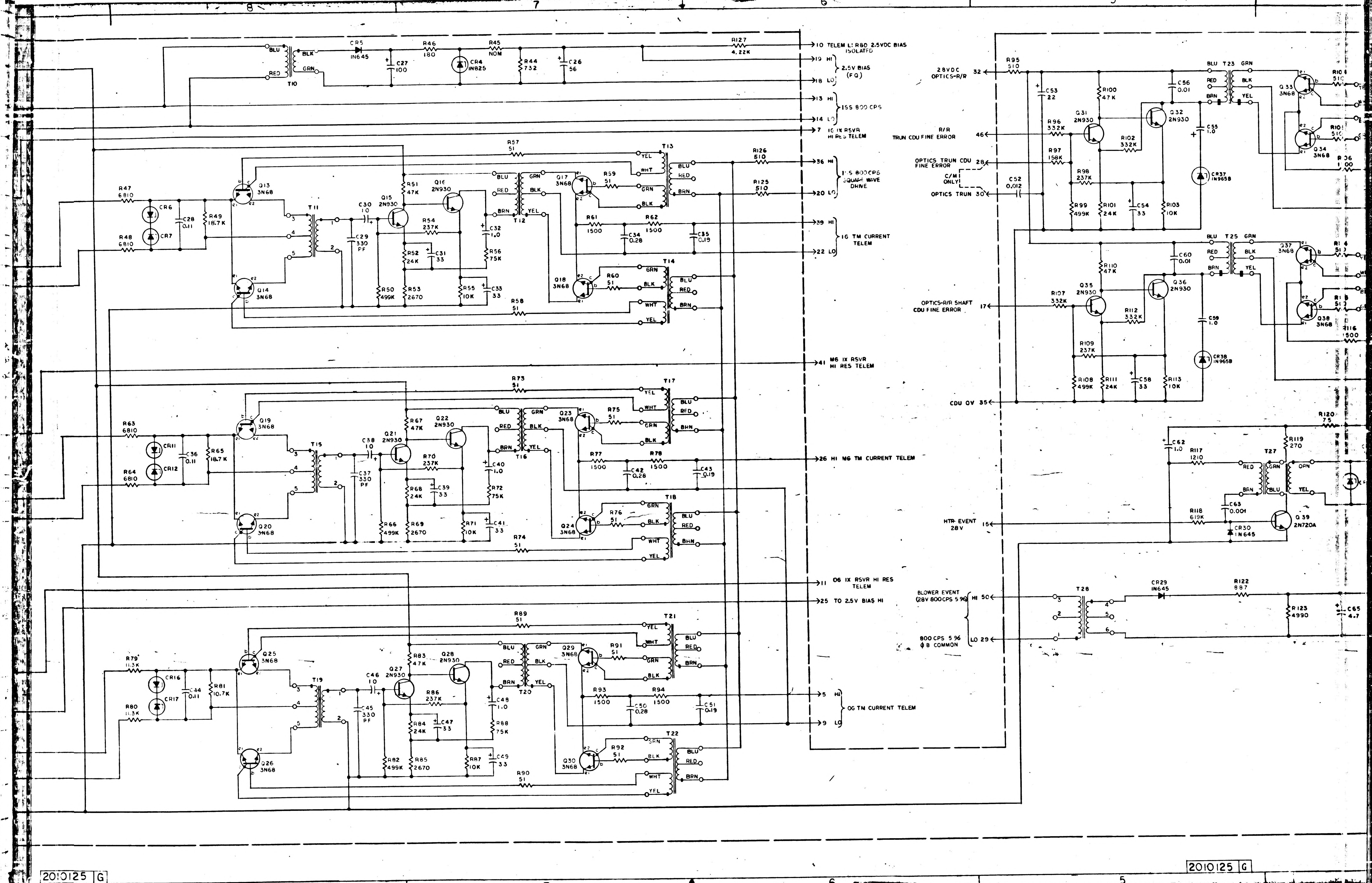

8
7
6
5
10 TELEM L: R&D 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
1SS 800 CPS
7 1G 1X RSVR HI RES TELEM
36 HI
20 LO
1SS 800CPS SQUARE WAVE DRIVE
39 HI
22 LO
1G TM CURRENT TELEM
41 MG 1X RSVR HI RES TELEM
26 HI MG TM CURRENT TELEM
11 OG 1X RSVR HI RES TELEM
25 TO 2.5V BIAS HI
5 HI
9 LO
OG TM CURRENT TELEM
28VDC OPTICS-R/R 32
R/R TRUN CDU FINE ERROR 46
OPTICS TRUN CDU FINE ERROR 28
C/M I ONLY
OPTICS TRUN 30
OPTICS-R/R SHAFT CDU FINE ERROR 17
CDU 0V 35
HTR EVENT 28V 15
BLOWER EVENT (28V 800CPS 5.96) HI 50
800 CPS 5.96 ϕB COMMON LO 29
T10
CR5 1N645
R46 180
R45 NOM
CR4 1N825
C27 100
R44 732
C26 56
R127 4.22K
T11
T12
T13
T14
Q13 3N68
Q14 3N68
Q15 2N930
Q16 2N930
Q17 3N68
Q18 3N68
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
C29 330 PF
C30 10
R51 47K
R52 24K
R53 2670
R50 499K
R54 237K
C31 33
R55 10K
C32 1.0
R56 75K
C33 33
R57 51
R58 51
R59 51
R60 51
R61 1500
R62 1500
C34 0.28
C35 0.19
R126 510
R125 510
T15
T16
T17
T18
Q19 3N68
Q20 3N68
Q21 2N930
Q22 2N930
Q23 3N68
Q24 3N68
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
C37 330 PF
C38 10
R67 47K
R68 24K
R69 2670
R66 499K
R70 237K
C39 33
R71 10K
C40 1.0
R72 75K
C41 33
R73 51
R74 51
R75 51
R76 51
R77 1500
R78 1500
C42 0.28
C43 0.19
T19
T20
T21
T22
Q25 3N68
Q26 3N68
Q27 2N930
Q28 2N930
Q29 3N68
Q30 3N68
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
C45 330 PF
C46 10
R83 47K
R84 24K
R85 2670
R82 499K
R86 237K
C47 33
R87 10K
C48 1.0
R88 75K
C49 33
R89 51
R90 51
R91 51
R92 51
R93 1500
R94 1500
C50 0.28
C51 0.19
R95 510
C53 22
R100 47K
C56 0.01
T23
Q31 2N930
Q32 2N930
Q33 3N68
Q34 3N68
R96 332K
R97 158K
R98 237K
R99 499K
R101 24K
R102 332K
C54 33
R103 10K
C55 1.0
CR37 1N965B
C52 0.012
T25
Q35 2N930
Q36 2N930
Q37 3N68
Q38 3N68
R110 47K
C60 0.01
R107 332K
R112 332K
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
C59 1.0
CR38 1N965B
R120 75
R119 270
C62 1.0
R117 1210
T27
C63 0.001
R118 619K
CR30 1N645
Q39 2N720A
T28
CR29 1N645
R122 887
R123 4990
C65 4.7
BLU
RED
GRN
BLK
YEL
WHT
BRN

2010125 G

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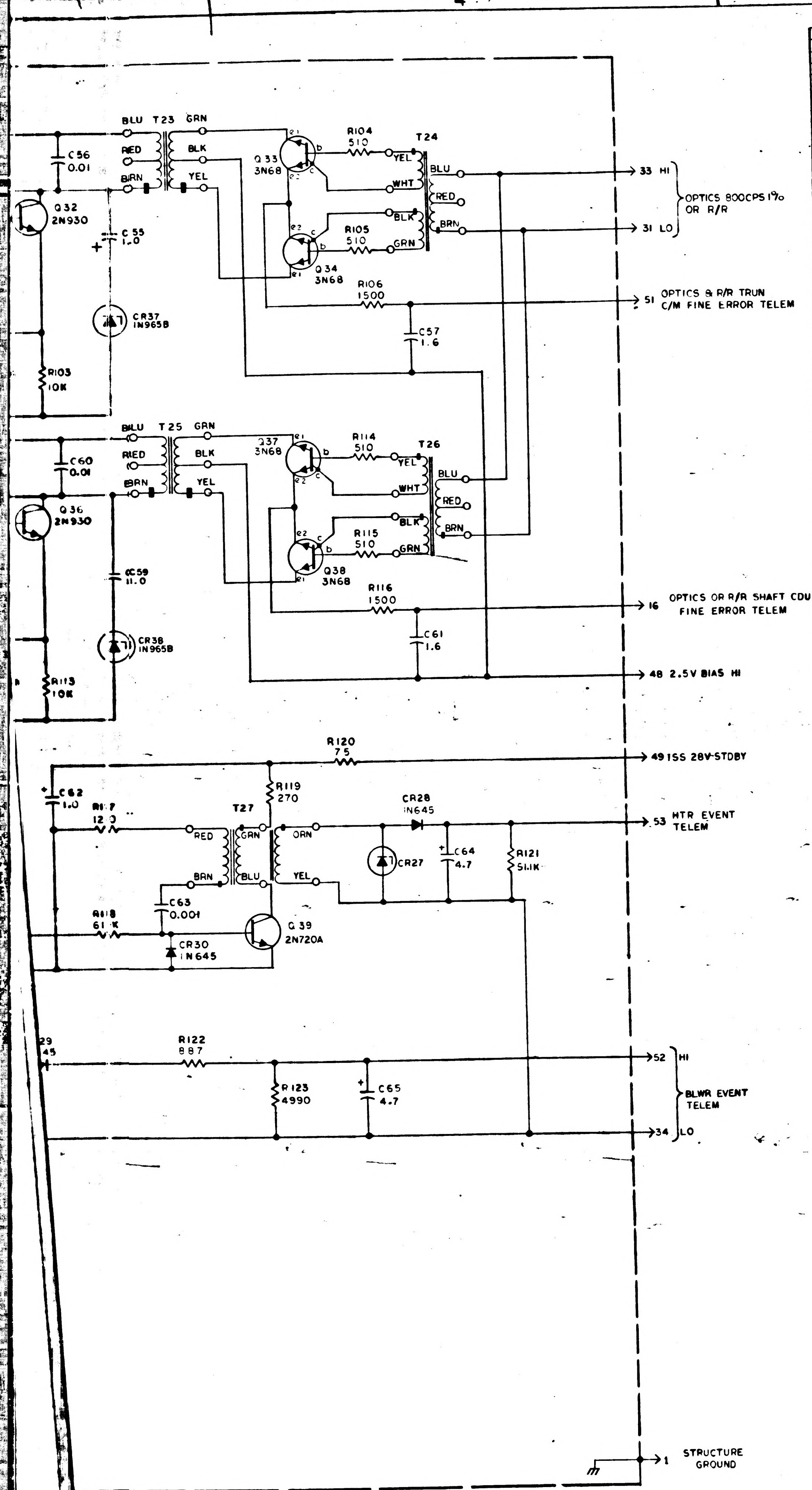


2010125 G

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-20	RESISTOR	330	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-241		887	±1%	1/8 W
R123	1010364-385		4990	±1%	1/8 W
R125	1006750-25		510	±2%	1/4 W
R126	1006750-25		510	±2%	1/4 W
R127	1010311-186	RESISTOR	4.22	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-6		0.28		6
C17	1010279-4		0.19	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	± 0%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-69		1.0		35
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR4	1010259-000	DIODE	IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR27	1010372-12	DIODE			
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
CR34	1008815-9	DIODE	IN965B		
CR35	1008815-9	DIODE	IN965B		
CR36	1008815-9	DIODE	IN965B		
CR37	1008815-9	DIODE	IN965B		
CR38	1008815-9	DIODE	IN965B		

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPR
A		REVISED PER TDRR 26030				
B		REVISED PER TDRR 26612				
C		REVISED PER TDRR 27172		LSB		
D		REVISED PER TDRR 29140		LSB		
E		REVISED PER TDRR 29604			21 Jun 66	
F		REVISED PER TDRR 30281	A.N.		3 AUG 66	
G		REVISED PER TDRR 30784		Rw	28 SEP 66	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. D. Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

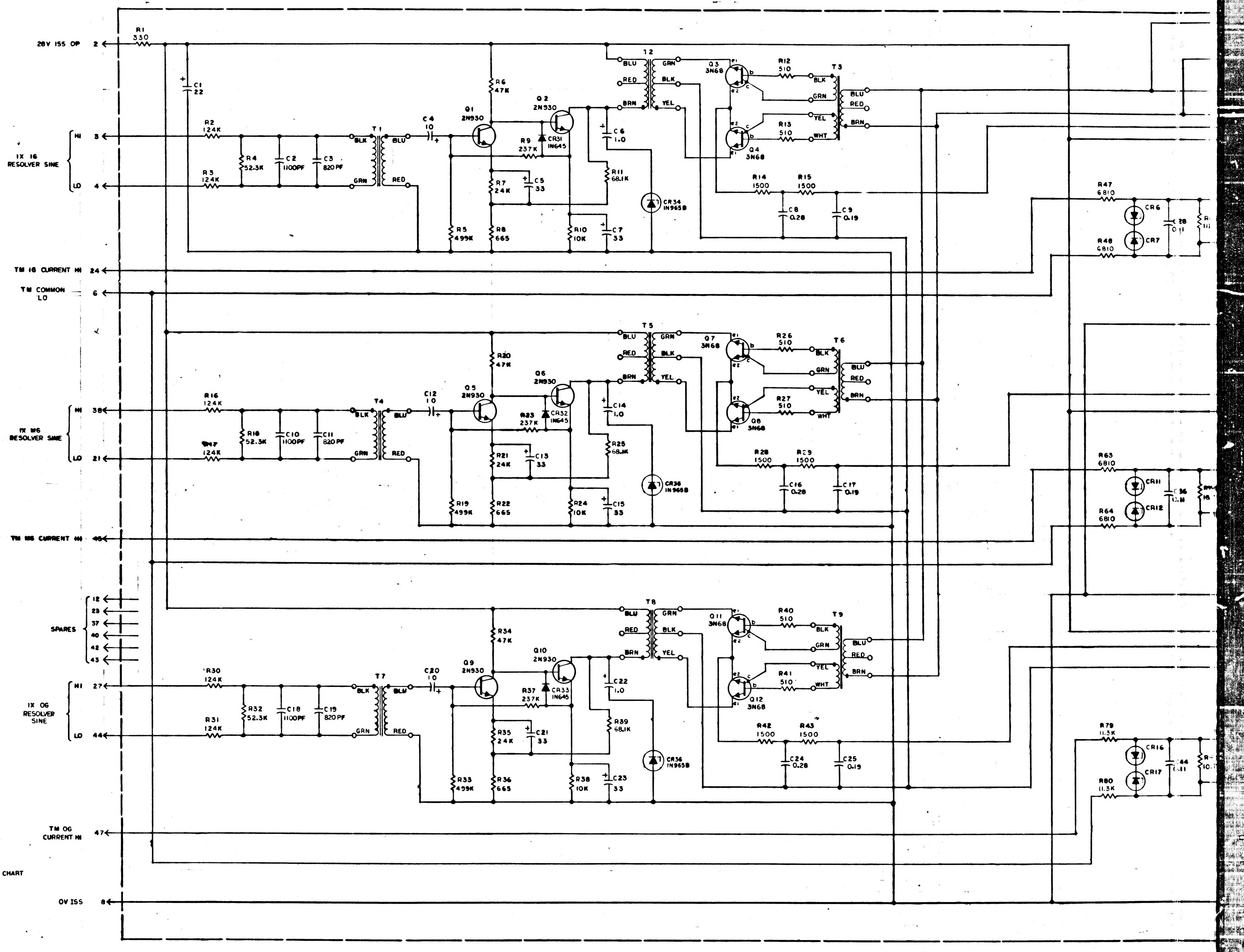
SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE
SHEET 1

2010125 G

3/2010125

[illegible]


28V 155 OP
2
R1
330
C1
22
1X 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
Q2 2N930
R5 499K
R6 47K
R7 24K
R8 665
R9 237K
CR31 1N645
C5 33
R10 10K
R11 68.1K
C6 1.0
C7 33
CR34 1N965B
T2
YEL
BRN
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
WHT
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
TM 16 CURRENT HI 24
TM COMMON LO 6
1X M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
Q6 2N930
R19 499K
R20 47K
R21 24K
R22 665
R23 237K
CR32 1N645
C13 33
R24 10K
R25 68.1K
C14 1.0
C15 33
CR35 1N965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
C36
TM M6 CURRENT HI 45
SPARES
12
23
37
40
42
43
1X 06 RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
Q10 2N930
R33 499K
R34 47K
R35 24K
R36 665
R37 237K
CR33 1N645
C21 33
R38 10K
R39 68.1K
C22 1.0
C23 33
CR36 1N965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44
TM 06 CURRENT HI 47
0V ISS 8
12
11
10
9
D
C
B
A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 H

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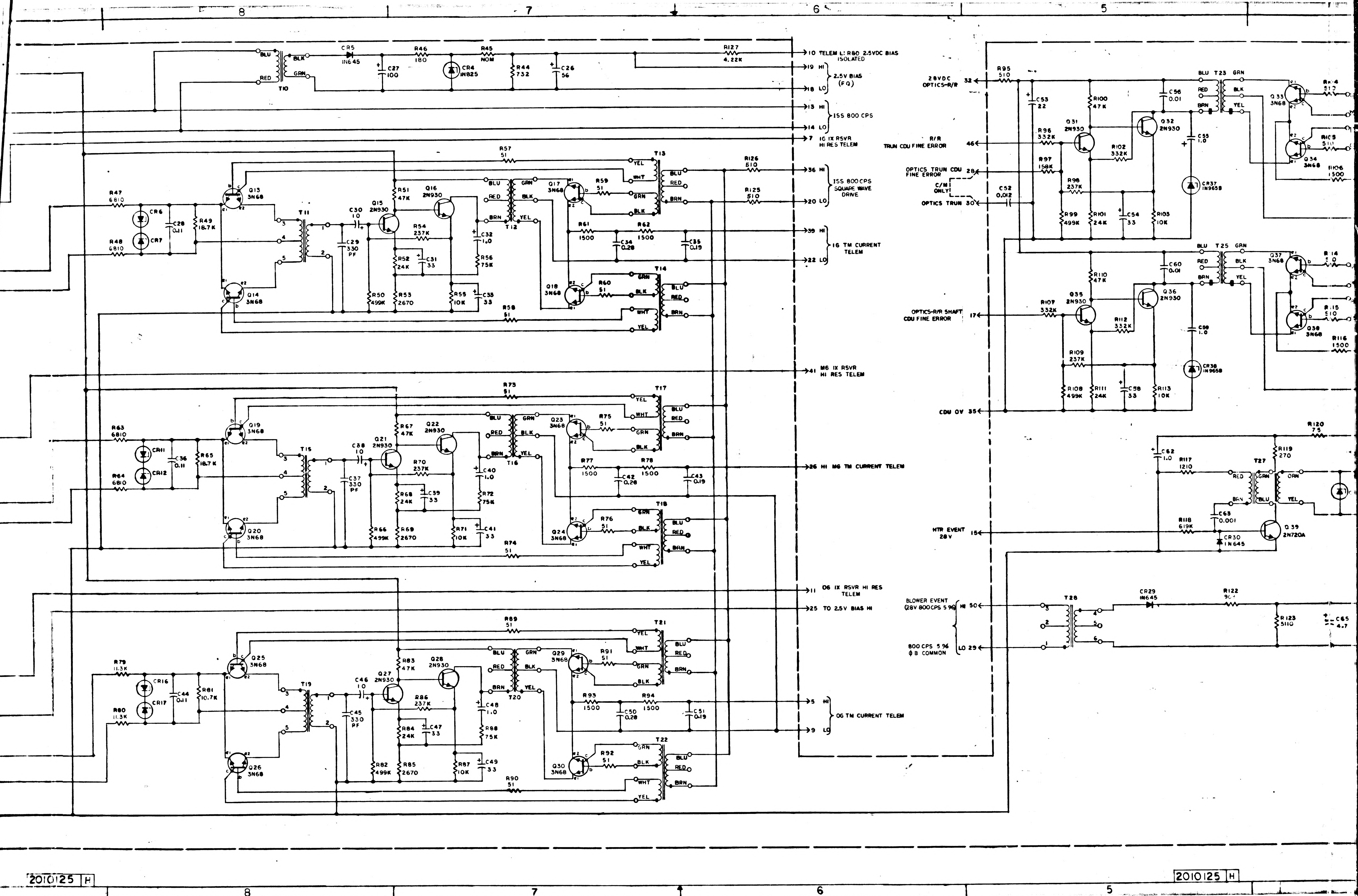
8
7
6
5
10 TELEM L: R80 2.5VDC BIAS ISOLATED
19 HI
2.5V BIAS (FQ)
18 LO
13 HI
ISS 800 CPS
14 LO
7 1G 1X RSVR HI RES TELEM
36 HI
ISS 800 CPS SQUARE WAVE DRIVE
20 LO
39 HI
1G TM CURRENT TELEM
22 LO
41 M6 1X RSVR HI RES TELEM
26 HI M6 TM CURRENT TELEM
11 OG 1X RSVR HI RES TELEM
25 TO 2.5V BIAS HI
5 HI
OG TM CURRENT TELEM
9 LO
T10
CR5 1N645
R46 180
R45 NOM
R127 4.22K
C27 100
CR4 1N825
R44 732
C26 56
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
T12
R57 51
R58 51
Q17 3N68
R59 51
Q18 3N68
R60 51
T13
T14
R61 1500
R62 1500
C34 0.28
C35 0.19
R126 510
R125 510
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
T16
R73 51
R74 51
Q23 3N68
R75 51
Q24 3N68
R76 51
T17
T18
R77 1500
R78 1500
C42 0.28
C43 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
T20
R89 51
R90 51
Q29 3N68
R91 51
Q30 3N68
R92 51
T21
T22
R93 1500
R94 1500
C50 0.28
C51 0.19
BLU
RED
BLK
GRN
BRN
YEL
WHT
28VDC OPTICS-R/R 32
R/R TRUN CDU FINE ERROR 46
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
OPTICS-R/R SHAFT CDU FINE ERROR 17
CDU 0V 35
HTR EVENT 28V 15
BLOWER EVENT (28V 800CPS 5 96) HI 50
800 CPS 5 96 ϕB COMMON LO 29
R95 510
C53 22
R100 47K
C56 0.01
T23
Q31 2N930
Q32 2N930
R96 332K
R102 332K
R97 158K
R98 237K
C52 0.012
C55 1.0
CR37 1N965B
R99 499K
R101 24K
C54 33
R103 10K
Q33 3N68
Q34 3N68
R114 510
R115 510
R106 1500
T25
C60 0.01
R110 47K
Q35 2N930
Q36 2N930
R107 332K
R112 332K
C59 1.0
R109 237K
CR38 1N965B
R108 499K
R111 24K
C58 33
R113 10K
Q37 3N68
Q38 3N68
R116 1500
R120 75
C62 1.0
R119 270
R117 1210
T27
ORN
C63 0.001
R118 619K
CR30 1N645
Q39 2N720A
T28
CR29 1N645
R122 90
R123 5110
C65 4.7

2010125 H

2010125 H

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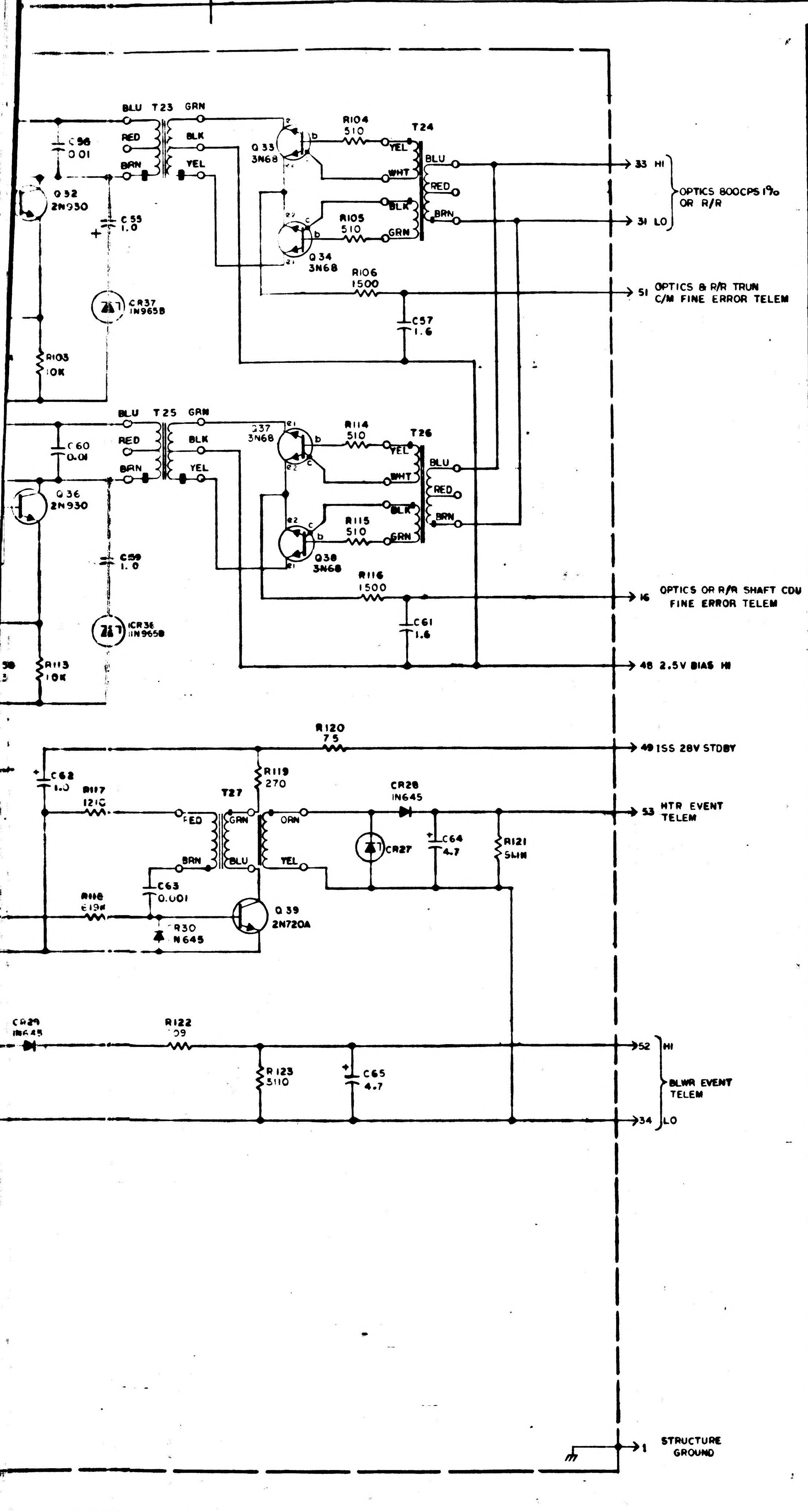


REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	↓ -36		1500	↓	↓
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	↓ -36		1500	↓	↓
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	↓ -36		1500	↓	↓
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-243		909	±1%	1/8 W
R123	1010364-387		5110	±1%	1/8 W
R125	1006750-25		510	±2%	1/4 W
R126	1006750-25	↓	510	±2%	1/4 W
R127	1010311-186	RESISTOR	4.22	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-134	CAPACITOR	22	±10%	50 VDC
C 2	1010410-18		1100 PF	±2	300
C 3	1010410-15		820 PF	±2	300
C 4	1006755-31		10	±10%	20
C 5	1006755-34		33		20
C 6	1006755-69		1.0		35
C 7	1006755-34		33		20
C 8	1010279-6		0.28	↓	6
C 9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-6		0.28	↓	6
C17	1010279-4		0.19	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100	↓	20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19	↓	6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19	↓	6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28	↓	6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-69		1.0		35
C60	1006777-31		0.01		100
C61	1010279-114		1.6	↓	15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037	↓	4.7	±10%	50 ↓
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR4	1010259-000	DIODE	1N825		
CR5	1010837-001		1N645		
CR6	1010372-12	↓			
CR7	1010372-12	DIODE			
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR27	1010372-12	DIODE			
CR28	1010837-001		1N645		
CR29					
CR30					
CR31					
CR32	↓	↓	↓		
CR33	1010837-001	DIODE	1N645		
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367-000	CHOPPER	3N68		
Q 4	1010367-000	CHOPPER	3N68		
Q 5	1010397-1	TRANSISTOR	2N930		
Q 6	1010397-1	TRANSISTOR	2N930		
Q 7	1010367-000	CHOPPER	3N68		
Q 8	1010367-000	CHOPPER	3N68		
Q 9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310	↓			
T28	1010282	TRANSFORMER			
CR34	1008815-9	DIODE	1N965B		
CR35	1008815-9	DIODE	1N965B		
CR36	1008815-9	DIODE	1N965B		
CR37	1008815-9	DIODE	1N965B		
CR38	1008815-9	DIODE	1N965B		

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				WR
B		REVISED PER TDRR 26612	RDL			WR
C		REVISED PER TDRR 27172		LEB	3/ /66	WR
D		REVISED PER TDRR 29140		LEB	5/ /66	
E		REVISED PER TDRR 29604	J.	RWH	21 JUN 66	
F		REVISED PER TDRR 30281	A.N.		3 AUG 66	
G		REVISED PER TDRR 30784	ME	RW	28 SEP 66	
H		REVISED PER TDRR 31521	EC	RW	21 OCT 66	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
↓ -263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN a. Di Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT W Kupfer A. G. METZGER
APPROVED MSC
DATE

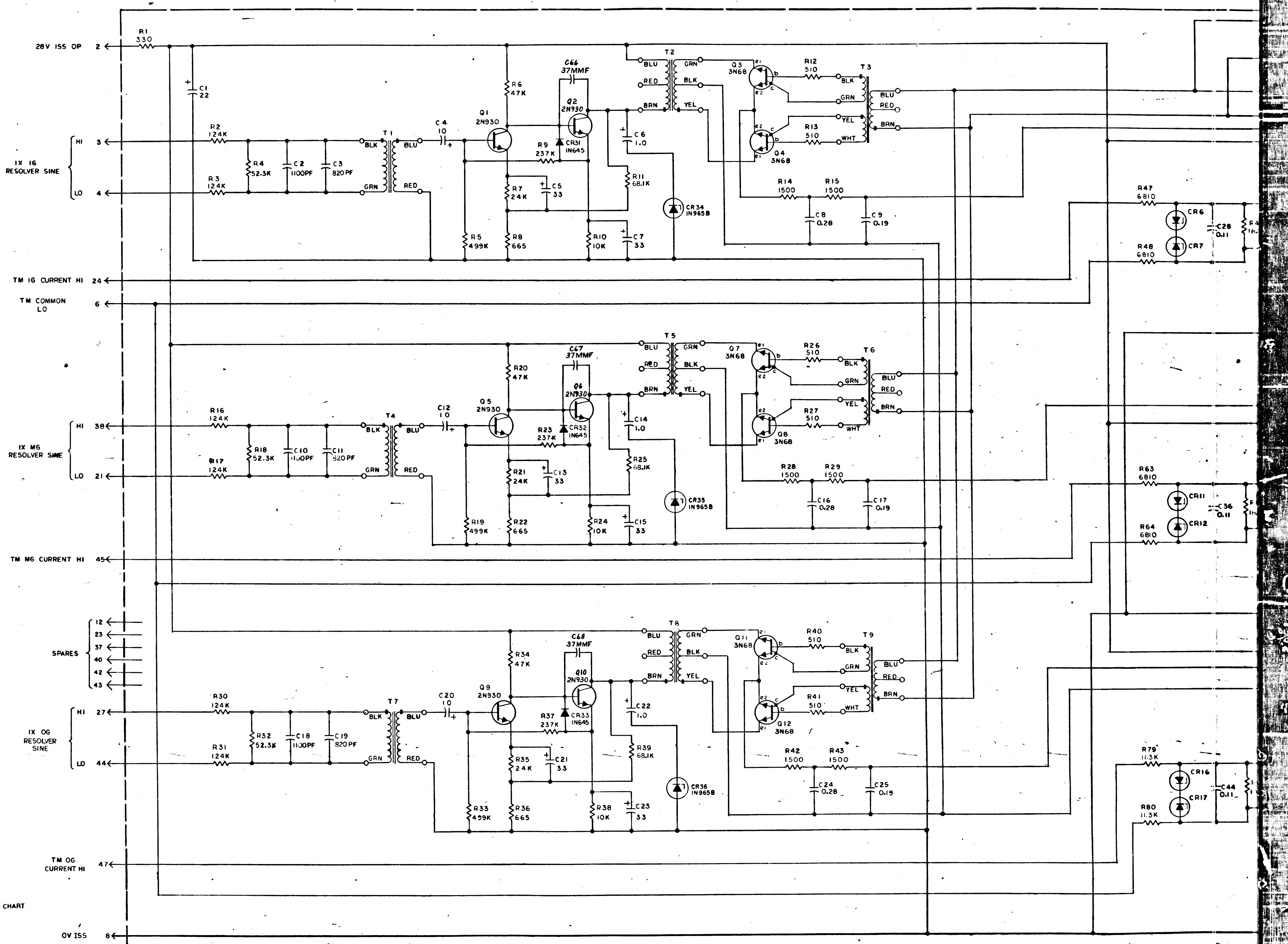
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2010125
SCALE —		SHEET 3

2010125 H

3/2010125



28V ISS OP 2
R1 330
C1 22
1X 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R5 499K
R6 47K
R7 24K
R8 665
C66 37MMF
Q2 2N930
R9 237K
CR31 1N645
C5 33
R10 10K
R11 68.1K
C6 1.0
C7 33
CR34 1N965B
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
C28 0.11
TM 1G CURRENT HI 24
TM COMMON LO 6
1X M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R19 499K
R20 47K
R21 24K
R22 665
C47 37MMF
Q6 2N930
R23 237K
CR32 1N645
C13 33
R24 10K
R25 68.1K
C14 1.0
C15 33
CR35 1N965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
C36 0.11
TM M6 CURRENT HI 45
SPARES
12
23
37
40
42
43
1X 0G RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R33 499K
R34 47K
R35 24K
R36 665
C68 37MMF
Q10 2N930
R37 237K
CR33 1N645
C21 33
R38 10K
R39 68.1K
C22 1.0
C23 33
CR36 1N965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
TM 0G CURRENT HI 47
0V ISS 8
D
C
B
A
12
11
10
9

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 J

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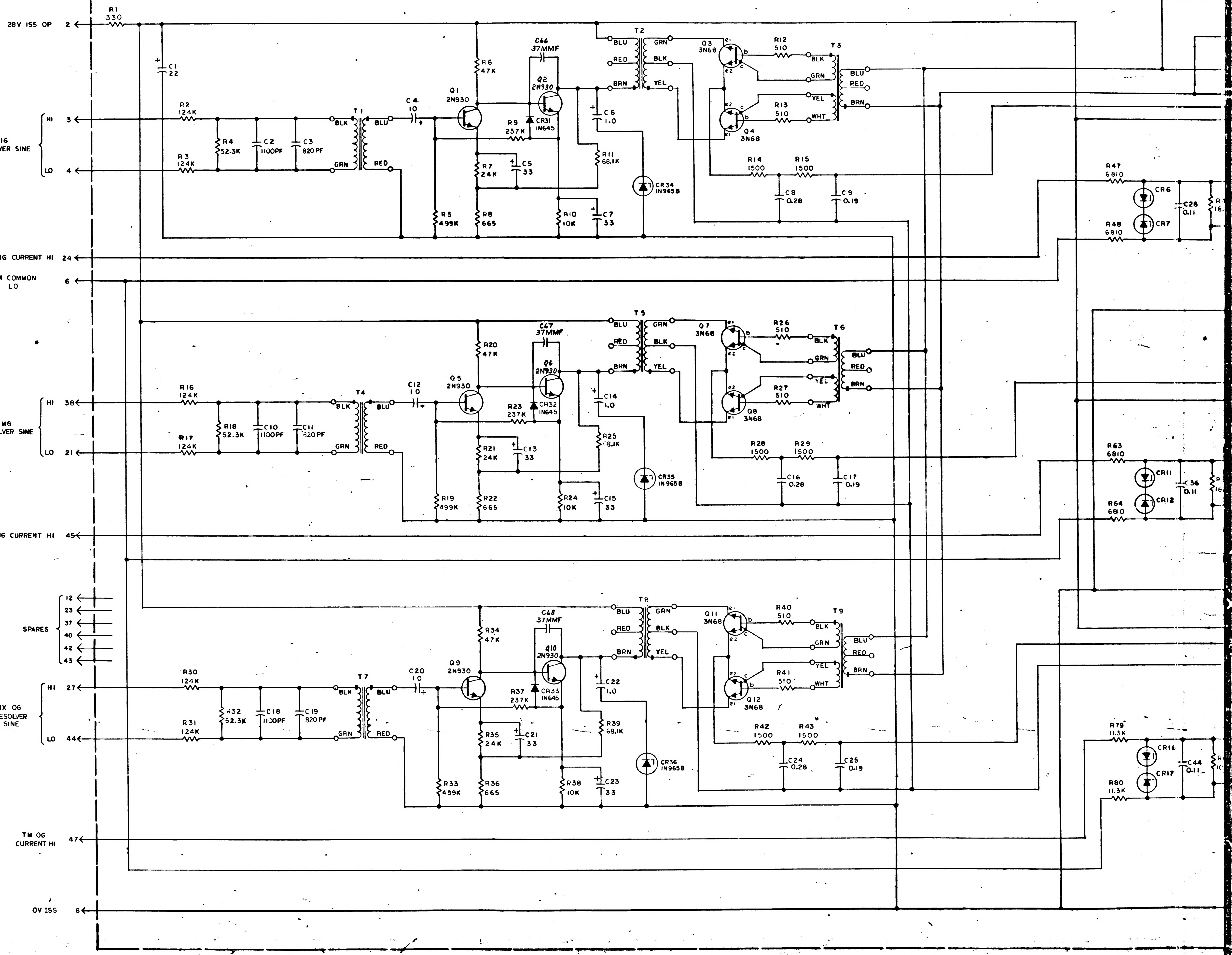
28V ISS OP 2
R1 330
C1 22
IX 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1 BLK BLU GRN RED
C4 10
Q1 2N930
R6 47K
C66 37MMF
Q2 2N930
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 68.1K
CR34 1N965B
T2 BLU RED BRN GRN BLK YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3 BLK GRN YEL WHT BLU RED BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
C28 0.11
TM 16 CURRENT HI 24
TM COMMON LO 6
IX M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R20 47K
C67 37MMF
Q6 2N930
R23 237K
CR32 1N645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 68.1K
CR35 1N965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
C36 0.11
TM M6 CURRENT HI 45
SPARES 12 23 37 40 42 43
IX 06 RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R34 47K
C68 37MMF
Q10 2N930
R37 237K
CR33 1N645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
C22 1.0
R39 68.1K
CR36 1N965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
TM 06 CURRENT HI 47
OV ISS 8

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 J

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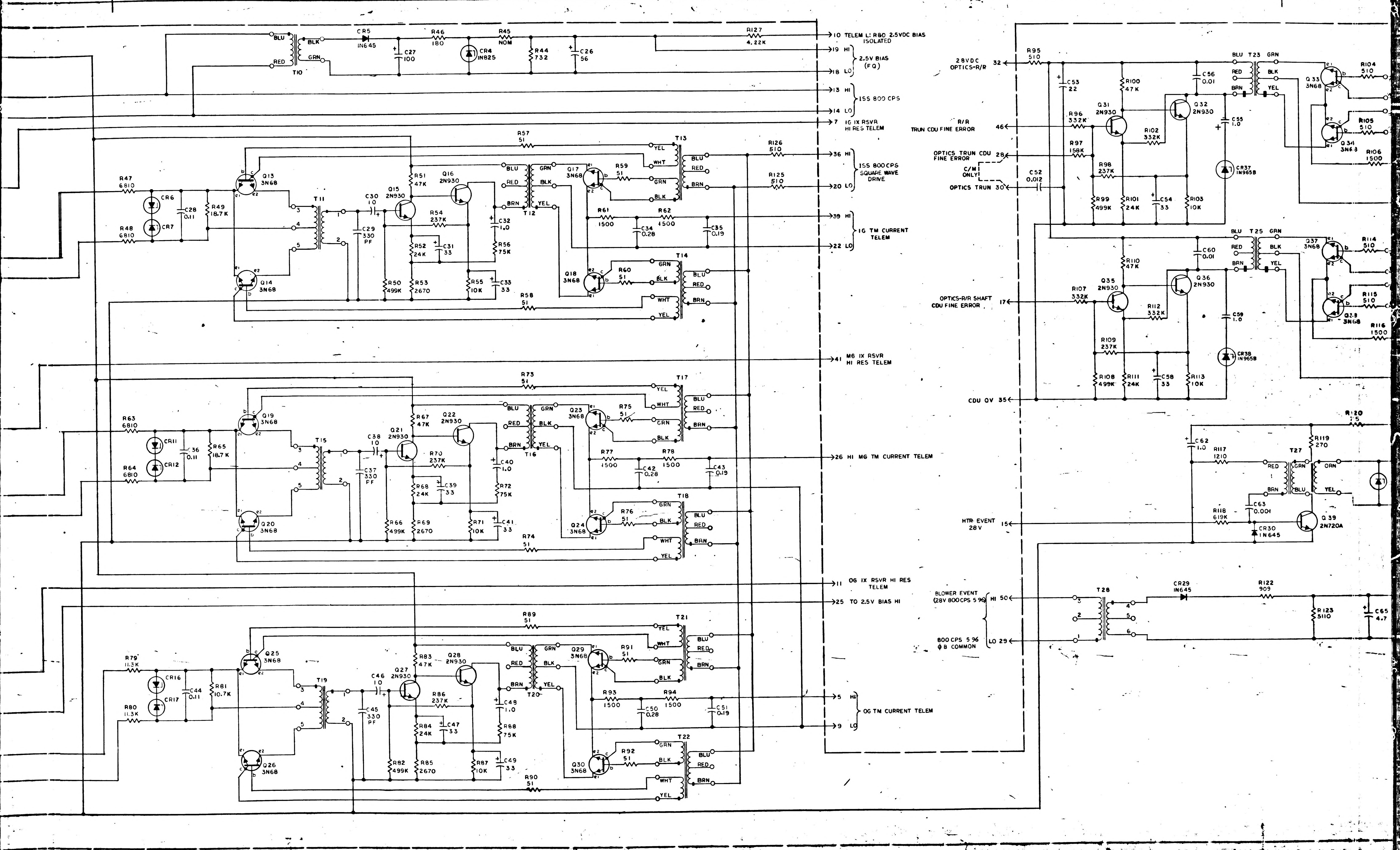
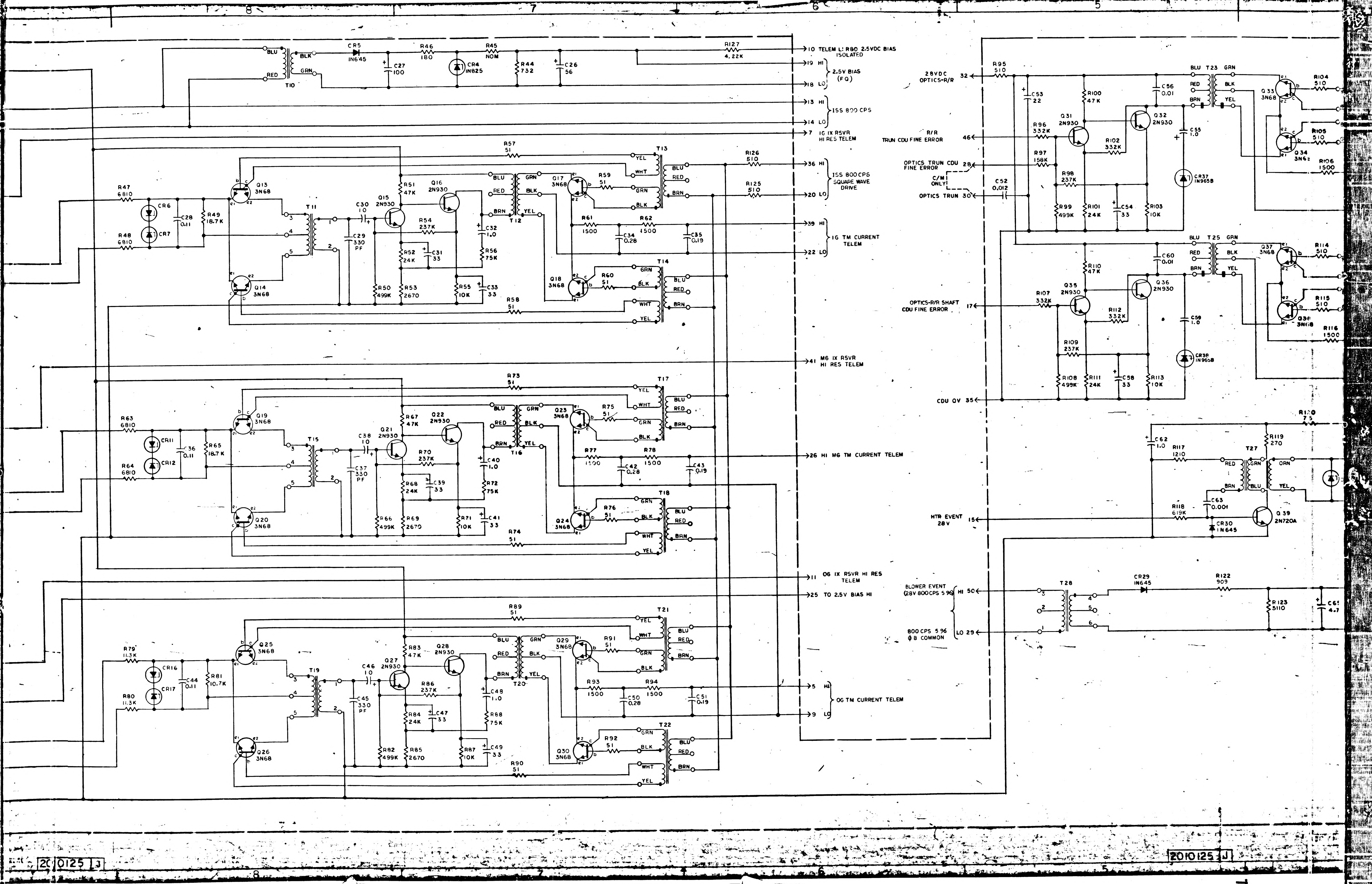


8
7
6
5
10 TELEM L: R80 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
ISS 800 CPS
7 1G 1X RSVR HI RES TELEM
36 HI
20 LO
ISS 800 CPS SQUARE WAVE DRIVE
39 HI
22 LO
1G TM CURRENT TELEM
41 MG 1X RSVR HI RES TELEM
26 HI MG TM CURRENT TELEM
11 OG 1X RSVR HI RES TELEM
25 TO 2.5V BIAS HI
5 HI
9 LO
OG TM CURRENT TELEM
T10
CR5 1N645
R46 180
R45 NOM
C27 100
CR4 1N825
R44 732
C26 56
R127 4.22K
R57 51
R58 51
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
C32 1.0
R56 75K
R50 499K
R53 2670
R55 10K
C33 33
T12
Q17 3N68
R59 51
T13
R126 510
R125 510
R61 1500
R62 1500
C34 0.28
C35 0.19
Q18 3N68
R60 51
T14
R73 51
R74 51
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
C40 1.0
R72 75K
R66 499K
R69 2670
R71 10K
C41 33
T16
Q23 3N68
R75 51
T17
R77 1500
R78 1500
C42 0.28
C43 0.19
Q24 3N68
R76 51
T18
R89 51
R90 51
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
C48 1.0
R88 75K
R82 499K
R85 2670
R87 10K
C49 33
T20
Q29 3N68
R91 51
T21
R93 1500
R94 1500
C50 0.28
C51 0.19
Q30 3N68
R92 51
T22
BLU
RED
GRN
BLK
BRN
YEL
WHT
28VDC OPTICS-R/R 32
R/R TRUN CDU FINE ERROR 46
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
R95 510
C53 22
R100 47K
C56 0.01
T23
Q33 3N68
R104 510
R96 332K
Q31 2N930
Q32 2N930
R102 332K
C55 1.0
Q34 3N68
R105 510
R106 1500
R97 158K
R98 237K
C52 0.012
CR37 1N965B
R99 499K
R101 24K
C54 33
R103 10K
T25
C60 0.01
Q37 3N68
R114 510
R110 47K
Q35 2N930
Q36 2N930
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
R112 332K
C59 1.0
Q38 3N68
R115 510
R116 1500
R109 237K
CR38 1N965B
R108 499K
R111 24K
C58 33
R113 10K
CDU 0V 35
R120 7.5
C62 1.0
R117 1210
R119 270
T27
ORN
C63 0.001
R118 619K
HTR EVENT 28V 15
CR30 1N645
Q39 2N720A
BLOWER EVENT (28V 800CPS 5.9) HI 50
800CPS 5.9 ϕB COMMON LO 29
T28
CR29 1N645
R122 909
R123 5110
C65 4.7


8
7
6
5
T10
BLU
RED
BLK
GRN
CR5 1N645
C27 100
R46 180
CR4 1N825
R45 NOM
R44 732
C26 56
R127 4.22K
10 TELEM L: R80 2.5VDC BIAS ISOLATED
19 HI
18 LO
2.5V BIAS (FQ)
13 HI
14 LO
ISS 800 CPS
7 IG IX RSVR HI RES TELEM
R57 51
T13
R126 510
R125 510
36 HI
20 LO
ISS 800 CPS SQUARE WAVE DRIVE
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C32 1.0
R56 75K
C33 33
T12
Q17 3N68
R59 51
R61 1500
R62 1500
C34 0.28
C35 0.19
39 HI
22 LO
IG TM CURRENT TELEM
Q18 3N68
R60 51
T14
R58 51
41 M6 IX RSVR HI RES TELEM
R73 51
T17
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C40 1.0
R72 75K
C41 33
T16
Q23 3N68
R75 51
R77 1500
R78 1500
C42 0.28
C43 0.19
26 HI M6 TM CURRENT TELEM
T18
Q24 3N68
R76 51
R74 51
11 OG IX RSVR HI RES TELEM
25 TO 2.5V BIAS HI
R89 51
T21
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C48 1.0
R88 75K
C49 33
T20
Q29 3N68
R91 51
R93 1500
R94 1500
C50 0.28
C51 0.19
5 HI
9 LO
OG TM CURRENT TELEM
T22
Q30 3N68
R92 51
R90 51
YEL
WHT
GRN
BLK
BRN
28VDC OPTICS-R/R 32
R95 510
C53 22
R100 47K
C56 0.01
T23
Q33 3N68
R104 510
R/R TRUN CDU FINE ERROR 46
R96 332K
Q31 2N930
Q32 2N930
R102 332K
C55 1.0
R105 510
Q34 3N68
R106 1500
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
C52 0.012
R97 158K
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
CR37 1N965B
T25
C60 0.01
Q37 3N68
R114 510
R110 47K
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
Q35 2N930
Q36 2N930
R112 332K
C59 1.0
R115 510
Q38 3N68
R116 1500
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CR38 1N965B
CDU 0V 35
R120 75
C62 1.0
R117 1210
R119 270
T27
ORN
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
MTR EVENT 28V 15
BLOWER EVENT (28V 800CPS 5.9) HI 50
800 CPS 5.9 ϕB COMMON LO 29
T28
CR29 1N645
R122 909
R123 5110
C65 4.7
2010125 J
2010125 J

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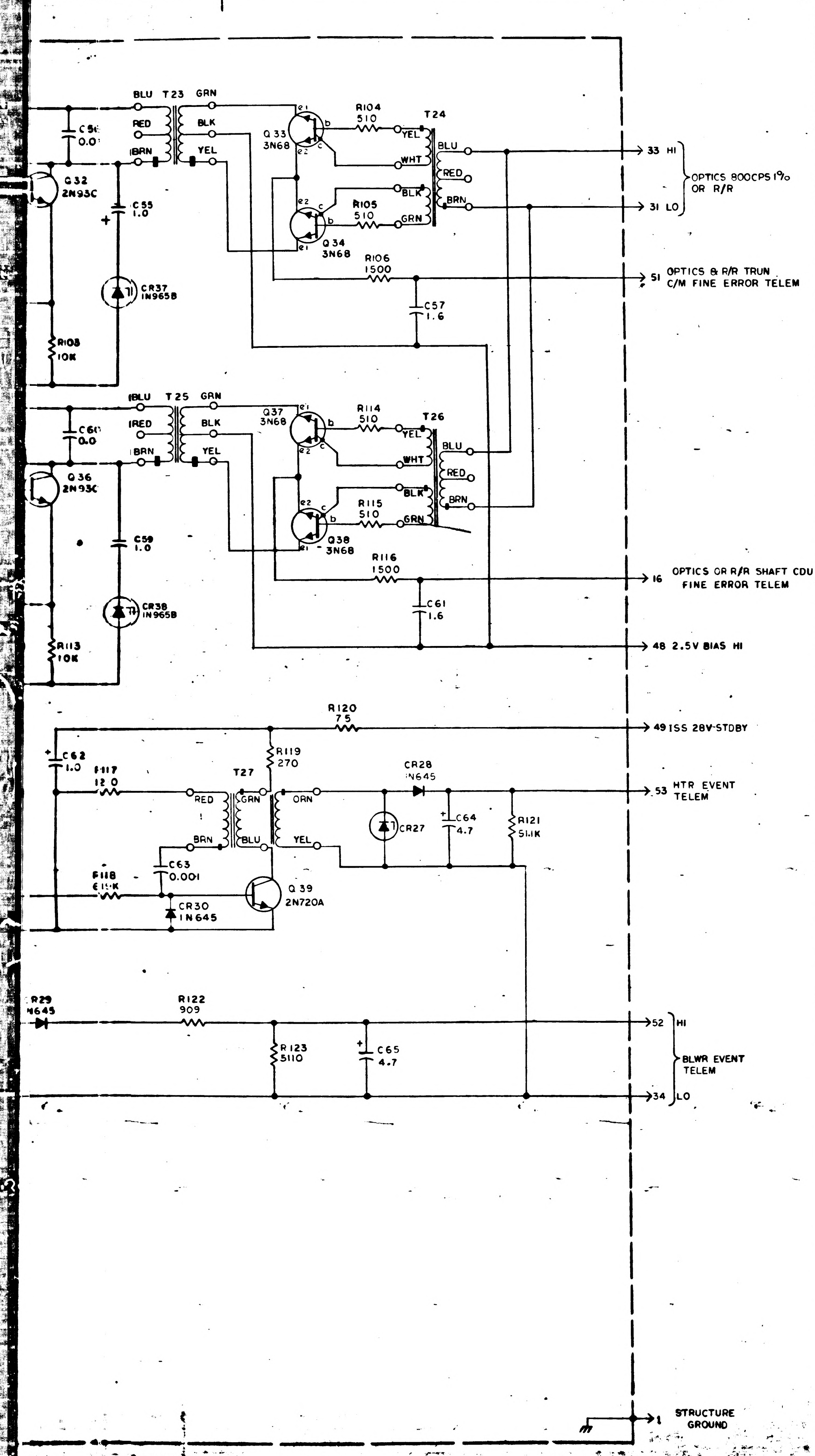


REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311 -291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750 -72		47K	±2%	1/4 W
R 7	1006750 -65		24K	±2%	1/4 W
R 8	1010311 -109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311 - 302		68.1K	±1%	1/10 W
R12	1006750 -25		510	±2%	1/4 W
R13	1006750 -25		510	±2%	1/4 W
R14	1006750 -36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311 -291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311 -109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311 -302		68.1K	±1%	1/10 W
R26	1006750 -25		510	±2%	1/4 W
R27	1006750 -25		510	±2%	1/4 W
R28	1006750 -36		1500	±2%	1/4 W
R29	1006750 -36		1500	±2%	1/4 W
R30	1010364 -653		124K	±1%	1/8 W
R31	1010364 -653		124K	±1%	1/8 W
R32	1010311 -291		52.3K	±1%	1/10 W
R33	1010364 -769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311 -109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311 -302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750 -14		180	±2%	1/4 W
R47	1010364 -411		6810	±1%	1/8 W
R48	1010364 -411		6810	±1%	1/8 W
R49	1010364 -495		18.7K	±1%	1/8 W
R50	1010364 -769		499K	±1%	1/8 W
R51	1006750 -72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311 -167		2670	±1%	1/10 W
R54	1010364 -707		237K	±1%	1/8 W
R55	1006750 -56		10K	±2%	1/4 W
R56	1010311 -306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	↓ -36		1500	↓	↓
R62	1006750-36		1500	±2%	1/4 W
R63	1010364 -411		6810	±1%	1/8 W
R64	1010364 -411		6810	±1%	1/8 W
R65	1010364 -495		18.7K	±1%	1/8 W
R66	1010364 -769		499K	±1%	1/8 W
R67	1006750 -72		47K	±2%	1/4 W
R68	1006750 -65		24K	±2%	1/4 W
R69	1010311 -167		2670	±1%	1/10 W
R70	1010364 -707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311 -306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	↓ - 36		1500	↓	↓
R78	1006750- 36		1500	±2%	1/4 W
R79	1010364- 453		11.3K	±1%	1/8 W
R80	1010364- 453		11.3K	±1%	1/8 W
R81	1010364- 449		10.7K	±1%	1/8 W
R82	1010364- 769		499K	±1%	1/8 W
R83	1006750 -72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311 -167		2670	±1%	1/10 W
R86	1010364 -707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311 -306		75K	±1%	1/10 W
R89	1006750 -1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	↓ -36		1500	↓	↓
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364 -769		499K	±1%	1/8 W
R100	1006750 - 72		47K	±2%	1/4 W
R101	1006750 -65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364 -735		332K	±1%	1/8 W
R108	1010364 -769		499K	±1%	1/8 W
R109	1010364 -707		237K	±1%	1/8 W
R110	1006750 -72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364 -35		75	±1%	1/8 W
R121	1010364 -579		51.1K	±1%	1/8 W
R122	1010364 -245		909	±1%	1/8 W
R123	1010364 -387		5110	±1%	1/8 W
R125	1006750 - 25		510	±2%	[illegible]
R126	1006750 - 25		510	±2%	[illegible]
R127	1010311 -106	RESISTOR	4.22	±1%	1/10 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755 - 134	CAPACITOR	22	±10%	50 VDC
C 2	1010410 - 18		1100 PF	±2	300
C 3	1010410 - 15		820 PF	±2	300
C 4	1006755 - 31		10	±10%	20
C 5	1006755 - 34		33		20
C 6	1006755 - 69		1.0		35
C 7	1006755 - 34		33		20
C 8	1010279 - 6		0.28	↓	6
C 9	1010279 - 4		0.19	±10%	6
C 10	1010410 - 18		1100 PF	±2	300
C 11	1010410 - 15		820 PF	±2	300
C 12	1006755 - 31		10	±10%	20
C 13	1006755 - 34		33		20
C 14	1006755 - 69		1.0		35
C 15	1006755 - 34		33		20
C 16	1010279 - 6		0.28	↓	6
C 17	1010279 - 4		0.19	±10%	6
C 18	1010410 - 18		1100 PF	±2%	300
C 19	1010410 - 15		820 PF	±2%	300
C 20	1006755 - 31		10	±10%	20
C 21	1006755 - 34		33		20
C 22	1006755 - 69		1.0		35
C 23	1006755 - 34		33		20
C 24	1010279 - 6		0.28		6
C 25	1010279 - 4		0.19		6
C 26	1006755 - 4		56		6
C 27	1006755 - 40		100	↓	20
C 28	1010279 - 100		0.11	±10%	15
C 29	1010410 - 5		330PF	±2%	500
C 30	1006755 - 31		10	±10%	20
C 31	1006755 - 34		33		20
C 32	1006755 - 69		1.0		35
C 33	1006755 - 34		33		20
C 34	1010279 - 6		0.28		6
C 35	1010279 - 4		0.19	↓	6
C 36	1010279 - 100		0.11	±10%	15
C 37	1010410 - 5		330PF	±2%	500
C 38	1006755 - 31		10	±10%	20
C 39	1006755 - 34		33		20
C 40	1006755 - 69		1.0		35
C 41	1006755 - 34		33		20
C 42	1010279 - 6		0.28		6
C 43	1010279 - 4		0.19	↓	6
C 44	1010279 - 100		0.11	±10%	15
C 45	1010410 - 5		330PF	±2%	500
C 46	1006755 - 31		10	±10%	20
C 47	1006755 - 34		33		20
C 48	1006755 - 69		1.0		35
C 49	1006755 - 34		33		20
C 50	1010279 - 6		0.28	↓	6
C 51	1010279 - 4		0.19	±10%	6
C 52	1010264 - 14		0.012	±5%	200
C 53	1006755 - 134		22	±10%	50
C 54	1006755 - 34		33		20
C 55	1006755 - 69		1.0		35
C 56	1006777 - 31		0.01		100
C 57	1010279 - 114		1.6		15
C 58	1006755 - 34		33		20
C 59	1006755 - 69		1.0		35
C 60	1006777 - 31		0.01		100
C 61	1010279 - 114		1.6	↓	15
C 62	1010393 - 029		1.0	±10%	50
C 63	1010359 - 17		0.001	±10%	200
C 64	1010393 - 037	↓	4.7	±10%	50 ↓
C 65	1006755 - 10	CAPACITOR	4.7	±10%	10 VDC
C66	1006777-6		37MMF	±10%	100VDC
C67	1006777-6	↓	37MMF	±10%	100VDC
C68	1006777-6	CAPACITOR	37MMF	±10%	100VDC
CR4	1010259 -000	DIODE	IN825		
CR5	1010837 -001		IN645		
CR6	1010372 - 12	↓			
CR7	1010372 - 12	DIODE			
CR11	1010372 - 12	DIODE			
CR12	1010372 - 12	DIODE			
CR16	1010372 - 12	DIODE			
CR17	1010372 - 12	DIODE			
CR27	1010372 - 12	DIODE			
CR28	1010837 - 001		IN645		
CR29					
CR30					
CR31					
CR32	↓	↓	↓		
CR33	1010837 - 001	DIODE	IN645		
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367 - 000	CHOPPER	3N68		
Q 4	1010367 - 000	CHOPPER	3N68		
Q 5	1010397 - 1	TRANSISTOR	2N930		
Q 6	1010397 - 1	TRANSISTOR	2N930		
Q 7	1010367 - 000	CHOPPER	3N68		
Q 8	1010367 - 000	CHOPPER	3N68		
Q 9	1010397 - 1	TRANSISTOR	2N930		
Q 10	1010397 - 1	TRANSISTOR	2N930		
Q 11	1010367 - 000	CHOPPER	3N68		
Q 12	1010367 - 000	CHOPPER	3N68		
Q 13	1010367 - 000	CHOPPER	3N68		
Q 14	1010367 - 000	CHOPPER	3N68		
Q 15	1010397 - 1	TRANSISTOR	2N930		
Q 16	1010397 - 1	TRANSISTOR	2N930		
Q 17	1010367 - 000	CHOPPER	3N68		
Q 18	1010367 - 000	CHOPPER	3N68		
Q 19	1010367 - 000	CHOPPER	3N68		
Q 20	1010367 - 000	CHOPPER	3N68		
Q 21	1010397 - 1	TRANSISTOR	2N930		
Q 22	1010397 - 1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q 23	1010367 - 000	CHOPPER	3N68		
Q 24	1010367 - 000	CHOPPER	3N68		
Q 25	1010367 - 000	CHOPPER	3N68		
Q 26	1010367 - 000	CHOPPER	3N68		
Q 27	1010397 - 1	TRANSISTOR	2N930		
Q 28	1010397 - 1	TRANSISTOR	2N930		
Q 29	1010367 - 000	CHOPPER	3N68		
Q 30	1010367 - 000	CHOPPER	3N68		
Q 31	1010397 - 1	TRANSISTOR	2N930		
Q 32	1010397 - 1	TRANSISTOR	2N930		
Q 33	1010367 - 000	CHOPPER	3N68		
Q 34	1010367 - 000	CHOPPER	3N68		
Q 35	1010397 - 1	TRANSISTOR	2N930		
Q 36	1010397 - 1	TRANSISTOR	2N930		
Q 37	1010367 - 000	CHOPPER	3N68		
Q 38	1010367 - 000	CHOPPER	3N68		
Q 39	1010357 - 1	TRANSISTOR	2N720A		
T 1	1008832	TRANSFORMER			
T 2	1008842				
T 3	1010323				
T 4	1008832				
T 5	1008842				
T 6	1010323				
T 7	1008832				
T 8	1008842				
T 9	1010323				
T 10	1010466				
T 11	1010710				
T 12	1008842				
T 13	1010323				
T 14	1010323				
T 15	1010710				
T 16	1008842				
T 17	1010323				
T 18	1010323				
T 19	1010710				
T 20	1008842				
T 21	1010323				
T 22	1010323				
T 23	1008842				
T 24	1010323				
T 25	1008842				
T 26	1010323				
T 27	1010310	↓			
T 28	1010282	TRANSFORMER			
CR34	1008815 - 9	DIODE	IN965B		
CR35	1008815 - 9	DIODE	IN965B		
CR36	1008815 - 9	DIODE	IN965B		
CR37	1008815 - 9	DIODE	IN965B		
CR38	1008815 - 9	DIODE	IN965B		

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030				
B		REVISED PER TDRR 26612				
C		REVISED PER TDRR 27172		LSB		
D		REVISED PER TDRR 29140		LSB		
E		REVISED PER TDRR 29504			21 JUN 66	
F		REVISED PER TDRR 30281			66	
G		REVISED PER TDRR 30784	NE		28 SEP 66	
H		REVISED PER TDRR 31521	EC		OCT 66	
J		REVISED PER TDRR 31976		CW	DEC	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & III SINE
GIMBAL RESOLVER ASSY
DWG. NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

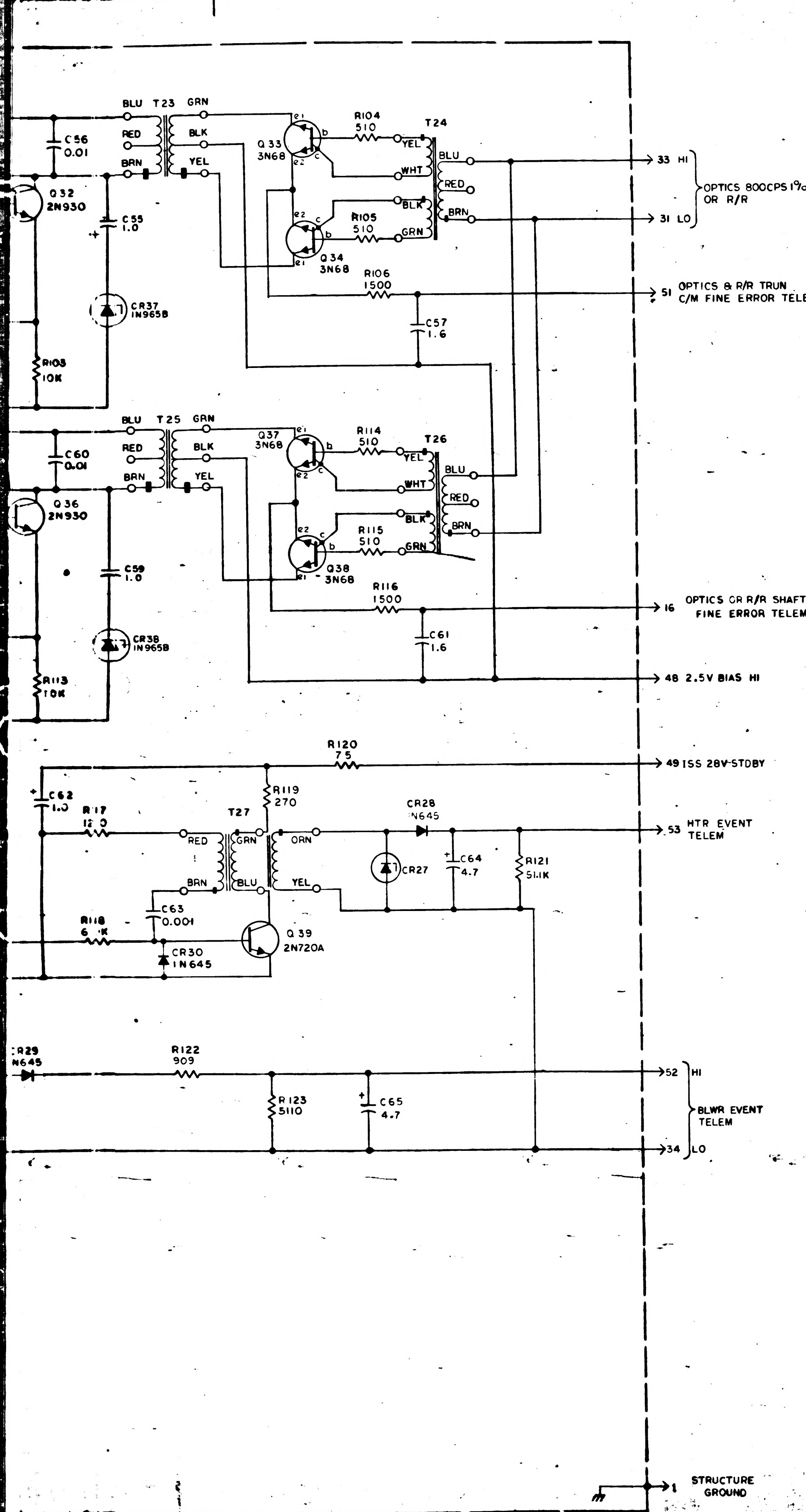
DRAWN A. Di Leo
CHECKED
APPROVED
APPROVED
APPROVED MIT E. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010125
SCALE

3/2010125



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10 W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-18		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-245		909	±1%	1/8 W
R123	1010364-347		5110	±1%	1/8 W
R125	1006750-25		510	±2%	1/4 W
R126	1006750-25		510	±2%	1/4 W
R127	[illegible]-186	RESISTOR	4.22	±[illegible]	[illegible]

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-6		0.28		6
C17	1010279-4		0.19	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-69		1.0		35
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
C66	1006777-6		37MMF	±10%	100VDC
C67	1006777-6		37MMF	±10%	100VDC
C68	1006777-6	CAPACITOR	37MMF	±10%	100VDC
CR4	1010259-000	DIODE	IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR27	1010372-12	DIODE			
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1003842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
CR34	1008815-9	DIODE	IN965B		
CR35	1008815-9	DIODE	IN965B		
CR36	1008815-9	DIODE	IN965B		
CR37	1008815-9	DIODE	IN965B		
CR38	1008815-9	DIODE	IN965B		

REVISIONS 25828

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030			7 [illegible]	
B		~~REVISED PER TDRR 26612~~				
C		REVISED PER TDRR 27172				
D		REVISED PER TDRR 29140				
E		REVISED PER TDRR 29504			21 JUN 66	
F		REVISED PER TDRR 30281			[illegible] 66	
G		REVISED PER TDRR 30784			28 SEP 66	
H		REVISED PER TDRR 31521	EC		21 OCT 66	
J		REVISED PER TDRR 31976			DEC 66	

R45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & HI SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A. Di Leo 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
MSC DATE

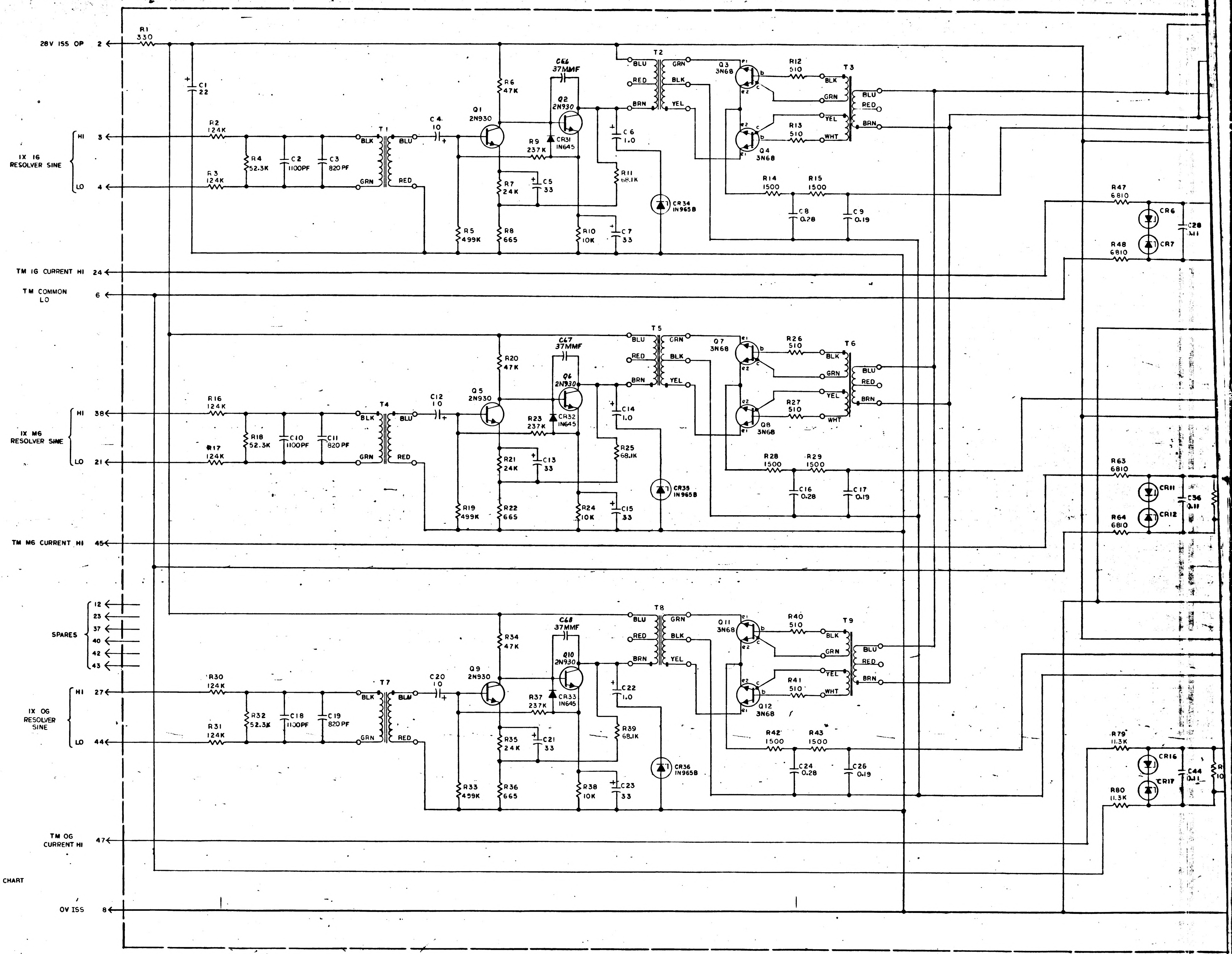
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR HI SINE GIMBAL RSVR

CODE IDENT NO. SIZE DRAWING NO
[illegible] 2010125

2010125 J

3/2010125

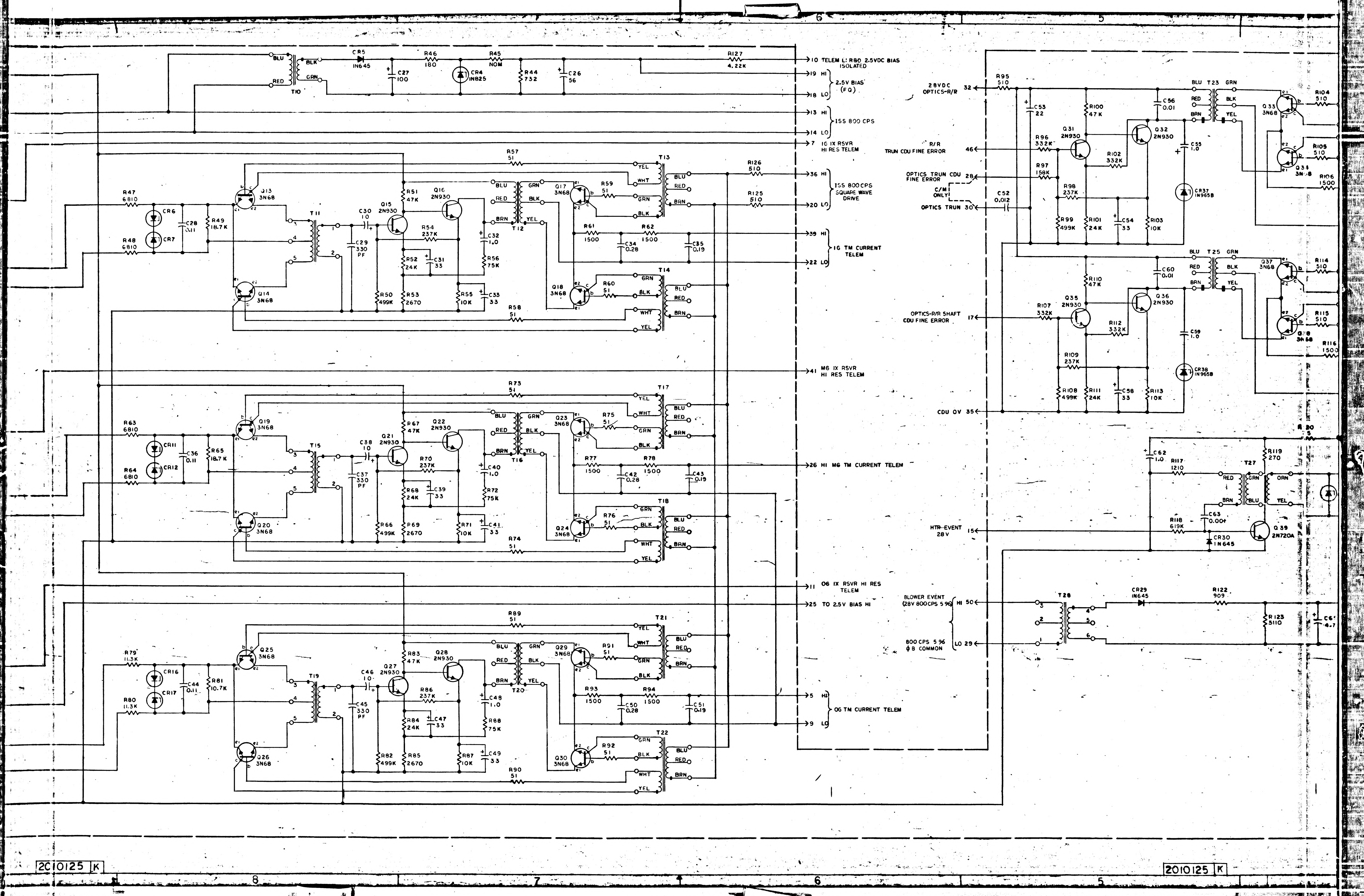

28V ISS OP 2
R1 330
C1 22
IX 16 RESOLVER SINE
HI 3
LO 4
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
R6 47K
C66 37MMF
Q2 2N930
R9 237K
CR31 1N645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
R11 68.1K
C6 1.0
C7 33
CR34 1N965B
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
R47 6810
R48 6810
CR6
CR7
C28 .11
TM 1G CURRENT HI 24
TM COMMON LO 6
IX M6 RESOLVER SINE
HI 38
LO 21
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
R20 47K
C67 37MMF
Q6 2N930
R23 237K
CR32 1N645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
R25 68.1K
C14 1.0
C15 33
CR35 1N965B
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
R63 6810
R64 6810
CR11
CR12
C36 .11
TM M6 CURRENT HI 45
SPARES
12
23
37
40
42
43
IX 0G RESOLVER SINE
HI 27
LO 44
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
R34 47K
C68 37MMF
Q10 2N930
R37 237K
CR33 1N645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
R39 68.1K
C22 1.0
C23 33
CR36 1N965B
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
R79 11.3K
R80 11.3K
CR16
CR17
C44 .11
TM 0G CURRENT HI 47
0V ISS 8
D
C
B
A
12
11
10
9

NOTES:

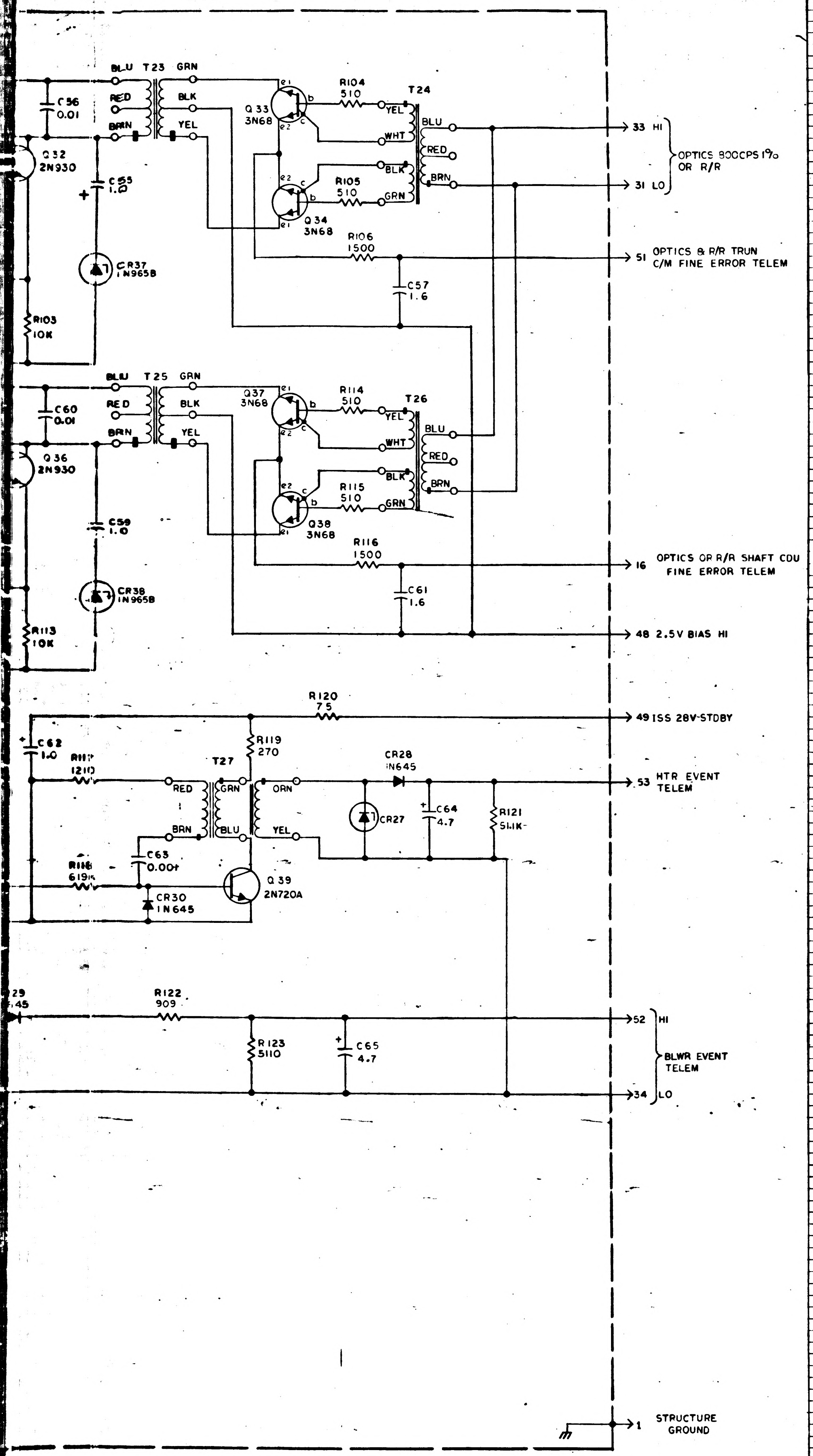
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327
2. SELECT R45 PER APPLICABLE PS FROM APPROPRIATE CHART

2010125 K

1/2010125


10 TELEM L: RBD 2.5VDC BIAS ISOLATED
19 HI 2.5V BIAS (FQ)
18 LO
13 HI 1SS 800 CPS
14 LO
7 1G 1X RSVR HI RES TELEM
36 HI 1SS 800CPS SQUARE WAVE DRIVE
20 LO
39 HI 1G TM CURRENT TELEM
22 LO
41 M6 1X RSVR HI RES TELEM
26 HI M6 TM CURRENT TELEM
11 OG 1X RSVR HI RES TELEM
25 TO 2.5V BIAS HI
5 HI OG TM CURRENT TELEM
9 LO
T10 BLU RED BLK GRN
CR5 1N645
R46 180
R45 NOM
C27 100
CR4 1N825
R44 732
C26 56
R127 4.22K
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
Q16 2N930
R51 47K
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
R57 51
R58 51
T12
Q17 3N68
Q18 3N68
R59 51
R60 51
R61 1500
R62 1500
C34 0.28
C35 0.19
T13
T14
R126 510
R125 510
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
Q22 2N930
R67 47K
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
R73 51
R74 51
T16
Q23 3N68
Q24 3N68
R75 51
R76 51
R77 1500
R78 1500
C42 0.28
C43 0.19
T17
T18
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
Q28 2N930
R83 47K
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
R89 51
R90 51
T20
Q29 3N68
Q30 3N68
R91 51
R92 51
R93 1500
R94 1500
C50 0.28
C51 0.19
T21
T22
28VDC OPTICS-R/R 32
R/R TRUN CDU FINE ERROR 46
OPTICS TRUN CDU FINE ERROR 28
C/M ONLY
OPTICS TRUN 30
C52 0.012
R95 510
C53 22
R96 332K
R97 158K
R98 237K
R99 499K
R100 47K
R101 24K
Q31 2N930
Q32 2N930
R102 332K
C54 33
R103 10K
C56 0.01
C55 1.0
CR37 1N965B
T23
Q33 3N68
Q34 3N68
R104 510
R105 510
R106 1500
OPTICS-R/R SHAFT CDU FINE ERROR 17
R107 332K
R109 237K
R108 499K
R110 47K
R111 24K
Q35 2N930
Q36 2N930
R112 332K
C58 33
R113 10K
C60 0.01
C59 1.0
CR38 1N965B
T25
Q37 3N68
Q38 3N68
R114 510
R115 510
R116 1500
CDU OV 35
R120 5
C62 1.0
R117 1210
R119 270
T27 RED GRN BRN BLU ORN YEL
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
HTR EVENT 28V 15
BLOWER EVENT (28V 800CPS 5 96) HI 50
800 CPS 5 96 Φ B COMMON LO 29
T28
CR29 1N645
R122 909
R123 5110
C61 4.7
2010125 K
8
7
6
5

2/2010125



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750-20	RESISTOR	330	±2%	1/4 W
R 2	1010364-653		124K	±1%	1/8 W
R 3	1010364-653		124K	±1%	1/8 W
R 4	1010311-291		52.3K	±1%	1/10 W
R 5	1010364-769		499K	±1%	1/8 W
R 6	1006750-72		47K	±2%	1/4 W
R 7	1006750-65		24K	±2%	1/4 W
R 8	1010311-109		665	±1%	1/10 W
R 9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	1010311-302		68.1K	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	1010311-302		68.1K	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	1010311-302		68.1K	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	1006750-14		180	±2%	1/4 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-1		51	±2%	1/4 W
R58	-1		51		
R59	-1		51		
R60	-1		51		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-1		51	±2%	1/4 W
R74	-1		51		
R75	-1		51		
R76	-1		51		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-1		51	±2%	1/4 W
R90	-1		51		
R91	-1		51		
R92	-1		51		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K	±1%	1/4 W
R119	1006760-13		270	±2%	1/2 W
R120	1010364-35		75	±1%	1/8 W
R121	1010364-579		51.1K	±1%	1/8 W
R122	1010364-243		909	±1%	1/8W
R123	1010364-387		5110	±1%	1/8W
R125	1006750-25		510	±2%	1/4W
R126	1006750-25		510	±2%	1/4W
R127	1010311-186	RESISTOR	4.22	±1%	1/10W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-134	CAPACITOR	22	±10%	50 VDC
C2	1010410-18		1100 PF	±2	300
C3	1010410-15		820 PF	±2	300
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-18		1100 PF	±2	300
C11	1010410-15		820 PF	±2	300
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-6		0.28		6
C17	1010279-4		0.19	±10%	6
C18	1010410-18		1100 PF	±2%	300
C19	1010410-15		820 PF	±2%	300
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006755-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-134		22	±10%	50
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006777-31		0.01		100
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-69		1.0		35
C60	1006777-31		0.01		100
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
C66	1006777-6		37MMF	±10%	100VDC
C67	1006777-6		37MMF	±10%	100VDC
C68	1006777-6	CAPACITOR	37MMF	±10%	100VDC
CR4	1010259-000	DIODE	IN925		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12	DIODE			
CR11	1010372-12	DIODE			
CR12	1010372-12	DIODE			
CR16	1010372-12	DIODE			
CR17	1010372-12	DIODE			
CR27	1010372-11	DIODE			
CR28	1010837-001		IN645		
CR29					
CR30					
CR31					
CR32					
CR33	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367-000	CHOPPER	3N68		
Q4	1010367-000	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367-000	CHOPPER	3N68		
Q8	1010367-000	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367-000	CHOPPER	3N68		
Q12	1010367-000	CHOPPER	3N68		
Q13	1010367-000	CHOPPER	3N68		
Q14	1010367-000	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367-000	CHOPPER	3N68		
Q18	1010367-000	CHOPPER	3N68		
Q19	1010367-000	CHOPPER	3N68		
Q20	1010367-000	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367-000	CHOPPER	3N68		
Q24	1010367-000	CHOPPER	3N68		
Q25	1010367-000	CHOPPER	3N68		
Q26	1010367-000	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367-000	CHOPPER	3N68		
Q30	1010367-000	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367-000	CHOPPER	3N68		
Q34	1010367-000	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367-000	CHOPPER	3N68		
Q38	1010367-000	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
CR34	1008815-9	DIODE	IN965B		
CR35	1008815-9	DIODE	IN965B		
CR36	1008815-9	DIODE	IN965B		
CR37	1008815-9	DIODE	IN965B		
CR38	1008815-9	DIODE	IN965B		

REVISIONS 25828

SYM	ZONE	DESCRIPTION	ER	CHK	DATE	APPROVED
A		REVISED PER TDRR 26030	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 26612	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 27172	[illegible]	LJB	[illegible]	[illegible]
D		REVISED PER TDRR 29140	[illegible]	LSB	[illegible]	[illegible]
E		REVISED PER TDRR 29604	[illegible]	[illegible]	21 JAN 66	
F		REVISED PER TDRR 30281	[illegible]	[illegible]	3 AUG 66	
G		REVISED PER TDRR 30784	NE	RW	28 SEP 66	
H		REVISED PER TDRR 31521	EC	RW	21 OCT 66	
J		REVISED PER TDRR 31976	[illegible]	RW	6 DEC 66	
K		REVISED PER TDRR 32016	AF	[illegible]	13 DEC 66	

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & IX SINE
GIMBAL RESOLVER ASSY
DWG NO. 2007239

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

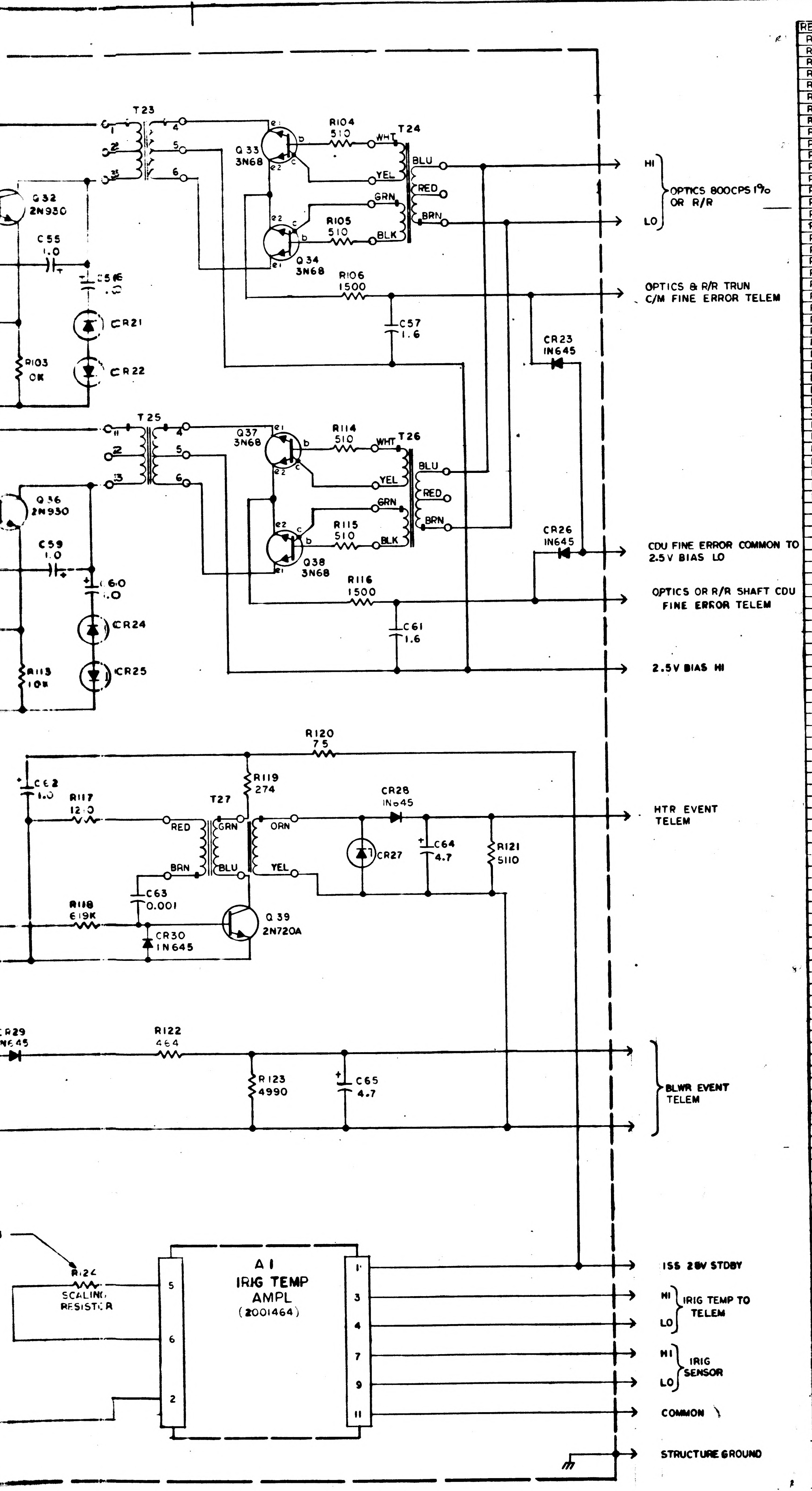
DRAWN A. Di Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & IX SINE GIMBAL RS/R

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 201012
SCALE

2010125 K

3/2010125



REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	SEE NOTE 2		NOM	±1%	1/8 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-25		510	±2%	1/4 W
R58	-25		510		
R59	-25		510		
R60	-25		510		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-25		510	±2%	1/4 W
R74	-25		510		
R75	-25		510		
R76	-25		510		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-25		510	±2%	1/4 W
R90	-25		510		
R91	-25		510		
R92	-25		510		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K		1/4 W
R119	1010452-101		274		1 W
R120	1010364-35		75		1/8 W
R121	1010364-387		5110		1/8 W
R122	1010364-187		464		1/8W
R123	1010364-385		4990		1/8W
R124	SEE NOTE 3	RESISTOR	NOM	±1%	1/8W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470PF	±2	500
C3	SEE NOTE 2		NOM	±2	—
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-9		470PF	±2	500
C11	SEE NOTE 2		NOM	±2	—
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-9		470PF	±2%	500
C19	SEE NOTE 2		NOM	±2%	—
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006756-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	1N645		
CR2	1010837-001		1N645		
CR3	1010837-001		1N645		
CR4	1010259-000		1N825		
CR5	1010837-001		1N645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		1N645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		1N645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		1N645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		1N645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		1N645		
CR27	1010372-12				
CR28	1010837-001		1N645		
CR29	1010837-001		1N645		
CR30	1010837-001	DIODE	1N645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
Q23	1010367	CHOPPER	3N68		
Q24	1010367	CHOPPER	3N68		
Q25	1010367	CHOPPER	3N68		
Q26	1010367	CHOPPER	3N68		
Q27	1010397-1	TRANSISTOR	2N930		
Q28	1010397-1	TRANSISTOR	2N930		
Q29	1010367	CHOPPER	3N68		
Q30	1010367	CHOPPER	3N68		
Q31	1010397-1	TRANSISTOR	2N930		
Q32	1010397-1	TRANSISTOR	2N930		
Q33	1010367	CHOPPER	3N68		
Q34	1010367	CHOPPER	3N68		
Q35	1010397-1	TRANSISTOR	2N930		
Q36	1010397-1	TRANSISTOR	2N930		
Q37	1010367	CHOPPER	3N68		
Q38	1010367	CHOPPER	3N68		
Q39	1010357-1	TRANSISTOR	2N720A		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466				
T11	1010710				
T12	1008842				
T13	1010323				
T14	1010323				
T15	1010710				
T16	1008842				
T17	1010323				
T18	1010323				
T19	1010710				
T20	1008842				
T21	1010323				
T22	1010323				
T23	1008842				
T24	1010323				
T25	1008842				
T26	1010323				
T27	1010310				
T28	1010282	TRANSFORMER			
A1	2001464	AMPLIFIER			

C3, C11, C19

PART NO.	VALUE	RATING
1010410-1	220	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200	300VDC

R46

PART NO.	VALUE
1010364-51	90.9
-59	100
-67	110
-75	121
-81	130
-87	140
-93	150
-99	162
-105	174
-111	187
-117	200
-121	210
-125	221
-129	232
1010364-133	243

R11, R25, R39

PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

R45

PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

R124

PART NO.	VALUE
1010364-471	14K
-473	14.3K
-475	14.7K
-477	15K
-479	15.4K
-481	15.3K
-483	16.2K
-485	16.5K
1010364-487	16.9K

REVISIONS

REF DWG:
SIGNAL CONDITIONER TORQUE MOTOR & 1X SINE GIMBAL RESOLVER ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

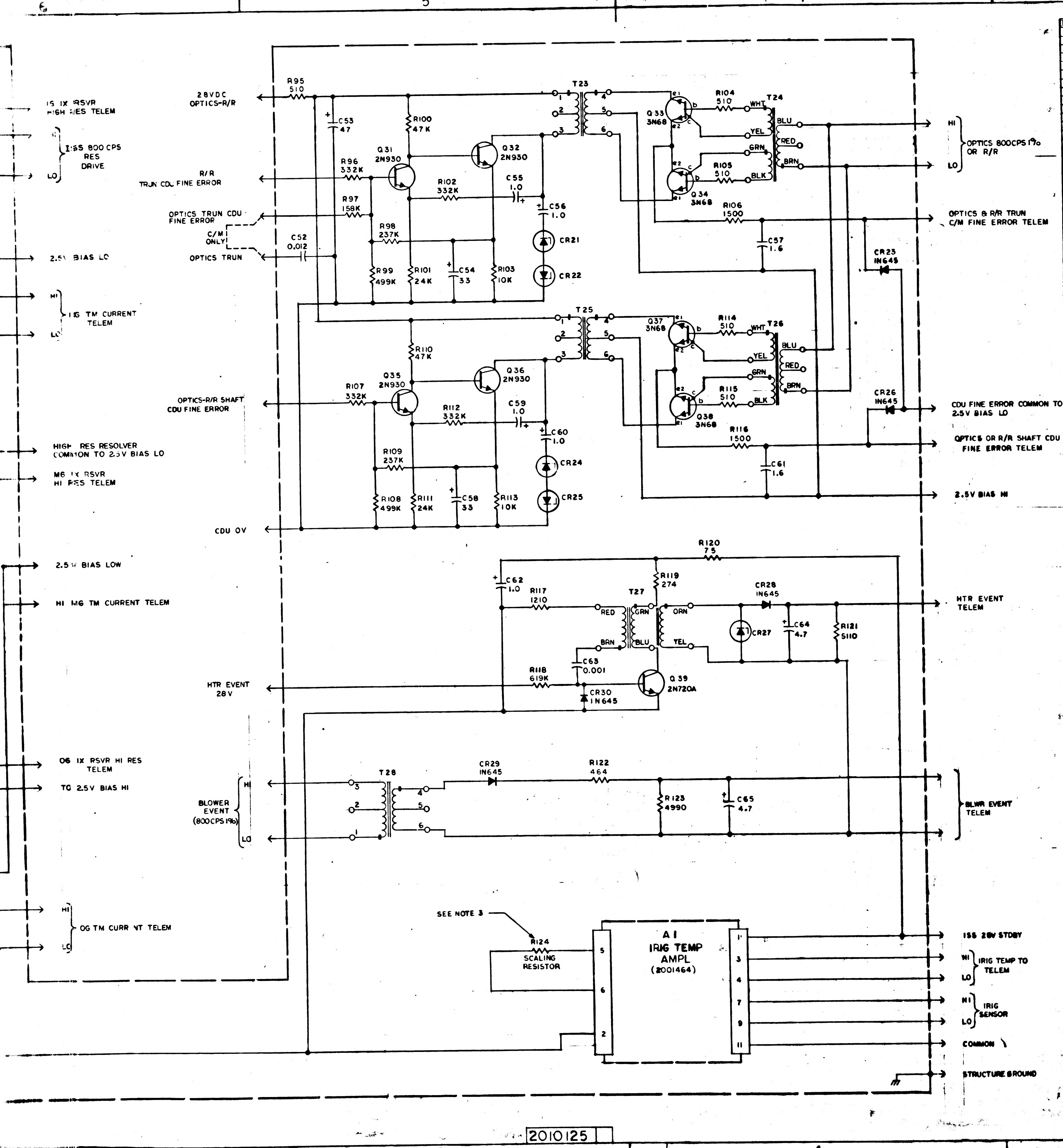
DRAWN a. Di Leo 19 JAN 66
CHECKED
APPROVED
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
TORQUE MOTOR & 1X SINE GIMBAL RSVR

CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010125
SCALE — | SHEET 1 OF 1

2010125



IS 1X RSVR HIGH RES TELEM
HI
LO
ISS 800 CPS RES DRIVE
R/R TRUN CDU FINE ERROR
OPTICS TRUN CDU FINE ERROR
C/M ONLY
OPTICS TRUN
2.5V BIAS LO
HI
LO
ISS TM CURRENT TELEM
OPTICS-R/R SHAFT CDU FINE ERROR
HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
MG 1X RSVR HI RES TELEM
CDU 0V
2.5V BIAS LOW
HI MG TM CURRENT TELEM
HTR EVENT 28V
OG 1X RSVR HI RES TELEM
TO 2.5V BIAS HI
BLOWER EVENT (800CPS 1%)
HI
LO
OG TM CURRENT TELEM
28VDC OPTICS-R/R
R95 510
C53 47
R100 47K
Q31 2N930
Q32 2N930
R96 332K
R102 332K
C55 1.0
C56 1.0
CR21
CR22
R97 158K
R98 237K
C52 0.012
R99 499K
R101 24K
C54 33
R103 10K
T23
Q33 3N68
R104 510
WHT
T24
BLU
YEL
RED
GRN
BRN
R105 510
BLK
Q34 3N68
R106 1500
C57 1.6
CR23 IN645
T25
Q37 3N68
R114 510
T26
R115 510
Q38 3N68
R116 1500
C61 1.6
CR26 IN645
R110 47K
Q35 2N930
Q36 2N930
R107 332K
R112 332K
C59 1.0
C60 1.0
CR24
CR25
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
R120 75
C62 1.0
R117 1210
R119 274
T27
RED
GRN
ORN
BRN
BLU
YEL
CR28 IN645
C64 4.7
R121 5110
CR27
C63 0.001
R118 619K
CR30 IN645
Q39 2N720A
T28
CR29 IN645
R122 464
R123 4990
C65 4.7
SEE NOTE 3
R124 SCALING RESISTOR
A1 IRIG TEMP AMPL (2001464)
HI
LO
OPTICS 800CPS 1% OR R/R
OPTICS & R/R TRUN C/M FINE ERROR TELEM
CDU FINE ERROR COMMON TO 2.5V BIAS LO
OPTICS OR R/R SHAFT CDU FINE ERROR TELEM
2.5V BIAS HI
HTR EVENT TELEM
BLWR EVENT TELEM
ISS 28V STDBY
HI
LO
IRIG TEMP TO TELEM
HI
LO
IRIG SENSOR
COMMON
STRUCTURE GROUND
6
5
4

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-25	RESISTOR	510	±2%	1/4 W
R2	1010364-653		124K	±1%	1/8 W
R3	1010364-653		124K	±1%	1/8 W
R4	1010311-291		52.3K	±1%	1/10 W
R5	1010364-769		499K	±1%	1/8 W
R6	1006750-72		47K	±2%	1/4 W
R7	1006750-65		24K	±2%	1/4 W
R8	1010311-109		665	±1%	1/10 W
R9	1010364-707		237K	±1%	1/8 W
R10	1006750-56		10K	±2%	1/4 W
R11	SEE NOTE 2		NOM	±1%	1/10 W
R12	1006750-25		510	±2%	1/4 W
R13	1006750-25		510	±2%	1/4 W
R14	1006750-36		1500	±2%	1/4 W
R15	1006750-36		1500	±2%	1/4 W
R16	1010364-653		124K	±1%	1/8 W
R17	1010364-653		124K	±1%	1/8 W
R18	1010311-291		52.3K	±1%	1/10 W
R19	1010364-769		499K	±1%	1/8 W
R20	1006750-72		47K	±2%	1/4 W
R21	1006750-65		24K	±2%	1/4 W
R22	1010311-109		665	±1%	1/10 W
R23	1010364-707		237K	±1%	1/8 W
R24	1006750-56		10K	±2%	1/4 W
R25	SEE NOTE 2		NOM	±1%	1/10 W
R26	1006750-25		510	±2%	1/4 W
R27	1006750-25		510	±2%	1/4 W
R28	1006750-36		1500	±2%	1/4 W
R29	1006750-36		1500	±2%	1/4 W
R30	1010364-653		124K	±1%	1/8 W
R31	1010364-653		124K	±1%	1/8 W
R32	1010311-291		52.3K	±1%	1/10 W
R33	1010364-769		499K	±1%	1/8 W
R34	1006750-72		47K	±2%	1/4 W
R35	1006750-65		24K	±2%	1/4 W
R36	1010311-109		665	±1%	1/10 W
R37	1010364-707		237K	±1%	1/8 W
R38	1006750-56		10K	±2%	1/4 W
R39	SEE NOTE 2		NOM	±1%	1/10 W
R40	1006750-25		510	±2%	1/4 W
R41	1006750-25		510	±2%	1/4 W
R42	1006750-36		1500	±2%	1/4 W
R43	1006750-36		1500	±2%	1/4 W
R44	1010364-225		732	±1%	1/8 W
R45	SEE NOTE 2		NOM	±1%	1/8 W
R46	SEE NOTE 2		NOM	±1%	1/8 W
R47	1010364-411		6810	±1%	1/8 W
R48	1010364-411		6810	±1%	1/8 W
R49	1010364-495		18.7K	±1%	1/8 W
R50	1010364-769		499K	±1%	1/8 W
R51	1006750-72		47K	±2%	1/4 W
R52	1006750-65		24K	±2%	1/4 W
R53	1010311-167		2670	±1%	1/10 W
R54	1010364-707		237K	±1%	1/8 W
R55	1006750-56		10K	±2%	1/4 W
R56	1010311-306		75K	±1%	1/10 W
R57	1006750-25		510	±2%	1/4 W
R58	-25		510		
R59	-25		510		
R60	-25		510		
R61	-36		1500		
R62	1006750-36		1500	±2%	1/4 W
R63	1010364-411		6810	±1%	1/8 W
R64	1010364-411		6810	±1%	1/8 W
R65	1010364-495		18.7K	±1%	1/8 W
R66	1010364-769		499K	±1%	1/8 W
R67	1006750-72		47K	±2%	1/4 W
R68	1006750-65		24K	±2%	1/4 W
R69	1010311-167		2670	±1%	1/10 W
R70	1010364-707		237K	±1%	1/8 W
R71	1006750-56		10K	±2%	1/4 W
R72	1010311-306		75K	±1%	1/10W
R73	1006750-25		510	±2%	1/4 W
R74	-25		510		
R75	-25		510		
R76	-25		510		
R77	-36		1500		
R78	1006750-36		1500	±2%	1/4 W
R79	1010364-453		11.3K	±1%	1/8 W
R80	1010364-453		11.3K	±1%	1/8 W
R81	1010364-449		10.7K	±1%	1/8 W
R82	1010364-769		499K	±1%	1/8 W
R83	1006750-72		47K	±2%	1/4 W
R84	1006750-65		24K	±2%	1/4 W
R85	1010311-167		2670	±1%	1/10 W
R86	1010364-707		237K	±1%	1/8 W
R87	1006750-56		10K	±2%	1/4 W
R88	1010311-306		75K	±1%	1/10 W
R89	1006750-25		510	±2%	1/4 W
R90	-25		510		
R91	-25		510		
R92	-25		510		
R93	-36		1500		
R94	-36		1500		
R95	1006750-25		510	±2%	1/4 W
R96	1010364-735		332K	±1%	1/8 W
R97	1010364-673		158K	±1%	1/8 W
R98	1010364-707		237K	±1%	1/8 W
R99	1010364-769		499K	±1%	1/8 W
R100	1006750-72		47K	±2%	1/4 W
R101	1006750-65		24K	±2%	1/4 W
R102	1010364-735		332K	±1%	1/8 W
R103	1006750-56		10K	±2%	1/4 W
R104	1006750-25		510	±2%	1/4 W
R105	1006750-25		510	±2%	1/4 W
R106	1006750-36		1500	±2%	1/4 W
R107	1010364-735		332K	±1%	1/8 W
R108	1010364-769		499K	±1%	1/8 W
R109	1010364-707		237K	±1%	1/8 W
R110	1006750-72		47K	±2%	1/4 W
R111	1006750-65		24K	±2%	1/4 W
R112	1010364-735		332K	±1%	1/8 W
R113	1006750-56		10K	±2%	1/4 W
R114	1006750-25		510	±2%	1/4 W
R115	1006750-25		510	±2%	1/4 W
R116	1006750-36		1500	±2%	1/4 W
R117	1010364-267		1210	±1%	1/8 W
R118	1010363-787		619K		1/4 W
R119	1010452-101		274		1 W
R120	1010364-35		75		1/8 W
R121	1010364-387		5110		1/8 W
R122	1010364-187		464		1/8W
R123	1010364-385		4990		1/8W
R124	SEE NOTE 3	RESISTOR	NOM	±1%	1/8W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C1	1006755-89	CAPACITOR	47	±10%	35VDC
C2	1010410-9		470PF	±2	500
C3	SEE NOTE 2		NOM	±2	—
C4	1006755-31		10	±10%	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	±10%	6
C10	1010410-9		470PF	±2	500
C11	SEE NOTE 2		NOM	±2	—
C12	1006755-31		10	±10%	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-16		1.9		6
C17	1010279-16		1.9	±10%	6
C18	1010410-9		470PF	±2%	500
C19	SEE NOTE 2		NOM	±2%	—
C20	1006755-31		10	±10%	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-4		56		6
C27	1006755-40		100		20
C28	1010279-100		0.11	±10%	15
C29	1010410-5		330PF	±2%	500
C30	1006756-31		10	±10%	20
C31	1006755-34		33		20
C32	1006755-69		1.0		35
C33	1006755-34		33		20
C34	1010279-6		0.28		6
C35	1010279-4		0.19		6
C36	1010279-100		0.11	±10%	15
C37	1010410-5		330PF	±2%	500
C38	1006755-31		10	±10%	20
C39	1006755-34		33		20
C40	1006755-69		1.0		35
C41	1006755-34		33		20
C42	1010279-6		0.28		6
C43	1010279-4		0.19		6
C44	1010279-100		0.11	±10%	15
C45	1010410-5		330PF	±2%	500
C46	1006755-31		10	±10%	20
C47	1006755-34		33		20
C48	1006755-69		1.0		35
C49	1006755-34		33		20
C50	1010279-6		0.28		6
C51	1010279-4		0.19	±10%	6
C52	1010264-14		0.012	±5%	200
C53	1006755-89		47	±10%	35
C54	1006755-34		33		20
C55	1006755-69		1.0		35
C56	1006755-69		1.0		35
C57	1010279-114		1.6		15
C58	1006755-34		33		20
C59	1006755-118		1.0		50
C60	1006755-118		1.0		50
C61	1010279-114		1.6		15
C62	1010393-029		1.0	±10%	50
C63	1010359-17		0.001	±10%	200
C64	1010393-037		4.7	±10%	50
C65	1006755-10	CAPACITOR	4.7	±10%	10 VDC
CR1	1010837-001	DIODE	IN645		
CR2	1010837-001		IN645		
CR3	1010837-001		IN645		
CR4	1010259-000		IN825		
CR5	1010837-001		IN645		
CR6	1010372-12				
CR7	1010372-12				
CR10	1010837-001		IN645		
CR11	1010372-12				
CR12	1010372-12				
CR15	1010837-001		IN645		
CR16	1010372-12				
CR17	1010372-12				
CR20	1010837-001		IN645		
CR21	1010372-15				
CR22	1010372-15				
CR23	1010837-001		IN645		
CR24	1010372-15				
CR25	1010372-15				
CR26	1010837-001		IN645		
CR27	1010372-12				
CR28	1010837-001		IN645		
CR29	1010837-001		IN645		
CR30	1010837-001	DIODE	IN645		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1	TRANSISTOR	2N930		
Q3	1010367	CHOPPER	3N68		
Q4	1010367	CHOPPER	3N68		
Q5	1010397-1	TRANSISTOR	2N930		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010367	CHOPPER	3N68		
Q8	1010367	CHOPPER	3N68		
Q9	1010397-1	TRANSISTOR	2N930		
Q10	1010397-1	TRANSISTOR	2N930		
Q11	1010367	CHOPPER	3N68		
Q12	1010367	CHOPPER	3N68		
Q13	1010367	CHOPPER	3N68		
Q14	1010367	CHOPPER	3N68		
Q15	1010397-1	TRANSISTOR	2N930		
Q16	1010397-1	TRANSISTOR	2N930		
Q17	1010367	CHOPPER	3N68		
Q18	1010367	CHOPPER	3N68		
Q19	1010367	CHOPPER	3N68		
Q20	1010367	CHOPPER	3N68		
Q21	1010397-1	TRANSISTOR	2N930		
Q22	1010397-1	TRANSISTOR	2N930		

REF DES	PART NO.	DESCRIPTION	VALUE
Q23	1010367	CHOPPER	3N68
Q24	1010367	CHOPPER	3N68
Q25	1010367	CHOPPER	3N68
Q26	1010367	CHOPPER	3N68
Q27	1010397-1	TRANSISTOR	2N930
Q28	1010397-1	TRANSISTOR	2N930
Q29	1010367	CHOPPER	3N68
Q30	1010367	CHOPPER	3N68
Q31	1010397-1	TRANSISTOR	2N930
Q32	1010397-1	TRANSISTOR	2N930
Q33	1010367	CHOPPER	3N68
Q34	1010367	CHOPPER	3N68
Q35	1010397-1	TRANSISTOR	2N930
Q36	1010397-1	TRANSISTOR	2N930
Q37	1010367	CHOPPER	3N68
Q38	1010367	CHOPPER	3N68
Q39	1010357-1	TRANSISTOR	2N720A
T1	1008832	TRANSFORMER	
T2	1008842		
T3	1010323		
T4	1008832		
T5	1008842		
T6	1010323		
T7	1008832		
T8	1008842		
T9	1010323		
T10	1010466		
T11	1010710		
T12	1008842		
T13	1010323		
T14	1010323		
T15	1010710		
T16	1008842		
T17	1010323		
T18	1010323		
T19	1010710		
T20	1008842		
T21	1010323		
T22	1010323		
T23	1008842		
T24	1010323		
T25	1008842		
T26	1010323		
T27	1010310		
T28	1010282	TRANSFORMER	
A1	2001464	AMPLIFIER	

C3, C11, C19		
PART NO.	VALUE	RATING
1010410-1	220	500 VDC
-2	240	
-3	270	
-4	300	
-5	330	
-6	360	
-7	390	
-8	430	
-9	470	
-10	510	500
-11	560	300
-12	620	
-13	680	
-14	750	
-15	820	
-16	910	
-17	1000	
-18	1100	
1010410-19	1200	300VDC

R11, R25, R39	
PART NO.	VALUE
1010311-296	59.0K
-297	60.4K
-298	61.9K
-299	63.4K
-300	64.9K
-301	66.5K
-302	68.1K
-303	69.8K
-304	71.5K
-305	73.2K
-306	75.0K
-307	76.8K
-308	78.7K
-309	80.6K
-310	82.5K
-311	84.5K
-312	86.6K
-313	88.7K
1010311-314	90.9K

PART
1010364
1010364

PART
1010364
1010364

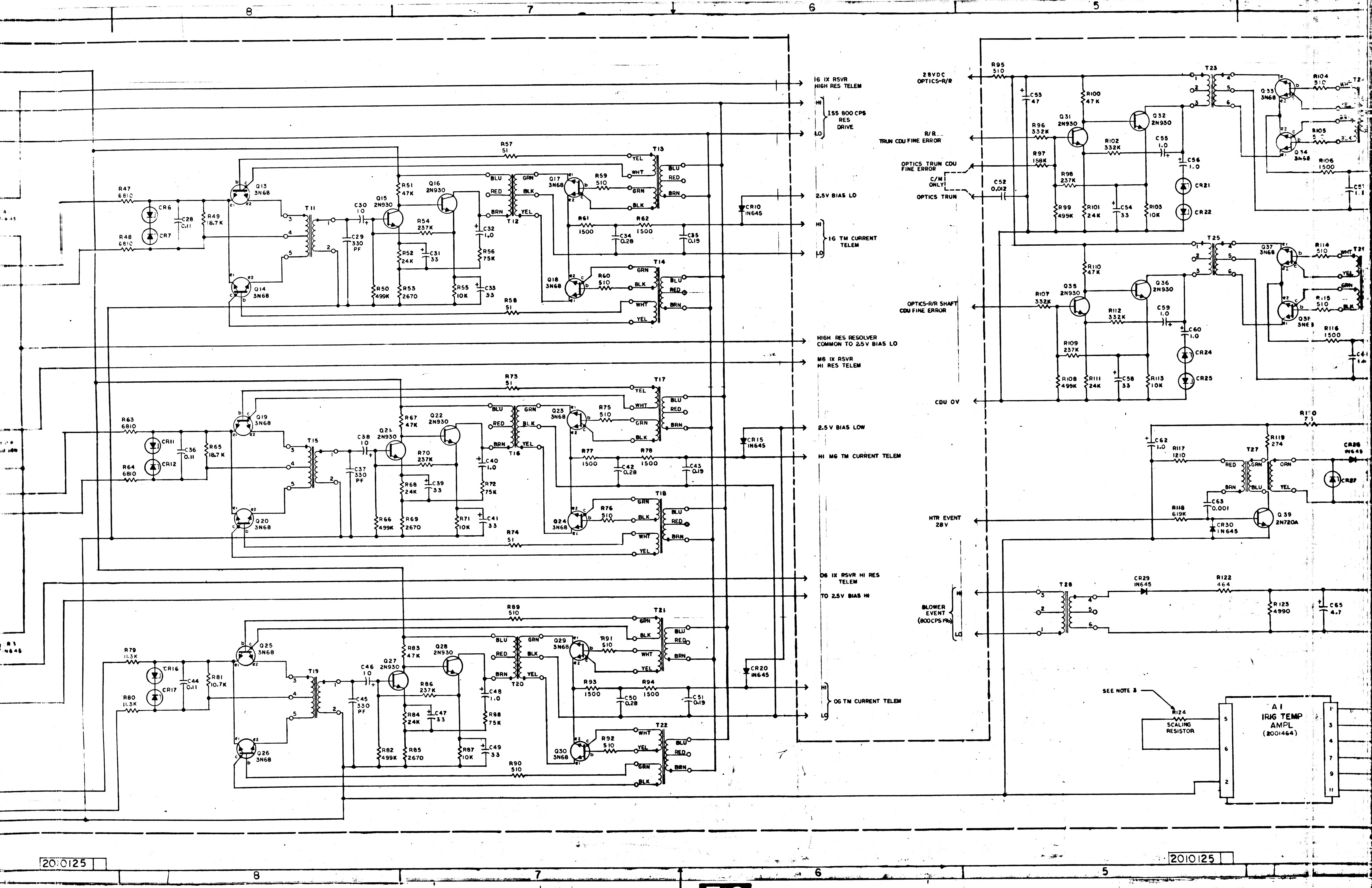
PART
1010364
1010364

NEXT ASSY
USED ON
APPLICATION

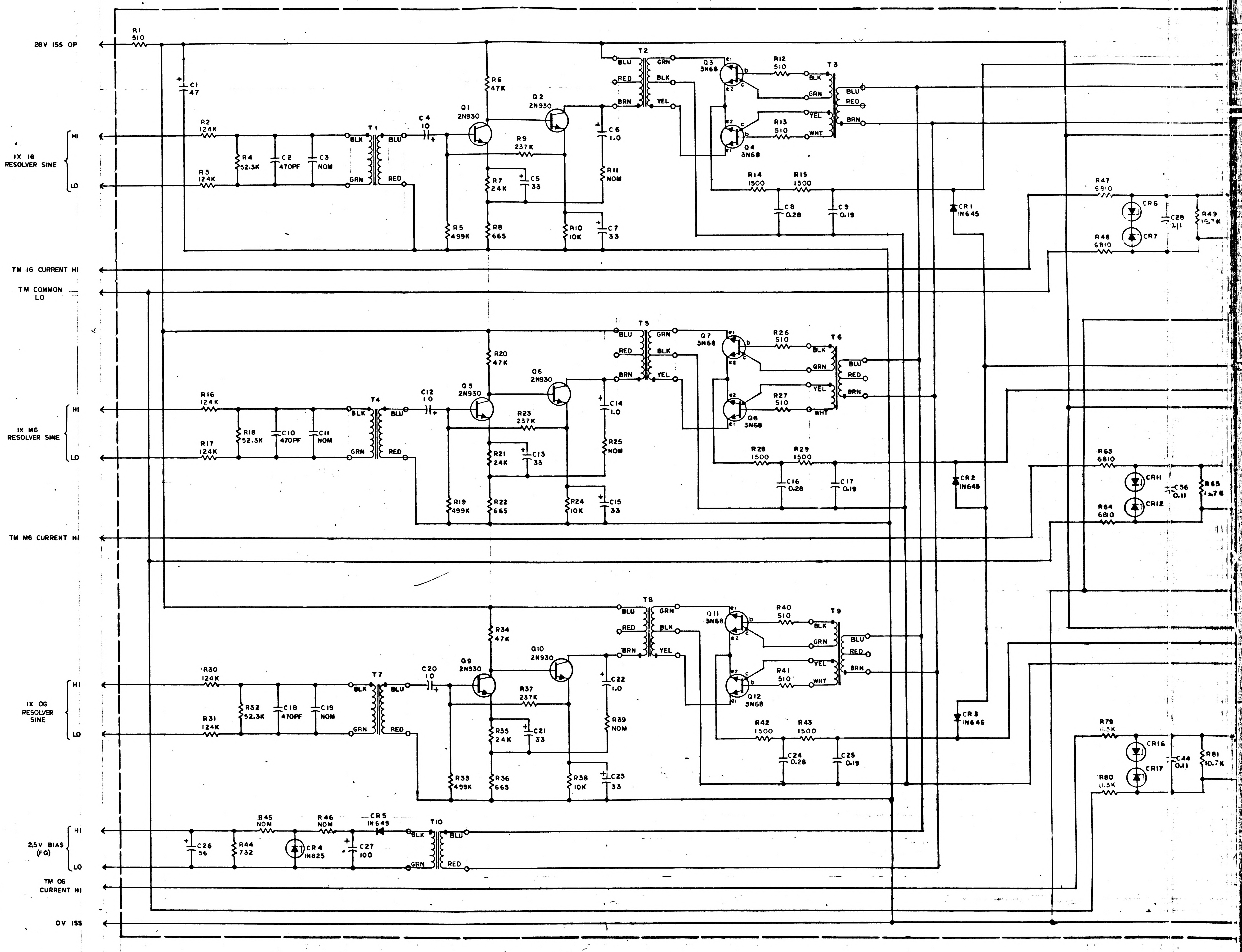
UNLESS OTHERWISE SPEC
DIMENSIONS ARE IN IN
CAPACITOR VALUES ARE I
RESISTOR VALUES ARE IN
TOLERANCES ON
FRACTIONS DECIMALS
± ±
DO NOT SCALE THIS DRA
MATERIAL

2010125

E3


8
7
6
5
16 1X RSVR HIGH RES TELEM
HI
155 800 CPS RES DRIVE
LO
2.5V BIAS LO
HI
1G TM CURRENT TELEM
LO
HIGH RES RESOLVER COMMON TO 2.5V BIAS LO
MG 1X RSVR HI RES TELEM
2.5V BIAS LOW
HI MG TM CURRENT TELEM
OG 1X RSVR HI RES TELEM
TO 2.5V BIAS HI
HI
OG TM CURRENT TELEM
LO
R47 6810
R48 6810
CR6
CR7
C28 0.11
R49 18.7K
Q13 3N68
Q14 3N68
T11
C30 10
C29 330 PF
Q15 2N930
R51 47K
Q16 2N930
R54 237K
R52 24K
C31 33
R50 499K
R53 2670
R55 10K
C33 33
C32 1.0
R56 75K
R57 51
R58 51
T12
T13
T14
Q17 3N68
Q18 3N68
R59 510
R60 510
R61 1500
R62 1500
C34 0.28
C35 0.19
CR10 1N645
YEL
WHT
GRN
BLK
BLU
RED
BRN
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65 18.7K
Q19 3N68
Q20 3N68
T15
C38 10
C37 330 PF
Q21 2N930
R67 47K
Q22 2N930
R70 237K
R68 24K
C39 33
R66 499K
R69 2670
R71 10K
C41 33
C40 1.0
R72 75K
R73 51
R74 51
T16
T17
T18
Q23 3N68
Q24 3N68
R75 510
R76 510
R77 1500
R78 1500
C42 0.28
C43 0.19
CR15 1N645
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
Q25 3N68
Q26 3N68
T19
C46 10
C45 330 PF
Q27 2N930
R83 47K
Q28 2N930
R86 237K
R84 24K
C47 33
R82 499K
R85 2670
R87 10K
C49 33
C48 1.0
R88 75K
R89 510
R90 510
T20
T21
T22
Q29 3N68
Q30 3N68
R91 510
R92 510
R93 1500
R94 1500
C50 0.28
C51 0.19
CR20 1N645
28VDC OPTICS-R/R
R95 510
C53 47
R100 47K
R96 332K
Q31 2N930
Q32 2N930
R102 332K
C55 1.0
C56 1.0
R97 158K
R98 237K
R99 499K
R101 24K
C54 33
R103 10K
CR21
CR22
T23
Q33 3N68
Q34 3N68
R104 510
R105 510
R106 1500
C51
R/R TRUN CDU FINE ERROR
OPTICS TRUN CDU FINE ERROR
C/M ONLY
OPTICS TRUN
C52 0.012
T25
R110 47K
R107 332K
Q35 2N930
Q36 2N930
R112 332K
C59 1.0
C60 1.0
R109 237K
R108 499K
R111 24K
C58 33
R113 10K
CR24
CR25
Q37 3N68
Q38 3N68
R114 510
R115 510
R116 1500
OPTICS-R/R SHAFT CDU FINE ERROR
CDU 0V
R120 73
C62 1.0
R117 1210
R119 274
T27
ORN
CR26 1N645
CR27
R118 619K
C63 0.001
CR30 1N645
Q39 2N720A
HTR EVENT 28V
BLOWER EVENT (800CPS 1Φ)
HI
LO
T28
CR29 1N645
R122 464
R123 4990
C65 4.7
SEE NOTE 3
R124 SCALING RESISTOR
A1 IRIG TEMP AMPL (2001464)
2010125
2010125
F2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


12
11
10
9
D
C
B
A
28V ISS OP
R1 510
C1 47
R2 124K
R3 124K
R4 52.3K
C2 470PF
C3 NOM
1X 16 RESOLVER SINE
HI
LO
BLK
GRN
T1
BLU
RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
R7 24K
C5 33
R5 499K
R8 665
C6 1.0
R11 NOM
R10 10K
C7 33
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
R14 1500
R15 1500
C8 0.28
C9 0.19
CR1 1N645
R47 6810
R48 6810
CR6
CR7
C28
R49
TM 16 CURRENT HI
TM COMMON LO
R16 124K
R17 124K
R18 52.3K
C10 470PF
C11 NOM
1X M6 RESOLVER SINE
T4
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
R21 24K
C13 33
R19 499K
R22 665
C14 1.0
R25 NOM
R24 10K
C15 33
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
CR2 1N645
R63 6810
R64 6810
CR11
CR12
C36 0.11
R65
TM M6 CURRENT HI
R30 124K
R31 124K
R32 52.3K
C18 470PF
C19 NOM
1X 06 RESOLVER SINE
T7
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
R35 24K
C21 33
R33 499K
R36 665
C22 1.0
R39 NOM
R38 10K
C23 33
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
R42 1500
R43 1500
C24 0.28
C25 0.19
CR3 1N645
R79 11.3K
R80 11.3K
CR16
CR17
C44 0.11
R81 10.7K
2.5V BIAS (FQ)
C26 56
R44 732
R45 NOM
R46 NOM
CR4 1N825
CR5 1N645
C27 100
T10
TM 06 CURRENT HI
0V ISS

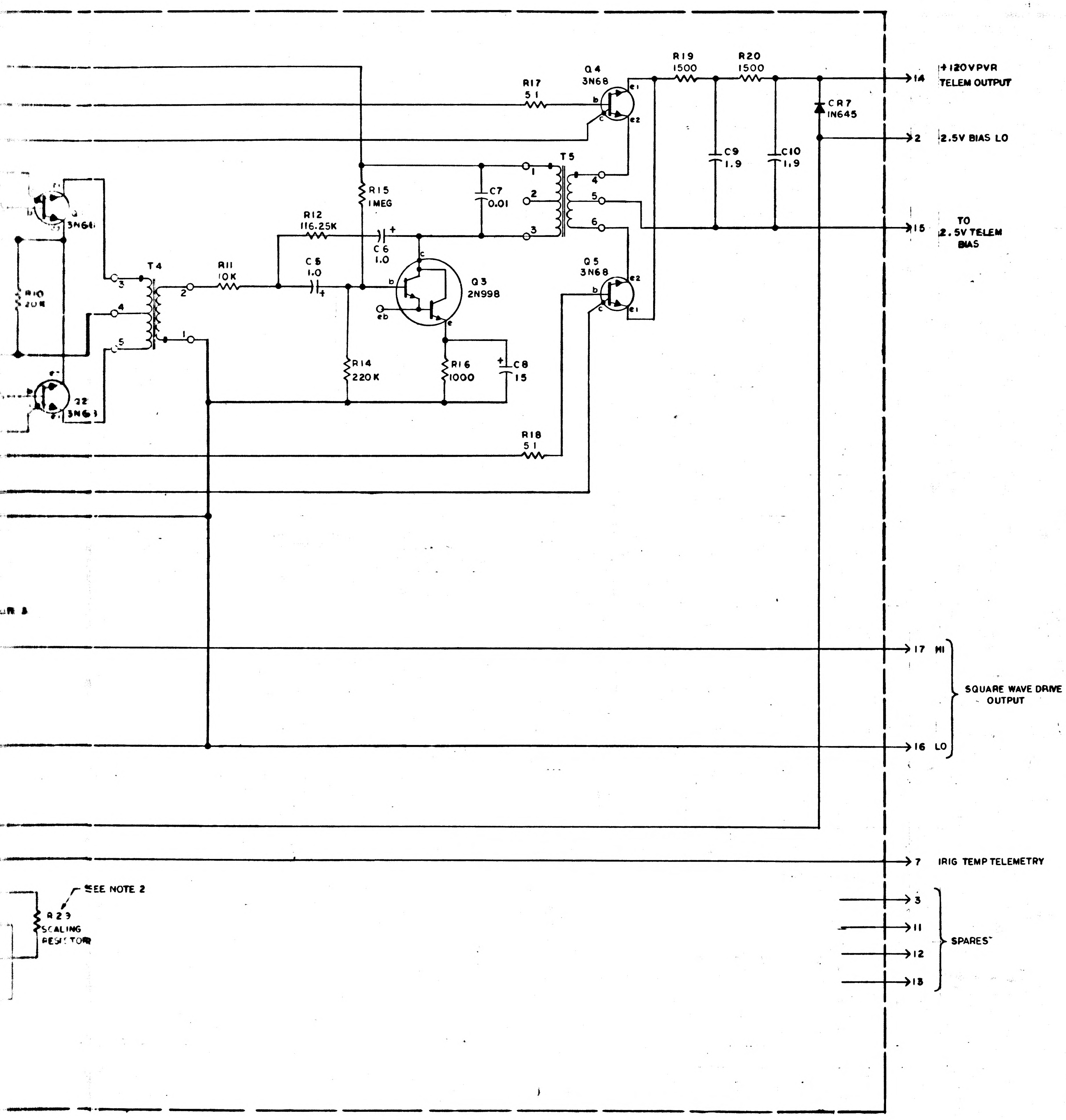
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R11, R25, R39, R45, R46, C3, C11, C19 PER APPLICABLE P.S. FROM APPROPRIATE CHART
3. SELECT R124 PER APPLICABLE P.S. FROM APPROPRIATE CHART FOR CONDITIONS 1RIG ± 4.0°F AS MARKED ON AMPLIFIER 2001464

2010125

F-1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28481		



R17 51
Q4 3N68
R19 1500
R20 1500
CR7 1N645
+120VPVR TELEM OUTPUT 14
2.5V BIAS LO 2
T5
C7 0.01
C9 1.9
C10 1.9
R15 1MEG
TO 2.5V TELEM BIAS 15
R12 116.25K
C6 1.0
C5 1.0
T4
R11 10K
Q3 2N998
Q5 3N68
R10 20K
Q1 3N68
Q2 3N68
R14 220K
R16 1000
C8 15
R18 51
17 MI
16 LO
SQUARE WAVE DRIVE OUTPUT
7 IRIG TEMP TELEMETRY
SEE NOTE 2
R29 SCALING RESISTOR
3
11
12
13
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± .1%	1/10W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10 K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-41		2400		
R28	1006750-41		2400	± 2%	1/4 W
R29	SEE NOTE 2	RESISTOR	NOM	±0.1%	1/8 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50 VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010259-000		IN825		
CR4	1010259-000		IN825		
CR5	1010372-12		IN752		
CR6	1010372-12		IN752		
CR7	1010837-001		IN645		
CR8	1010385	DIODE	IN660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			
A1	2001466	AMPLIFIER			

R29	
PART NO.	VALUE
1008878-044	14.000K
-045	14.112K
-046	14.225K
-047	14.339K
-048	14.454K
-049	14.570K
-050	14.687K
-051	14.804K
-052	14.922K
-053	15.041K
-054	15.161K
-055	15.282K
-056	15.404K
-057	15.527K
-058	15.651K
-059	15.776K
-060	15.902K
-061	16.029K
-062	16.157K
-063	16.286K
-064	16.416K
-065	16.547K
-066	16.679K
-067	16.812K
1008878-068	16.900K

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY &
IRIG TEMP (FQ) ASSY
DWG NO. 2007241

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY.	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN G. Di [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL [illegible] 11 Feb 66
APPROVAL
NASA APPROVAL A. C. [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY & IRIG TEMP (FQ)

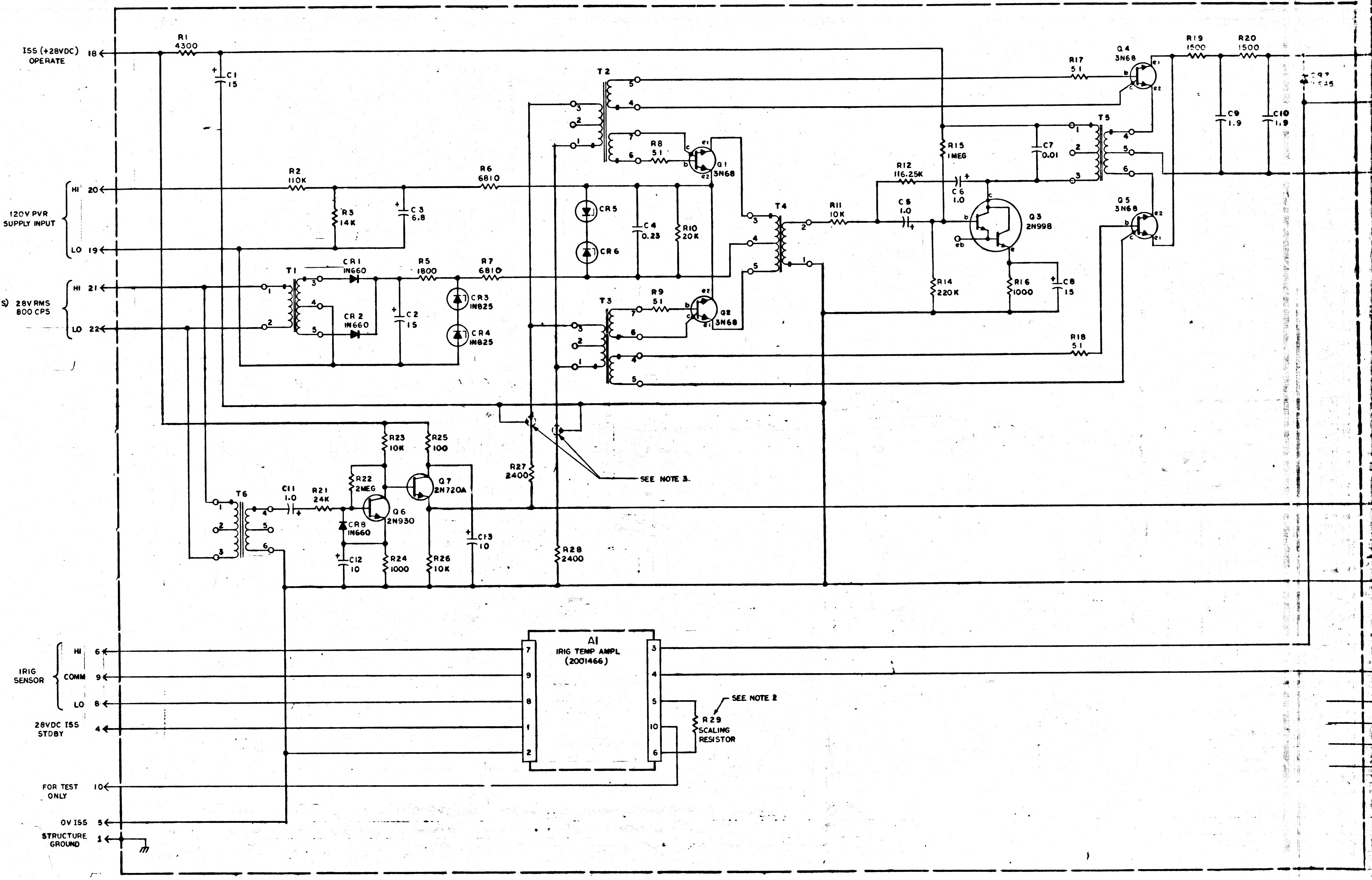
CODE IDENT NO.	SIZE	NASA DRAWING NO
80230	J	2010126

SCALE — WT — SHEET 1 OF 1

2010126 A

MASTER

F-2

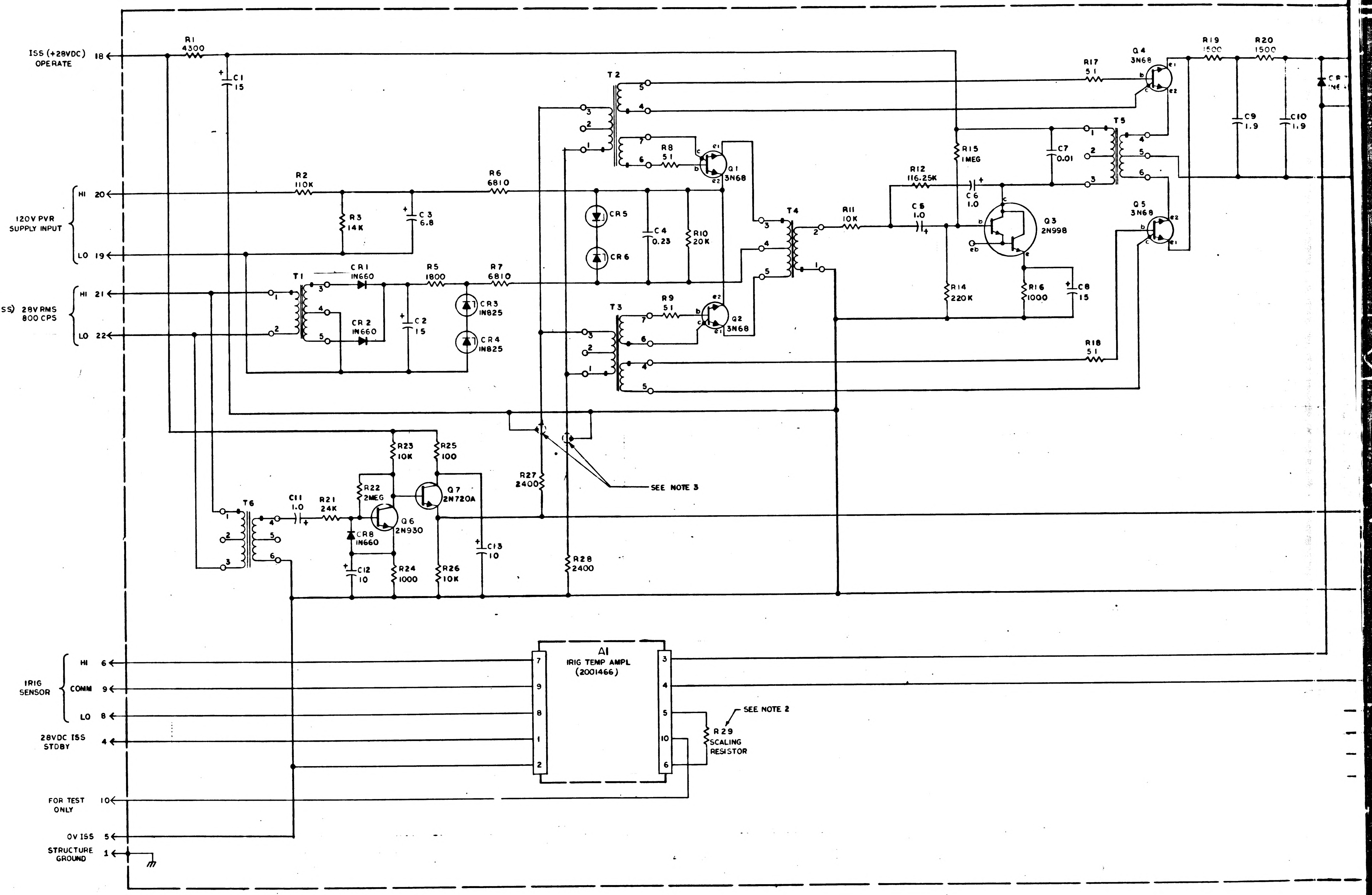

ISS (+28VDC) OPERATE
18
R1
4300
C1
15
120V PVR SUPPLY INPUT
HI 20
LO 19
R2
110K
R3
14K
C3
6.8
R6
6810
(ISS) 28V RMS 800 CPS
HI 21
LO 22
T1
CR1
IN660
CR 2
IN660
R5
1800
R7
6810
C2
15
CR3
IN825
CR4
IN825
T2
R8
51
Q1
3N68
CR5
CR6
C4
0.23
R10
20K
T3
R9
51
Q2
3N68
T4
R11
10K
R12
116.25K
C6
1.0
C5
1.0
R15
1MEG
Q3
2N998
R14
220K
R16
1000
C8
15
C7
0.01
T5
Q4
3N68
R17
51
Q5
3N68
R18
51
R19
1500
R20
1500
C9
1.9
C10
1.9
T6
C11
1.0
R21
24K
R22
2MEG
CR8
IN660
C12
10
Q6
2N930
R23
10K
R24
1000
R25
100
Q7
2N720A
R26
10K
C13
10
R27
2400
R28
2400
SEE NOTE 3
IRIG SENSOR
HI 6
COMM 9
LO 8
28VDC ISS STDBY
4
FOR TEST ONLY
10
OV ISS
5
STRUCTURE GROUND
1
A1
IRIG TEMP AMPL
(2001466)
SEE NOTE 2
R29
SCALING RESISTOR

NOTES

1. INTERPRET DRAWING INACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AMPLIFIER AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON AMPLIFIER
3. DENOTES SHIELDED CONDUCTOR

2H

2010126 A



ISS (+28VDC) OPERATE 18
R1 4300
C1 15
120V PVR SUPPLY INPUT
HI 20
LO 19
R2 110K
R3 14K
C3 6.8
R6 6810
(ISS) 28V RMS 800 CPS
HI 21
LO 22
T1
CR1 IN660
CR2 IN660
C2 15
R5 1800
R7 6810
CR3 IN825
CR4 IN825
T2
T3
R8 51
R9 51
Q1 3N68
Q2 3N68
CR5
CR6
C4 0.23
R10 20K
T4
R11 10K
C5 1.0
R12 116.25K
C6 1.0
R15 1MEG
R14 220K
Q3 2N998
R16 1000
C8 15
C7 0.01
T5
R17 51
R18 51
Q4 3N68
Q5 3N68
R19 1500
R20 1500
C9 1.9
C10 1.9
CR7 IN6
R23 10K
R25 100
R22 2MEG
Q7 2N720A
Q6 2N930
R21 24K
C11 1.0
T6
CR8 IN660
C12 10
R24 1000
R26 10K
C13 10
R27 2400
R28 2400
SEE NOTE 3
A1 IRIG TEMP AMPL (2001466)
IRIG SENSOR
HI 6
COMM 9
LO 8
28VDC ISS STDBY 4
FOR TEST ONLY 10
OV ISS 5
STRUCTURE GROUND 1
SEE NOTE 2
R29 SCALING RESISTOR

NOTES

1. INTERPRET DRAWING INACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AMPLIFIER AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON AMPLIFIER
3. DENOTES SHIELDED CONDUCTOR

2010126 B

2H

SYM	DESCRIPTION	DATE	APPROVAL
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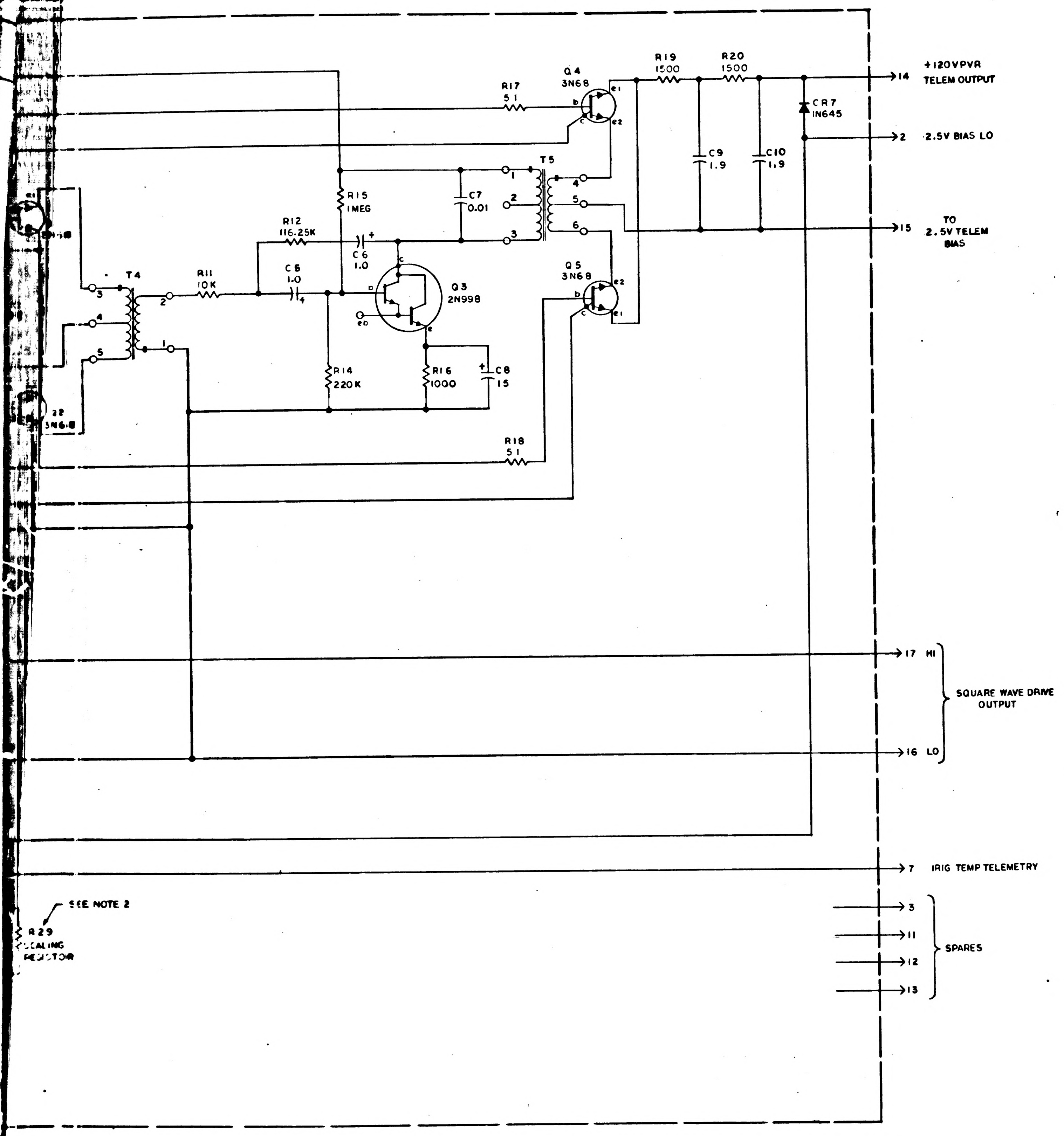
B	REVISED PER TDRR 30433	10 AUG 66	[illegible]


R17
51
Q4
3N68
R19
1500
R20
1500
14 +120VPVR TELEM OUTPUT
CR7
1N645
2 2.5V BIAS LO
C9
1.9
C10
1.9
T5
R15
1MEG
C7
0.01
15 TO 2.5V TELEM BIAS
R12
116.25K
C6
1.0
T4
R11
10K
C5
1.0
Q3
2N998
Q5
3N68
R14
220K
R16
1000
C8
15
R18
51
Q2
3N68
17 HI
16 LO
SQUARE WAVE DRIVE OUTPUT
7 IRIG TEMP TELEMETRY
3
11
12
13
SPARES
SEE NOTE 2
R29
SCALING RESISTOR

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± .1%	1/10W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-36		1500		
R28	1006750-36		1500	± 2%	1/4 W
R29	SEE NOTE 2	RESISTOR	NOM	±0.1%	1/8 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50VDC
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010259-003		1N825	±1%	
CR4	1010259-003		1N825	±1%	
CR5	1010372-12		1N752		
CR6	1010372-12		1N752		
CR7	1010837-001		1N645		
CR8	1010385	DIODE	1N660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			
A1	2001466	AMPLIFIER			

R29	
PART NO.	VALUE
1008878-044	14.000K
-045	14.112K
-046	14.225K
-047	14.339K
-048	14.454K
-049	14.570K
-050	14.687K
-051	14.804K
-052	14.922K
-053	15.041K
-054	15.161K
-055	15.282K
-056	15.404K
-057	15.527K
-058	15.651K
-059	15.776K
-060	15.902K
-061	16.029K
-062	16.157K
-063	16.286K
-064	16.416K
-065	16.547K
-066	16.679K
-067	16.812K
1008878-068	16.900K

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY &
IRIG TEMP (FQ) ASSY
DWG NO. 2007241

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

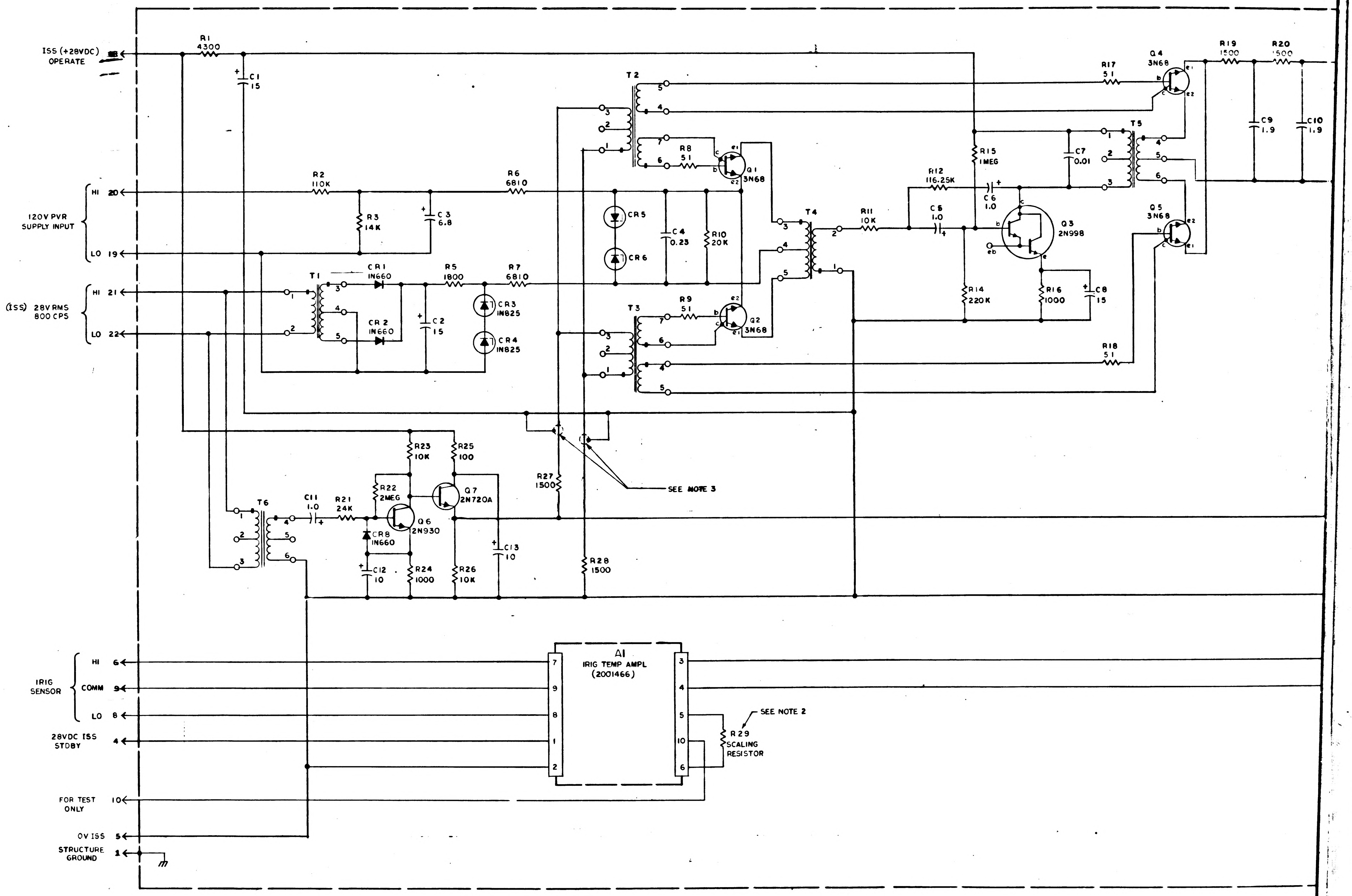
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN A. Di [illegible] DATE 8 FEB 66
CHECKED [illegible] 11 Feb 66
APPROVAL [illegible] 11 Feb 66
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY & IRIG TEMP (FQ)

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010126
SCALE —
WT —
SHEET 1 OF 1

2H



ISS (+28VDC) OPERATE
120V PVR SUPPLY INPUT
HI 20
LO 19
(ISS) 28V RMS 800 CPS
HI 21
LO 22
R1 4300
C1 15
R2 110K
R3 14K
C3 6.8
R6 6810
T1
CR1 1N660
CR2 1N660
C2 15
R5 1800
CR3 1N825
CR4 1N825
R7 6810
CR5
CR6
C4 0.23
R10 20K
T2
R8 51
Q1 3N68
T3
R9 51
Q2 3N68
T4
R11 10K
R12 116.25K
C6 1.0
C5 1.0
R15 1MEG
C7 0.01
Q3 2N998
R14 220K
R16 1000
C8 15
T5
R17 51
Q4 3N68
R18 51
Q5 3N68
R19 1500
R20 1500
C9 1.9
C10 1.9
R27 1500
R28 1500
SEE NOTE 3
T6
C11 1.0
R21 24K
R22 2MEG
CR8 1N660
C12 10
R23 10K
Q6 2N930
R24 1000
R25 100
Q7 2N720A
R26 10K
C13 10
A1 IRIG TEMP AMPL (2001466)
IRIG SENSOR
HI 6
COMM 9
LO 8
28VDC ISS STDBY 4
FOR TEST ONLY 10
OV ISS 5
STRUCTURE GROUND 1
SEE NOTE 2
R29 SCALING RESISTOR

NOTES

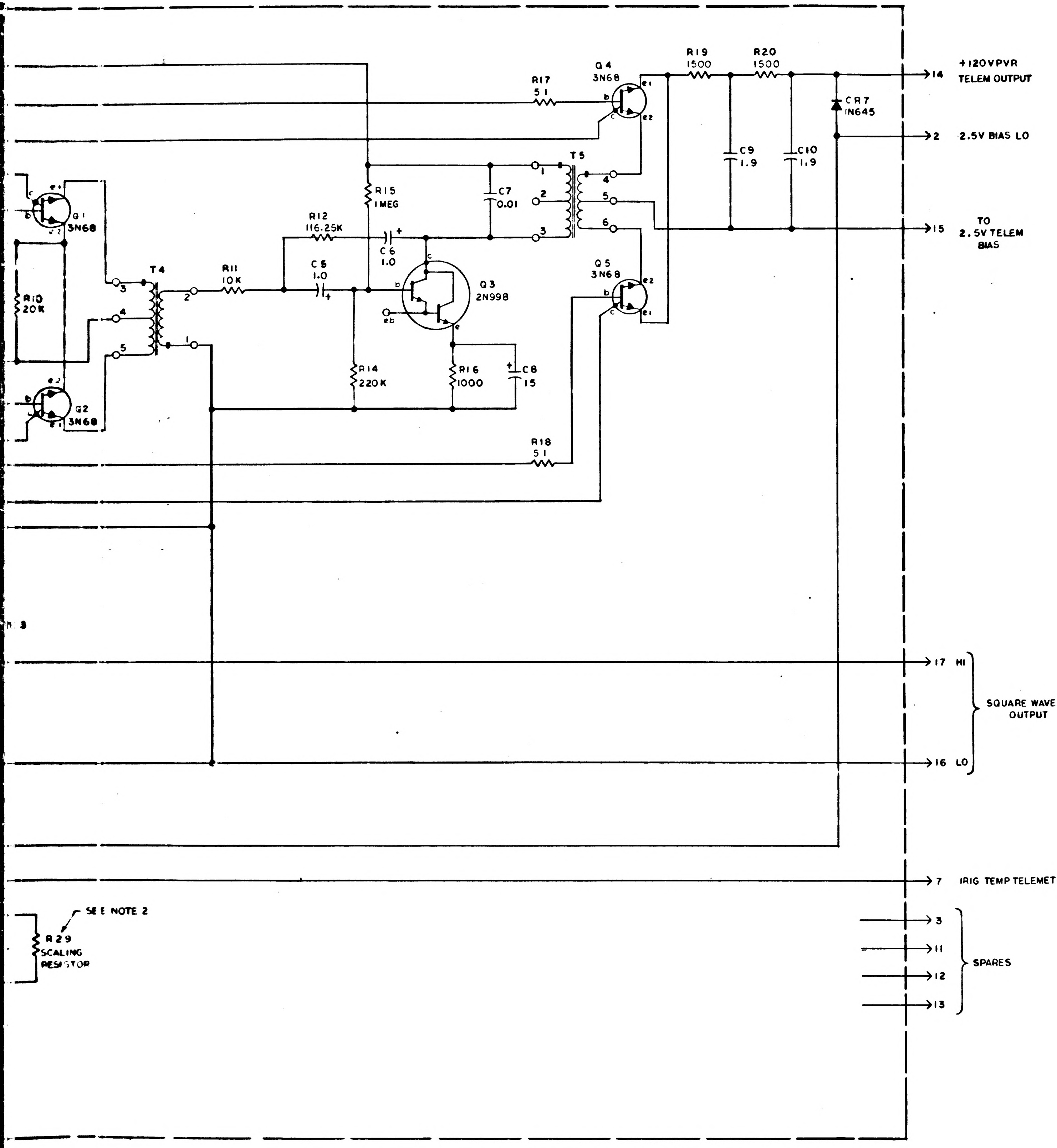
1. INTERPRET DRAWING INACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AMPLIFIER AND R29 ARE MATCHED COMPONENTS. R29 SHALL BE SELECTED FROM CHART AS MARKED ON AMPLIFIER
3. DENOTES SHIELDED CONDUCTOR

2010126 C

1/2010126

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 28481		
B	REVISED PER TDRR 30433	3 AUG 66	JI
C	REVISED PER TDRR 30793	SEPT 66	JI RPS

REVISIONS 27178


R17
51
Q4
3N68
R19
1500
R20
1500
+120VPVR
TELEM OUTPUT
14
CR7
IN645
2
2.5V BIAS LO
C9
1.9
C10
1.9
T5
1
2
3
4
5
6
C7
0.01
R15
1MEG
R12
116.25K
C6
1.0
15
TO
2.5V TELEM
BIAS
Q1
3N68
R10
20K
T4
R11
10K
C5
1.0
Q3
2N998
eb
Q5
3N68
R14
220K
R16
1000
C8
15
Q2
3N68
R18
51
17 HI
16 LO
SQUARE WAVE DRIVE
OUTPUT
7
IRIG TEMP TELEMETRY
SEE NOTE 2
R29
SCALING
RESISTOR
3
11
12
13
SPARES

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± .1%	1/10W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10 K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-36		1500		
R28	1006750-36		1500	± 2%	1/4 W
R29	SEE NOTE 2	RESISTOR	NOM	±0.1%	1/8 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	±10%	50VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010259-003		IN825	±1%	
CR4	1010259-003		IN825	±1%	
CR5	1010372-12		IN752		
CR6	1010372-12		IN752		
CR7	1010837-001		IN645		
CR8	1010385	DIODE	IN660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			
A1	2001466	AMPLIFIER			

R29	
PART NO.	VALUE
1008878-044	14.000K
-045	14.112K
-046	14.225K
-047	14.339K
-048	14.454K
-049	14.570K
-050	14.687K
-051	14.804K
-052	14.922K
-053	15.041K
-054	15.161K
-055	15.282K
-056	15.404K
-057	15.527K
-058	15.651K
-059	15.776K
-060	15.902K
-061	16.029K
-062	16.157K
-063	16.286K
-064	16.416K
-065	16.547K
-066	16.679K
-067	16.812K
1008878-068	16.900K

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY &
IRIG TEMP (FQ) ASSY
DWG NO. 2007241

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN A. Di Leo DATE 8 FEB 66
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY & IRIG TEMP (FQ)

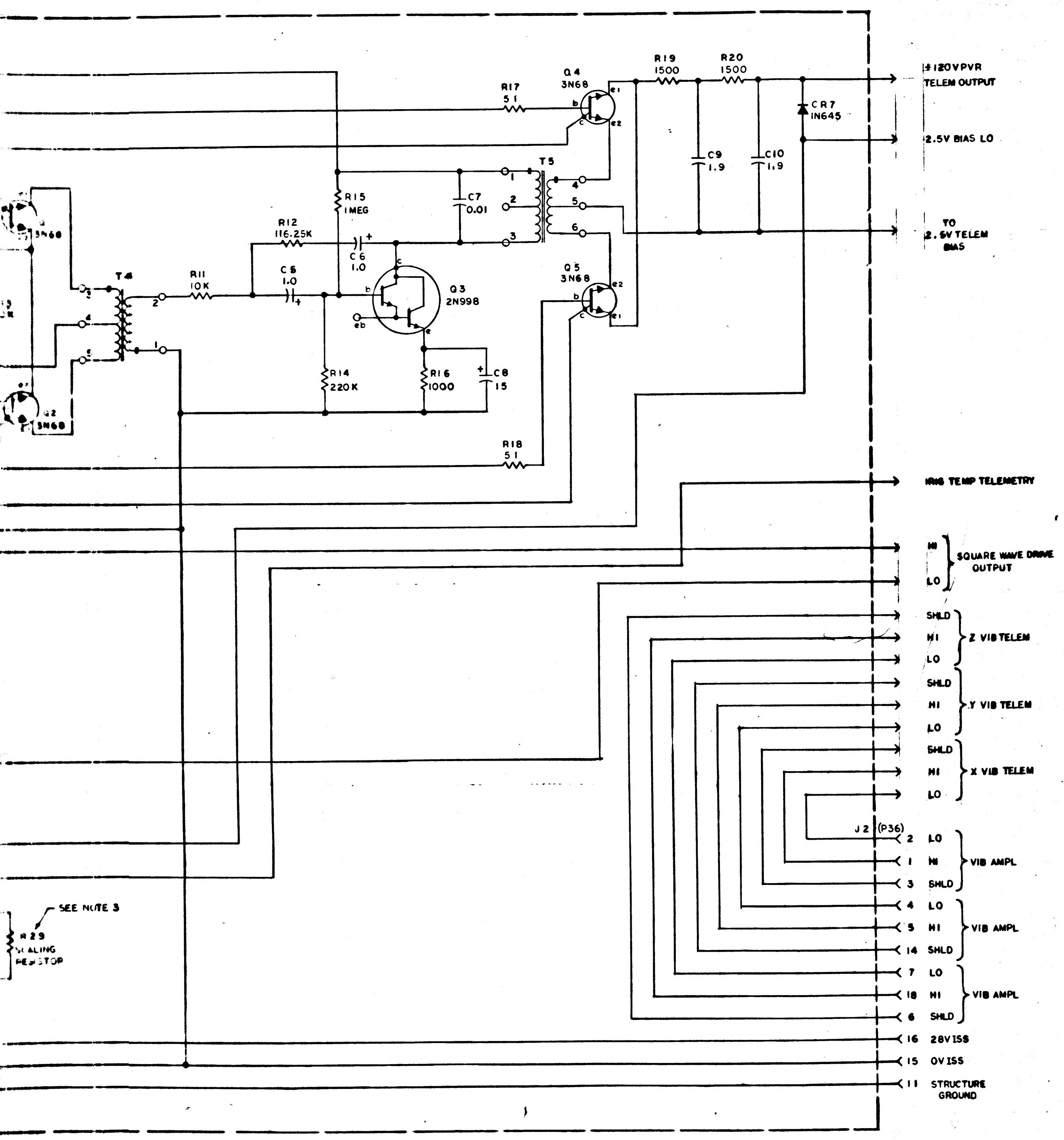
CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2010126
SCALE —
WT —
SHEET 1 OF 1

2010126 C

2H

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL


R17
51
Q4
3N68
b
c
e1
e2
R19
1500
R20
1500
CR7
IN645
C9
1.9
C10
1.9
±120VPVR
TELEM OUTPUT
2.5V BIAS LO
TO
2.5V TELEM
BIAS
T5
1
2
3
4
5
6
C7
0.01
R15
1MEG
R12
116.25K
C6
1.0
Q3
2N998
b
c
e
eb
Q5
3N68
b
c
e1
e2
T4
R11
10K
C5
1.0
2
1
4
5
R14
220K
R16
1000
C8
15
Q1
3N68
Q2
3N68
R18
51
IRIG TEMP TELEMETRY
HI
LO
SQUARE WAVE DRIVE
OUTPUT
SHLD
HI
LO
Z VIB TELEM
SHLD
HI
LO
Y VIB TELEM
SHLD
HI
LO
X VIB TELEM
J2 (P36)
2 LO
1 HI
3 SHLD
VIB AMPL
4 LO
5 HI
14 SHLD
VIB AMPL
7 LO
18 HI
6 SHLD
VIB AMPL
16 28V ISS
15 0V ISS
11 STRUCTURE GROUND
SEE NOTE 3
R29
SCALING
RESISTOR

R29
1008878-023 THRU 1008878-047

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± .1%	1/10W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-41		2400		
R28	1006750-41		2400	± 2%	1/4 W
R29	SEE NOTE 3	RESISTOR	NOM	±0.1%	1/8 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		.01		100
C8	1006755-33				20
C9	1010279-16				6
C10	1010279-16		1		6
C11	1006755-69		1.		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010259-000		IN825		
CR4	1010259-000		IN825		
CR5	1010372-12		IN752		
CR6	1010372-12		IN752		
CR7	1010837-001		IN645		
CR8	1010385	DIODE	IN660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			
J2	1010930-013	CONNECTOR			
A1	2001466	AMPLIFIER			

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY &
VIB CONNECTOR ASSY
DWG NO.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY.	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN G. Di Lima DATE 2/23/66
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

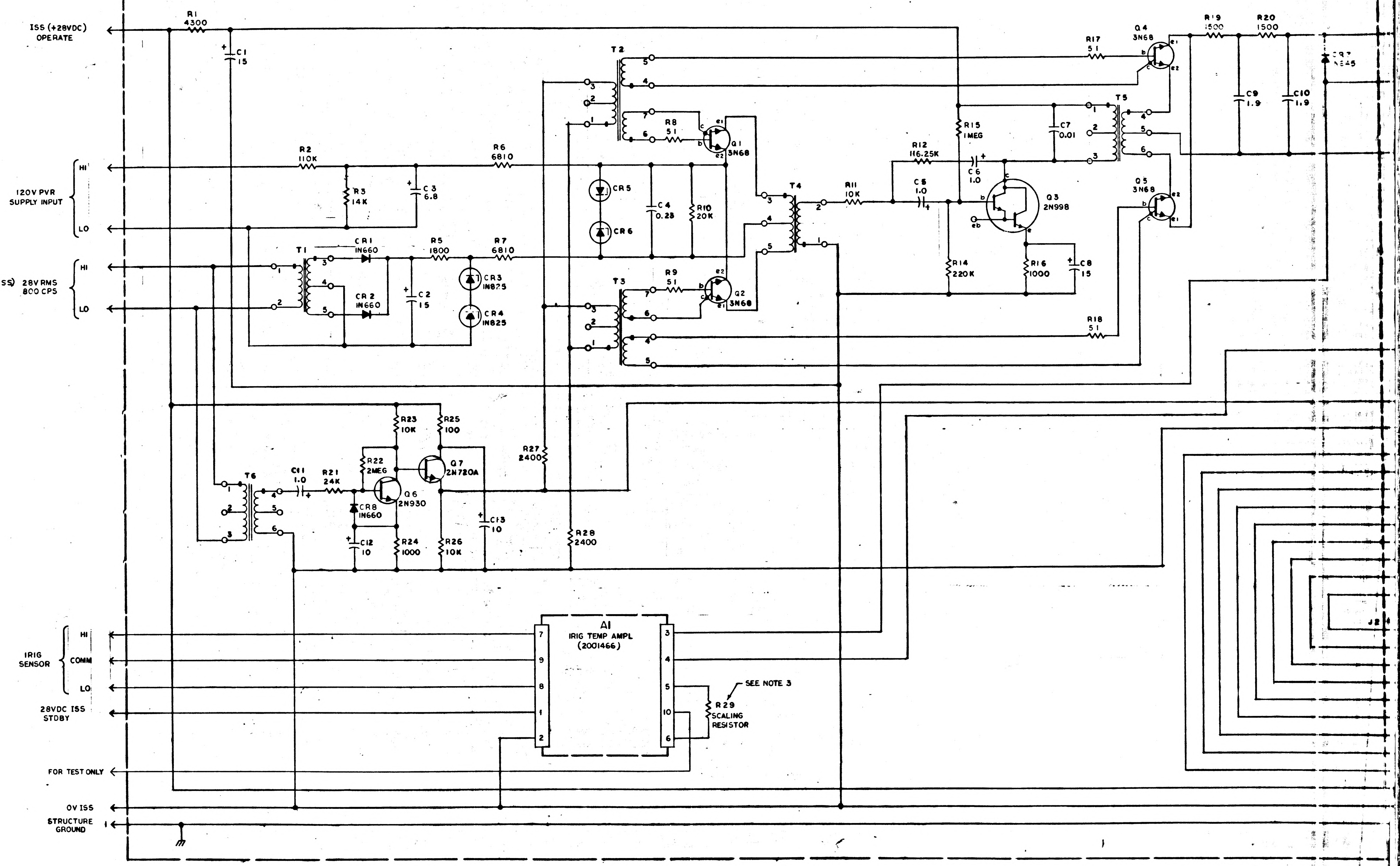
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY & VIB CONNECTOR

CODE IDENT NO 80230 SIZE J NASA DRAWING NO. 2010126
SCALE — WT — SHEET 1 OF 1

MASTER

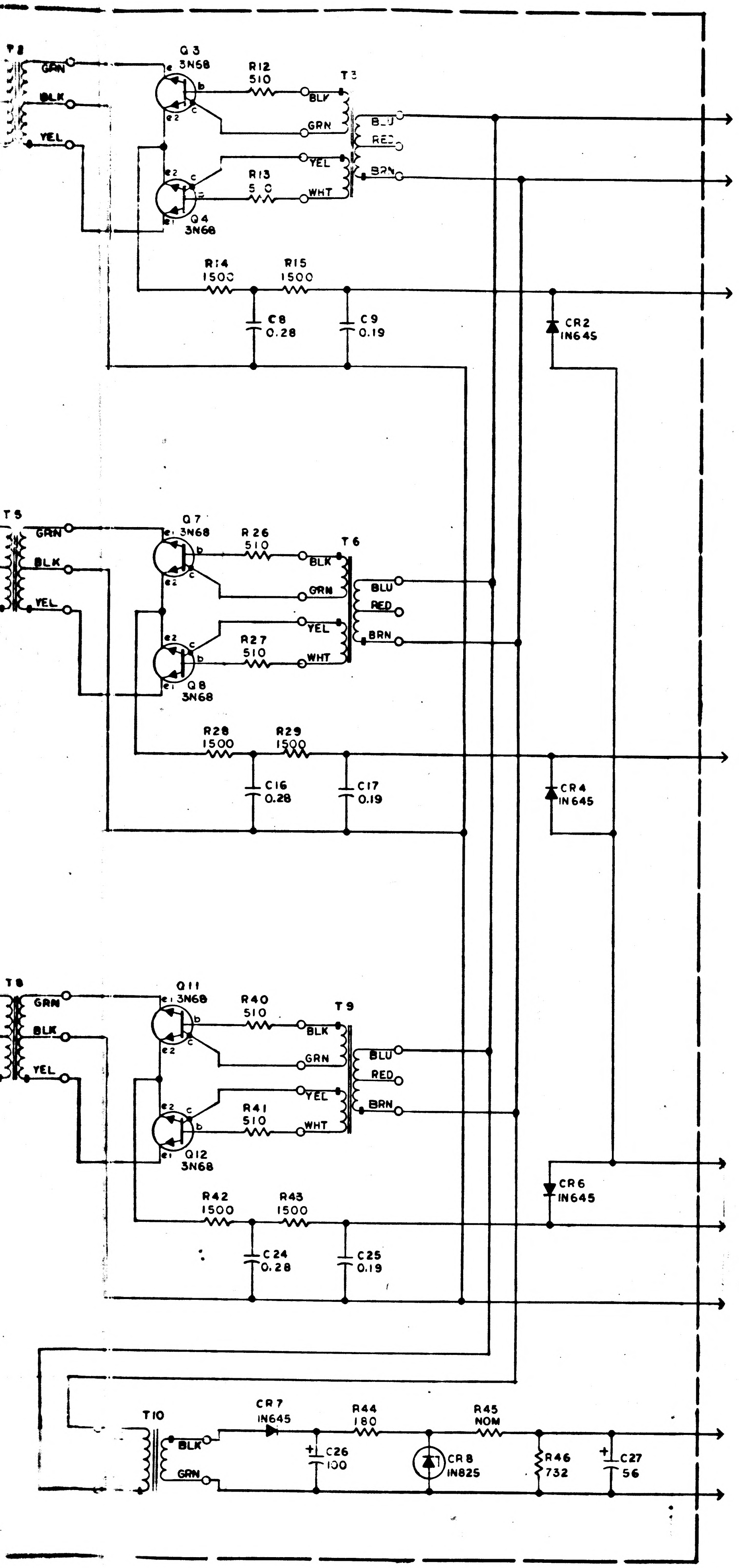
2010126


ISS (+28VDC) OPERATE
R1 4300
C1 15
T2
R8 51
Q1 3N68
120V PVR SUPPLY INPUT
HI
LO
R2 110K
R3 14K
C3 6.8
R6 6810
CR5
CR6
C4 0.25
R10 20K
T4
R11 10K
C5 1.0
R12 116.25K
C6 1.0
R15 1MEG
Q3 2N998
C7 0.01
T5
Q4 3N68
R17 51
R19 1500
R20 1500
C9 1.9
C10 1.9
CR7 1N645
Q5 3N68
R14 220K
R16 1000
C8 15
R18 51
(ISS) 28V RMS 800 CPS
T1
CR1 1N660
CR2 1N660
C2 15
R5 1800
R7 6810
CR3 1N825
CR4 1N825
T3
R9 51
Q2 3N68
T6
C11 1.0
R21 24K
R22 2MEG
R23 10K
R25 100
Q6 2N930
Q7 2N720A
CR8 1N660
C12 10
R24 1000
R26 10K
C13 10
R27 2400
R28 2400
A1
IRIG TEMP AMPL
(2001466)
SEE NOTE 3
R29
SCALING RESISTOR
IRIG SENSOR
HI
COMM
LO
28VDC ISS STDBY
FOR TEST ONLY
OV ISS
STRUCTURE GROUND
J2

NOTES

1. INTERPRET DRAWING INACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R29 PER APPLICABLE P.S. FROM APPROPRIATE CHART FOR CONDITION IRIG ± 4° F AS MARKED ON AMPLIFIER 2001466

2010126



Q3
3N68
R12
510
T3
GRN
BLK
YEL
BLU
RED
BRN
WHT
R13
510
Q4
3N68
HI
LO
ISS 800 CPS
R14
1500
R15
1500
C8
0.28
C9
0.19
CR2
IN645
IG IX RSVR
HI RES TELEM
T5
Q7
3N68
R26
510
T6
R27
510
Q8
3N68
R28
1500
R29
1500
C16
0.28
C17
0.19
CR4
IN645
MG IX RSVR
HI RES TELEM
T8
Q11
3N68
R40
510
T9
R41
510
Q12
3N68
R42
1500
R43
1500
C24
0.28
C25
0.19
CR6
IN645
HIGH RES RSVR
COMM TO 2.5V BIAS LO
OG IX RSVR
HI RES TELEM
TO
2.5V BIAS HI
T10
CR7
IN645
R44
180
R45
NOM
C26
100
CR8
IN825
R46
732
C27
56
HI
LO
2.5V BIAS
(FQ)

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
R1	1006750-20	RESISTOR	330	2	1/4 W
R2	1010364-653		124K	1	1/8 W
R3	1010364-653		124K	1	1/8 W
R4	1010311-291		52.3K	1	1/10 W
R5	1010364-769		499K	1	1/8 W
R6	1006750-72		47K	2	1/4 W
R7	1006750-65		24K	2	1/4 W
R8	1010311-109		665	1	1/10 W
R9	1010364-707		237K	1	1/8 W
R10	1006750-56		10K	2	1/4 W
R11	1010311-302		68.1K	1	1/10 W
R12	1006750-25		510	2	1/4 W
R13	1006750-25		510	2	1/4 W
R14	1006750-36		1500	2	1/4 W
R15	1006750-36		1500	2	1/4 W
R16	1010364-653		124K	1	1/8 W
R17	1010364-653		124K	1	1/8 W
R18	1010311-291		52.3K	1	1/10 W
R19	1010364-769		499K	1	1/8 W
R20	1006750-72		47K	2	1/4 W
R21	1006750-65		24K	2	1/4 W
R22	1010311-109		665	1	1/10 W
R23	1010364-707		237K	1	1/8 W
R24	1006750-56		10K	2	1/4 W
R25	1010311-302		68.1K	1	1/10 W
R26	1006750-25		510	2	1/4 W
R27	1006750-25		510	2	1/4 W
R28	1006750-36		1500	2	1/4 W
R29	1006750-36		1500	2	1/4 W
R30	1010364-653		124K	1	1/8 W
R31	1010364-653		124K	1	1/8 W
R32	1010311-291		52.3K	1	1/10 W
R33	1010364-769		499K	1	1/8 W
R34	1006750-72		47K	2	1/4 W
R35	1006750-65		24K	2	1/4 W
R36	1010311-109		665	1	1/10 W
R37	1010364-707		237K	1	1/8 W
R38	1006750-56		10K	2	1/4 W
R39	1010311-302		68.1K	1	1/10 W
R40	1006750-25		510	2	1/4 W
R41	1006750-25		510	2	1/4 W
R42	1006750-36		1500	2	1/4 W
R43	1006750-36		1500	2	1/4 W
R44	1006750-14		180	2	1/4 W
R45	SEE NOTE 2		NOM	1	1/8 W
R46	1010364-225	RESISTOR	732	1	1/8 W
C1	1006755-89	CAPACITOR	47	10	35 VDC
C2	1010410-18		1100 PF	2	300
C3	1010410-15		820 PF	2	300
C4	1006755-31		10	10	20
C5	1006755-34		33		20
C6	1006755-69		1.0		35
C7	1006755-34		33		20
C8	1010279-6		0.28		6
C9	1010279-4		0.19	10	6
C10	1010410-18		1100 PF	2	300
C11	1010410-15		820 PF	2	300
C12	1006755-31		10	10	20
C13	1006755-34		33		20
C14	1006755-69		1.0		35
C15	1006755-34		33		20
C16	1010279-6		0.28		6
C17	1010279-4		0.19	10	6
C18	1010410-18		1100 PF	2	300
C19	1010410-15		820 PF	2	300
C20	1006755-31		10	10	20
C21	1006755-34		33		20
C22	1006755-69		1.0		35
C23	1006755-34		33		20
C24	1010279-6		0.28		6
C25	1010279-4		0.19		6
C26	1006755-40		100		20
C27	1006755-4	CAPACITOR	56	10	6 VDC

REF DES	PART NO.	DESCRIPTION	VALUE	TOL ±%	RATING
CR1	1010837-001	DIODE	IN645		
CR2	-001				
CR3	-001				
CR4	-001				
CR5	-001				
CR6	-001				
CR7	1010837-001		IN645		
CR8	1010259-000	DIODE	IN825		
Q1	1010397-1	TRANSISTOR	2N930		
Q2	1010397-1		2N930		
Q3	1010367		3N68		
Q4	1010367		3N68		
Q5	1010397-1		2N930		
Q6	1010397-1		2N930		
Q7	1010367		3N68		
Q8	1010367		3N68		
Q9	1010397-1		2N930		
Q10	1010397-1		2N930		
Q11	1010367		3N68		
Q12	1010367	TRANSISTOR	3N68		
T1	1008832	TRANSFORMER			
T2	1008842				
T3	1010323				
T4	1008832				
T5	1008842				
T6	1010323				
T7	1008832				
T8	1008842				
T9	1010323				
T10	1010466	TRANSFORMER			

R 45	
PART NO.	VALUE
1010364-255	1050
-257	1070
-259	1100
-261	1130
-263	1150
1010364-265	1180

REF DES:
SIGNAL CONDITIONER ONE-SPEED SINE RESOLVER ASSY
DWG NO. 2007242

REVISIONS 2741

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN A. Di Leo
CHECKED
APPROVED
APPROVED
APPROVED MIT
A. C. HIGGINS
APPROVED MSC
DATE

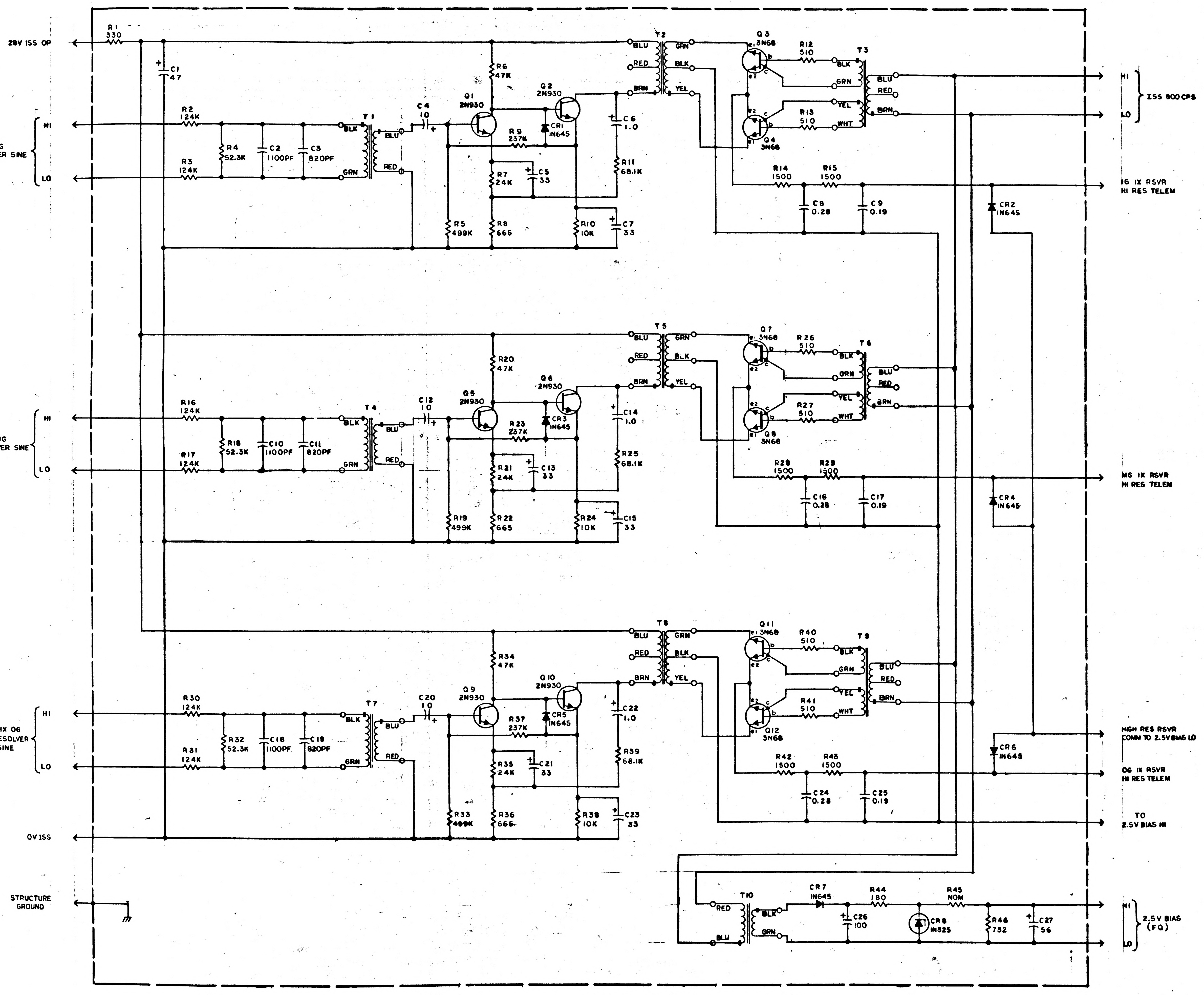
SCHEMATIC
SIGNAL CONDITIONER
ONE-SPEED SINE RESOLVER

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010127
SCALE —
SHEET 1 OF 1

MASTER

2010127

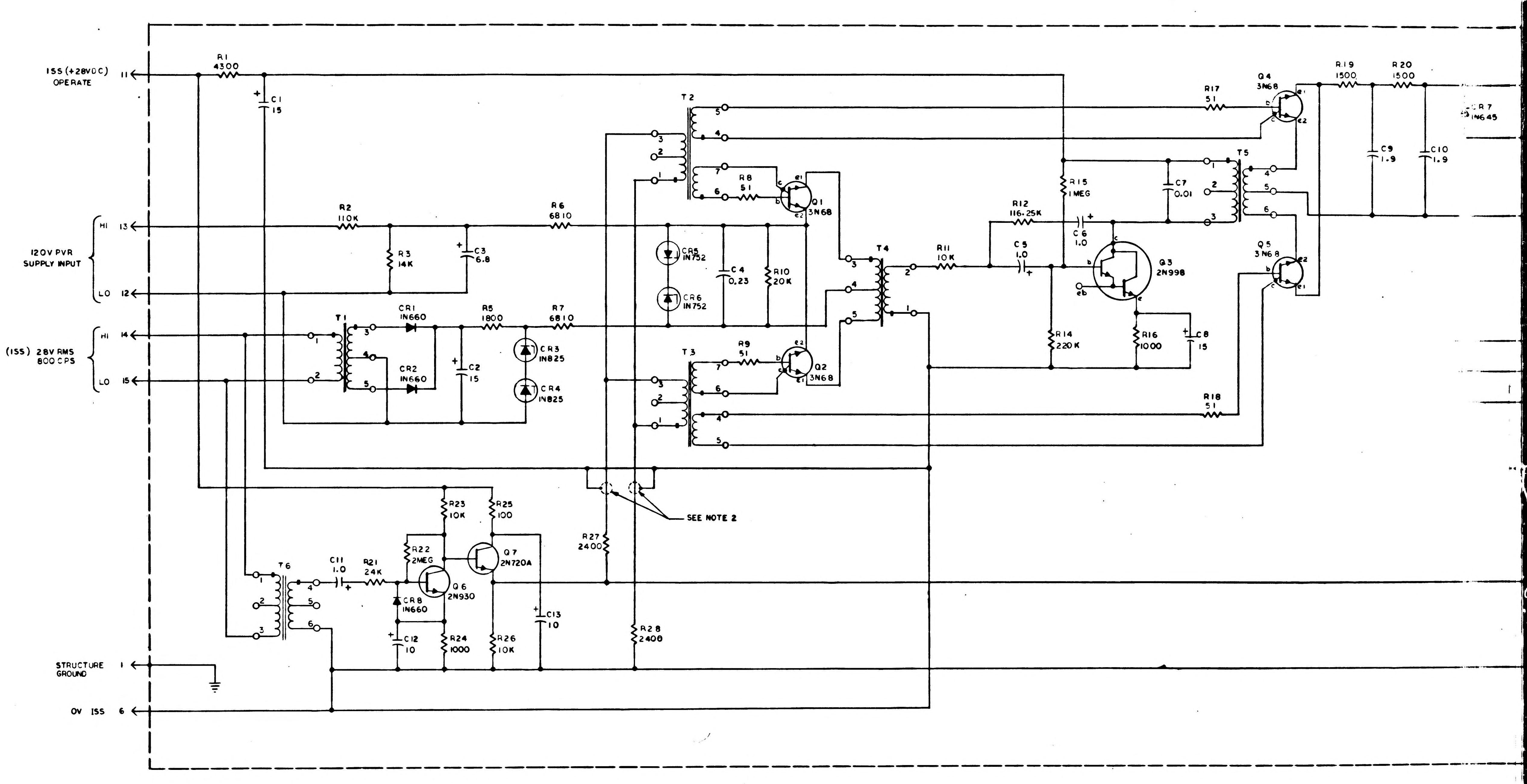
NOTICE – [illegible]


28V ISS OP
R1 330
C1 47
R2 124K
R3 124K
R4 52.3K
C2 1100PF
C3 820PF
IX IG RESOLVER SINE
HI
LO
T1
BLK
GRN
BLU
RED
C4 10
Q1 2N930
Q2 2N930
R6 47K
R9 237K
CR1 IN645
R7 24K
C5 33
R5 499K
R8 665
R10 10K
C7 33
C6 1.0
R11 68.1K
T2
BLU
RED
BRN
GRN
BLK
YEL
Q3 3N68
Q4 3N68
R12 510
R13 510
T3
BLK
GRN
YEL
WHT
BLU
RED
BRN
HI
LO
ISS 800 CPS
R14 1500
R15 1500
C8 0.28
C9 0.19
IG IX RSVR HI RES TELEM
CR2 IN645
IX MG RESOLVER SINE
R16 124K
R17 124K
R18 52.3K
C10 1100PF
C11 820PF
T4
C12 10
Q5 2N930
Q6 2N930
R20 47K
R23 237K
CR3 IN645
R21 24K
C13 33
R19 499K
R22 665
R24 10K
C15 33
C14 1.0
R25 68.1K
T5
Q7 3N68
Q8 3N68
R26 510
R27 510
T6
R28 1500
R29 1500
C16 0.28
C17 0.19
MG IX RSVR HI RES TELEM
CR4 IN645
IX OG RESOLVER SINE
R30 124K
R31 124K
R32 52.3K
C18 1100PF
C19 820PF
T7
C20 10
Q9 2N930
Q10 2N930
R34 47K
R37 237K
CR5 IN645
R35 24K
C21 33
R33 499K
R36 665
R38 10K
C23 33
C22 1.0
R39 68.1K
T8
Q11 3N68
Q12 3N68
R40 510
R41 510
T9
HIGH RES RSVR COMM TO 2.5V BIAS LO
CR6 IN645
R42 1500
R43 1500
C24 0.28
C25 0.19
OG IX RSVR HI RES TELEM
TO 2.5V BIAS HI
OV ISS
STRUCTURE GROUND
T10
CR7 IN645
C26 100
R44 180
CR8 IN825
R45 NOM
R46 732
C27 56
2.5V BIAS (FQ)

NOTES

1. INTE RET DRAWING IN ACCORDANCE WITH ST RDS PRESCRIBED BY MIL-D-70327
2. SE R45 PER APPLICABLE RS. FROM APP PRIATE CHART

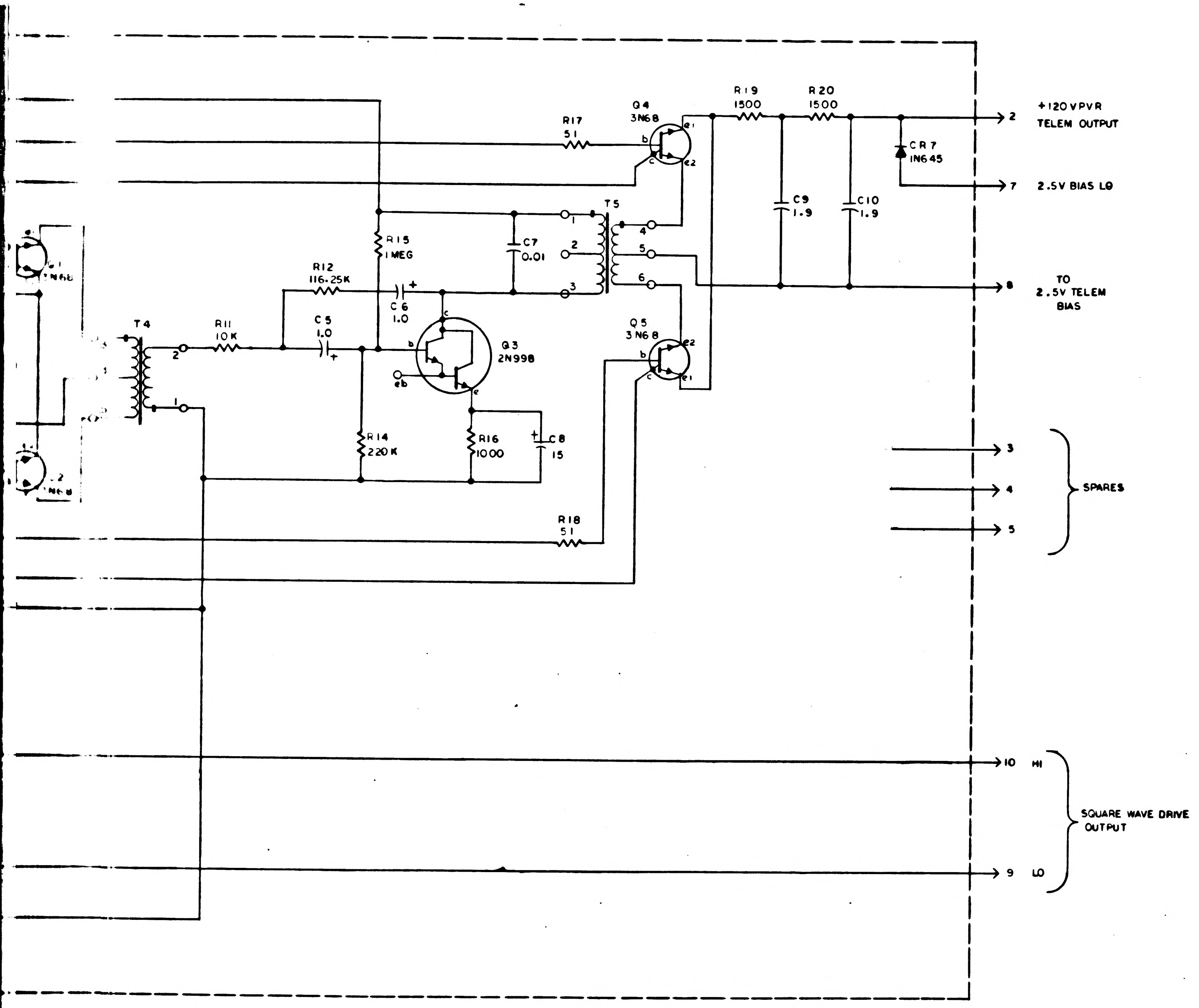
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


ISS (+28VDC) OPERATE
11
R1 4300
C1 15
120V PVR SUPPLY INPUT
HI 13
LO 12
R2 110K
R3 14K
C3 6.8
R6 6810
(ISS) 28V RMS 800 CPS
HI 14
LO 15
T1
CR1 IN660
CR2 IN660
C2 15
R5 1800
R7 6810
CR3 IN825
CR4 IN825
T2
R8 51
Q1 3N68
CR5 IN752
CR6 IN752
C4 0.23
R10 20K
T3
R9 51
Q2 3N68
T4
R11 10K
R12 116.25K
C5 1.0
C6 1.0
R15 1MEG
Q3 2N998
eb
R14 220K
R16 1000
C8 15
C7 0.01
T5
R17 51
Q4 3N68
Q5 3N68
R18 51
R19 1500
R20 1500
C9 1.9
C10 1.9
CR7 IN645
SEE NOTE 2
R27 2400
R28 2400
T6
C11 1.0
R21 24K
R22 2MEG
R23 10K
R25 100
Q6 2N930
Q7 2N720A
CR8 IN660
C12 10
R24 1000
R26 10K
C13 10
STRUCTURE GROUND 1
OV ISS 6

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. DENOTES SHIELDED CONDUCTOR

2010128 A

REVISIONS 2F510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30-...		JI	10 AUG 66	


R17
51
Q4
3N68
b
c
e1
e2
R19
1500
R20
1500
CR7
1N645
+120VPVR
TELEM OUTPUT
2
2.5V BIAS LO
7
T5
1
2
3
4
5
6
C7
0.01
C9
1.9
C10
1.9
R15
1MEG
R12
116.25K
C6
1.0
TO
2.5V TELEM
BIAS
8
T4
R11
10K
C5
1.0
Q3
2N998
b
c
e
eb
Q5
3N68
R14
220K
R16
1000
C8
15
3
4
5
SPARES
R18
51
10 HI
9 LO
SQUARE WAVE DRIVE
OUTPUT

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± 1%	1/10 W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-36		1500		
R28	1006750-36	RESISTOR	1500	± 2%	1/4 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50 VDC
CR1	1010385	DIODE	1N660		
CR2	1010385		1N660		
CR3	1010259-000		1N825		
CR4	1010259-000		1N825		
CR5	1010372-12		1N752		
CR6	1010372-12		1N752		
CR7	10108[illegible]7-001		1N645		
CR8	1010385	DIODE	1N660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY ASSY (OP)
DWG NO. 2007244

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

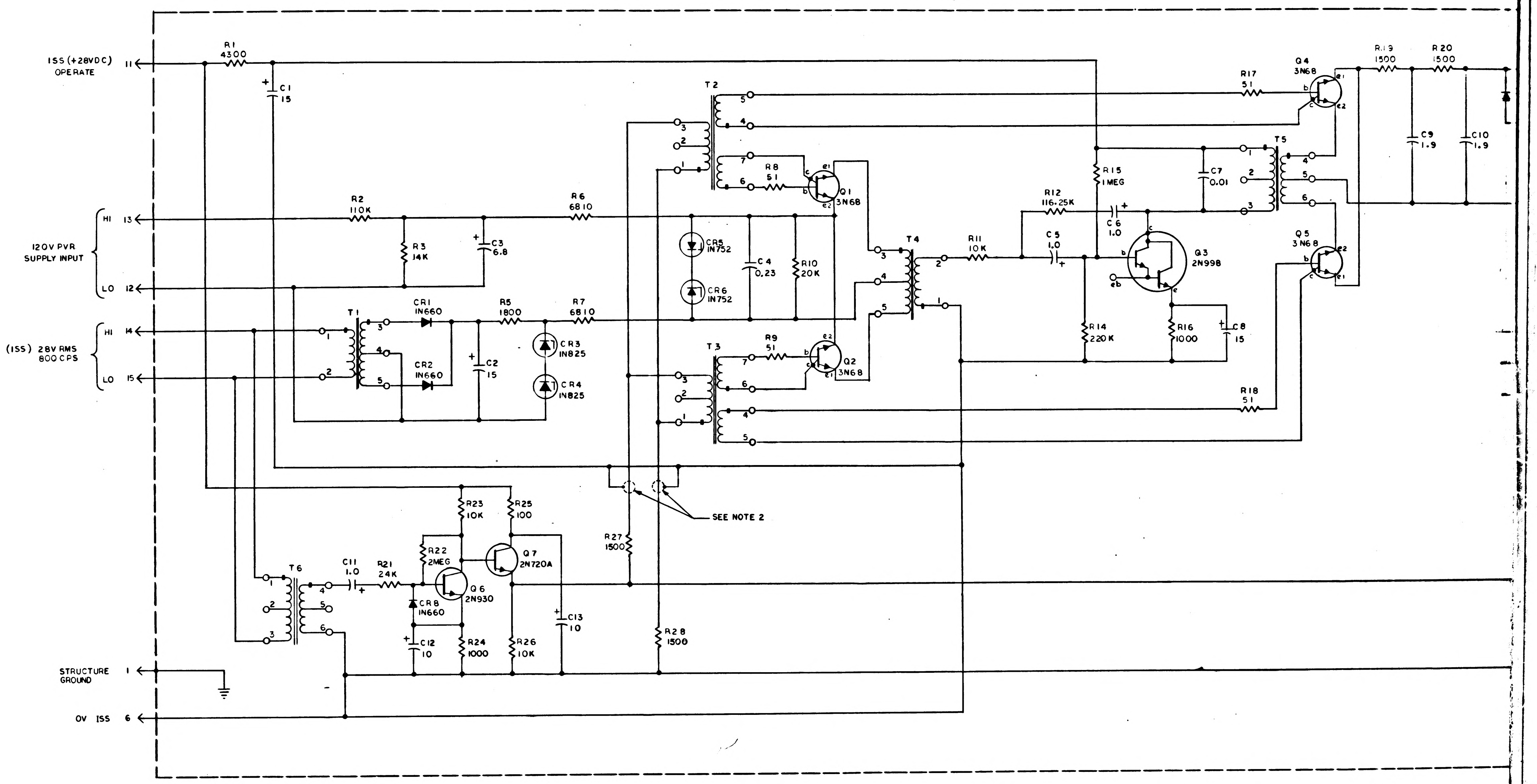
DRAWN S Alol
CHECKED Bocarrigo
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY (OP)

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010128
SCALE —
SHEET 1 OF 1

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

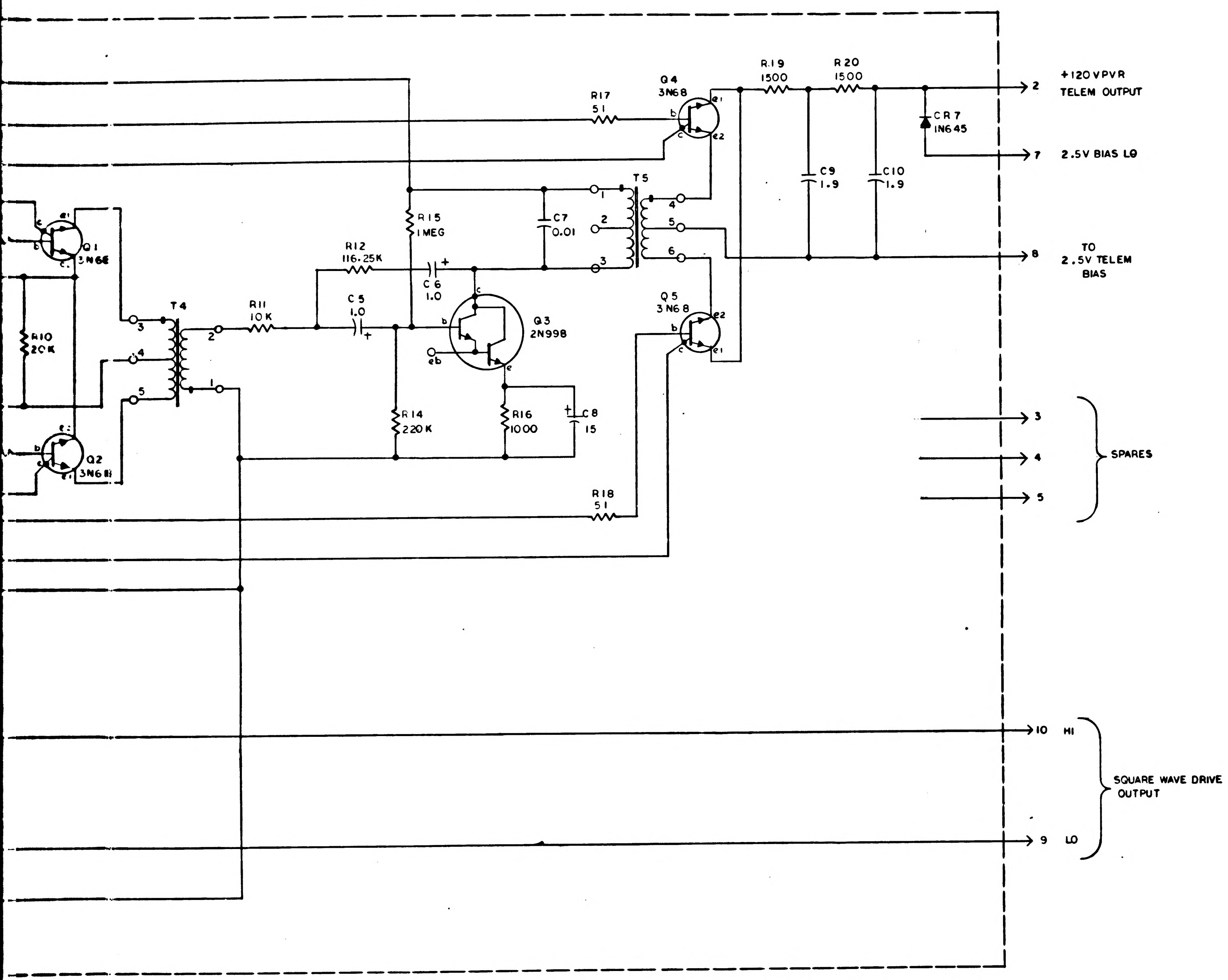


ISS (+28VDC) OPERATE
11
120V PVR SUPPLY INPUT
HI 13
LO 12
(ISS) 28V RMS 800 CPS
HI 14
LO 15
STRUCTURE GROUND
1
0V ISS
6
R1 4300
C1 15
R2 110K
R3 14K
C3 6.8
T1
CR1 1N660
CR2 1N660
C2 15
R5 1800
R6 6810
R7 6810
CR3 1N825
CR4 1N825
T2
T3
CR5 1N752
CR6 1N752
C4 0.23
R10 20K
R8 51
R9 51
Q1 3N68
Q2 3N68
T4
R11 10K
C5 1.0
R12 116.25K
C6 1.0
R15 1MEG
R14 220K
Q3 2N998
eb
R16 1000
C8 15
C7 0.01
T5
R17 51
R18 51
Q4 3N68
Q5 3N68
R19 1500
R20 1500
C9 1.9
C10 1.9
SEE NOTE 2
R27 1500
R28 1500
T6
C11 1.0
R21 24K
CR8 1N660
C12 10
R22 2MEG
R23 10K
R24 1000
Q6 2N930
R25 100
Q7 2N720A
R26 10K
C13 10
7
6
5
4
D
C
B
A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. DENOTES SHIELDED CONDUCTOR

REVISIONS 2F510						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 30434	E91	JI	10 AUG 66	
B		REVISED PER TDRR 30756	JJB	JI	31AUG 66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± 1%	1/10 W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-36		1500		
R28	1006750-36	RESISTOR	1500	± 2%	1/4 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50 VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010259-000		IN825		
CR4	1010259-000		IN825		
CR5	1010372-12		IN752		
CR6	1010372-12		IN752		
CR7	1010837-001		IN645		
CR8	1010385	DIODE	IN660		
Q1	1010367	CHOPPER	3N68		
Q2	1010367	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			


Q1
3N68
e1
c
b
c
R10
20K
Q2
3N68
e
b
c
e1
T4
3
4
5
2
1
R11
10K
R12
116.25K
C5
1.0
C6
1.0
R15
1MEG
R14
220K
Q3
2N998
b
c
e
eb
R16
1000
C8
15
C7
0.01
T5
1
2
3
4
5
6
R17
51
Q4
3N68
b
c
e1
e2
Q5
3N68
b
c
e1
e2
R18
51
R19
1500
R20
1500
C9
1.9
C10
1.9
CR7
IN645
2
+120VPVR
TELEM OUTPUT
7
2.5V BIAS LO
8
TO
2.5V TELEM
BIAS
3
4
5
SPARES
10
HI
9
LO
SQUARE WAVE DRIVE
OUTPUT

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY ASSY (OP)
DWG NO. 2007244

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN A Love 22 Apr 66
CHECKED Bonarrigo 22 Apr 66
APPROVED 22 Apr 66
APPROVED
APPROVED MIT A. C. METZGER
APPROVED MSC
DATE

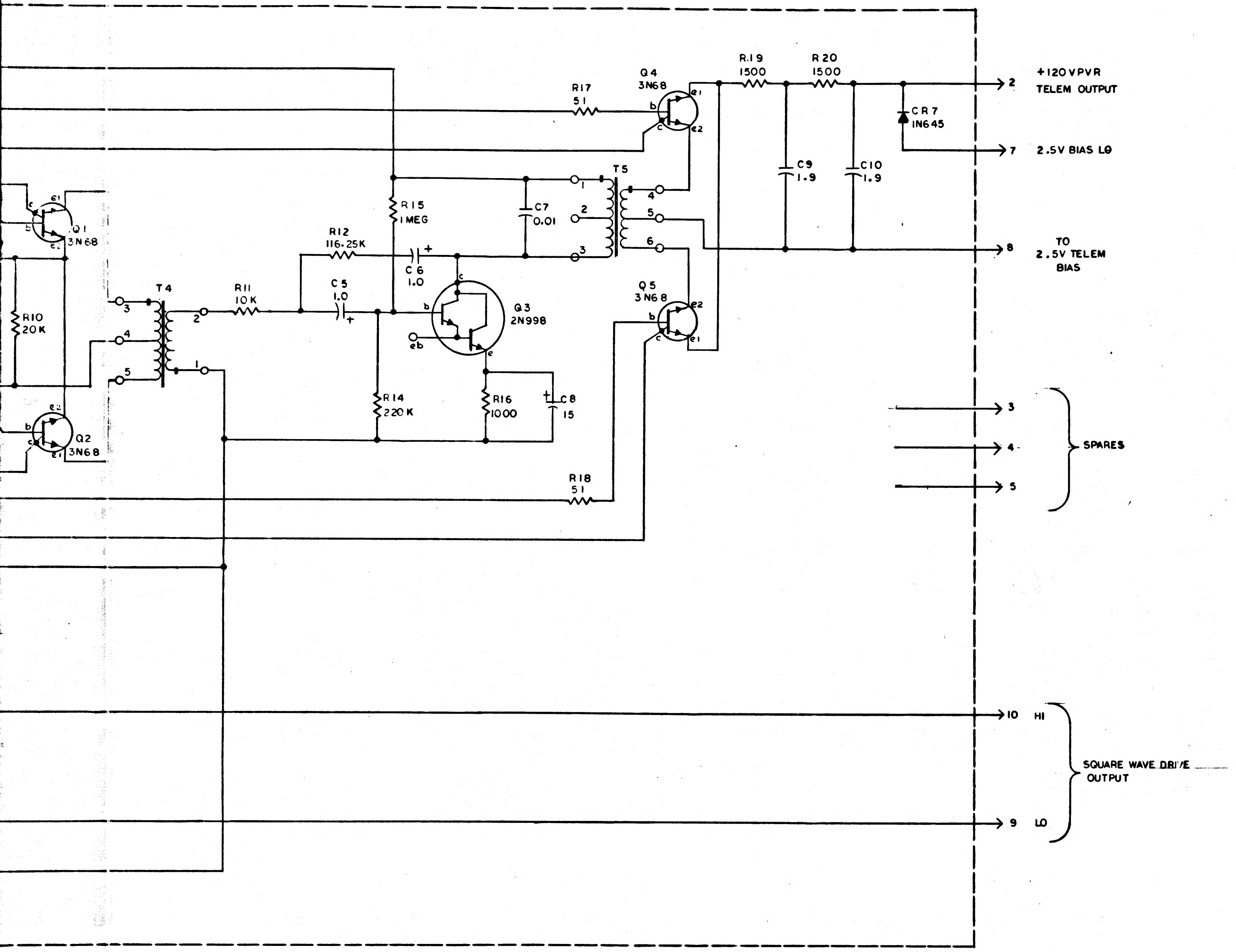
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY (OP)

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010128
SCALE —
SHEET 1 OF

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS 2F5


+120VPVR TELEM OUTPUT
2.5V BIAS LO
TO 2.5V TELEM BIAS
SPARES
SQUARE WAVE DRIVE OUTPUT
HI
LO
R17 51
Q4 3N68
R19 1500
R20 1500
CR7 IN645
C9 1.9
C10 1.9
T5
C7 0.01
R15 1MEG
R12 116.25K
C6 1.0
Q1 3N68
R10 20K
T4
R11 10K
C5 1.0
Q3 2N998
Q5 3N68
R14 220K
R16 1000
C8 15
Q2 3N68
R18 51
2
7
8
3
4
5
10
9

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-47	RESISTOR	4300	± 2%	1/4 W
R2	1010377-20		110K	± 1%	1/10 W
R3	1010364-471		14 K	± 1%	1/8 W
R5	1006750-38		1800	± 2%	1/4 W
R6	1010364-411		6810	± 1%	1/8 W
R7	1010364-411		6810	± 1%	1/8 W
R8	1006750-1		51	± 2%	1/4 W
R9	1006750-1		51	± 2%	1/4 W
R10	1010364-501		20K	± 1%	1/8 W
R11	1010364-443		10K	± 1%	1/8 W
R12	1010377-103		116.25K	± 1%	1/10 W
R14	1010368-105		220K	± 5%	1/4 W
R15	1010368-121		1 MEG	± 5%	
R16	1006750-32		1000	± 2%	
R17	-1		51		
R18	-1		51		
R19	-36		1500		
R20	-36		1500		
R21	1006750-65		24K	± 2%	
R22	1010368-128		2 MEG	± 5%	
R23	1006750-56		10K	± 2%	
R24	-32		1000		
R25	-8		100		
R26	-56		10K		
R27	-41		2400		
R28	1006750-41	RESISTOR	2400	± 2%	1/4 W
C1	1006755-132	CAPACITOR	15	± 10%	50 VDC
C2	1006755-132		15		50
C3	1006755-79		6.8		35
C4	1010279-104		0.23		15
C5	1006755-69		1.0		35
C6	1006755-69		1.0		35
C7	1006777-31		0.01		100
C8	1006755-33		15		20
C9	1010279-16		1.9		6
C10	1010279-16		1.9		6
C11	1006755-69		1.0		35
C12	1006755-31		10		20
C13	1006755-130	CAPACITOR	10	± 10%	50 VDC
CR1	1010385	DIODE	IN660		
CR2	1010385		IN660		
CR3	1010259-000		IN825		
CR4	1010259-000		IN825		
CR5	1010372-12		IN752		
CR6	1010372-12		IN752		
CR7	1010837-001		IN645		
CR8	1010385	DIODE	IN660		
Q1	1010367	CHOPPER	3N68		
Q2	1010357	CHOPPER	3N68		
Q3	1010342	TRANSISTOR	2N998		
Q4	1010367	CHOPPER	3N68		
Q5	1010367	CHOPPER	3N68		
Q6	1010397-1	TRANSISTOR	2N930		
Q7	1010357-1	TRANSISTOR	2N720A		
T1	1010710	TRANSFORMER			
T2	1010365				
T3	1010365				
T4	1010710				
T5	1010274				
T6	1010274	TRANSFORMER			

REF DES:
SIGNAL CONDITIONER 120V PIPA SUPPLY ASSY (OP)
DWG NO. 2007244

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL

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INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN S Alec
CHECKED Bonarrigo
APPROVED
APPROVED
APPROVED MIT A.C. METZGER
APPROVED MSC
DATE

SCHEMATIC
SIGNAL CONDITIONER
120V PIPA SUPPLY (OP)

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010128
SCALE —
SHEET 1 OF 1

MASTER

2010128

F-2

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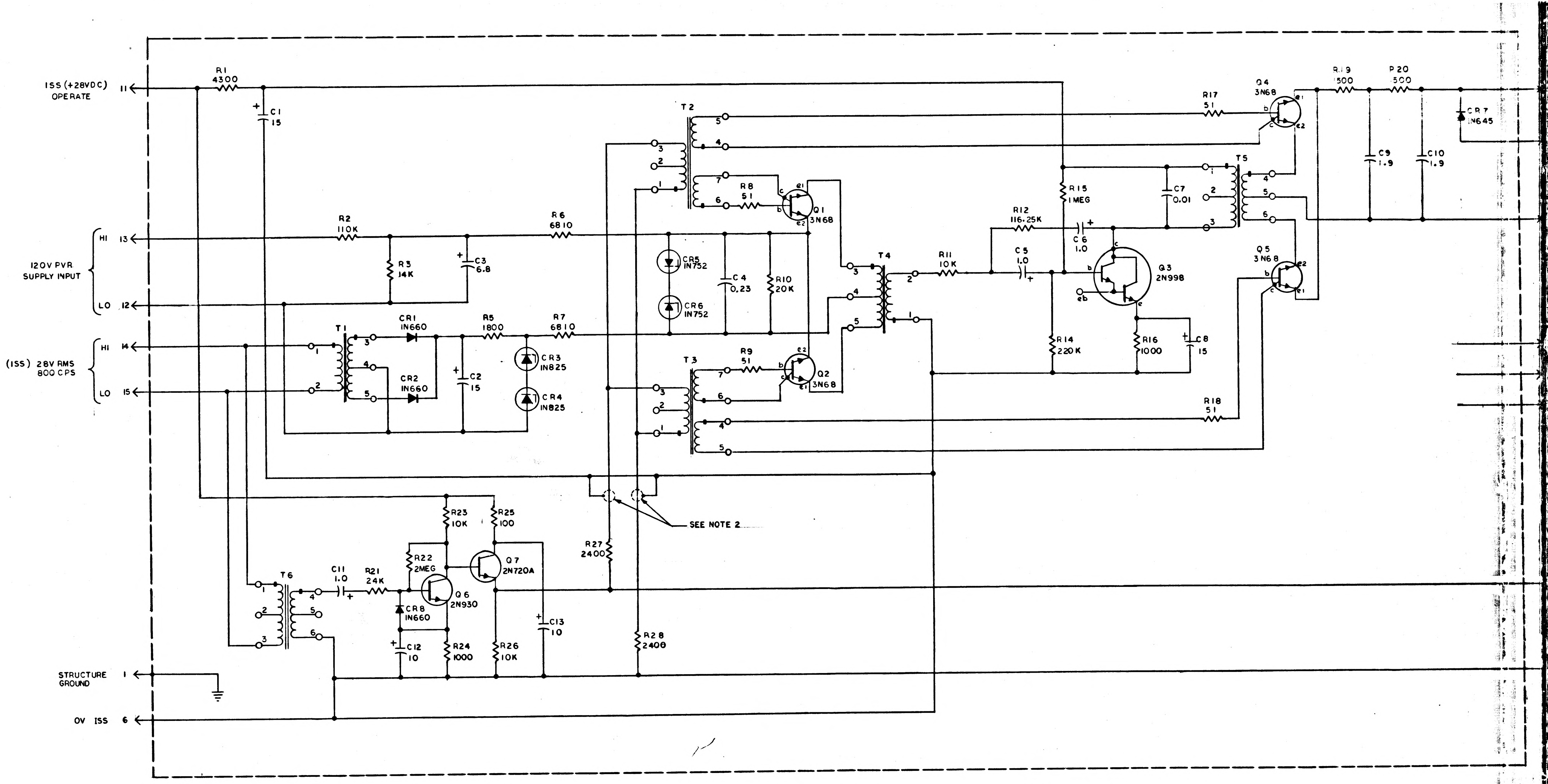
ISS (+28VDC) OPERATE
11
R1 4300
C1 15
120V PVR SUPPLY INPUT
HI 13
LO 12
R2 110K
R3 14K
C3 6.8
R6 6810
(ISS) 28V RMS 800 CPS
HI 14
LO 15
T1
CR1 IN660
CR2 IN660
C2 15
R5 1800
R7 6810
CR3 IN825
CR4 IN825
T2
T3
R8 51
R9 51
Q1 3N68
Q2 3N68
CR5 IN752
CR6 IN752
C4 0.23
R10 20K
T4
R11 10K
C5 1.0
R12 116.25K
C6 1.0
R15 1MEG
R14 220K
Q3 2N998
R16 1000
C8 15
C7 0.01
T5
R17 51
R18 51
Q4 3N68
Q5 3N68
R19 500
P 20 500
C9 1.9
C10 1.9
CR7 IN645
SEE NOTE 2
R27 2400
R28 2400
T6
C11 1.0
R21 24K
R22 2MEG
R23 10K
R25 100
Q6 2N930
Q7 2N720A
CR8 IN660
C12 10
R24 1000
R26 10K
C13 10
STRUCTURE GROUND 1
OV ISS 6

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. DENOTES SHIELDED CONDUCTOR

APOLLO G&C Specification
PS2010603 REV C
Original Issue Date: 9-14-65
Release Authority: TDRR 22495
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B.6.e(3) of SCG-11, Rev 1, dated 1 January 1966.

Signed KDGeiger Dept. 32-17, Date: 14 April '66.

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
1/11/66	A	25164	2, 19 RDG/AC	WK	ACM
2/8/66	B	26013	16 RDG/AC	WK	TM
4/5/66	C	27760	1, 3, 4, 5, 9, 19 RDG/AC	WK	TM

This specification consists of page 1 to 21 inclusive.

APPROVALS	NASA/MSC	9/14/65	ccB 9-14-65 MIT/IL	ACSP

NOT REQUIRED PER LE
NASA PP7-65-612

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Operational Requirements. The conditions necessary for proper operation of the assembly shall be as follows:

3.1.1.1 PIP Temperature. The PIP operating temperature shall be maintained at 130° ±0.2°F.

3.1.1.2 Excitations

a. 2V rms ±1 percent at 3200±1 cps

b. 120 vdc ±2 percent

c. 28 vdc ±2 percent

d. Data pulses, switch pulses, and interrogator pulses shall meet the requirements of Table I and Figure 1 and shall be synchronized with respect to the 2V rms ±1 percent supply.

e. Leading edge of interrogator pulse must occur at the 135° ±2.5° point on the 3200 cps excitation voltage sine wave.

TABLE I

PULSE PARAMETERS

PULSE	AMPLITUDE (volts)	PRF (±1 pulse)	RISE TIME (max)	PULSE WIDTH (μsec)
Interrogator	6.0±1.0	3.2 kc	0.2 μsec	2.0±0.5
Switch	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5
Data	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5

3.1.2 Performance Characteristics

3.1.2.1 Null Coincidence. The 3:3 and 4:4 null difference angle for selecting the TG compensation resistors shall be less than 10 arc seconds. The 2:2 and 3:3 null difference angle for selecting the TG compensation resistors shall be less than 20 arc seconds.

3.1.2.2 Transient. The peak transient shall not exceed 0.80 cm/sec^2.

3.1.2.3 Position Memory. The position memory capability of the assembly shall demonstrate a bias deviation of less than 15 arc seconds between the two sets of nulls.

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0.00±0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 5.85 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

Symbol	Axis Aligned	DEVIATION FROM SET Set	Recheck Following 12 Hr Oven Storage at (130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_w	IRA About PRA	±10"	±10"	±12"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one of each of the modules specified on Drawing Number 2007201 and one 16 PIP and Suspension Module (see 3.2.2).

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2018639, is a GFP component of the assembly.

3.2.3 Standards of Manufacturing, Manufacturing Process, and Production

3.2.3.1 Critical Processes. Critical processes and adjustments shall be performed in the sequence established by Figure 2.

3.2.3.1.1 Compensation for Null Coincidence

3.2.3.1.1.1 TG Capacitance. The proper values of C3 and C4 for the compensation of the TG Windings shall be determined in accordance with the following requirements:

a. To properly compensate the DC Amplifier output, the values of C3 and C4 shall be alternately replaced until the compensated output approximates that of Figure 3.

b. Stable 3:3-4:4 or 2:2-3:3 nulls shall be obtained with the PRA vertically up.

d. The PIPA bias (A_b) and the down angle (A_D) shall be determined from the two null angles.

e. The PIPA bias shall be less than 330 arc sec. If the calculated null bias is greater than ±330 arc sec, bias resistors R5 and R6 shall be replaced until the PIPA bias is less than ±330 arc sec.

f. Bias potentiometer R-7 shall be adjusted to the required acceleration bias.

3.2.3.1.3 Scale Factor. The assembly scale factor shall be determined in accordance with the following requirements:

a. The scale factor potentiometer (R10) shall be set at the center position.

b. The PIPA IA shall be postioned at A_D -90° (+1g) and the total number of clock pulses shall be determined for 250,000 "P" pulses.

c. The PIP IA shall be positioned at A_D+90° (-1g), and the total number of clock pulses shall be determined for 250,000 "P" pulses.

d. From the counts obtained at the ±1g orientation of the PIP input axis the scale factor shall be determined, using the formulas shown in Para. 6.4.

e. The PIPA scale factor shall be 5.85 cm/sec/pulse ±400 ppm. New values of scale factor resistors R11 and R12 shall be selected until this scale factor is obtained.

3.2.3.1.4 PIP Axis Alignments

3.2.3.1.4.1 IRA About ORA

a. The assembly shall be operating in a closed loop mode.

b. The bias angle (A_b) and the down angle (A_D) shall be calculated after obtaining a stable PRA down null, PRA up null, and an additional PRA down null which shall repeat within 5 arc sec of the first PRA down null.

c. Position the dividing head to the angle ($A_{VERT-REF} + A_b$).

d. Use a torque wrench to loosen the outer alignment screws.

e. Insert the rotary adjustment tool in the top flange notches of the PIP case.

f. Use the lever arm of the rotary adjustment tool to rotate the PIP until the SG closed loop pattern is approximately at null.

g. Tighten the outer alignment screws to 3 in-lb.

4.2.3.8 Bias Adjustment. Bias adjustment shall be adjusted in accordance with the method specified in 3.2.3.1.2 and shall meet the requirements of 3.1.2.4.

4.2.3.9 Scale Factor and Bias. Scale factor and bias shall be measured to determine that the requirements of 3.1.2.4 and 3.1.2.5 have been met. To assure that the correct PIPA bias is measured the bias angle (A_b) and the down angle (A_D) shall be calculated after obtaining a stable PRA down null, PRA up null, and an additional PRA down null which shall repeat within 5 arc sec of the first PRA down null.

4.2.3.10 Stability. The stability shall be determined in accordance with the following requirements for a 4-hour run:

a. From PRA up and PRA down null angles calculate the bias angle (A_b) and the down angle (A_D). Set the bias to be less than 0.05 cm/sec^2 by adjustment of R7. At least two sets of nulls which are coincident within 5 arc seconds must be obtained.

b. Determine the PIPA scale factor from the ratio of "P" pulses to clock pulses in the IA up and IA down orientations. The duration of the count shall be 500,000 "P" pulses. Adjust R10 (Reference Drawing 2007105) to set the scale factor to within ±50 ppm of the nominal value.

c. Check the bias to insure that it is still within specification limits following scale factor adjustment.

d. Record the dynamic PVR, SF, and I_{TM} voltages in the IA up position.

e. With the IA up, monitor the PIPA output and the I_{TM} voltage for at least 4 hours.

f. Terminate the stability run, in the following sequence:

   (1) Measure the dynamic PVR, SF and I_{TM} voltages in the IA up position. Record.
   (2) Obtain IA down counts for SF calculation.
   (3) Obtain nulls for bias determination.

g. Calculate and record the initial and final values and deviations in PVR and SF voltages, SF current, SF, and bias.

4.2.3.11 Bonding of Alignment Screws. Bonding of alignment screws shall be accomplished with bonding agent, Drawing 2021529. The relative position of the alignment rings shall remain unchanged during the bonding process.

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B. 6. e(3) of SCG-11, Rev 1, dated 1 January 1966.

Signed KDGeiger Dept. 32-17, Date: 14 April '66.

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4/20/66	D	28181	, 2, 5 RDG/AC	WK	--

This specification consists of page 1 to 21 inclusive.

APPROVALS	NASA/MSC	9/14/65 MIT/IL	ACSP

NOT REQUIRED PER LE
NASA PP7-65-612

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Block II CM 16 Pulsed Integrating Pendulum Accelerometer (PIPA) Assembly, hereafter called the assembly.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&C

ND1002004	Process Specification, Epoxy Bonding of Metallic and Nonmetallic Materials

DRAWINGS

National Aeronautics and Space Administration

R101837	PIPA Test Console Bay Front Pictorial

APOLLO G&C

2007103	Binary Current Switch Assembly
2007105	PIPA Calibration Assembly
2007201	PIPA Electronics Assembly
2001730	Pulsed Integrating Pendulum and Suspension Module
2021529	Bonding Agent

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In the event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0.00±0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 5.85 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

		DEVIATION FROM SET		
Symbol	Axis Aligned	Set	Recheck Following 12 Hr Oven Storage at (130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_w	IRA About PRA	±10"	±10"	±12"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one of each of the modules specified on Drawing Number 2007201 and one 16 PIP and Suspension Module (see 3.2.2).

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2001730, is a GFP component of the assembly.

3.2.3 Standards of Manufacturing, Manufacturing Process, and Production

3.2.3.1 Critical Processes. Critical processes and adjustments shall be performed in the sequence established by Figure 2.

3.2.3.1.1 Compensation for Null Coincidence

3.2.3.1.1.1 TG Capacitance. The proper values of C3 and C4 for the compensation of the TG Windings shall be determined in accordance with the following requirements:

a. To properly compensate the DC Amplifier output, the values of C3 and C4 shall be alternately replaced until the compensated output approximates that of Figure 3.

b. Stable 3:3-4:4 or 2:2-3:3 nulls shall be obtained with the PRA vertically up.

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Original Issue Date: 9-14-65
Release Authority: TDRR 22495
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B.6.e(3) of SCG-11, Rev 1, dated 1 January 1966.

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4/20/66	D	28181	, 2, 5 RDG/AC	WK	--
6/21/66	E	29771	2, 5 RDG/AC	MGM	--

This specification consists of page 1 to 21 inclusive.

APPROVALS	NASA/MSC	9/14/65	ccB 9-14 MIT/IL	ACSP

NOT REQUIRED PER LE
NASA PP7-65-612

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Block II CM 16 Pulsed Integrating Pendulum Accelerometer (PIPA) Assembly, hereafter called the assembly.

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APOLLO G&C

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2018639	PIP and Suspension Capacitor Module
2021529	Bonding Agent

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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a. The contract
b. This specification
c. Documents listed in this section

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0.00±0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 5.85 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

DEVIATION FROM SET

Symbol	Axis Aligned	Set	Recheck Following 12 Hr Oven Storage at (130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_w	IRA About PRA	±10"	±10"	±12"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one of each of the modules specified on Drawing Number 2007201 and one 16 PIP and Suspension Module (see 3.2.2).

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2001730,or 2018639, is a GFP component of the assembly.

3.2.3 Standards of Manufacturing, Manufacturing Process, and Production

3.2.3.1 Critical Processes. Critical processes and adjustments shall be performed in the sequence established by Figure 2.

3.2.3.1.1 Compensation for Null Coincidence

3.2.3.1.1.1 TG Capacitance. The proper values of C3 and C4 for the compensation of the TG Windings shall be determined in accordance with the following requirements:

a. To properly compensate the DC Amplifier output, the values of C3 and C4 shall be alternately replaced until the compensated output approximates that of Figure 3.

b. Stable 3:3-4:4 or 2:2-3:3 nulls shall be obtained with the PRA vertically up.

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

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4/20/66	D	28181	, 2, 5 RDG/AC	WK	--
6/21/66	E	29771	2, 5 RDG/AC	MGM	--
10/14/66	F	31558	3, 5, 9-21, Was 21 pages, now	MGM EA	WLS
			19 pages. RDG/AC		

This specification consists of page 1 to 19 inclusive.

APPROVALS	NASA/MSC	9/14/65 MGMurphy ccB 9-14-65 MIT/IL	ACSP

NOT REQUIRED PER LE
NASA PP7-65-612

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Operational Requirements. The conditions necessary for proper operation of the assembly shall be as follows:

3.1.1.1 PIP Temperature. The PIP operating temperature shall be maintained at 130° ±0.2°F.

3.1.1.2 Excitations

a. 2V rms ±1 percent at 3200±1 cps

b. 120 vdc ±2 percent

c. 28 vdc ±2 percent

d. Data pulses, switch pulses, and interrogator pulses shall meet the requirements of Table I and Figure 1 and shall be synchronized with respect to the 2V rms ±1 percent supply.

e. Leading edge of interrogator pulse must occur at the 135° ±2.5° point on the 3200 cps excitation voltage sine wave.

TABLE I

PULSE PARAMETERS

PULSE	AMPLITUDE (volts)	PRF (±1 pulse)	RISE TIME (max)	PULSE WIDTH (μsec)
Interrogator	6.0±1.0	3.2 kc	0.2 μsec	2.0±0.5
Switch	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5
Data	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5

3.1.2 Performance Characteristics

3.1.2.1 Null Coincidence. The 3:3 and 4:4 null difference angle for selecting the TG compensation resistors shall be less than 10 arc seconds. The 2:2 and 3:3 null difference angle for selecting the TG compensation resistors shall be less than 20 arc seconds.

3.1.2.2 Transient. The peak transient shall not exceed 0.18 cm/sec^2.

3.1.2.3 Position Memory. The position memory capability of the assembly shall demonstrate a bias deviation of less than 15 arc seconds between the two sets of nulls.

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C
b. Relative Humidity: 60% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.1.1.2 Special Condition — PIP Degaussing. After external signals have been applied to the TG, the PIP shall be degaussed at a current-time rate defined in Figure 4. The TM+ winding shall be degaussed first, followed by the TM- winding. The degaussing shall be repeated three times. PIP degaussing shall be performed as the first procedure in the test sequence. Scale factor and bias data shall not be taken after degaussing until the PIP has been operating closed-loop for 1/2 hour.

4.1.1.3 Test Console. All tests shall be conducted on a four-bay PIPA Test Console (reference National Aeronautics and Space Administration Drawing R101837). For the acceptance tests listed in 4.2.3, all modules including the calibration module shall be located on the heatsink in the electronics drawer.

4.1.2 Nonconforming Units. Failure of the assembly to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming assembly corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant NASA representative, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.1.3 Test Sequence. The required acceptance test sequence shall be as shown in Figure 5.

4.2 TESTS AND VERIFICATIONS

4.2.1 Drawing Compliance. The assembly components shall have been visually examined for compliance to the requirements of their applicable drawings. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, connector pin misalignment, and legibility and appearance of markings which would be detrimental to system function or performance.

4.2.2 Verification of Critical Processes. In addition to the acceptance tests of this section, data and records shall be examined to verify that critical processes and procedures required for buildup and calibration of the assembly have been performed, and that they have resulted in an assembly which meets the following listed performance requirements:

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10/14/66	F	31558	3, 5, 9-21. Was 21 pages, now	MGM EA	WLS
			19 pages. RDG/AC		
11/4/66	G	31840	12 RDG/AC	EA	--

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Date	Revision Letter	TDRR No.	Pages Revised	Approvals MIT	Approvals NASA
1/11/66	A	25164	2, 19 RDG/ac	WK	ACM
2/8/66	B	26013	16 RDG/ac	WK	TM
4/5/66	C	27760	1, 3, 4, 5, 9, 19 RDG/ac	WK	TM
4/20/66	D	28181	2, 5 RDG/ac	WK	--
6/21/66	E	29771	2, 5 RDG/ac	MGM	--
10/14/66	F	31558	3, 5, 9-21, Was 21 pages, now	MGM EA	WLS
			19 pages. RDG/ac		
11/4/66	G	31840	12 RDG/ac	EA	--
12/28/66	H	32475	14 RDG/ac	JP MGM	ACM

This specification consists of page 1 to 19 inclusive.

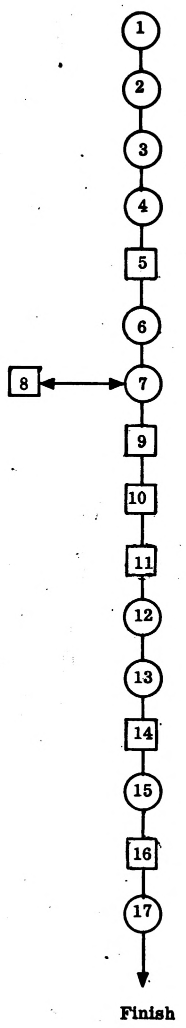
APPROVALS	NASA/MSC	9/14/65	McMurley COB 9-14-65 MIT/IL	ACSP

NOT REQUIRED PER LET
NASA PP7-65-612

Key:

○ = Acceptance Test

☐ = Process or Adjustment Operation



1. Transient Test
2. Position Memory Test
3. Null Coincidence Test
4. PIP Axis Alignment Test
5. Oven Storage
6. Recheck the PIP Axis Alignments to insure that the first deviation requirement is met (reference paragraph 3.1.2.6).
7. Binary Current Switch Bias Adjustment Test
8. Binary Current Switch Bias Adjustment (if required) (repeat test if required)
9. Scale Factor Adjustment (referenced paragraph 3.1.2.5)
10. Bias Adjustment (reference paragraph 3.1.2.4)
11. PIP Degaussing
12. Scale Factor and Bias Tests
13. Stability Test
14. Bond Alignment Screws
15. Recheck the PIP Axis Alignments to insure that the second deviation requirement is met (reference paragraph 3.1.2.6).
16. PIP Degaussing
17. Determine the Scale Factor and Bias. (The specification limits of 3.1.2.4 and 3.1.2.5 are not applicable to this test.)

REQUIRED ACCEPTANCE TEST SEQUENCE

FIGURE 5

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APOLLO G&N Specification
PS2010604 REV– B
Original Issue Date: 28 SEPT 1965
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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

Declassified per Paragraph II B.6.e (3) of SCG-11, Rev 1, dated 1 January 1966.

Signed R.D. [illegible] Dept. 32-17, Date: 14 April '66

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
3/1/66	A	26774	5, 5 RDG/ac	WK	--
4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDG/ac		

This specification consists of page 1 to 19 inclusive.

APPROVALS	NASA/MSC	9/22/65 28 Sep 65 MIT/IL	ACSP

NOT REQUIRED PER [illegible]
NASA PP7-65-612

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Appendix 3.2

1. SCOPE. This appendix establishes the requirement for one item of equipment from NASA inventory identified as IRIG Prealigned Assembly, APOLLO II IRIG for the APOLLO G&N System.

2. APPLICABLE DOCUMENTS. G&N System Specification PS2015000 establishes the need for the 25 IRIG as a required GFE item.

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

PS2015000	Performance/Design and Product Configuration Requirements, Airborne Guidance and Navigation Equipment - Block II for APOLLO Command Module
PS2021500	Specification for Procurement of APOLLO II Inertial Reference Integrating Gyro

STANDARDS

Military

MIL-STD-202C	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

APOLLO G&N

2021500	IRIG Prealigned Assembly, APOLLO II IRIG

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 DESCRIPTION. The IRIG is a single degree of freedom gyro used as a stabilization component in the APOLLO G&N System.

3.2 CONFIGURATION. The configuration of the IRIG shall be in accordance with APOLLO G&N Drawing 2021500 and all drawings and engineering data referenced thereon.

3.2.1 Continuity and Resistance. Continuity and resistance shall be as specified in Table I.

TABLE I

CONTINUITY AND DC RESISTANCE

CIRCUIT	FROM	TO	RESISTANCE (ohms)
SG Suspension 8-1	E9	E8	29.5 to 39.5
3-2	E11	E8	29.5 to 39.5
4-5	E12	E8	29.5 to 39.5
7-6	E4	E8	29.5 to 39.5
TG Suspension 8-1	E3	E7	29.5 to 39.5
3-2	E5	E7	29.5 to 39.5
4-5	E10	E7	29.5 to 39.5
7-6	E6	E7	29.5 to 39.5
Padded TG -	E19	E20	70 to 107
Padded TG +	E21	E20	70 to 107
TG Com	Z	E20	77 to 107
Motor Stator Phase A	P	B	57 to 77
B	R	J	57 to 77
SG Primary, Reset Coil and Padded Bias Coil in Parallel	Y	W	10.0 to 19.4
Heater	F	T	116 to 136
Aux Heater	L	N	116 to 136
Motor Stator Phase A	P	Gyro Case	100 megohms min
TG Com	Z	↕	↕
Thermistor	D	↕	↕
Motor Stator Phase B	R	↕	↕
Aux Heater	L	↕	↕
Heater	F	↕	↕
3200 CPS High	W	↕	↕
SG Secondary	E1	Gyro Case	↕
Motor Stator A-B	P	R	↕
Heater - Aux Heater	L	F	↕
3200 CPS High - SG Secondary	W	E1	100 megohms min

Appendix 3.2

3.3 PERFORMANCE

3.3.1 Thermistor Padding. The total padded thermistor circuit resistance shall be 769.6±6.0 ohms at 135.0° ±0.1°F with 2.00±0.04 ma excitation.

3.3.2 IA Alignment. The gyro IA shall be aligned to 35° 0' ±1' from the mounting flange slots.

3.3.3 Transfer Function. The average preamp output shall be 1200±60 mv/mrad into a 10K resistive load.

3.3.4 Coefficient Servo

3.3.4.1 Maximum Deviation. The standard deviation of the 1° increments in drift rate during any 10° or 5° servo run at compensated normal excitation shall not exceed 3 meru.

3.3.4.1.1 Compensated Normal Bias Drift Rate. The compensated normal bias drift rate (NBD) shall not deviate by more than 5 meru from any other NBD value obtained within a servo series nor more than 5 meru from the average NBD value obtained during acceptance testing.

3.3.4.1.2 IA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate (ADIA) shall not deviate by more than 10 meru from any other ADIA value obtained within a servo series nor more than 10 meru from the average value obtained during the last series (C series) of acceptance testing.

3.3.4.1.3 SRA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate (ADSRA) shall not deviate by more than 5 meru from any other ADSRA value obtained within a servo series nor more than 10 meru from the average value obtained during acceptance testing.

3.3.5 Torque Command Angle (Scale Factor). The torque command angle (scale factor) shall be $\pi/2^{20}$ mrad/pulse ±1000 ppm.

4.1.1.3 Special Test Conditions

4.1.1.3.1 Internal Temperature. Unless otherwise specified, at all times during testing the internal temperature of the gyro shall be maintained at 135.0° ±0.5°F and stable to ±0.1°F as indicated by the padded thermistors.

4.1.1.3.2 Handling. The gyro shall be handled with the care due a precision instrument. The gyro may be positioned at will at any time the gyroscopic element is at rest. Once the motor is energized, the gyro shall be handled only in a support fixture which shall prevent application of input rates other than those required for testing.

4.1.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. The cognizant NASA representative shall specify the disposition of nonconforming units. All data taken prior to repadding or realignment shall be recorded.

4.1.2.1 Requalification. If required, repadding and/or realignment shall be accomplished in accordance with APOLLO G&N Drawing 2021500, as determined below:

a. If the unit fails to meet IA Alignment requirements specified in 3.3.2, the alignment shall be readjusted and retested to meet this requirement.

4.1.3 Test Sequence. The recommended test sequence is indicated in Table III.

Table III
RECOMMENDED TEST SEQUENCE

PARAGRAPH TITLE	PARAGRAPH NO.
Drawing Compliance	4.2.1
Continuity and Resistance	4.2.2
Thermistor Padding	4.2.3
IA Alignment	4.2.4
Transfer Function	4.2.5
*Differential Wheel Power	4.2.6
*Coefficient Servo Series	4.2.7

*Simultaneously

4.2 RECEIVING TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 2021500. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, contaminants, pin misalignment, and legibility and appearance of markings.

4.2.2 Continuity and Resistance. With the gyro temperature maintained at 135° +5°, -10°F, continuity and resistance shall be as specified in Table I when measured in accordance with Method 303 of Standard MIL-STD-202.

4.2.3 Thermistor Padding. The total padded thermistor circuit resistance shall be 769.6±6.0 ohms when measured at 135.0° ±0.1°F.

4.2.4 IA Alignment. With the following conditions existing, the inphase component of the SG voltage shall be less than 1.5 mv when the gyro is continuously rotated cw about the +SRA indicating alignment to 35° 0' ±1" from the mounting flange slots.

a. The top of the test block on the turntable level within 20 arc sec.
b. The unit mounted in the test fixture with the SRA vertical.
c. The gyro wheel excited.
d. The microsyns excited to 4.00±0.04V.

4.2.5 Transfer Function. With the following conditions established, a rotation of 0° 20' 00" about the IA shall produce a preamplifier output change of 1200±60 mv/mrad.

a. The gyro temperature at 135.0° ±0.1°F as indicated by the padded thermistors.
b. The gyro block heated to 120° ±0.5°F.
c. The microsyns excited to 4.00±0.04V.
d. The gyro wheel excited and demagnetized at least 1/2 hour prior to performing this test.
e. The output of the preamplifier loaded with a 10K ohm resistance.
f. The float rotation approximately equal about null.
g. The 0° 20' input about the IA accomplished in less than 15 sec.

4.2.6 Differential Wheel Power. The differential wheel power shall be monitored and recorded continuously while performing each Coefficient Servo test (4.2.7.1) specified in 4.2.7.

4.2.7 Coefficient Servo Series. A coefficient servo series test shall be performed. This shall consist of the following tests performed in the order specified: Coefficient Servo (4.2.7.1), Torque Command Angle Scale Factor (4.2.7.2), Coefficient Servo (4.2.7.1), Coefficient Servo (4.2.7.1), and Rundown Time (4.2.7.3).

4.2.7.1 Coefficient Servo. The gyro shall be subjected to this test from 1-1/2 to 2 hours after the wheel has reached synchronous speed with the gyro temperature, as indicated by the thermistors, at 135.0° ±0.5°F and stable to ±0.1°F. The requirements of 4.2.7.1.3 shall be met only after the third set of compensated normal excitation drift servos.

4.2.7.1.1 Compensated Normal Excitation Drift With the IA Vertical. With the ducosyn excitation at 4.00±0.04V and the IA vertically up within 1 mr, the gyro shall be servoed through a minimum of 12° but not more than 17°. The angular rate of travel for the last 10° shall be converted to meru by means of the following formula:

$$D_a = 1000 \left(\text{Sin lat angle} - \frac{239.3447}{\text{Avg time}/1^\circ \text{ in sec}}\right)$$

Where: D_a = The total compensated normal excitation inertial space drift with the IA up.

NOTE: Latitude at AC Electronics, Oak Creek, Wisconsin equals 42° 54' 0".

4.2.7.1.2 Compensated Normal Excitation Drift with the IA Horizontal

4.2.7.1.2.1 SRA UP. With the IA horizontal within 1 mr and within 5 mr of north and the spin reference axis (SRA) 5° toward the east away from the vertical and up, the gyro shall be

4.2.7.1.4.2 Compensated Normal Bias Drift Rate. The compensated normal bias drift rate (BD) shall be computed as follows:

$$BD = \frac{D_b + D_c}{2}$$

4.2.7.1.4.3 IA Acceleration-Sensitive Drift Rate. The acceleration sensitive drift rate due to lg of case acceleration along the +IA shall be computed as follows:

$$AD_{IA} = D_a - BD$$

4.2.7.1.4.4 SRA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate due to lg of case acceleration along the +SRA shall be computed as follows:

$$AD_{SRA} = \frac{D_b - D_c}{2}$$

4.2.7.1.4.5 Maximum Deviation

a. The standard deviation of the 1° increments in drift rate during any 10° or 5° servo run at compensated normal excitation shall not exceed 3 meru.

b. The deviation between any of the BD coefficients obtained during the coefficient servo series specified herein shall not exceed 5 meru, nor shall these coefficients vary by more than 5 meru from the average value obtained during acceptance testing.

c. The deviation between any of the AD_{SRA} coefficients obtained during the coefficient servo series specified herein shall not exceed 5 meru, nor shall these coefficients vary by more than 10 meru from the average value obtained during acceptance testing.

d. The deviation between any of the AD_{IA} coefficients obtained during the coefficient servo series specified herein shall not exceed 10 meru, nor shall the average of these coefficients vary by more than 10 meru from the average value obtained during the last series ("C" Series) of acceptance testing.

4.2.7.2 Torque Command Angle (Scale Factor). When tested in accordance with Specification PS2021500, under the test conditions listed in 4.2.7.2.1, torque command angle characteristics shall be as specified in 4.2.7.2.2.

4.2.7.2.1 Test Conditions. Test conditions shall be as follows:

a. The gyro oriented with the +IA vertically up.
b. The digital-analog-torquing electronics operating with 1° turntable rotation increments.
c. TM+ operation started.
d. The 3200-cycle pulses for each 10° increment of rotation recorded for a total of 100° of turntable rotation.
e. Conditions c and d (above) repeated for TM- operation.

4.2.7.2.2 Acceptance Criteria. The following criteria shall be met during the last 5 of the 10 printouts obtained:

a. The total spread in the TM+ counts and the TM- counts shall not exceed 29 counts.
b. The average of the TM+ counts obtained (excluding the first printout) shall be 57,954±58.
c. The average of the TM- counts obtained (excluding the first printout) shall be 58,557±58.

4.2.7.3 Rundown Time. The wheel rundown time shall be measured under the following conditions:

a. Measurement performed from 24,000 rpm to 6,000 rpm.

b. A 5.0±0.5 sec short from A+ to A- and from B+ to B- applied within 1 sec of removal of wheel power.

5. PREPARATION FOR DELIVERY

5.1 STORAGE. Unless otherwise specified, the following requirements shall be met at all times during storage:

a. The unit shall be positioned with the +OA up.
b. The ambient temperature shall be maintained at 70.0° ±10.0°F.

6. NOTES

6.1 DATA SUBMITTAL. Upon completion of the receiving and inspection tests, the test data will be immediately forwarded to:

Inertial Subsystem Development Division
M.S. #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts 02142

6.2 ABBREVIATIONS AND SYMBOLS

IRIG	Integrating Reference Inertial Gyro
GFP	Government Furnished Property
TG	Torque Generator
SG	Signal Generator
IA	Input Axis
BD	Compensated Normal Bias Drift Rate
SRA	Spin Reference Axis
CD	Microsyn Drift Rate
ID	Independent Drift Rate
OA	Output Axis

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APOLLO G&N Specification
PS2010604 REV– C
Original Issue Date: 28 SEPT 1965
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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

Declassified per Paragraph II B.6.e (3) of SCG-11, Rev 1,
dated 1 January 1966.

Signed RD Crisp Dept. 32-17, Date: 14 April '66

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
3/1/66	A	26774	5, 8 RDC/AC	WK	--
4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDC/AC		
4/20/66	C	28196	, 3, 4, 7 RDC/AC	WK	--

This specification consists of page 1 to 19 inclusive.

APPROVALS	NASA/MSC	MIT/IL	ACSP

NASA P07 65 512

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Appendix 3.1

1. SCOPE. This appendix establishes the requirement for one item of equipment from NASA inventory identified as PIP and Suspension Capacitor Module P/N 2001730 for the APOLLO G&N System.

2. APPLICABLE DOCUMENTS. G&N System specification PS2015000 establishes the need for the PIP as a required GFP item.

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

PS2010605	Procurement Specification, Product Configuration and Acceptance Test Requirements, 16 Pulsed Integrating Pendulum Accelerometer (U)
PS2010607	Procurement Specification. Product Configuration and Acceptance Test Requirements, 16 Pulsed Integrating Pendulum Accelerometer (U)
PS2015000	Performance/Design and Product Configuration Requirements, Airborne Guidance and Navigation Equipment--Block II for Apollo Command Module

STANDARDS

Military

MIL-STD-202C	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

Apollo G&N

2001730	PIP and Suspension Capacitor Module

PUBLICATIONS

National Aeronautics and Space Administration

ND1002024	Assembly and Test Manual, 16 Pulsed Integrating Pendulum (16 PIP)

2.2 CONFLICTING REQUIREMENTS. - In the event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

Appendix 3.1

a. The contract.
b. This specification.
c. Documents listed in this section.

3. REQUIREMENTS

3.1 DESCRIPTION. - The PIP is mounted on the stable member and shall measure acceleration inputs and generate velocity increment pulses to the APOLLO Guidance Computer.

3.2 CONFIGURATION. The configuration of the PIP shall be in accordance with APOLLO G&N Drawing 2001730 and all drawings and engineering data referenced thereon.

Appendix 3.1

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor receiving the inventory item shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions.

4.1.1.1 Environmental. Unless otherwise specified, the assembly shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C.
b. Relative Humidity: 90% max.
c. Barometric Pressure: 28 to 32 inches of Hg.

4.1.2 Nonconforming Units. Failure of the PIP to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Unless otherwise specified by the cognizant NASA representatives, nonconforming units shall be returned to NASA for disposition.

4.2 RECEIVING TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 2001730. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, connector pin misalignment, and legibility and appearance of markings which would be detrimental to system function or performance

4.2.2 Continuity and Resistance. With the PIP at 130° ±10°F verify that the continuity and resistance is in accordance with Table I when measured in accordance with Method 303 of Standard MIL-STD-202.

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

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Signed R D Gregory Dept. 32-17, Date: 14 April '66

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				MIT	NASA
3/1/66	A	26774	5, 8 RDG/AC	WK	--
4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDG/AC		
4/20/66	C	28196	, 3, 4, 7 RDG/AC	WK	--
4/22/66	D	28222	5, 8 RDG/AC	WK	--

This specification consists of page 1 to 19 inclusive.

APPROVALS	NASA/MSC	9/22/65	28 ... 65 MIT/IL	ACSP

NOT REQUIRED
NASA PP7-65-612

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Appendix 3.1

3.2.1 Continuity and DC Resistance. Continuity and dc resistance of the PIP shall be in accordance with Table I.

TABLE I

CONTINUITY AND DC RESISTANCE

PINS (J1)		RESISTANCE (Ohms)			CIRCUIT
From	To	Minimum	Nominal	Maximum	
1	14	508	520	532	Indicating Sensor
16	17	508	520	532	Sensor 2
11	12	252	314	376	Fixed Heater
6	7	32	40	48	Signal Hi to Lo
7	21	16	20	24	Signal Hi to CT
6	21	16	20	24	Signal Lo to CT
13	23	100	126	142	Control Heater
24	10	100	126	142	Emergency Heater
15	5	55	60	65	Body Heater
18	19	0	0	0	Suspension Relay Control

NOTE: Do not check continuity between the pins 2, 4, 8 and 22.

3.3 PERFORMANCE

3.3.1 Operational Requirements

3.3.1.1 PIP Temperature. The PIP operating temperature shall be maintained at 130° ±0.2°F.

3.3.1.2 Excitation. PIP excitation shall be 2V, rms ±1 percent at 3200±1 cps.

3.3.2 Performance Characteristics

3.3.2.1 Magnetic Suspension

a. The average phase of the suspension currents relative to the excitation shall be 45° ±3° lagging.
b. The suspension currents for the TG and SG suspensions shall each be 71±7 ma.
c. The suspension currents shall be equal within 3 ma.
d. There shall be no external connections between pin 8 and pin 10 of Suspension Module Assembly Drawing 108077 as shown on Drawing 2018639.
e. The SG quadrature shall be 0.0±0.1 mv with reference to the PIP SG output.
f. The leading edge of the clock pulse shall be aligned within ±2.5° of the AC Differential Amplifier G/S output peak.

4.2.3 Magnetic Suspension. With the 2V±1 percent, 3200±1 cps applied to the PIP suspension, verify that the following conditions exist:

a. Each suspension TG and SG current shall be 71±7 ma and the average suspension current phase relative to the reference excitation shall be 45° ±3° lagging.

b. The TG and SG suspension currents shall be equal within 3 ma.

c. Verify that there are no external connections between pin 8 and pin 10 of Suspension Module Assembly Drawing 108077 as shown on Drawing 2018639.

d. R6 shall be capable of reducing the SG quadrature to zero mv. (Reference Drawing 2018639)

e. The leading edge of the clock pulse alignment shall be within ±2.5° of peak of the AC Differential Amplifier G/S output.

4.2.4 Positional Repeatability (Average Angular Spread). With the following conditions established, the average angular spread shall be verified to meet the requirements of 3.3.2.2.

a. The torque motor winding shall be open and the PRA in a vertically down position.

b. The PIP shall be adjusted such that the SG output is greater than 5 but less than 10 mv rms. Record this value as the reference voltage.

c. The PIP shall be torqued in the $+\theta_{OA}$ direction until the PIP output is 20± 1 mv rms and a period of 2 hours allowed for the float to return to the referenced position of step b.

d. Record the magnitude and phase of the return voltage at the completion of step c.

e. Step c and d shall be repeated for the $-\theta_{OA}$ direction.

NOTE: Steps c through e constitute one pendulum set.

f. Repeat steps c through e to determine the second pendulum set.

g. Calculate the value of Average Angular Spread as follows:

(1) Average difference voltage

$$V_{0(ave)} = \frac{V_{01} + V_{02}}{2} \text{ mv}$$

where $V_{01} = V_{0+} - V_{0-}$ of data set A

$V_{02} = V_{0+} - V_{0-}$ of data set B

(2) Average Angular Spread

$$AAS = \frac{206 \left| V_{0\,(ave)} \right|}{S_{SG}} \text{ sec of arc}$$

where S_{SG} = Signal generator sensitivity in mv/mr from manufacturer's data sheet

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

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3/1/66	A	26774	5, 8 RDG/AC	WK	--
4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDG/AC		
4/20/66	C	28196	, 3, 4, 7 RDG/AC	WK	--
4/22/66	D	28222	5, 8 RDG/AC	WK	--
6/21/66	E	29772	5, 6, 8-19, now 21 pgs was 19 pgs.	MGM	---

This specification consists of page 1 to 21 inclusive.

APPROVALS	NASA/MSC	9/22/65 28 [illegible] 65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

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3.3.2.2 Position Repeatability. The pendulum position repeatability within the fluid shall meet the following requirements.

a. No hang-up. ✓

b. Four data Sets. The difference between the maximum and the minimum of each data set shall be less than or equal to two arc-minutes.

3.3.2.3 Phase. With the IA up, the SG output shall be 180° out of phase with respect to the reference excitation.

3.3.2.4 PIP Temperature Probes. The resistance of the probes shall be within ±1 ohm of the value specified on the manufacturer's data sheets when measured at a temperature of 130° ±0.3°F.

3.3.2.5 Position Memory. Each assembly shall be operated closed loop in the LEM configuration with a properly compensated d.c. amplifier output, and the Position Memory recorded. Only those assemblies having:

a. Position Memory less than 25 arc seconds may be assigned to LEM systems and shall be processed per PS2010607.

b. Position Memory less than 45 arc seconds may be used in C/M systems and shall be processed per PS2010603.

3.3.2.6 Suspension Hang-Up. With the PIP float at any axial and/or radial extreme, a stable suspension shall exist within the instruments.

3.3.2.7 AC Hysteresis Check. With the PIP normally suspended, the AC Hysteresis exhibited by the instrument shall be less than 90 arc-seconds.

n. Obtain a stable PRA up null and record.

p. Repeat step k and then steps i through n two additional times.

q. The three nulls obtained in steps c, f, j or n shall constitute a data set.

r. The difference between the maximum and the minimum of each data set shall be less than 2 arc-minutes.

4.2.5 Position Memory. Verify that the Position Memory of the assembly meets the requirements of paragraph 3.3.2.5. The position memory shall be determined in accordance with the following requirements:

a. Wait at IA up for 5 minutes.
b. With PRA up, obtain a stable 3:3 null. Record.
c. Rotate through IA up to PRA down, obtain a stable 3:3 null and record.
d. Calculate the bias angle (A_b) and the down angle (A_D) from the nulls obtained in Steps b and c.
e. Wait at IA down for 5 minutes.
f. With PRA up, obtain a stable 3:3 null. Record.
g. Rotate through IA down to PRA down.
h. Obtain a stable 3:3 null and record the angle.
i. Repeat step d.
j. The values of bias obtained in steps d and i shall agree within:
    1. 25 arc seconds for PIPs to be used in LEM systems.
    2. 45 arc seconds for PIPs to be used in C/M systems.

4.2.6 Phase. The SG output phasing shall be as follows:

a. With the IA up, the SG output shall be 180° out of phase with respect to the 2V±1 percent, 3200±1 cps reference excitation.

b. With the PRA down and current flowing between TM+ and T common, the SG output shall be out of phase with respect to the 2V±1 percent, 3200±1 cps reference excitation.

4.2.7 PIP Temperature Probes. Verify that the resistance of the probes is within ±1 ohm of the value specified on the manufacturer's data sheets when measured at a temperature of 130° ±0.3°F.

4.2.8 Suspension Hang-Up. With the PIP float at any axial and/or radial extreme, a stable suspension shall exist within the instrument. This shall be determined in accordance with the following requirements.

a. Suspend the unit using the test station capacitors set to $C_O = C_m - 0.0016\ \mu f$, where C_{SM} = nominal suspension module value for the unit.

b. Measure and record I_{SSG} and I_{STG}. If $I_{SSG} > I_{STG}$, perform Test I first. If $I_{STG} > I_{SSG}$, perform Test II first. Both tests have to be performed before the unit can meet the requirements of 3.3.2.6.

4.2.8.1 Test I. - Checkout of the SG End.

a. Set C_{SG} = Zero.

b. Monitor I_{STG} until a stable current is reached. (No change in current over an interval of at least two minutes.)

NOTE: Steps c through i are to be performed over an interval of no more than 25 minutes.

c. Set $C_{SG} = C_O$

d. Wait two minutes, then measure and record I_{STG}.

e. Set $C_1 = 0.0\ \mu f$

f. Monitor the SG X Axis radial signal until a stable value is reached.

g. While still monitoring the SG X Axis radial signal, set $C_1 = C_O$. Record the final signal value and the time required for the signal to reach its final value. The signal shall decay to a small value within three minutes.

h. Repeat steps e through g for each of the remaining SG capacitors (C_2, C_3 and C_4).

i. Measure and record I_{STG}.

4.2.8.2 Test II. Checkout of the TG End.

a. Set C_{TG} = zero

b. Monitor I_{SSG} until a stable current is reached.

NOTE: Steps c through i are to be performed over an interval of no more than 25 minutes.

c. Set $C_{TG} = C_O$

d. Wait two minutes, then measure and record I_{SSG}.

e. Set $C_5 = 0.0\ \mu f$

f. Monitor the TG X Axis radial signal until a stable value is reached.

g. While still monitoring the TG X Axis radial signal, set $C_5 = C_O$. Record the final signal value and the time required for the signal to reach its final value. The signal shall decay to a small value within three minutes.

h. Repeat steps c through g for each of the remaining T_G capacitors (C_6, C_7 and C_8).

i. Measure and record I_{SSG}.

4.2.9 AC Hysteresis Check. The AC Hysteresis shall be determined in accordance with the following conditions and shall meet the requirements of 3.3.2.7.

a. Suspend the PIP normally.

b. Place the IA up for one minute.

c. Rotate to IA down and wait for one minute.

d. Rotate to IA up and wait for five minutes.

e. Obtain a PRA up null. The null will drift for approximately five minutes. Record the final null.

f. Place the IA down for five minutes.

g. Repeat step e.

h. The difference in the final nulls obtained in step e shall be less than 90 arc-seconds.

5. PREPARATION FOR DELIVERY

5.1 STORAGE TEMPERATURE (NONOPERATING). During periods of storage or when the PIP is not operating, the temperature shall be maintained at 130° ±10°F.

6. NOTES

6.1 DATA SUBMITTAL. Upon completion of the receiving and inspection tests, the test data will be immediately forwarded to:

Inertial Subsystem Development Division
M.S. #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts 02142

6.2 ABBREVIATIONS AND SYMBOLS

PIP	Pulse Integrating Pendulum
θ_{OA}	Angle about output axis
TG	Torque Generator
IRA	Input Reference Axis
ORA	Output Reference Axis
PRA	Pendulum Reference Axis
GFP	Government Furnished Property
IA	Input Axis
SG	Signal Generator

~~DOWNGRADED AT 3 YEAR INTERVALS~~
~~DECLASSIFIED AFTER 12 YEARS~~

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APOLLO G&N Specification
PS2010604 REV- F
Original Issue Date: 28 SEPT 1965
Release Authority: TDRR 22785
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

Declassified per Paragraph II B.6.e (3) of SCG-11, Rev 1, dated 1 January 1966.

Signed RD Greggs Dept. 32-17, Date: 14 April '66

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
3/1/66	A	26774	5, 8 RDG/AC	WK	--
4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDG/AC		
4/20/66	C	28196	3, 4, 7 RDG/AC	WK	--
4/22/66	D	28222	5, 8 RDG/AC	WK	--
6/2/66	E	29772	5, 6,8-19, now 21 pgs was 19 pgs.	MGM	---
6/21/66	F	29771	3, 4, 7 RDG/AC	MGM	---

This specification consists of page 1 to 21 inclusive.

APPROVALS	NASA/MSC	9/22/65	28 Sep 65 MIT/IL	ACSP

NASA PP7-65-612

Appendix 3.1

1. SCOPE. This appendix establishes the requirement for one item of equipment from NASA inventory identified as PIP and Suspension Capacitor Module P/N **2001730 or 2018639 for the APOLLO G&N System.**

2. APPLICABLE DOCUMENTS. G&N System specification PS2015000 establishes the need for the PIP as a required GFP item.

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

PS2010603	Procurement Specification, Product Configuration and Acceptance Test Requirements, 16 Pulsed Integrating Pendulum Accelerometer (U)
PS2010607	Procurement Specification, Product Configuration and Acceptance Test Requirements, 16 Pulsed Integrating Pendulum Accelerometer (U)
PS2015000	Performance/Design and Product Configuration Requirements, Airborne Guidance and Navigation Equipment--Block II for Apollo Command Module

STANDARDS

Military

MIL-STD-202C	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

APOLLO G&N

2001730	**PIP and Suspension Capacitor Module**
2018639	**PIP and Suspension Capacitor Module**

PUBLICATIONS

National Aeronautics and Space Administration

ND1002024	Assembly and Test Manual, 16 Pulsed Integrating Pendulum (16 PIP)

2.2 CONFLICTING REQUIREMENTS. - In the event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract.
b. This specification.
c. Documents listed in this section.

3. REQUIREMENTS

3.1 DESCRIPTION. - The PIP is mounted on the stable member and shall measure acceleration inputs and generate velocity increment pulses to the APOLLO Guidance Computer.

3.2 CONFIGURATION. The configuration of the PIP shall be in accordance with APOLLO G&N Drawing 2001730 or 2018639 and all drawings and engineering data referenced thereon.

Appendix 3.1

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor receiving the inventory item shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions.

4.1.1.1 Environmental. Unless otherwise specified, the assembly shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C.
b. Relative Humidity: 90% max.
c. Barometric Pressure: 28 to 32 inches of Hg.

4.1.2 Nonconforming Units. Failure of the PIP to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Unless otherwise specified by the cognizant NASA representatives, nonconforming units shall be returned to NASA for disposition.

4.2 RECEIVING TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 2001730 or 2018639. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, connector pin misalignment, and legibility and appearance of markings which would be detrimental to system function or performance.

4.2.2 Continuity and Resistance. With the PIP at 130° ±10°F verify that the continuity and resistance is in accordance with Table I when measured in accordance with Method 303 of Standard MIL-STD-202.

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~~DOWNGRADED AT 3 YEAR INTERVALS~~
~~DECLASSIFIED AFTER 12 YEARS~~

~~"This document contains information affecting the National defense of the United States within the meaning of the Espionage Laws (Title 18, U.S.C., Sections 793 and 794). Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by Law."~~

APOLLO G&N Specification
PS2010604 REV— H
Original Issue Date: 28 SEPT 1965
Release Authority: TDRR 22785
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

APOLLO CM/LEM

G&N SYSTEM

REQUIREMENT ITEMS

Declassified per Paragraph II B.6.e (3) of SCG-11, Rev 1, dated 1 January 1966. [illegible]

Signed R.D. Geiger Dept. 32-17, Date: 14 April '66

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
Ⓜ 3/1/66	A	26774	5, 8 RDG/AC	WK	--
Ⓜ 4/5/66	B	27756	1, 11, 12, 13, 15, 16, 18, 19, 20	WK	TM
			Now 19 pages, was 20 pages. RDG/AC		
4/20/66	C	28196	[illegible], 3, 4, 7 RDG/AC	WK	--
Ⓜ 4/22/66	D	28222	5, 8 RDG/AC	WK	--
6/2/66	E	29772	5, 6, 8-19, now 21 pgs was 19 pgs.	MGM	---
Ⓜ 6/21/66	F	29771	2, [illegible], 7 RDG/AC	MGM	---
Ⓜ 10/13/66	G	31520	6, 9, 10, 11 RDG/AC	MGM EA	--
12/14/66	H	32352	11-21 was 21 pages, now	MGM EA	WLS
			23 pages RDG/AC		

This specification consists of page 1 to 23 inclusive.

APPROVALS	NASA/MSC	J. Stamy 9/22/65	W. Snyder 28 Sept 65 MIT/IL	J. Pozekaj	R. Lingg ACSP

NOT REQUIRED PER LETTER 9-7
NASA PP7-65-612

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4.2.8 Suspension Hang-Up. With the PIP float at any axial and/or radial extreme, a stable suspension shall exist within the instrument. This shall be determined in accordance with the following requirements.

a. Suspend the unit using the accompanying suspension module. The jumper cable used for monitoring the suspension radial signals and suspension currents must also be used.

b. Measure and record I_{SSG} and I_{STG}. If $I_{SSG} > I_{STG}$, perform Test I first. If $I_{STG} > I_{SSG}$, perform Test II first. Both tests have to be performed before the unit can meet the requirements of 3.3.2.6.

4.2.8.1 Test I. - Checkout of the SG End.

a. Short the following points on the test station patch panel to excitation lo on the patch panel: MS 3-2, MS 4-5, MS 7-6, and MS 8-1.

b. Monitor I_{STG} until a stable current is reached. (No change in current over an interval of at least two minutes.)

c. Remove shorting cables and check that the excitation voltage at the suspension module terminals is still at 2.0 volts rms. Readjust if necessary.

d. Replace shorting cables and insure that the TG current is still at an extreme (not changing over an interval of at least two minutes).

e. Remove shorting cables. Measure and record I_{STG} (initial).

NOTE: The current may appear to change rapidly for 10-20 seconds after the shorts are removed. Record the current value after it appears to settle.

f. Short MS 8-1 to excitation lo.

g. Monitor the SG X-Axis radial signal until a stable value is reached.

h. While still monitoring the SG X-Axis radial signal, remove the short between MS 8-1 and excitation lo. Record the time required for the signal to decay to 1.5 volts rms. The signal shall decay to 1.5 volts rms within two minutes.

i. Measure and record I_{STG} (final). I_{STG} (final) - I_{STG} (initial) must be less than 2.0 ma or the test must be repeated.

j. Repeat "d" thru "i" for each of the remaining junction points; MS 4-5, MS 6-7, and MS 3-2.

4.2.8.2 Test II. - Checkout of the TG End.

a. Short the following points on the test station patch panel to excitation lo on the patch panel: MT 3-2, MT 4-5, MT 7-6, and MT 8-1.

b. Monitor I_{SSG} until a stable current is reached. (No change in current over an interval of at least two minutes.)

c. Remove shorting cables and check that the excitation voltage at the suspension module terminals is still at 2.0 volts rms. Readjust if necessary.

d. Replace shorting cables and insure that the SG current is still at an extreme (not changing over an interval of at least two minutes).

e. Remove shorting cables. Measure and record I_{SSG} (initial)

NOTE: The current may appear to change rapidly for 10-20 seconds after the shorts are removed. Record the current value after it appears to settle.

f. Short MT 8-1 to excitation lo.

g. Monitor the TG X-Axis radial signal until a stable value is reached.

h. While still monitoring the TG X-Axis radial signal, remove the short between MT 8-1 and excitation lo. Record the time required for the signal to decay to 1.5 volts rms. The signal shall decay to 1.5 volts rms within two minutes.

i. Measure and record I_{SSG} (final). I_{SSG} (final) - I_{SSG} (initial) must be less than 2.0 ma or the test must be repeated.

j. Repeat "d" thru "i" for each of the remaining junction points; MT 4-5, MT 6-7, and MT 3-2.

5. PREPARATION FOR DELIVERY

5.1 STORAGE TEMPERATURE (NONOPERATING). During periods of storage or when the PIP is not operating, the temperature shall be maintained at 130° ±10°F.

6. NOTES

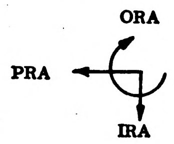
6.1 DATA SUBMITTAL. Upon completion of the receiving and inspection tests, the test data will be immediately forwarded to:

Inertial Subsystem Development Division
M.S. #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts 02142

6.2 ABBREVIATIONS AND SYMBOLS

PIP	Pulse Integrating Pendulum
θ_{OA}	Angle about output axis
TG	Torque Generator
IRA	Input Reference Axis
ORA	Output Reference Axis
PRA	Pendulum Reference Axis
GFP	Government Furnished Property
IA	Input Axis
SG	Signal Generator

6.3 AXIS ORIENTATION



View from SG End

Appendix 3.2

1. SCOPE. This appendix establishes the requirement for one item of equipment from NASA inventory identified as IRIG Prealigned Assembly, APOLLO II IRIG for the APOLLO G&N System.

2. APPLICABLE DOCUMENTS. G&N System Specification PS2015000 establishes the need for the 25 IRIG as a required GFP item.

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

PS2015000	Performance/Design and Product Configuration Requirements, Airborne Guidance and Navigation Equipment - Block II for APOLLO Command Module
PS2021500	Specification for Procurement of APOLLO II Inertial Reference Integrating Gyro

STANDARDS

Military

MIL-STD-202C	Test Methods for Electronic and Electrical Component Parts

DRAWINGS

APOLLO G&N

2021500	IRIG Prealigned Assembly, APOLLO II IRIG

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 DESCRIPTION. The IRIG is a single degree of freedom gyro used as a stabilization component in the APOLLO G&N System.

3.2 CONFIGURATION. The configuration of the IRIG shall be in accordance with APOLLO G&N Drawing 2021500 and all drawings and engineering data referenced thereon.

3.2.1 Continuity and Resistance. Continuity and resistance shall be as specified in Table I.

TABLE I

CONTINUITY AND DC RESISTANCE

CIRCUIT		FROM	TO	RESISTANCE (ohms)
SG Suspension	8-1	E9	E8	29.5 to 39.5
	3-2	E11	E8	29.5 to 39.5
	4-5	E12	E8	29.5 to 39.5
	7-6	E4	E8	29.5 to 39.5
TG Suspension	8-1	E3	E7	29.5 to 39.5
	3-2	E5	E7	29.5 to 39.5
	4-5	E10	E7	29.5 to 39.5
	7-6	E6	E7	29.5 to 39.5
Padded TG -		E19	E20	70 to 107
Padded TG +		E21	E20	70 to 107
TG Com		Z	E20	77 to 107
Motor Stator Phase A		P	B	57 to 77
B		R	J	57 to 77
SG Primary, Reset Coil and Padded Bias Coil in Parallel		Y	W	10.0 to 19.4
Heater		F	T	116 to 136
Aux Heater		L	N	116 to 136
Motor Stator Phase A		P	Gyro Case	100 megohms min
TG Com		Z	↑	↑
Thermistor		D		
Motor Stator Phase B		R		
Aux Heater		L		
Heater		F		
3200 CPS High		W	↓	
SG Secondary		E1	Gyro Case	
Motor Stator A-B		P	R	
Heater - Aux Heater		L	F	↓
3200 CPS High - SG Secondary		W	E1	100 megohms min

Appendix 3.2

3.3 PERFORMANCE

3.3.1 Thermistor Padding. The total padded thermistor circuit resistance shall be 769.6±6.0 ohms at 135.0° ±0.1°F with 2.00±0.04 ma excitation.

3.3.2 IA Alignment. The gyro IA shall be aligned to 35° 0' ±1' from the mounting flange slots.

3.3.3 Transfer Function. The average preamp output shall be 1200±60 mv/mrad into a 10K resistive load.

3.3.4 Coefficient Servo

3.3.4.1 Maximum Deviation. The standard deviation of the 1° increments in drift rate during any 10° or 5° servo run at compensated normal excitation shall not exceed 3 meru.

3.3.4.1.1 Compensated Normal Bias Drift Rate. The compensated normal bias drift rate (NBD) shall not deviate by more than 5 meru from any other NBD value obtained within a servo series nor more than 5 meru from the average NBD value obtained during acceptance testing.

3.3.4.1.2 IA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate (ADIA) shall not deviate by more than 10 meru from any other ADIA value obtained within a servo series nor more than 10 meru from the average value obtained during the last series (C series) of acceptance testing.

3.3.4.1.3 SRA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate (ADSRA) shall not deviate by more than 5 meru from any other ADSRA value obtained within a servo series nor more than 10 meru from the average value obtained during acceptance testing.

3.3.5 Torque Command Angle (Scale Factor). The torque command angle (scale factor) shall be $\pi/2^{20}$ mrad/pulse ±1000 ppm.

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor receiving the inventory item shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assembly shall be tested under the following ambient conditions:

- a. Temperature: 25° ±10°C
- b. Relative Humidity: 90% max
- c. Barometric Pressure: 28 to 32 inches of Hg

4.1.1.2 Test Power. The electrical inputs specified in Table II, as measured at the input of the item under test, are necessary for testing this item. All ac electrical inputs shall be supplied from a common frequency source, with all voltages, except wheel phase B, phase locked at 0° at the input of the power sources.

TABLE II

TEST POWER

PARAMETER		VALUE	SET POINT ACCURACY	STABILITY		ADJUSTMENT RANGE FOR TESTS
				Value	Time Period	
Gyro Motor	Voltage	28V	±1%	±0.1%	20 hr	0 to 33V
	Frequency	800 cps	±0.001%	±0.001%	20 hr	
	Phase (A leading B)					
	Power (total)	15W				
Suspension Excitation	Voltage	4.0V	±1%	±0.1%	20 hr	0 to 9.5V
	Frequency	3200 cps	±0.001%	±0.001%	20 hr	
	Current	100 ma max				
Microsyn Excitation	Voltage	4.0V	±1%	±0.1%	20 hr	0 to 9.5V
	Frequency	3200 cps	±0.001%	±0.001%	20 hr	
	Current	7.8 ma nom				
Reset Winding	Voltage	4.0V	±1%	±0.1%	20 hr	0 to 9.5V
	Frequency	3200 cps	±0.001%	±0.001%	20 hr	
	Current	50 ma max				
Bias Compensation Winding	Voltage	4.0V	±1%	±0.1%	20 hr	0 to 9.5V
	Frequency	3200 cps	±0.001%	±0.001%	20 hr	
	Current	50 ma max				

4.1.1.3 Special Test Conditions

4.1.1.3.1 Internal Temperature. Unless otherwise specified, at all times during testing the internal temperature of the gyro shall be maintained at 135.0° ±0.5°F and stable to ±0.1°F as indicated by the padded thermistors.

4.1.1.3.2 Handling. The gyro shall be handled with the care due a precision instrument. The gyro may be positioned at will at any time the gyroscopic element is at rest. Once the motor is energized, the gyro shall be handled only in a support fixture which shall prevent application of input rates other than those required for testing.

4.1.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. The cognizant NASA representative shall specify the disposition of nonconforming units. All data taken prior to repadding or realignment shall be recorded.

4.1.2.1 Requalification. If required, repadding and/or realignment shall be accomplished in accordance with APOLLO G&N Drawing 2021500, as determined below:

a. If the unit fails to meet IA Alignment requirements specified in 3.3.2, the alignment shall be readjusted and retested to meet this requirement.

4.1.3 Test Sequence. The recommended test sequence is indicated in Table III.

Table III
RECOMMENDED TEST SEQUENCE

PARAGRAPH TITLE	PARAGRAPH NO.
Drawing Compliance	4.2.1
Continuity and Resistance	4.2.2
Thermistor Padding	4.2.3
IA Alignment	4.2.4
Transfer Function	4.2.5
*Differential Wheel Power	4.2.6
*Coefficient Servo Series	4.2.7
*Simultaneously	

4.2 RECEIVING TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&N Drawing 2021500. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, contaminants, pin misalignment, and legibility and appearance of markings.

4.2.2 Continuity and Resistance. With the gyro temperature maintained at 135° +5°, -10°F, continuity and resistance shall be as specified in Table I when measured in accordance with Method 303 of Standard MIL-STD-202.

4.2.3 Thermistor Padding. The total padded thermistor circuit resistance shall be 769.6±6.0 ohms when measured at 135.0° ±0.1°F.

4.2.4 IA Alignment. With the following conditions existing, the inphase component of the SG voltage shall be less than 1.5 mv when the gyro is continuously rotated cw about the +SRA indicating alignment to 35° 0' ±1" from the mounting flange slots.

a. The top of the test block on the turntable level within 20 arc sec.
b. The unit mounted in the test fixture with the SRA vertical.
c. The gyro wheel excited.
d. The microsyns excited to 4.00±0.04V.

4.2.5 Transfer Function. With the following conditions established, a rotation of 0° 20' 00" about the IA shall produce a preamplifier output change of 1200±60 mv/mrad.

a. The gyro temperature at 135.0° ±0.1°F as indicated by the padded thermistors.
b. The gyro block heated to 120° ±0.5°F.
c. The microsyns excited to 4.00±0.04V.
d. The gyro wheel excited and demagnetized at least 1/2 hour prior to performing this test.
e. The output of the preamplifier loaded with a 10K ohm resistance.
f. The float rotation approximately equal about null.
g. The 0° 20' input about the IA accomplished in less than 15 sec.

4.2.6 Differential Wheel Power. The differential wheel power shall be monitored and recorded continuously while performing each Coefficient Servo test (4.2.7.1) specified in 4.2.7.

4.2.7 Coefficient Servo Series. A coefficient servo series test shall be performed. This shall consist of the following tests performed in the order specified: Coefficient Servo (4.2.7.1), Torque Command Angle Scale Factor (4.2.7.2), Coefficient Servo (4.2.7.1), Coefficient Servo (4.2.7.1), and Rundown Time (4.2.7.3).

4.2.7.1 Coefficient Servo. The gyro shall be subjected to this test from 1-1/2 to 2 hours after the wheel has reached synchronous speed with the gyro temperature, as indicated by the thermistors, at 135.0° ±0.5°F and stable to ±0.1°F. The requirements of 4.2.7.1.3 shall be met only after the third set of compensated normal excitation drift servos.

4.2.7.1.1 Compensated Normal Excitation Drift With the IA Vertical. With the ducosyn excitation at 4.00±0.04V and the IA vertically up within 1 mr, the gyro shall be servoed through a minimum of 12° but not more than 17°. The angular rate of travel for the last 10° shall be converted to meru by means of the following formula:

$$D_a = 1000 \left(\text{Sin. lat angle} - \frac{239.3447}{\text{Avg time}/1^\circ \text{ in sec}}\right)$$

Where: D_a = The total compensated normal excitation inertial space drift with the IA up.

NOTE: Latitude at AC Electronics, Oak Creek, Wisconsin equals 42° 54' 0".

4.2.7.1.2 Compensated Normal Excitation Drift with the IA Horizontal

4.2.7.1.2.1 SRA UP. With the IA horizontal within 1 mr and within 5 mr of north and the spin reference axis (SRA) 5° toward the east away from the vertical and up, the gyro shall be servoed for a minimum of 7°. The rate of travel for the last 5° interval shall be converted to meru by means of the following formula:

$$D_b = 1000 \left(\cos \text{lat angle} - \frac{239.3447}{\text{Avg time}/1^\circ \text{ in sec}} \right)$$

Where D_b = The total compensated normal excitation inertial space drift with the SRA up.

4.2.7.1.2.2 SRA Down. With the IA horizontally north and the SRA 5° toward the west away from the vertical and down, the gyro shall be servoed for a minimum of 7°. The rate of travel for the last 5° interval shall be converted to meru by means of the following formula:

$$D_c = 1000 \left(\cos \text{lat angle} - \frac{239.3447}{\text{Avg time}/1^\circ \text{ in sec}} \right)$$

Where D_c = Total compensated normal excitation inertial space drift with the SRA down

4.2.7.1.3 SRA Down Reduced Excitation Drift. With the IA horizontally north and the SRA 5° toward the west away from vertical and down, the ducosyn excitation of 2.00±0.02V, the gyro shall be servoed for a minimum of 7°. The rate of travel for the last 5° interval shall be converted to meru by means of the following formula:

$$D_d = 1000 \left(\cos \text{lat angle} - \frac{239.3447}{\text{Avg time}/1^\circ \text{ in sec}} \right)$$

Where D_d = The total compensated reduced excitation inertial space drift with the SRA down.

4.2.7.1.4 Acceptance Criteria

4.2.7.1.4.1 Microsyn Drift and Independent Drift

a. The microsyn drift rate (CD) shall be computed as follows:

$$CD = \frac{4}{3} (D_c - D_d)$$

b. The independent drift rate (ID) shall be computed as follows:

$$ID = BD - CD$$

Where: BD = Compensated normal bias drift rate.

4.2.7.1.4.2 Compensated Normal Bias Drift Rate. The compensated normal bias drift rate (BD) shall be computed as follows:

$$BD = \frac{D_b + D_c}{2}$$

4.2.7.1.4.3 IA Acceleration-Sensitive Drift Rate. The acceleration sensitive drift rate due to lg of case acceleration along the +IA shall be computed as follows:

$$AD_{IA} = D_a - BD$$

4.2.7.1.4.4 SRA Acceleration-Sensitive Drift Rate. The acceleration-sensitive drift rate due to lg of case acceleration along the +SRA shall be computed as follows:

$$AD_{SRA} = \frac{D_b - D_c}{2}$$

4.2.7.1.4.5 Maximum Deviation

a. The standard deviation of the 1° increments in drift rate during any 10° or 5° servo run at compensated normal excitation shall not exceed 3 meru.

b. The deviation between any of the BD coefficients obtained during the coefficient servo series specified herein shall not exceed 5 meru, nor shall these coefficients vary by more than 5 meru from the average value obtained during acceptance testing.

c. The deviation between any of the AD_{SRA} coefficients obtained during the coefficient servo series specified herein shall not exceed 5 meru, nor shall these coefficients vary by more than 10 meru from the average value obtained during acceptance testing.

d. The deviation between any of the AD_{IA} coefficients obtained during the coefficient servo series specified herein shall not exceed 10 meru, nor shall the average of these coefficients vary by more than 10 meru from the average value obtained during the last series ("C" Series) of acceptance testing.

4.2.7.2 Torque Command Angle (Scale Factor). When tested in accordance with Specification PS2021500, under the test conditions listed in 4.2.7.2.1, torque command angle characteristics shall be as specified in 4.2.7.2.2.

4.2.7.2.1 Test Conditions. Test conditions shall be as follows:

a. The gyro oriented with the +IA vertically up.
b. The digital-analog-torquing electronics operating with 1° turntable rotation increments.
c. TM+ operation started.
d. The 3200-cycle pulses for each 10° increment of rotation recorded for a total of 100° of turntable rotation.
e. Conditions c and d (above) repeated for TM- operation.

4.2.7.2.2 Acceptance Criteria. The following criteria shall be met during the last 5 of the 10 printouts obtained:

a. The total spread in the TM+ counts and the TM- counts shall not exceed 29 counts.
b. The average of the TM+ counts obtained (excluding the first printout) shall be 57,954±58.
c. The average of the TM- counts obtained (excluding the first printout) shall be 58,557±58.

4.2.7.3 Rundown Time. The wheel rundown time shall be measured under the following conditions:

a. Measurement performed from 24,000 rpm to 6,000 rpm.

b. A 5.0±0.5 sec short from A+ to A- and from B+ to B- applied within 1 sec of removal of wheel power.

5. PREPARATION FOR DELIVERY

5.1 STORAGE. Unless otherwise specified, the following requirements shall be met at all times during storage:

a. The unit shall be positioned with the +OA up.
b. The ambient temperature shall be maintained at 70.0° ±10.0°F.

6. NOTES

6.1 DATA SUBMITTAL. Upon completion of the receiving and inspection tests, the test data will be immediately forwarded to:

Inertial Subsystem Development Division
M.S. #63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts 02142

6.2 ABBREVIATIONS AND SYMBOLS

IRIG	Integrating Reference Inertial Gyro
GFP	Government Furnished Property
TG	Torque Generator
SG	Signal Generator
IA	Input Axis
BD	Compensated Normal Bias Drift Rate
SRA	Spin Reference Axis
CD	Microsyn Drift Rate
ID	Independent Drift Rate
OA	Output Axis

Appendix 3.2

4.2.10.3.1 Test Conditions. Test conditions shall be as follows:

a. The gyro oriented with the +IA vertically up

b. The digital-analog-torquing electronics operating with 1° turntable rotation increments

c. TM+ operation started

d. The 3200-cycle pulses for each 10° increment of rotation recorded for a total of 100° of turntable rotation.

e. Conditions c and d (above) repeated for TM- operation.

4.2.10.3.2 Acceptance Criteria. The following criteria shall be met during the last 5 of the 10 printouts obtained:

a. The total spread in the TM+ counts and the TM-counts shall not exceed 29 counts.
b. The average of the TM+ counts obtained (excluding the first printout) shall be 57,954±58.
c. The average of the TM- counts obtained (excluding the first printout) shall be 58,557±58.

4.2.10.4 Shorted Rundown Time. The shorted wheel rundown time (SRDT) shall be measured under the following conditions:

a. Measurement performed from 24,000 rpm to 6,000 rpm.

b. A 5.0±0.5 sec short from A+ to A- and from B+ to B- applied within 1 sec of removal of wheel power.

c. Continuous shorts from A+ to B+ and from A- to B- applied within 1 second of removal of wheel power and maintained for the entire rundown.

5. PREPARATION FOR DELIVERY

5.1 STORAGE. Unless otherwise specified, the following requirements shall be met at all times during storage:

a. The unit shall be positioned with the +OA up.
b. The ambient temperature shall be maintained at 70.0° ±10.0°F.

6. NOTES

6.1 DATA SUBMITTAL. Upon completion of the receiving and inspection tests, the test data will be immediately forwarded to:

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M.S. No. 63
Instrumentation Laboratory
75 Cambridge Parkway
Cambridge, Massachusetts 02142

APOLLO G&C Specification
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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B. 6. e(3) of SCG-11, Rev 1, dated 1 January 1966.

Signed RDGeiger Dept. 32-17, Date: 14 April 1966.

Record of Revisions

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2/8/66	A	26014	2, 3, 19, 21 RDG/AC	WK	----
(M) 2/8/66	B	26015	17 RDG/AC	WK	TM
4/5/66	C	27760	1, 3-5, 10, 20 RDG/AC	WK	TM

This specification consists of page 1 to 23 inclusive.

APPROVALS	NASA/MSC	J Sitomer 9/14/65	McKinley CCB 9-14-65 MIT/IL	ACSP

[illegible] PER LETTER
NASA PP7-65 612

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Operational Requirements. The conditions necessary for proper operation of the assembly shall be as follows:

3.1.1.1 PIP Temperature. The PIP operating temperature shall be maintained at 130° ±0.2°F.

3.1.1.2 Excitations

a. 2V rms ±1 percent at 3200±1 cps

b. 120 vdc ±2 percent

c. 28 vdc ±2 percent

d. Data pulses, switch pulses, and interrogator pulses shall meet the requirements of Table I and Figure 1 and shall be synchronized with respect to the 2V rms ±1 percent supply.

e. The leading edge of the interrogator pulse shall occur at the 135° ±2.5° point in the 3200 cps excitation voltage sine wave.

TABLE I

PULSE PARAMETERS

PULSE	AMPLITUDE (volts)	PRF (±1 pulse)	RISE TIME (max)	PULSE WIDTH (μsec)
Interrogator	6.0±1.0	3.2 kc	0.2 μsec	2.0±0.5
Switch	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5
Data	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5

3.1.2 Performance Characteristics

3.1.2.1 Null Coincidence. The 3:3 and 4:4 null difference angle for selecting the TG compensation resistors shall be less than 10 arc seconds. The 2:2 and 3:3 null difference angle for selecting the TG compensation resistors shall be less than 20 arc seconds.

3.1.2.2 Transient. The peak transient shall not exceed 0.80 cm/sec^2.

3.1.2.3 Position Memory. The position memory capability of the assembly shall demonstrate a bias deviation of less than 25 arc seconds between the two sets of nulls.

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0±0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 1.00 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

DEVIATION FROM SET

Symbol	Axis Aligned	Set	Recheck Following 12 Hr Oven Storage (At 130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_w	IRA About PRA	±15"	±12"	±14"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one 16 PIP and Suspension Module (see 3.2.2) and one of each of the following modules as specified on Drawing No. 6007000.

a. DC Differential Amplifier and PVR
b. Binary Current Switch
c. AC Differential Amplifier and Interrogator
d. PIPA Calibration Module

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2018639, is a GFP component of the assembly.

d. From the counts obtained at the ±1g orientation of the PIP input axis the scale factor shall be determined, using the formulas shown in Para. 6.4.

e. The PIPA scale factor shall be 1.00 cm/sec/pulse ±400 ppm. New values of scale factor resistors R11 and R12 shall be selected until this scale factor is obtained.

3.2.3.1.4 PIP Axis Alignments

3.2.3.1.4.1 IRA About ORA

a. The assembly shall be operating in a closed loop mode.

b. The bias angle (A_b) and the down angle (A_D) shall be calculated after obtaining a stable PRA down null, PRA up null, and an additional PRA down null which shall repeat within 5 arc sec of the first PRA down null.

c. Position the dividing head to the angle ($A_{VERT-REF} + A_b$).

d. Use a torque wrench to loosen the outer alignment screws.

e. Insert the rotary adjustment tool in the top flange notches of the PIP case.

f. Use the lever arm of the rotary adjustment tool to rotate the PIP until the SG closed loop pattern is approximately at null.

g. Tighten the outer alignment screws to 3 in-lb.

3.2.3.1.4.2 IRA About PRA

a. Calculate the bias angle (A_b) and the down angle (A_D) by obtaining a stable PRA down null, PRA up null and another PRA down null, which must repeat within 5 arc sec of the first null.

b. With the PRA down, at null, tilt the dividing head about the trunnion axis until the PIP ORA is vertical.

c. Rotate the dividing head about the rotary axis to the angle A_D -90°.

d. Place a pendulous mirror in front of the trunnion axis autocollimator and take a pendulous mirror reading. Record as θ pend -1.

d. Energize the PIPA loop.

e. Obtain a stable PRA up null. Record.

f. Remove the power to the PIPA loop.

g. Set the loop-reversal switch at "REVERSED".

h. Energize the PIPA loop.

i. Obtain a stable PRA up null. Record.

j. Alternately repeat steps 4.2.3.6.b thru i until the calculated electronics bias is repeatable to within 5 arc seconds. (The electronics bias equals 1/2 of the difference between the PRA up nulls obtained in the normal and reversed condition).

k. Adjust R5 until the electronics bias is less than or equal to 10 arc seconds. (Reference Drawing 2007103).

4.2.3.7 Scale Factor Adjustment. Scale factor adjustment shall be adjusted in accordance with the method specified in 3.2.3.1.3 and shall meet the requirements of 3.1.2.5.

4.2.3.8 Bias Adjustment. Bias adjustment shall be adjusted in accordance with the method specified in 3.2.3.1.2 and shall meet the requirements of 3.1.2.4.

4.2.3.9 Scale Factor and Bias. Scale factor and bias shall be measured to determine that the requirements of 3.1.2.4 and 3.1.2.5 have been met. To assure that the correct PIPA bias is measured the bias angle (A_b) and the down angle (A_D) shall be calculated after obtaining a stable PRA down null, PRA up null, and an additional PRA down null which shall repeat within 5 arc sec of the first PRA down null.

4.2.3.10 Stability. The stability shall be determined in accordance with the following requirements for a 4-hour run:

a. From PRA up and PRA down null angles caclulate the bias angle (A_b) and the down angle (A_D). Set the bias to be less than 0.05 cm/sec^2 by adjustment of R7. At least two sets of nulls which are coincident within 5 arc seconds must be obtained.

b. Determine the PIP scale factor from the ratio of "P" pulses to clock pulses in the IA up and IA down orientations. The duration of the count shall be 250,000 "P" pulses. Adjust R10 (Reference Drawing 2007105) to set the scale factor to within ±50 ppm of the nominal value. Scale Factor may be computed only when the printout of the LEM Count Repeatability is within 10 counts.

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B.6.e(3) of SCG-11, Rev 1, dated 1 January 1966.

Signed RD Geiger Dept. 32-17, Date: 14 April 1966.

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2/8/66	B	26015	17 RDG/AC	WK	TM
4/5/66	C	27760	1, 3-5, 10, 20 RDG/AC	WK	TM
4/20/66	D	28180	, 2, 5 RDG/AC	WK	--

This specification consists of page 1 to 23 inclusive.

APPROVALS	NASA/MSC	J Sitomer 9/14/65 McNulty CCB 9/14/65 MIT/IL	ACSP

NOT REQUIRED PER
NASA PP7-65-612

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the LEM 16 Pulsed Integrating Pendulum Accelerometer (PIPA) Assembly, hereafter called the assembly.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&C

ND1002004	Process Specification, Epoxy Bonding of Metallic and Nonmetallic Materials

DRAWINGS

National Aeronautics and Space Administration

R101837	PIPA Test Console Bay Front Pictorial

APOLLO G&C

2007103	Binary Current Switch
2001730	Pulsed Integrating Pendulum and Suspension Module
2021529	Bonding Agent
6007000	Pulse Torque Assembly
6007105	PIPA Calibration Assembly, LEM

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In the event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIL/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0 ± 0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 1.00 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

DEVIATION FROM SET

Symbol	Axis Aligned	Set	Recheck Following 12 Hr Oven Storage (At 130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_w	IRA About PRA	±15"	±12"	±14"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one 16 PIP and Suspension Module (see 3.2.2) and one of each of the following modules as specified on Drawing No. 6007000.

a. DC Differential Amplifier and PVR
b. Binary Current Switch
c. AC Differential Amplifier and Interrogator
d. PIPA Calibration Module

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2001730, is a GFP component of the assembly.

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4/5/66	C	27760	1,3-5,10,20 RDG/AC	WK	TM
4/20/66	D	28180	2, 5 RDG/AC	WK	--
6/21/66	E	29771	2, 5 RDG/BC	MGM	--

This specification consists of page 1 to 23 inclusive.

APPROVALS	NASA/MSC	J Sitomer 9/14/65 MIT/IL	ACSP

3.1.2.4 Bias. The assembly acceleration bias shall be capable of being adjusted to 0±0.05 cm/sec^2.

3.1.2.5 Scale Factor. The assembly scale factor shall be capable of being adjusted to 1.00 cm/sec/pulse ±50 ppm. Scale factor voltage, scale factor current, and PVR voltage shall be measured and recorded with the PIP at +1g at the time this adjustment is performed.

3.1.2.6 Alignment. The assembly alignment requirements shall be as follows:

DEVIATION FROM SET

Symbol	Axis Aligned	Set	Recheck Following 12 Hr Oven Storage (At 130° ±2°F)	Recheck Following Bonding of Alignment Screws
θ_R	IRA About ORA	±8"	±10"	±12"
θ_W	IRA About PRA	±15"	±12"	±14"

3.1.2.7 Stability. The assembly stability requirements shall comply with the following:

a. The maximum scale factor deviation shall be ±100 ppm from the initially adjusted value.

b. The maximum acceleration bias deviation shall be ±0.20 cm/sec^2 from the initially adjusted value.

3.1.2.8 Binary Current Switch Bias Contribution. The binary current switch contribution to PIPA bias shall be less than or equal to 10 arc seconds.

3.2 PRODUCT CONFIGURATION

3.2.1 Components. The assembly consists of one 16 PIP and Suspension Module (see 3.2.2) and one of each of the following modules as specified on Drawing No. 6007000.

a. DC Differential Amplifier and PVR
b. Binary Current Switch
c. AC Differential Amplifier and Interrogator
d. PIPA Calibration Module

3.2.2 Government-Furnished Property (GFP). One 16 PIP and Suspension Module, Part Number 2001730, or 2018639, is a GFP component of the assembly.

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PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

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(M) 4/20/66	D	28180	2, 5 RDG/AC	WK	--
(M) 6/21/66	E	29771	2, 5 RDG/AC	MGM	--
10/14/66	F	31559	3, 5, 9-23 Was 23 pages, now	MGM EA	WLS
			20 pages. RDG/AC		

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NASA PP7-65-612

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Operational Requirements. The conditions necessary for proper operation of the assembly shall be as follows:

3.1.1.1 PIP Temperature. The PIP operating temperature shall be maintained at 130° ±0.2°F.

3.1.1.2 Excitations

a. 2V rms ±1 percent at 3200±1 cps

b. 120 vdc ±2 percent

c. 28 vdc ±2 percent

d. Data pulses, switch pulses, and interrogator pulses shall meet the requirements of Table I and Figure 1 and shall be synchronized with respect to the 2V rms ±1 percent supply.

e. The leading edge of the interrogator pulse shall occur at the 135° ±2.5° point in the 3200 cps excitation voltage sine wave.

TABLE I

PULSE PARAMETERS

PULSE	AMPLITUDE (volts)	PRF (±1 pulse)	RISE TIME (max)	PULSE WIDTH (μsec)
Interrogator	6.0±1.0	3.2 kc	0.2 μsec	2.0±0.5
Switch	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5
Data	6.0±1.0	3.2 kc	0.2 μsec	3.0±0.5

3.1.2 Performance Characteristics

3.1.2.1 Null Coincidence. The 3:3 and 4:4 null difference angle for selecting the TG compensation resistors shall be less than 10 arc seconds. The 2:2 and 3:3 null difference angle for selecting the TG compensation resistors shall be less than 20 arc seconds.

3.1.2.2 Transient. The peak transient shall not exceed 0.18 cm/sec^2.

3.1.2.3 Position Memory. The position memory capability of the assembly shall demonstrate a bias deviation of less than 25 arc seconds between the two sets of nulls.

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Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
2/8/66	A	26014	2,3,19,21 RDG/AC	WK	----
2/8/66	B	26015	17 RDG/AC	WK	TM
4/5/66	C	27760	1,3-5,10,20 RDG/AC	WK	TM
4/20/66	D	28180	2, 5 RDG/AC	WK	--
6/21/66	E	29771	2, 5 RDG/AC	MGM	--
10/14/66	F	31559	3,5, 9-23 Was 23 pages, now	MGM EA	WLS
			20 pages. RDG/AC		
11/4/66	G	31841	12 RDG/AC	EA	--

This specification consists of page 1 to 20 inclusive.

APPROVALS	NASA/MSC	J Sitomer 9/14/65 MIT/IL	ACSP

NASA PP7-65-612

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C
b. Relative Humidity: 60% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.1.1.2 Special Condition - PIP Degaussing. After external signals have been applied to the TG, the PIP shall be degaussed at a current-time rate defined in Figure 4. The TM+ winding shall be degaussed first, followed by the TM-winding. The degaussing shall be repeated three times. PIP degaussing shall be performed as the first procedure in the test sequence. Scale factor and bias data shall not be taken after degaussing until the PIP has been operating closed-loop for 1/2 hour.

4.1.1.3 Test Console. All tests shall be conducted on a four-bay 16 PIPA Test Console. (Reference NASA Drawing R101837) and Phase Angle Voltmeter for alternate method in measuring suspension phasing. For the acceptance tests listed in 4.2.3, all modules including the calibration module shall be located on the heatsink in the electronics drawer.

4.1.2 Nonconforming Units. Failure of the assembly to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming assembly corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant NASA representative, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.1.3 Test Sequence. The required acceptance test sequence shall be as shown in Figure 5.

4.2 TESTS AND VERIFICATIONS

4.2.1 Drawing Compliance. The assembly components shall have been visually examined for compliance to the requirements of their applicable drawings. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, connector pin misalignment, and legibility and appearance of markings which would be detrimental to system function or performance.

APOLLO G&C Specification
PS2010607 REV H
Original Issue Date: 9-14-65
Release Authority: TDRR 22496
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

16 PULSED INTEGRATING PENDULUM ACCELEROMETER (U)

Declassified per Paragraph II B.6.e(3) of SCG-11, Rev I, dated 1 January 1966.
Signed RD Geiger Dept. 32-17, Date: 14 April 1966.

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised		Approvals AC	Approvals NASA
2/8/66	A	26014	2,3,19,21	RDG/AC	WK	----
2/8/66	B	26015	17	RDG/AC	WK	TM
4/5/66	C	27760	1,3-5,10,20	RDG/AC	WK	TM
4/20/66	D	28180	2, 5	RDG/AC	WK	--
6/21/66	E	29771	2, 5	RDG/AC	MGM	--
10/14/66	F	31559	3,5, 9-23 Was 23 pages, now		MGM EA	WLS
			20 pages.	RDG/AC		
11/4/66	G	31841	12	RDG/AC	EA	--
12/28/66	H	32476	14	RDG/AC	JP MGM	--

This specification consists of page 1 to 20 inclusive.

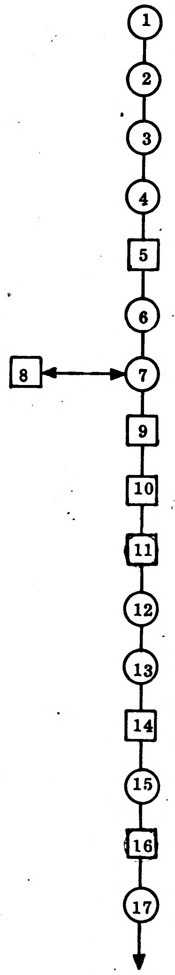
APPROVALS	NASA/MSC	J Sitomer 9/14/65	McKinley CCB 9/14/65 MIT/IL	ACSP

NOT REQUIRED PER LETTER
NASA PP7-65-612

Key:

○ = Acceptance Test

□ = Process or Adjustment Operation



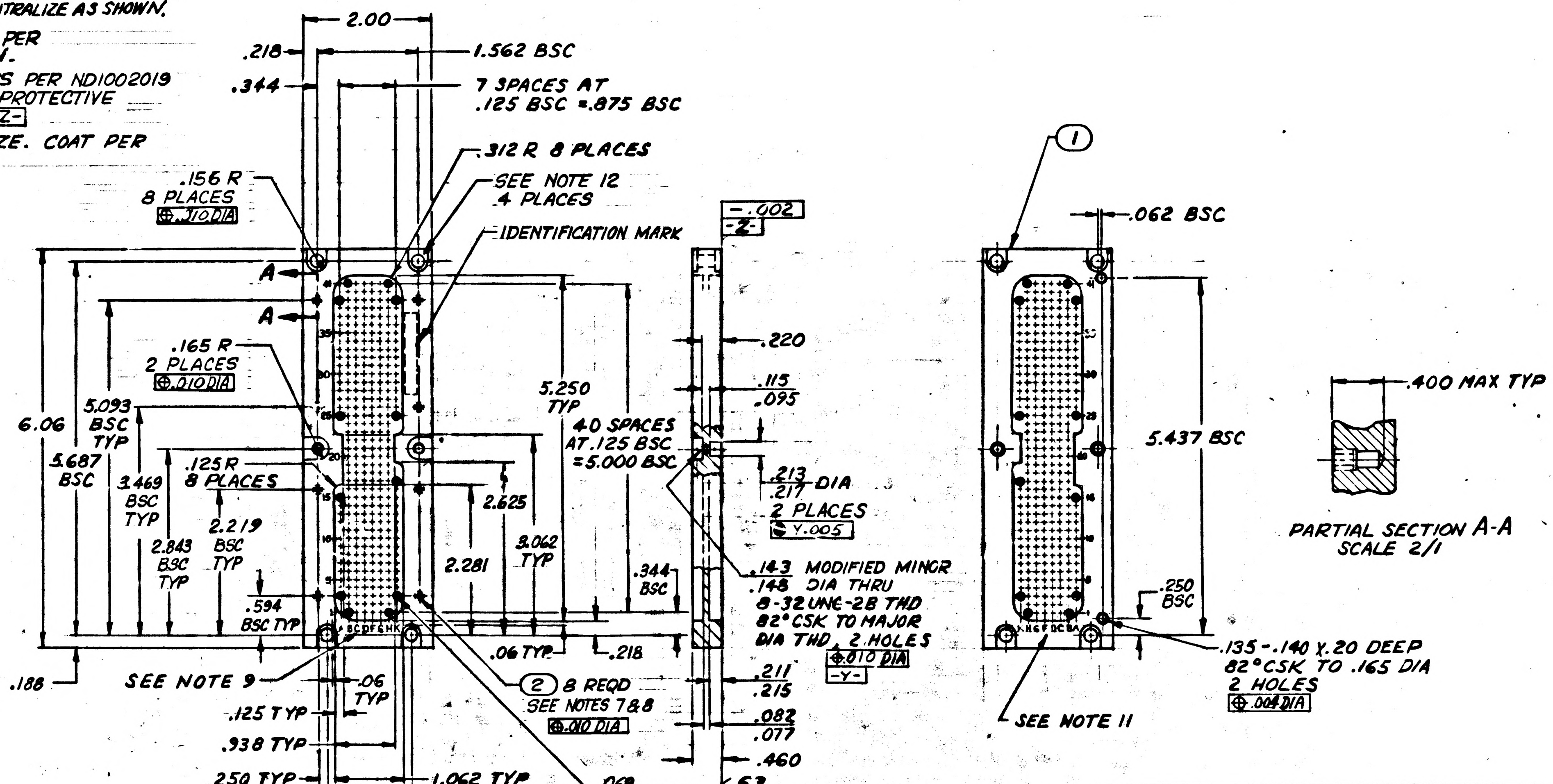
1. Transient Test
2. Position Memory Test
3. Null Coincidence Test
4. PIP Axis Alignment Test
5. Oven Storage
6. Recheck the PIP Axis Alignments to insure that the first deviation requirement is met (reference paragraph 3.1.2.6).
7. Binary Current Switch Bias Adjustment Test
8. Binary Current Switch Bias Adjustment (if required) (repeat test if required)
9. Scale Factor Adjustment (reference paragraph 3.1.2.5)
10. Bias Adjustment (reference paragraph 3.1.2.4)
11. PIP Degaussing
12. Scale Factor and Bias Tests
13. Stability Test
14. Bond Alignment Screws
15. Recheck the PIP Axis Alignments to insure that the second deviation requirement is met (reference paragraph 3.1.2.6).
16. PIP Degaussing
17. Determine the Scale Factor and Bias. (The specification limits of 3.1.2.4 and 3.1.2.5 are not applicable to this test.)

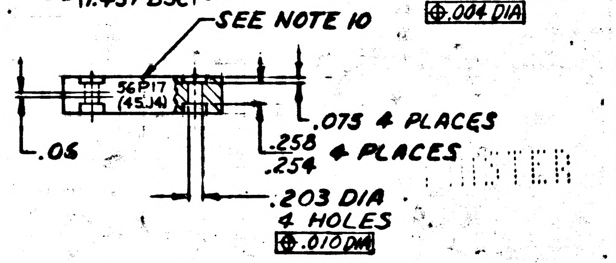
REQUIRED ACCEPTANCE TEST SEQUENCE

FIGURE 5

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


2.00
.218
1.562 BSC
.344
7 SPACES AT .125 BSC =.875 BSC
.312 R 8 PLACES
SEE NOTE 12 4 PLACES
IDENTIFICATION MARK
.156 R 8 PLACES ⊕.010 DIA
A
A
.165 R 2 PLACES ⊕.010 DIA
6.06
5.093 BSC TYP
5.687 BSC
3.469 BSC TYP
.125 R 8 PLACES
2.843 BSC TYP
2.219 BSC TYP
.594 BSC TYP
5.250 TYP
40 SPACES AT .125 BSC =5.000 BSC
2.625
2.281
3.062 TYP
.188
SEE NOTE 9
.06 TYP
.125 TYP
.938 TYP
.250 TYP
1.062 TYP
.125 BSC
1.437 BSC
.06 TYP
.218
② 8 REQD SEE NOTES 7&8 ⊕.010 DIA
.069 .070 THRU 82° CSK TO .072-.082 DIA BOTH SIDES 304 HOLES ⊕.004 DIA
-.002 -Z-
.220
.115 .095
.213 .217 DIA 2 PLACES ⌖Y.005
.344 BSC
.143 .148 MODIFIED MINOR DIA THRU 8-32 UNC-2B THD 82° CSK TO MAJOR DIA THD 2 HOLES ⊕.010 DIA -Y-
.211 .215
.082 .077
.460
63
①
.062 BSC
5.437 BSC
.250 BSC
.135-.140 X .20 DEEP 82° CSK TO .165 DIA 2 HOLES ⊕.004 DIA
SEE NOTE 11
.400 MAX TYP
PARTIAL SECTION A-A SCALE 2/1


SEE NOTE 10
56P17 (45.14)
.06
.073 4 PLACES
.258 .254 4 PLACES
.203 DIA 4 HOLES ⊕.010 DIA

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010650-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014744	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.005 ±.02
ANGLES +2° −
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN 9 SEP 65
CHECKED 17 SEP 65
APPROVAL D. Boty 24 SEP 65
APPROVAL LTB
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P17)
(INSEPARABLE ASSEMBLY)

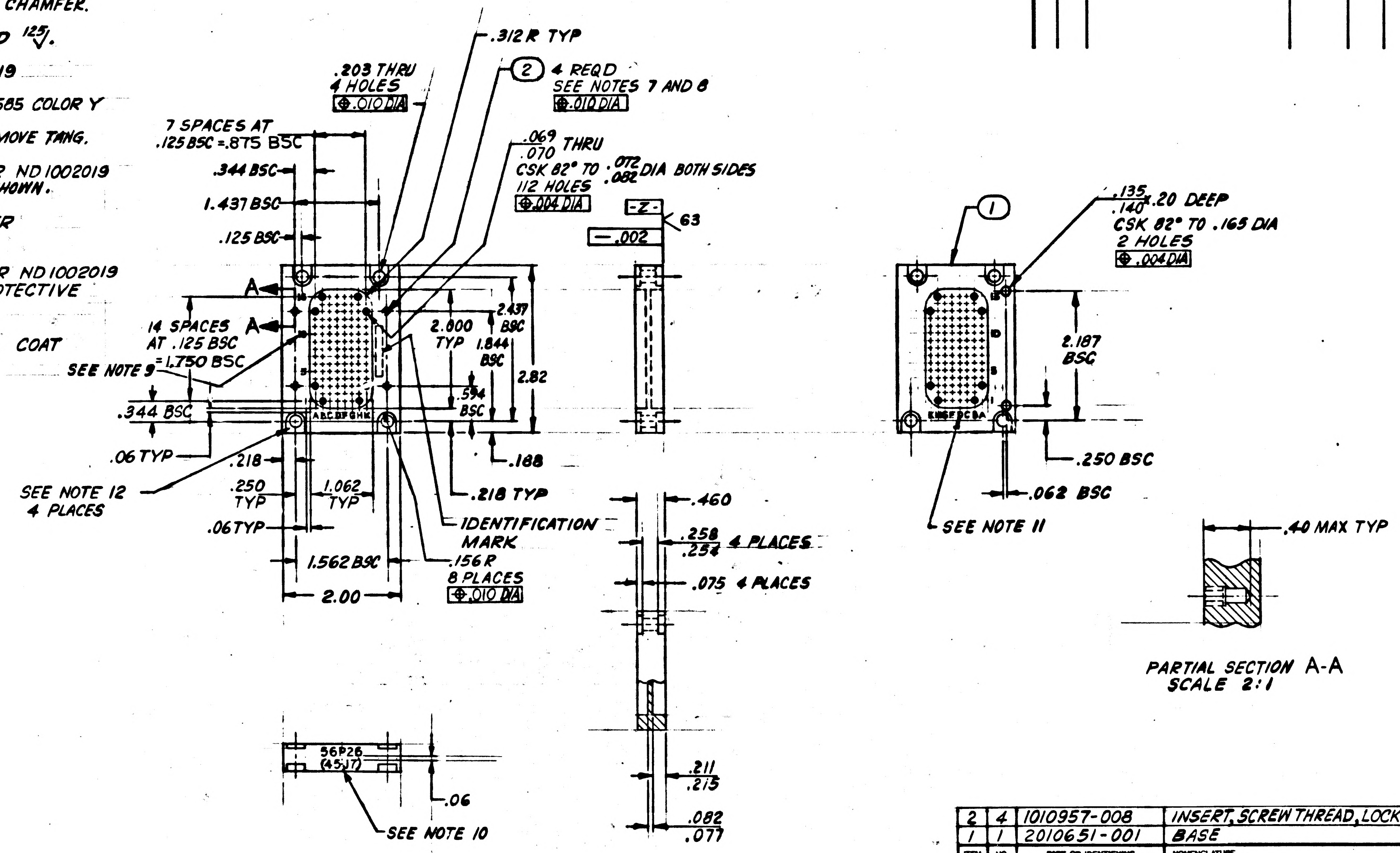
CODE IDENT NO. 80230
SIZE D
2010650
SCALE 1/1
SHEET 1 OF 1

3 B. Erickson 16 SEP 65

2010651 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   - A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   - B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND 1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.


.312 R TYP
.203 THRU
4 HOLES
⊕ .010 DIA
② 4 REQD
SEE NOTES 7 AND 8
⊕ .010 DIA
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.069/.070 THRU
CSK 82° TO .072/.082 DIA BOTH SIDES
112 HOLES
⊕ .004 DIA
-Z-
63
— .002
A
A
14 SPACES AT .125 BSC = 1.750 BSC
SEE NOTE 9
2.000 TYP
2.437 BSC
1.844 BSC
2.82
.594 BSC
.344 BSC
.06 TYP
.218
.188
SEE NOTE 12
4 PLACES
.250 TYP
1.062 TYP
.218 TYP
.06 TYP
IDENTIFICATION MARK
.156 R
8 PLACES
⊕ .010 DIA
1.562 BSC
2.00
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P26 (45J7)
.06
SEE NOTE 10
①
.135/.140 × .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
2.187 BSC
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP

PARTIAL SECTION A-A
SCALE 2:1

2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010651-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN Hatchler 7 SEP 65
CHECKED M. Manning 17 SEP 65
APPROVAL D. Barta 24 SEP 65
APPROVAL G. Sule LTB
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 MAR 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P26)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010651
SCALE FULL
SHEET 1 OF 1

H Enstrom 16 SEP 65

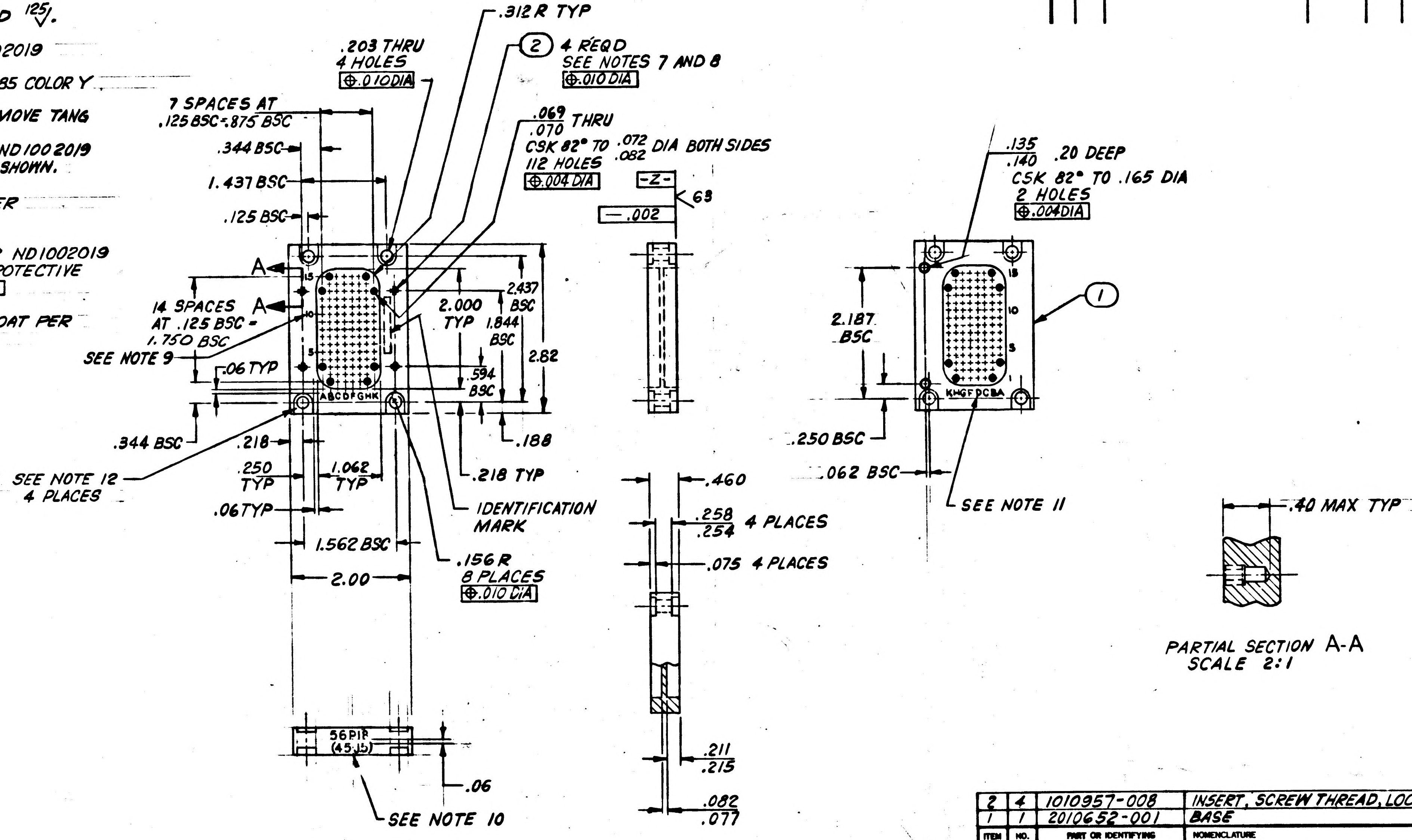
P26

MASTER

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


.312 R TYP
.203 THRU
4 HOLES
⊕.010 DIA
② 4 REQD
SEE NOTES 7 AND 8
⊕.010 DIA
7 SPACES AT
.125 BSC=.875 BSC
.344 BSC
1.437 BSC
.125 BSC
.069/.070 THRU
CSK 82° TO .072/.082 DIA BOTH SIDES
112 HOLES
⊕.004 DIA
-Z-
63
— .002
A
A
14 SPACES
AT .125 BSC =
1.750 BSC
SEE NOTE 9
.06 TYP
2.000
TYP
2.437
BSC
1.844
BSC
2.82
.594
BSC
15
10
5
ABCDFGHK
.344 BSC
.218
.188
.250
TYP
1.062
TYP
.218 TYP
SEE NOTE 12
4 PLACES
.06 TYP
IDENTIFICATION
MARK
1.562 BSC
2.00
.156 R
8 PLACES
⊕.010 DIA
56P18
(45J5)
.06
SEE NOTE 10
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
.135/.140 .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕.004 DIA
2.187
BSC
15
10
5
1
KHGFDCBA
①
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
PARTIAL SECTION A-A
SCALE 2:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010652-001	BASE

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2014742	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

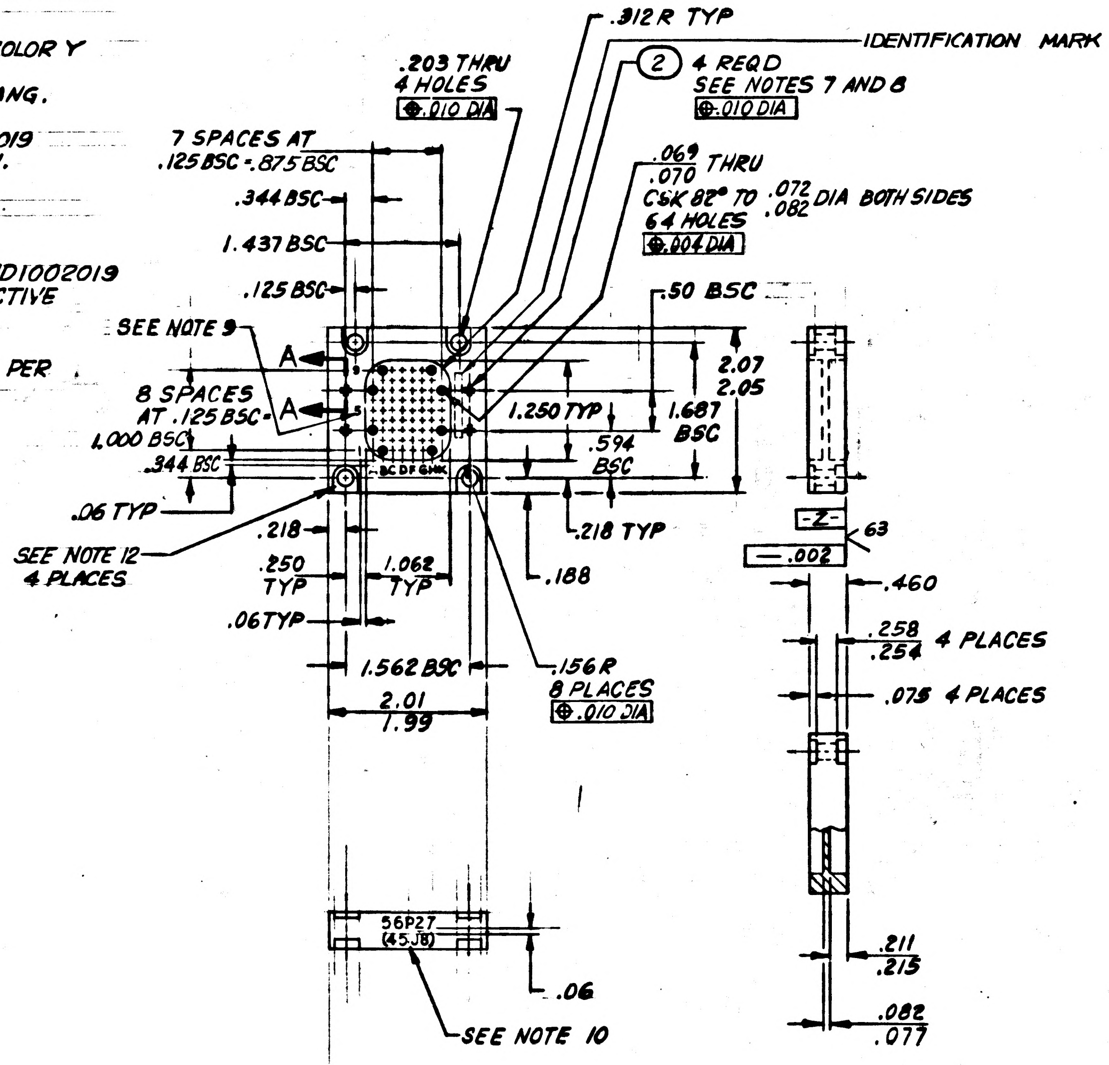
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN Hotchkiss DATE 8 SEP 65
CHECKED M. Mummey 17 SEP 65
APPROVAL D. Butz 24 SEP 65
APPROVAL [illegible] WTB
NASA APPROVAL A. C. METZGER
MIT APPROVAL [illegible] 23 Sep 65
3 G. Erickson 16 SEP 65

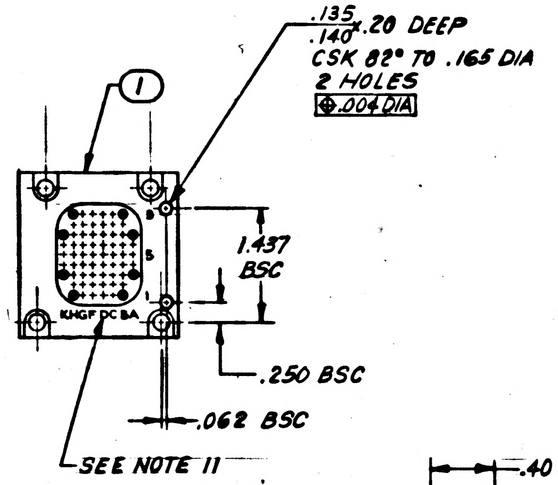
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

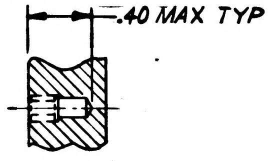
BASE, ELECTRICAL CONNECTOR-
PSA (56P18)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010652
SCALE FULL
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\surd}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


.312 R TYP
IDENTIFICATION MARK
.203 THRU
4 HOLES
⊕ .010 DIA
② 4 REQD
SEE NOTES 7 AND 8
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.069/.070 THRU
CSK 82° TO .072/.082 DIA BOTH SIDES
64 HOLES
⊕ .004 DIA
.344 BSC
1.437 BSC
.125 BSC
.50 BSC
SEE NOTE 9
A
A
8 SPACES
AT .125 BSC
1.000 BSC
.344 BSC
1.250 TYP
2.07/2.05
1.687 BSC
.594 BSC
BCDFGHK
.06 TYP
SEE NOTE 12
4 PLACES
.218
.250 TYP
1.062 TYP
.06 TYP
.218 TYP
.188
1.562 BSC
2.01/1.99
.156 R
8 PLACES
⊕ .010 DIA
-Z-
63
— .002
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P27
(45JB)
.06
SEE NOTE 10


①
.135/.140 x .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
1.437 BSC
KHGF DC BA
.250 BSC
.062 BSC
SEE NOTE 11



PARTIAL SECTION A-A
SCALE 2:1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010653-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014748	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Hetchler 3 SEP 65
CHECKED M. Manning 17 SEP 65
APPROVAL D. Beaty 24 SEP 65
APPROVAL G. [illegible]
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P27)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010653
SCALE FULL
SHEET 1 OF 1

H. Erickson 16 SEP 65

MASTER

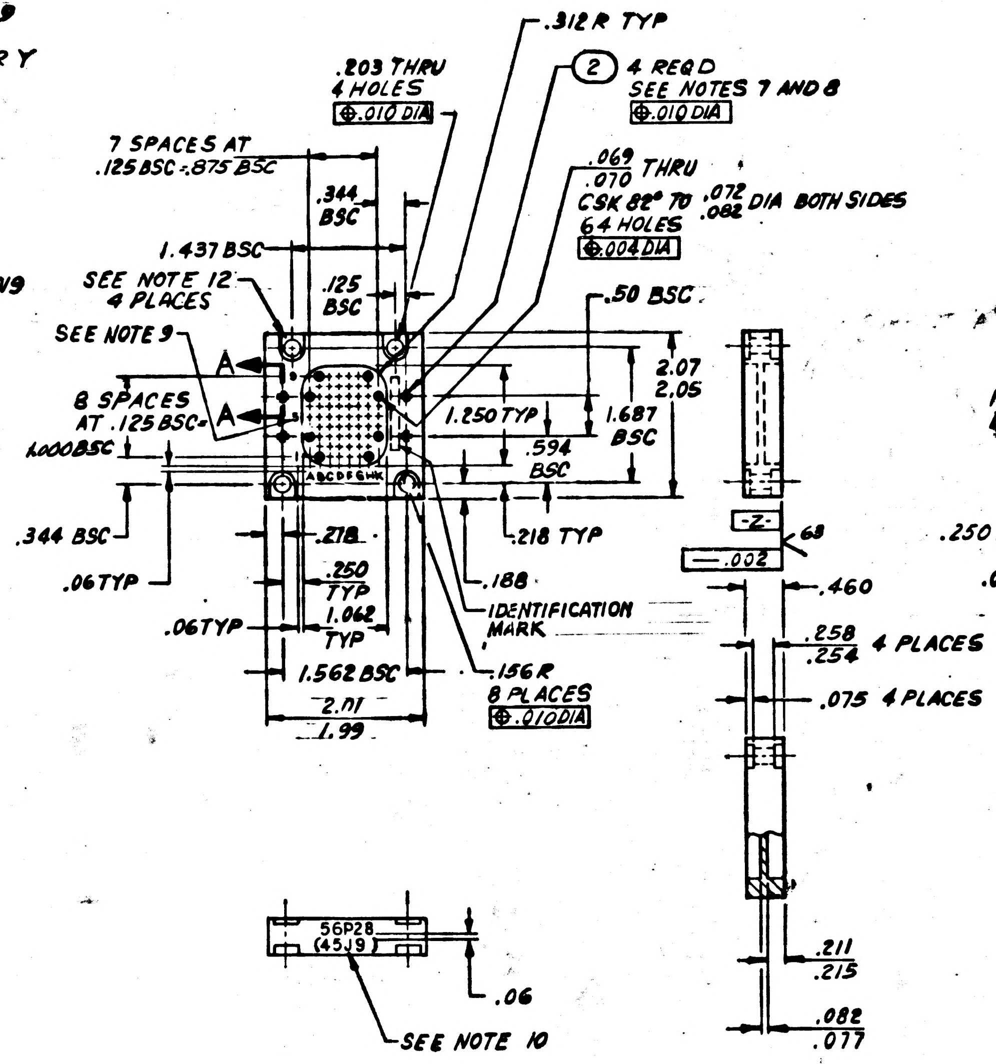
2010653A

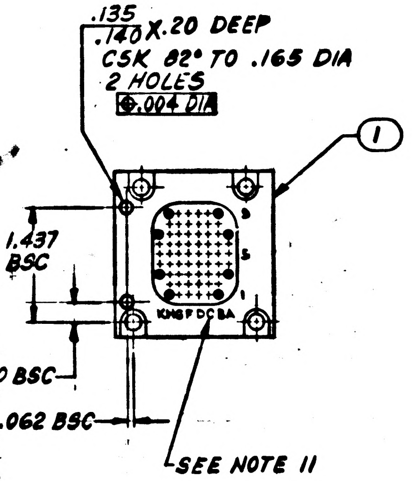
2010654

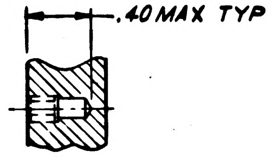
REVISIONS						
SYM	ZONE	DESCRIPTION			DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285	CHG NO.			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
10. MARK .100-.140 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
11. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


.312 R TYP
.203 THRU
4 HOLES
⊕.010 DIA
② 4 REQD
SEE NOTES 7 AND 8
⊕.010 DIA
7 SPACES AT
.125 BSC =.875 BSC
.069/.070 THRU
CSK 82° TO .072/.082 DIA BOTH SIDES
64 HOLES
⊕.004 DIA
.344 BSC
1.437 BSC
SEE NOTE 12
4 PLACES
.125 BSC
.50 BSC
SEE NOTE 9
A
8 SPACES
AT .125 BSC=
A
1.000 BSC
1.250 TYP
2.07
2.05
1.687 BSC
.594 BSC
ABCDEFGHK
.344 BSC
.218
.218 TYP
.06 TYP
.250 TYP
.188
1.062 TYP
IDENTIFICATION MARK
.06 TYP
1.562 BSC
.156 R
8 PLACES
⊕.010 DIA
2.01
1.99
-Z-
68
—.002
.460
.258/.254 4 PLACES
.075 4 PLACES
56P28
(4519)
.06
SEE NOTE 10
.211/.215
.082/.077


.135/.140 X.20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕.004 DIA
①
1.437 BSC
KHGFDCBA
.250 BSC
.062 BSC
SEE NOTE 11



PARTIAL SECTION A-A
SCALE 2:1

2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010654-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014746	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Hatchler DATE 16 SEP 65
CHECKED D. Manning 17 SEP 65
APPROVAL D. Baxter 24 SEP 65
APPROVAL A. Olwe
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23
J. Erickson 16 SEP 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P28)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010654
SCALE FULL
SHEET 1 OF 1

MASTER

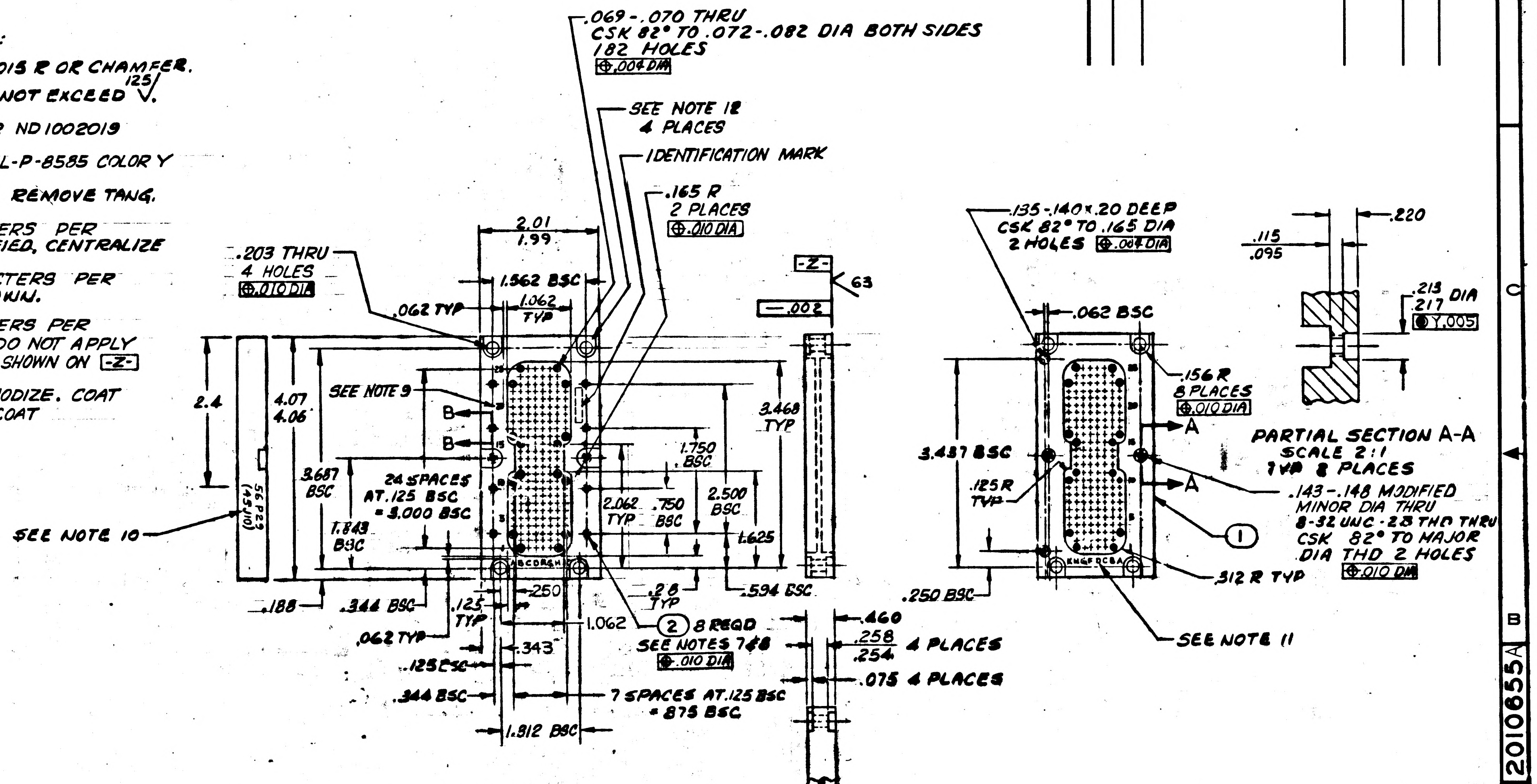
2010654

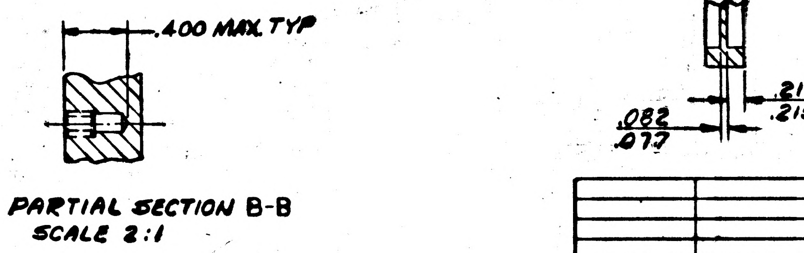
2010655 A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
    A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
    B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\surd}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS33646 REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND 1002019. UNLESS OTHERWISE SPECIFIED, CENTRALIZE AS SHOWN
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT


.069-.070 THRU
CSK 82° TO .072-.082 DIA BOTH SIDES
182 HOLES
⊕.004 DIA
SEE NOTE 12
4 PLACES
IDENTIFICATION MARK
.165 R
2 PLACES
⊕.010 DIA
.203 THRU
4 HOLES
⊕.010 DIA
2.01
1.99
1.562 BSC
1.062
TYP
.062 TYP
-Z-
63
— .002
2.4
4.07
4.06
SEE NOTE 9
B
B
3.687
BSC
24 SPACES
AT .125 BSC
= 3.000 BSC
1.843
BSC
1.750
BSC
2.062
TYP
.750
BSC
2.500
BSC
3.468
TYP
1.625
56P29
(45J10)
SEE NOTE 10
.188
.344 BSC
.125
TYP
.062 TYP
.250
1.062
.343
.125 BSC
.344 BSC
1.312 BSC
7 SPACES AT .125 BSC
= .875 BSC
.28
TYP
.594 BSC
② 8 REQD
SEE NOTES 7&8
⊕.010 DIA
.460
.258
.254
4 PLACES
.075 4 PLACES
.135-.140×.20 DEEP
CSK 82° TO .165 DIA
2 HOLES ⊕.004 DIA
.062 BSC
3.437 BSC
.125 R
TYP
.156 R
8 PLACES
⊕.010 DIA
A
A
①
.250 BSC
.312 R TYP
SEE NOTE 11
.115
.095
.220
.213
.217 DIA
◉ Y .005
PARTIAL SECTION A-A
SCALE 2:1
TYP 8 PLACES
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B THD THRU
CSK 82° TO MAJOR
DIA THD 2 HOLES
⊕.010 DIA


.400 MAX. TYP
.211
.215
.082
.077

PARTIAL SECTION B-B
SCALE 2:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THD, LOCKING
1	1	2010655-001	BASE

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2014747	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES +2° −
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN 13 SEP 65
DATE
17 SEP 65
CHECKED
APPROVAL 24 SEP 65
APPROVAL LSB
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 [illegible] 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-FSA (56P29)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010655
SCALE FULL
SHEET 1 OF 1

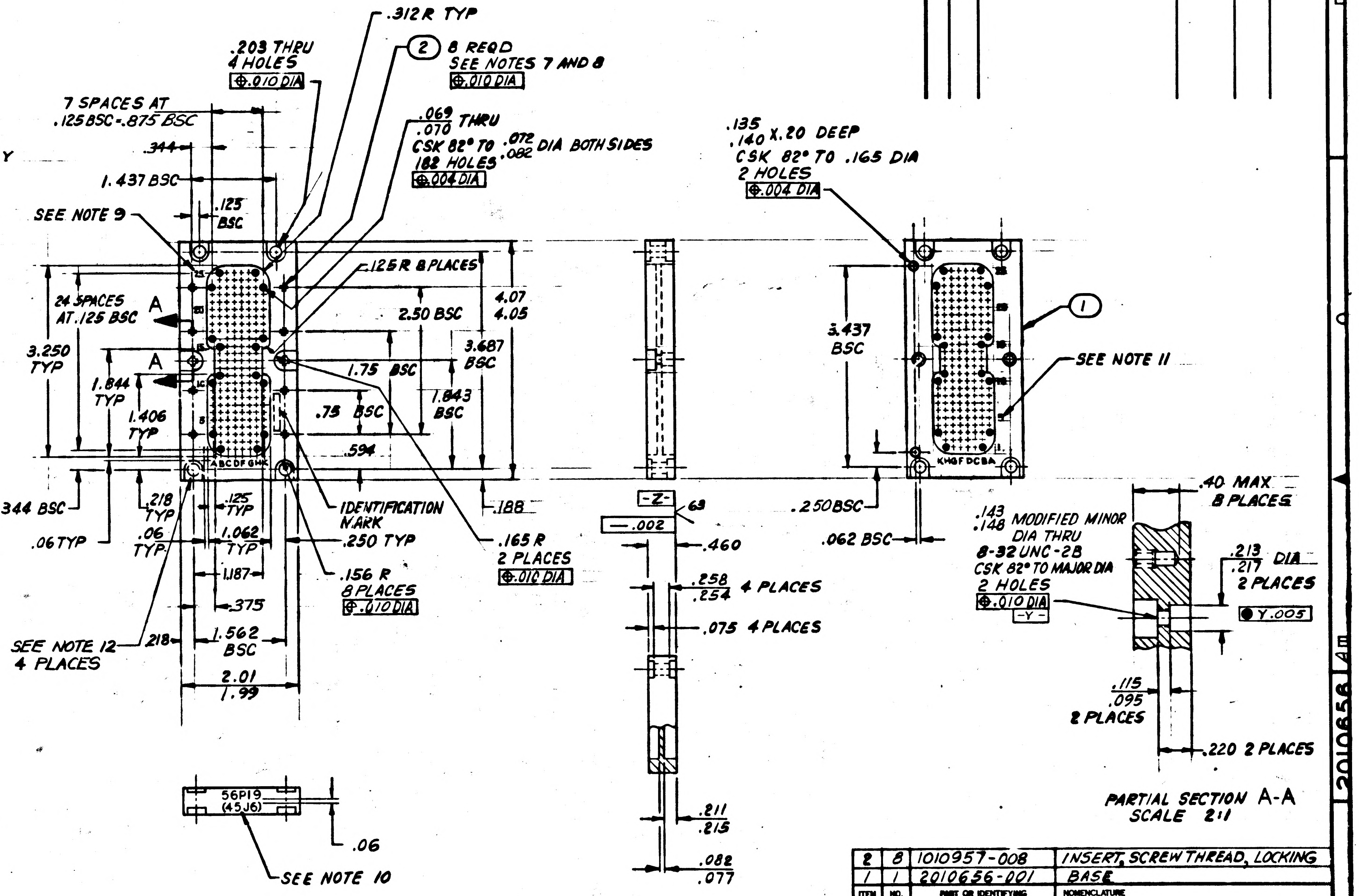
H. Erickson 17 SEP 65

2010655A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ-31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


.312 R TYP
.203 THRU
4 HOLES
⊕.010 DIA
② 8 REQD
SEE NOTES 7 AND 8
⊕.010 DIA
7 SPACES AT
.125 BSC-.875 BSC
.344
1.437 BSC
.125
BSC
SEE NOTE 9
.069
.070 THRU
CSK 82° TO .072
.082 DIA BOTH SIDES
182 HOLES
⊕.004 DIA
.125 R 8 PLACES
24 SPACES
AT .125 BSC
A
A
3.250
TYP
1.844
TYP
1.406
TYP
2.50 BSC
4.07
4.05
3.687
BSC
1.75 BSC
1.843
BSC
.75 BSC
.594
.344 BSC
.06 TYP
.218
TYP
.06
TYP
.125
TYP
1.062
TYP
1.187
.375
IDENTIFICATION
MARK
.250 TYP
.156 R
8 PLACES
⊕.010 DIA
.188
.165 R
2 PLACES
⊕.010 DIA
SEE NOTE 12
4 PLACES
.218
1.562
BSC
2.01
1.99
56P19
(45J6)
.06
SEE NOTE 10
-Z-
63
.002
.460
.258
.254 4 PLACES
.075 4 PLACES
.211
.215
.082
.077
.135
.140 X .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕.004 DIA
①
3.437
BSC
SEE NOTE 11
KHGFDCBA
.250 BSC
.062 BSC
.143
.148 MODIFIED MINOR
DIA THRU
8-32 UNC-2B
CSK 82° TO MAJOR DIA
2 HOLES
⊕.010 DIA
-Y-
.40 MAX
8 PLACES
.213
.217 DIA
2 PLACES
● Y .005
.115
.095
2 PLACES
.220 2 PLACES
PARTIAL SECTION A-A
SCALE 2:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010656-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014743	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + - ; DECIMALS ±.02 ±.005 ; ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN Hetzler DATE 14 SEP 65
CHECKED M. Manning 17 SEP 65
APPROVAL D. Baker 24 SEP 65
APPROVAL G. Ivey LTB
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Sep 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P19)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230 SIZE D 2010656
SCALE FULL SHEET 1 OF 1

D. Erickson 17 SEP 65

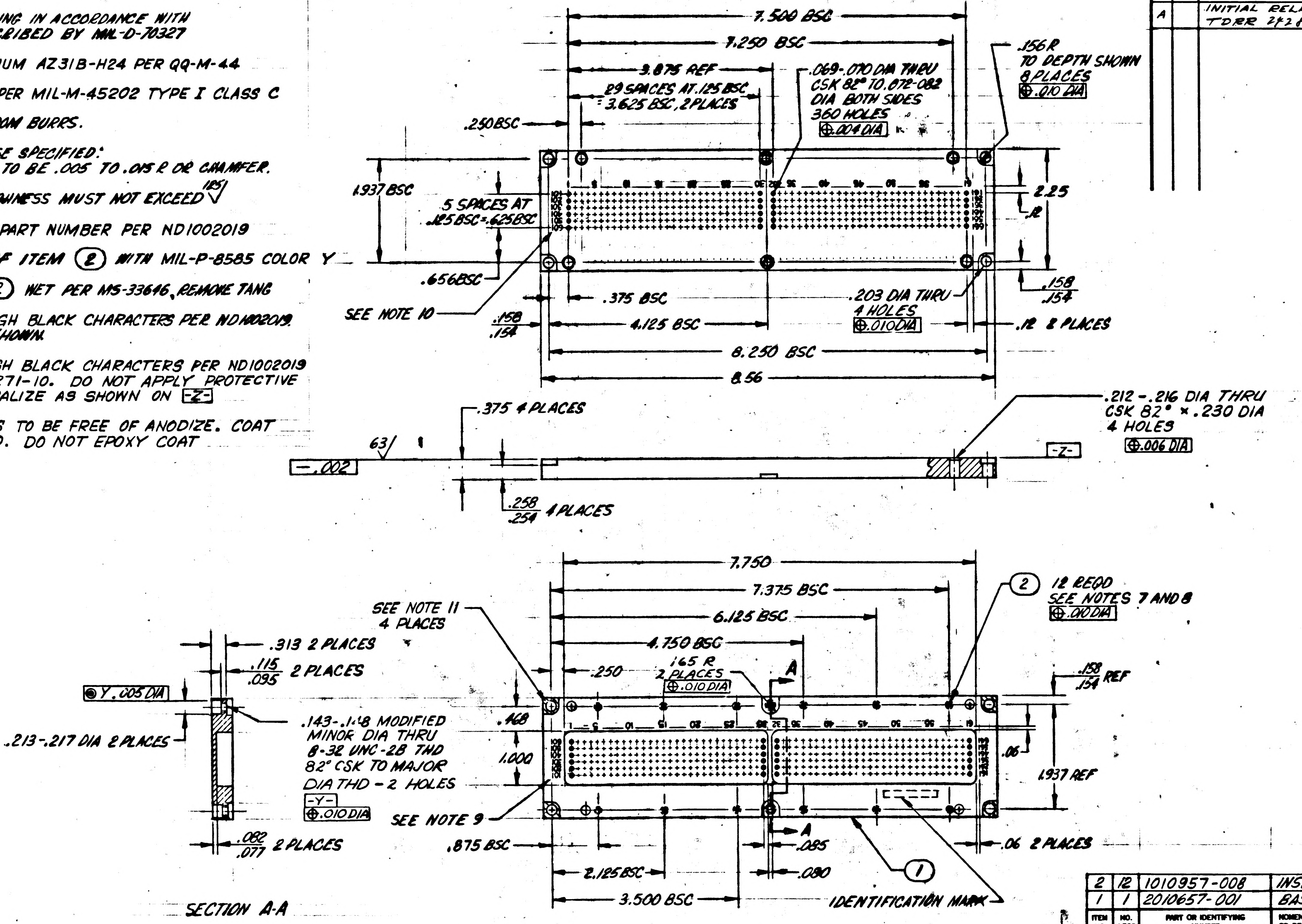
MASTER

2010657

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}$ 125
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			


7.500 BSC
7.250 BSC
3.875 REF
29 SPACES AT .125 BSC = 3.625 BSC, 2 PLACES
.069-.070 DIA THRU CSK 82° TO .072-.082 DIA BOTH SIDES 360 HOLES ⊕ .004 DIA
.156 R TO DEPTH SHOWN 8 PLACES ⊕ .010 DIA
.250 BSC
1.937 BSC
5 SPACES AT .125 BSC = .625 BSC
.225
.12
.656 BSC
.158 / .154
SEE NOTE 10
.375 BSC
.203 DIA THRU 4 HOLES ⊕ .010 DIA
4.125 BSC
.12 2 PLACES
8.250 BSC
8.56
.212-.216 DIA THRU CSK 82° × .230 DIA 4 HOLES ⊕ .006 DIA
.375 4 PLACES
63
-.002
-Z-
.258 / .254 4 PLACES
7.750
7.375 BSC
6.125 BSC
4.750 BSC
.250
.165 R 2 PLACES ⊕ .010 DIA
A
② 12 REQD SEE NOTES 7 AND 8 ⊕ .010 DIA
SEE NOTE 11 4 PLACES
.158 / .154 REF
.313 2 PLACES
.115 / .095 2 PLACES
● Y .005 DIA
.213-.217 DIA 2 PLACES
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B THD 82° CSK TO MAJOR DIA THD - 2 HOLES
-Y-
⊕ .010 DIA
.468
1.000
.06
1.937 REF
SEE NOTE 9
.082 / .077 2 PLACES
.875 BSC
.085
.080
.06 2 PLACES
2.125 BSC
3.500 BSC
①
IDENTIFICATION MARK
SECTION A-A

MASTER

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	12	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010657-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6014534	
2014749	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS ±.02 ±.005 ANGLES +2° −2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN 14 SEP 65 DATE
CHECKED 23 SEP 65
APPROVAL D. 23 SEP 65
APPROVAL LSD
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
AGC (INSEPARABLE ASSY)

CODE IDENT NO. 80230
SIZE D
2010657
SCALE 1/1
SHEET 1 OF 1

24 SEP 65

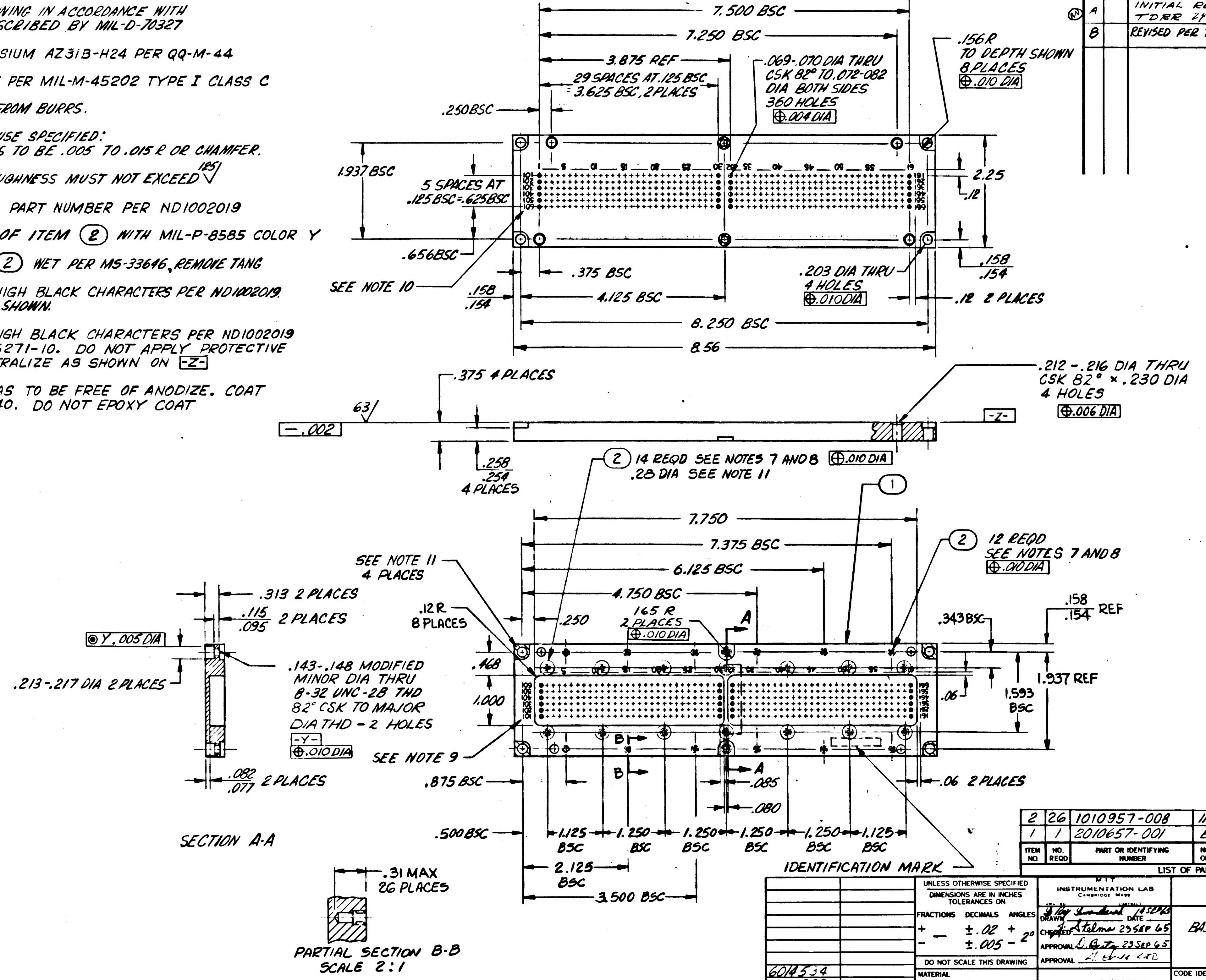
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT

B | 2010657 | 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
Ⓝ A		INITIAL RELEASE PER TDRR 24285			
B		REVISED PER TDRR 25699		9 FEB 66	HTO WL


7.500 BSC
7.250 BSC
3.875 REF
29 SPACES AT .125 BSC = 3.625 BSC, 2 PLACES
.069-.070 DIA THRU CSK 82° TO .072-.082 DIA BOTH SIDES 360 HOLES ⊕.004 DIA
.156 R TO DEPTH SHOWN 8 PLACES ⊕.010 DIA
.250 BSC
1.937 BSC
5 SPACES AT .125 BSC = .625 BSC
2.25
.12
.656 BSC
SEE NOTE 10
.375 BSC
.203 DIA THRU 4 HOLES ⊕.010 DIA
.158
.154
4.125 BSC
.12 2 PLACES
8.250 BSC
8.56
.375 4 PLACES
63
— .002
.258
.254
4 PLACES
.212-.216 DIA THRU CSK 82° × .230 DIA 4 HOLES ⊕.006 DIA
-Z-
② 14 REQD SEE NOTES 7 AND 8 ⊕.010 DIA .28 DIA SEE NOTE 11
①
7.750
7.375 BSC
6.125 BSC
4.750 BSC
② 12 REQD SEE NOTES 7 AND 8 ⊕.010 DIA
SEE NOTE 11 4 PLACES
.12 R 8 PLACES
.250
.165 R 2 PLACES ⊕.010 DIA
A
.343 BSC
.158
.154 REF
.468
1.000
.06
1.593 BSC
1.937 REF
SEE NOTE 9
B
.875 BSC
.085
.080
.06 2 PLACES
.500 BSC
1.125 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.125 BSC
2.125 BSC
3.500 BSC
IDENTIFICATION MARK
.313 2 PLACES
.115
.095 2 PLACES
◎ Y .005 DIA
.213-.217 DIA 2 PLACES
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B THD 82° CSK TO MAJOR DIA THD - 2 HOLES
-Y-
⊕.010 DIA
.082
.077 2 PLACES
SECTION A-A
.31 MAX 26 PLACES
PARTIAL SECTION B-B SCALE 2:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	26	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010657-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6014534	
2014749	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 14 SEP 65 DATE
CHECKED J. Stelma 23 SEP 65
APPROVAL D. Bata 23 SEP 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65
21 SEP 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
AGC (INSEPARABLE ASSY)

CODE IDENT NO. 80230
SIZE D
2010657
SCALE 1:1
SHEET 1 OF 1

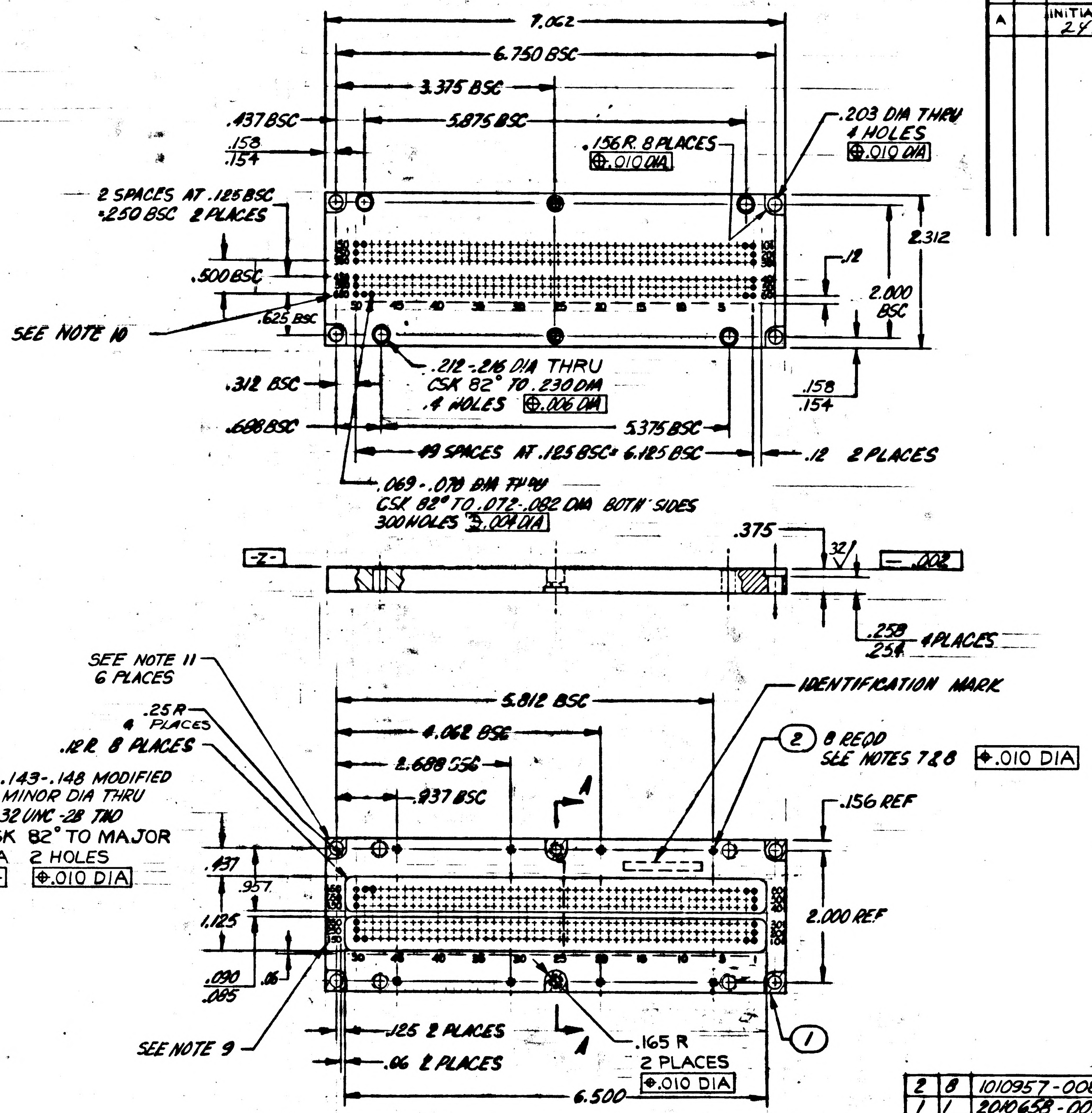
2010657

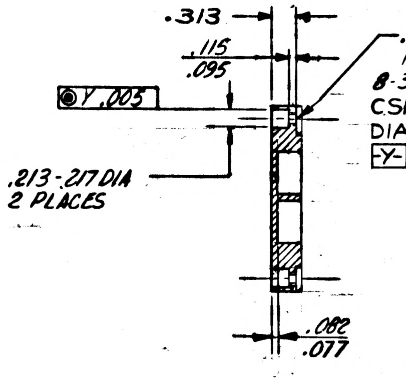
MIL 10772-A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 24285			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
10. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING, CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


7.062
6.750 BSC
3.375 BSC
.437 BSC
5.875 BSC
.158
.154
.156 R 8 PLACES
⊕.010 DIA
.203 DIA THRU 4 HOLES
⊕.010 DIA
2 SPACES AT .125 BSC
.250 BSC 2 PLACES
.500 BSC
.625 BSC
SEE NOTE 10
2.312
.12
2.000 BSC
.312 BSC
.212-.216 DIA THRU CSK 82° TO .230 DIA .4 HOLES ⊕.006 DIA
.688 BSC
5.375 BSC
.158
.154
49 SPACES AT .125 BSC = 6.125 BSC
.12 2 PLACES
.069-.073 DIA THRU CSK 82° TO .072-.082 DIA BOTH SIDES 300 HOLES ⊕.004 DIA
.375
32
-Z-
— .002
.258
.254 4 PLACES
SEE NOTE 11 6 PLACES
.25 R 4 PLACES
.12 R 8 PLACES
5.812 BSC
4.062 BSC
2.688 BSC
.937 BSC
IDENTIFICATION MARK
② 8 REQD SEE NOTES 7 & 8
⊕.010 DIA
.156 REF
A
.437
.957
1.125
2.000 REF
.090
.085
.06
SEE NOTE 9
.125 2 PLACES
.06 2 PLACES
.165 R 2 PLACES
⊕.010 DIA
6.500
①


.313
.115
.095
⊕Y .005
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B THD CSK 82° TO MAJOR DIA 2 HOLES
-Y-
⊕.010 DIA
.213-.217 DIA 2 PLACES
.082
.077

SECTION A-A

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, SELF-LKG
1	1	2010658-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6014533	
2014741	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + -
DECIMALS ±.02 ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN [illegible] DATE 23 SEP 65
CHECKED J. Stelma 23 SEP 65
APPROVAL D. Bente 23 SEP 65
APPROVAL LTB
NASA APPROVAL A. C. METZGER
MIT APPROVAL 23 Nov 65

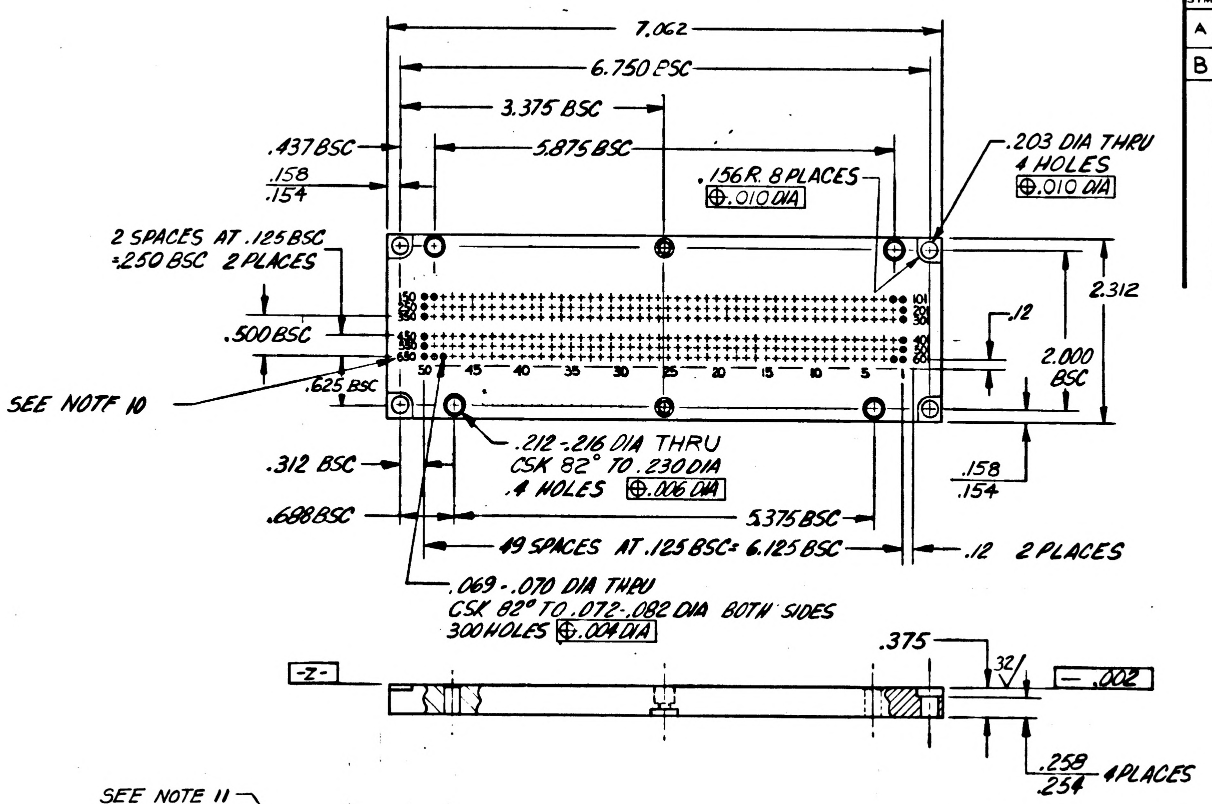
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

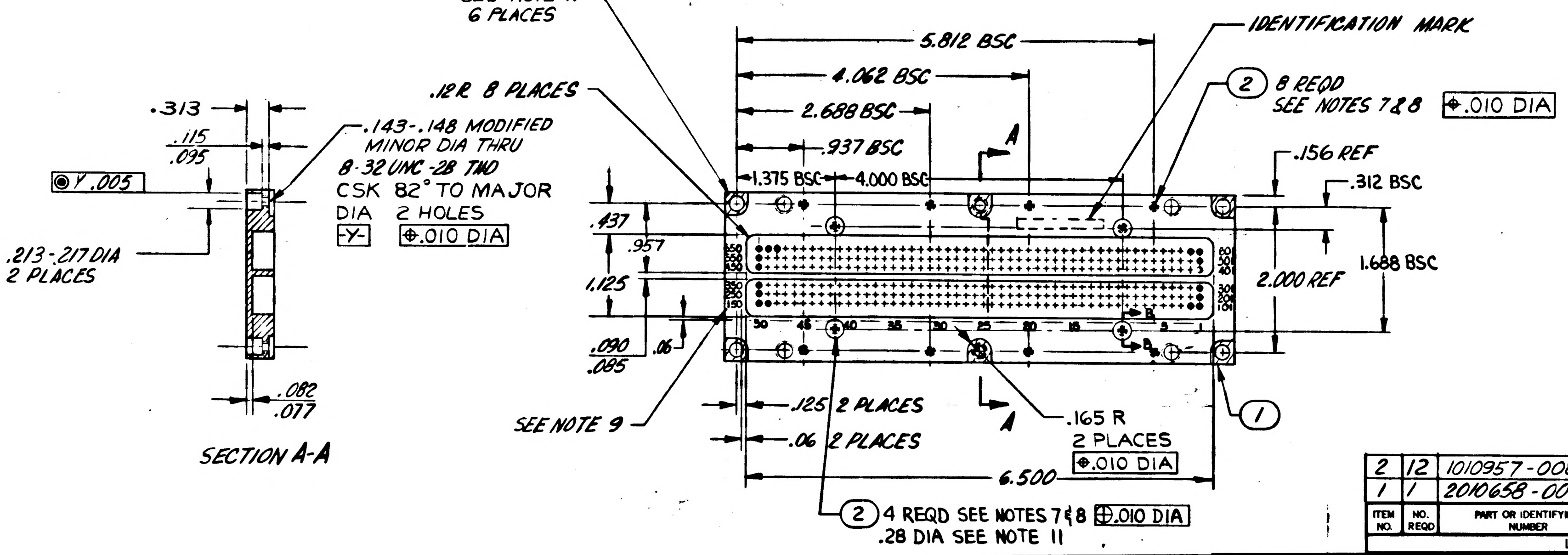
BASE, ELECTRICAL CONNECTOR
CDU (INSEPARABLE ASSY)

CODE IDENT NO. 80230
SIZE D
2010658
SCALE 1:1
SHEET 1 OF 1

NOTES:

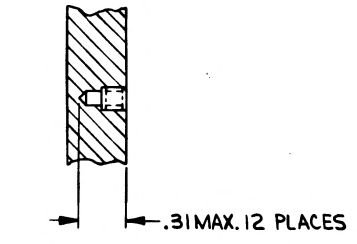
1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
10. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING, CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT


7.062
6.750 BSC
3.375 BSC
5.875 BSC
.437 BSC
.158
.154
.156 R. 8 PLACES
⊕.010 DIA
.203 DIA THRU
4 HOLES
⊕.010 DIA
2 SPACES AT .125 BSC
=.250 BSC 2 PLACES
.500 BSC
.625 BSC
SEE NOTE 10
2.312
.12
2.000 BSC
.212-.216 DIA THRU
CSK 82° TO .230 DIA
.4 HOLES ⊕.006 DIA
.312 BSC
.688 BSC
5.375 BSC
49 SPACES AT .125 BSC = 6.125 BSC
.12 2 PLACES
.158
.154
.069-.070 DIA THRU
CSK 82° TO .072-.082 DIA BOTH SIDES
300 HOLES ⊕.004 DIA
-Z-
.375
32
— .002
.258
.254 4 PLACES


SEE NOTE 11
6 PLACES
.12 R 8 PLACES
5.812 BSC
4.062 BSC
2.688 BSC
.937 BSC
1.375 BSC
4.000 BSC
IDENTIFICATION MARK
② 8 REQD
SEE NOTES 7 & 8 ⊕.010 DIA
.156 REF
.312 BSC
.437
.957
1.125
.090
.085
.06
2.000 REF
1.688 BSC
.125 2 PLACES
.06 2 PLACES
SEE NOTE 9
A
.165 R
2 PLACES
⊕.010 DIA
①
6.500
.313
.115
.095
◎ Y .005
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B THD
CSK 82° TO MAJOR
DIA 2 HOLES
-Y- ⊕.010 DIA
.213-.217 DIA
2 PLACES
.082
.077

SECTION A-A

② 4 REQD SEE NOTES 7 & 8 ⊕.010 DIA
.28 DIA SEE NOTE 11


.31 MAX. 12 PLACES

PARTIAL SECTION B-B
SCALE 2/1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE PER TDRR 24285			
B		REVISED PER TDRR 25698		8 FEB 66	RP PF

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	12	1010957-008	INSERT, SCREW THREAD, SELF-LKG
1	1	2010658-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6014533	
2014741	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ −	±.02 ±.005	+ 2° −

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN		16 SEP 65
CHECKED	J. Stelma	23 SEP 65
APPROVAL	D. Basta	23 SEP 65
APPROVAL		
NASA APPROVAL	A. C. METZGER	
MIT APPROVAL		23 Nov 65

21 SEP 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
CDU (INSEPARABLE ASSY)

CODE IDENT NO.	SIZE	
80230	D	2010658

SCALE 1:1 SHEET 1 OF 1

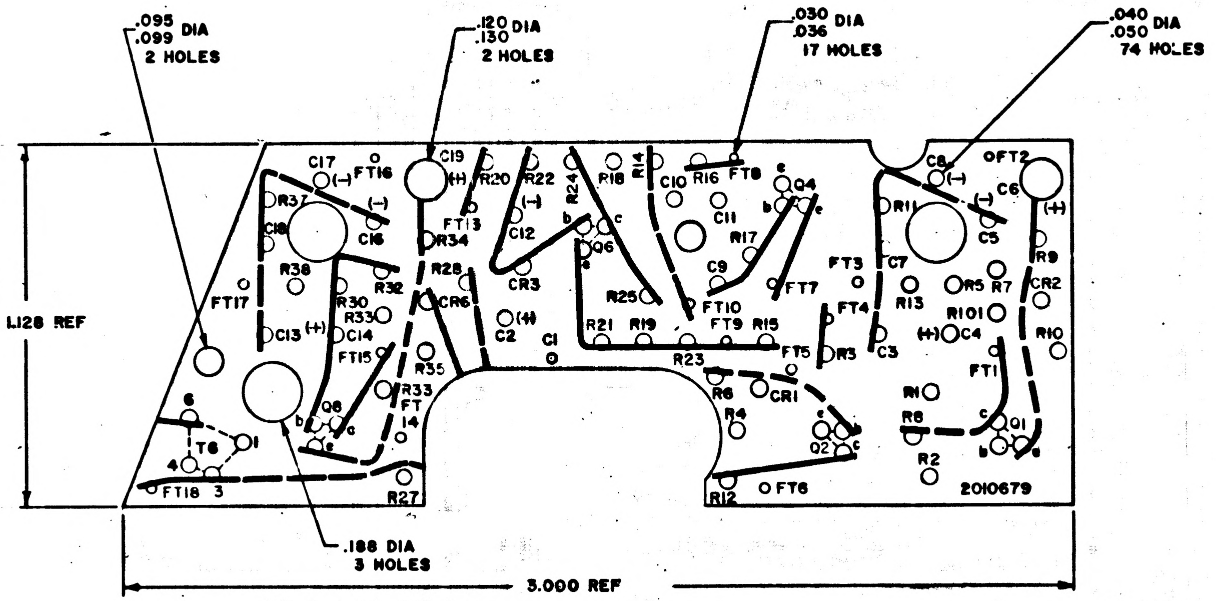
2010658 B

MIL 10770K

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27729		9 MAR 66	


.095 .099 DIA 2 HOLES
.120 .130 DIA 2 HOLES
.030 .036 DIA 17 HOLES
.040 .050 DIA 74 HOLES
.188 DIA 3 HOLES
1.128 REF
3.000 REF
C17
(−)
FT16
C19
(+)
R20
R22
R24
R18
R14
C10
R16
FT8
e
Q4
b
e
C8
(−)
OFT2
C6
(+)
R37
(−)
C18
C16
FT13
R34
(−)
C12
b
c
Q6
e
C11
R17
R11
(−)
C5
R9
R38
R28
R32
CR6
CR3
C9
FT3
C7
R13
R5
R7
CR2
FT17
R30
R33
(+)
C2
C1
R25
FT10
FT7
FT4
R101
C13
(+)
C14
R21
R19
FT9
R15
(+)
C4
R10
FT15
R35
R23
FT5
R3
C3
FT1
R33
FT 14
R6
CR1
R1
6
Q8
b
c
e
R4
R8
c
Q1
b
e
T6
1
4
Q2
c
R2
FT18
3
R27
R12
O FT6
2010679

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF:
DRAWING NO. 2010678 FOR PHOTOGRAPHIC MASTER.

NEXT ASSY	USED ON
2007263	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN M. Yamasaki DATE 19 Jan 66
CHECKED J. GRIEB 22 FEB 66
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

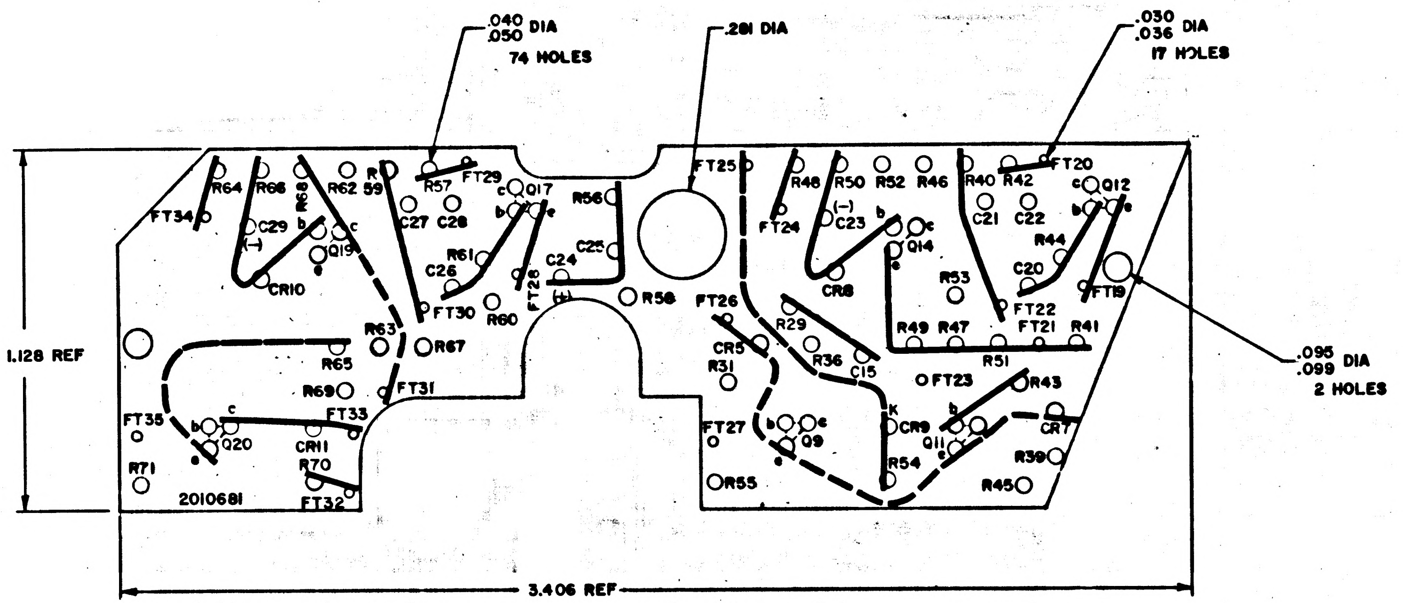
WIRING BOARD A
INTERROGATE MODULE

CODE IDENT NO. 80230
SIZE D
2010679
SCALE 4/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27829		9 MAR 66	


.040 .050 DIA
74 HOLES
.281 DIA
.030 .036 DIA
17 HOLES
.095 .099 DIA
2 HOLES
1.128 REF
3.406 REF
2010681
FT34
R64
R66
R68
R62
R 59
R57
FT29
Q17
C29
(−)
Q19
CR10
C27
C28
R61
C26
FT30
R60
FT28
(+)
C24
C25
R56
R58
R63
R67
R65
R69
FT31
FT35
Q20
FT33
CR11
R70
R71
FT32
FT25
FT24
R48
R50
R52
R46
R40
R42
FT20
Q12
C23
(−)
Q14
C21
C22
R44
C20
FT19
CR8
R53
FT22
FT26
R29
CR5
R31
R36
C15
R49
R47
FT21
R41
R51
FT23
R43
FT27
Q9
CR9
Q11
CR7
R39
R54
R55
R45
b
c
e
K

REF:
DRAWING NO. 2010680 FOR PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

NEXT ASSY	USED ON
2007263	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN M. Yamasaki DATE 19 JAN 66
CHECKED J.GRIEB 22 FEB 66
APPROVAL 28 Feb 66
APPROVAL 29 Mar 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

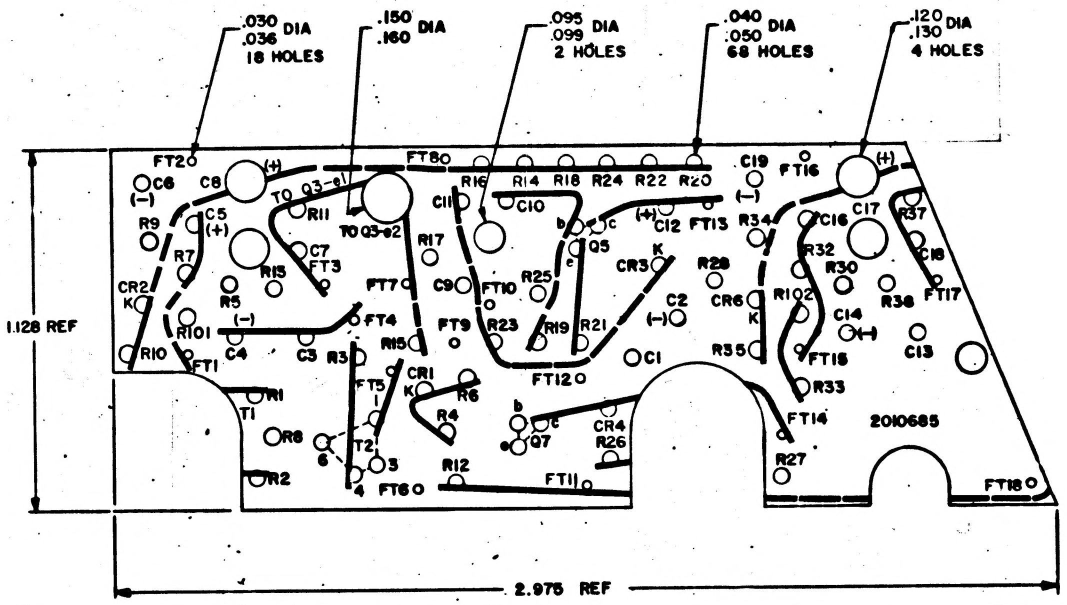
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
INTERROGATE MODULE

CODE IDENT NO. 80230
SIZE D
2010681
SCALE 4/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27829		9 MAR 66	


.030 .036 DIA 18 HOLES
.150 .160 DIA
.095 .099 DIA 2 HOLES
.040 .050 DIA 68 HOLES
.120 .130 DIA 4 HOLES
FT2
C6
(−)
C8
(+)
TO Q3-e1
TO Q3-e2
FT8
R16
R14
R18
R24
R22
R20
C19
FT16
(−)
(+)
R9
C5
(+)
R11
C11
C10
b
c
Q5
e
(+)
C12
FT13
R34
C16
C17
R37
R7
C7
FT3
R15
R17
CR3
K
R28
R32
R30
C18
CR2
K
R5
(−)
FT7
C9
FT10
R25
R102
R36
FT17
FT4
C2
(−)
CR6
K
C14
(+)
R101
R10
FT1
C4
C3
R3
R15
FT9
R23
R19
R21
C1
R35
FT15
C13
R1
T1
FT5
1
CR1
K
R6
FT12
R33
R4
FT14
2010685
R8
6
T2
3
4
b
c
e
Q7
CR4
R26
R27
R2
FT6
R12
FT11
FT18
1.128 REF
2.975 REF

REF DRAWING:
2010684 PHOTOGRAPHIC MASTER

NOTES:
1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

NEXT ASSY	USED ON
2007263	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Nolski DATE 10 JAN 66
CHECKED J.GRIEB 22 FEB 66
APPROVAL 28 FEB 66
APPROVAL 4 Apr 66
APPROVAL 29 MAR 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
INTERROGATE MODULE

CODE IDENT NO. 80230
SIZE D
2010685
SCALE 4/1
SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULA[illegible] FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS [illegible] OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS					
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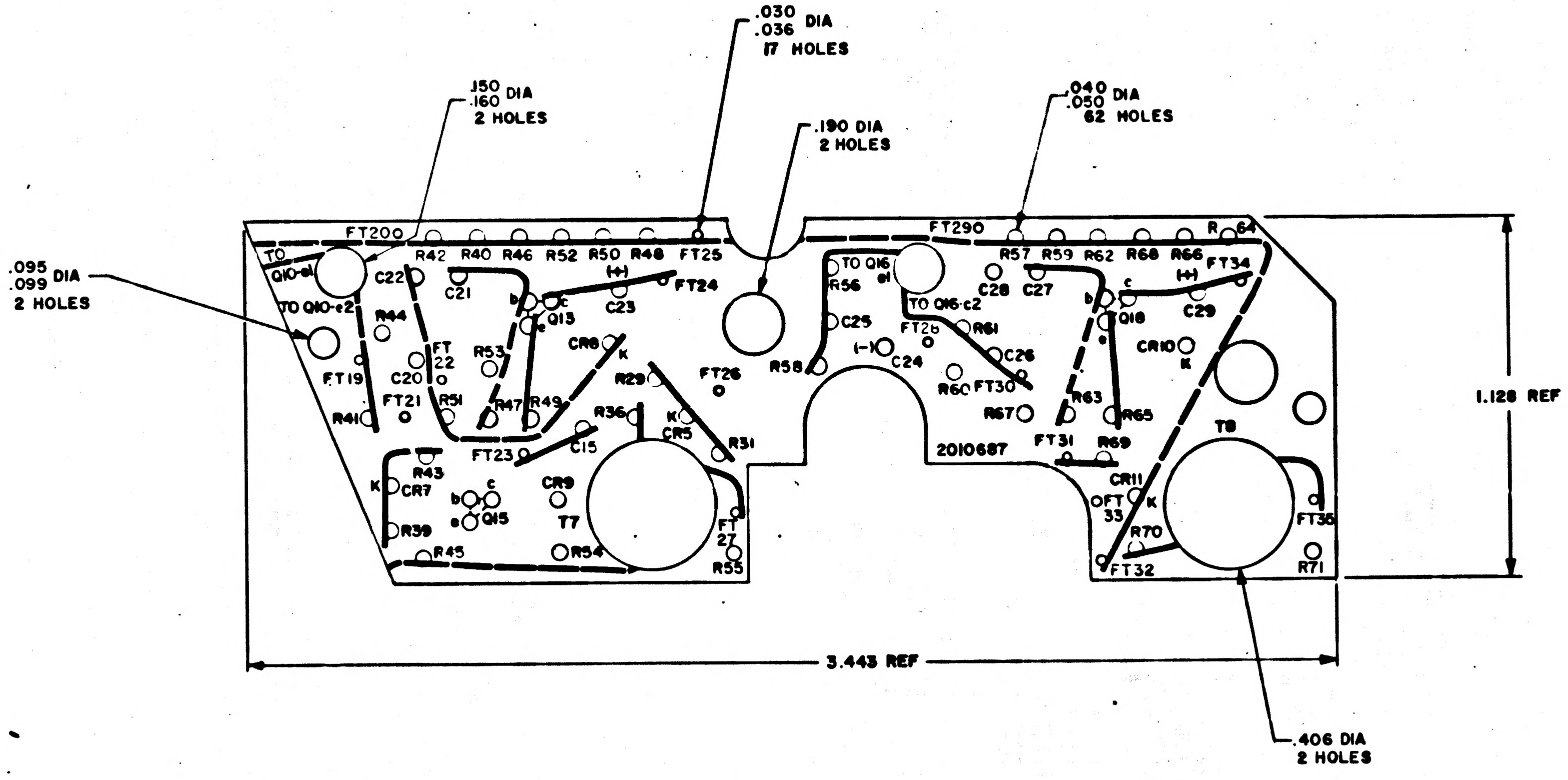
	A	INITIAL RELEASE CLASS A PER TDRR 27129		9 MAR 66	Dm



.030
.036 DIA
17 HOLES
.150
.160 DIA
2 HOLES
.190 DIA
2 HOLES
.040
.050 DIA
62 HOLES
.095
.099 DIA
2 HOLES
1.128 REF
3.443 REF
.406 DIA
2 HOLES
FT200
TO Q10-e1
TO Q10-e2
R42
R40
R46
R52
R50
R48
FT25
(+)
FT24
C22
C21
b
c
e
Q13
C23
R44
FT 22
C20
R53
CR8
K
FT19
FT21
R51
R47
R49
R29
R41
R36
K
CR5
R31
FT26
FT23
C15
R43
K
CR7
c
b
e
Q15
CR9
T7
R39
R45
R54
FT 27
R55
FT290
TO Q16 e1
R56
TO Q16-c2
C28
C27
R57
R59
R62
R68
R66
R 64
(+)
FT34
C29
C25
FT28
R61
(–)
C24
C26
R58
R60
FT30
Q18
CR10
K
R63
R67
R65
2010687
FT31
R69
T8
CR11
FT 33
K
R70
FT32
FT35
R71

REF DRAWING:
2010686 PHOTOGRAPHIC MASTER

NOTES:
1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

2007263	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
CONTRACT NAS 9-497

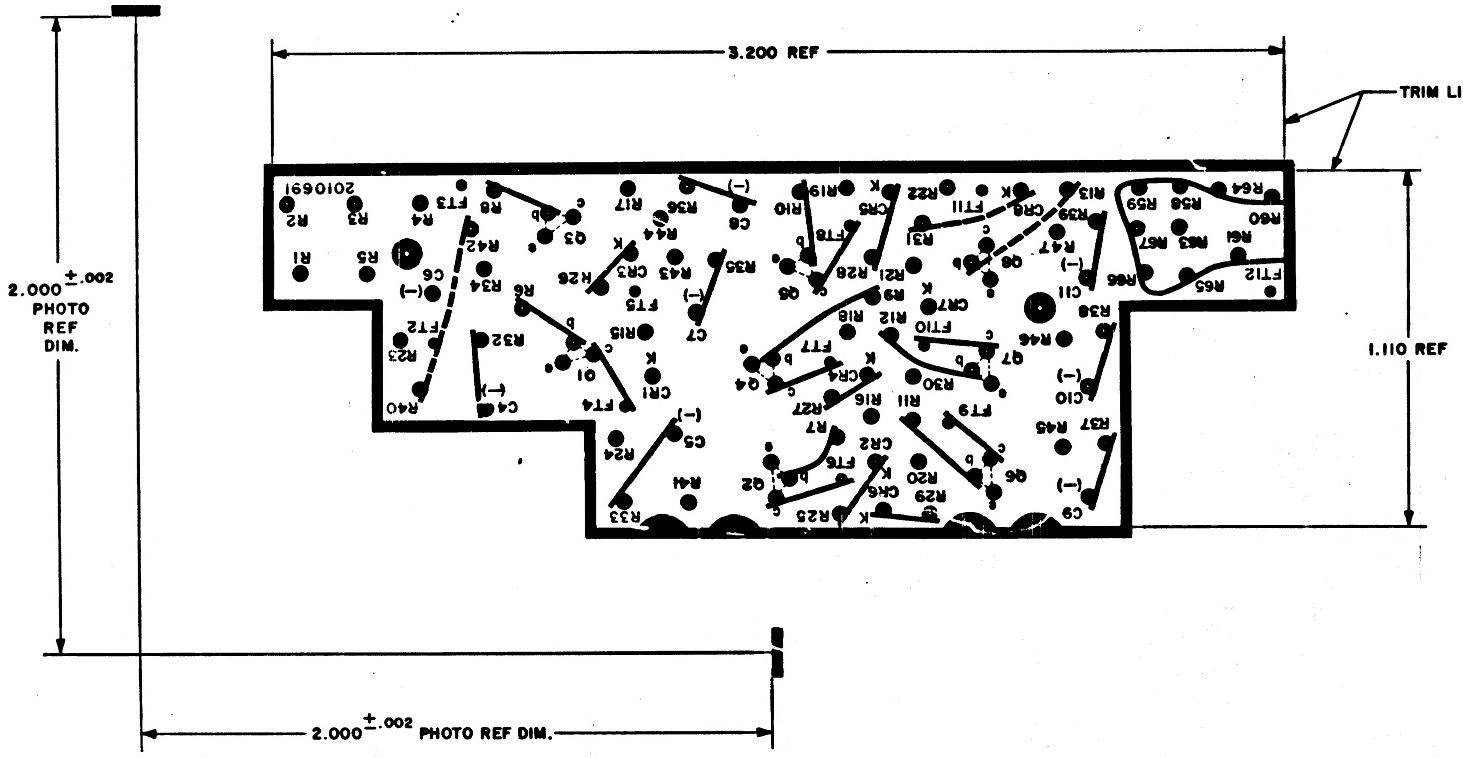
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J Noloki DATE 7 JAN 66
CHECKED J.GRIEB 2 FEB 66
APPROVAL E Ebisch 8 FEB 66
APPROVAL R V Vittek 23 MAR 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer 5 Apr 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD E
INTERROGATE MODULE

CODE IDENT NO. 80230 SIZE D 2010687
SCALE 4/1 SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27830		21 FEB 66	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN.
4. CUT TO WITHIN .010 OF TRIM LINE.
5. BROKEN LINE DENOTES SLEEVING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

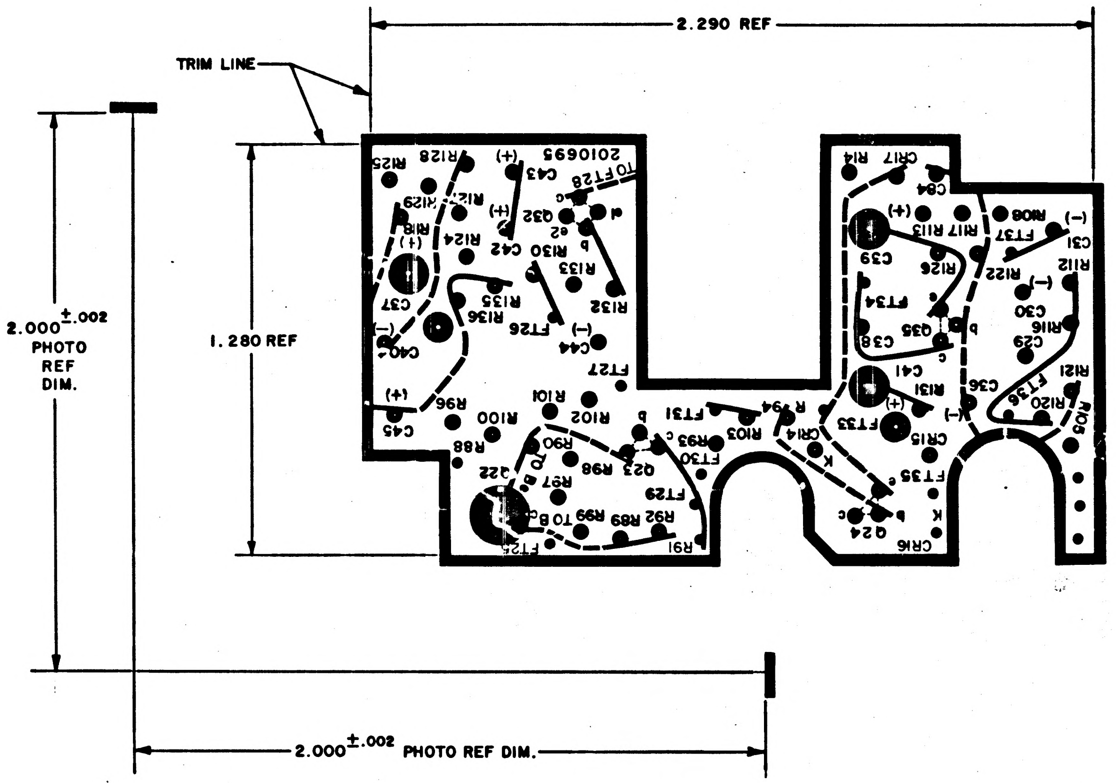
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Art. Nikure 7 JAN 66
CHECKED 10 FEB 66
APPROVAL 11 FEB 66
CONTRACT 1 MAR 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD A
MSA & QUADRATURE REJECTION MODULE

SIZE D
CODE IDENT NO. 80230
2010690
SCALE 4:1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27830		21 FEB 66	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN.
4. CUT TO WITHIN .010 OF TRIM LINE.
5. BROKEN LINE DENOTES SLEEVING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN ART. NIKURE DATE 7 JAN 66
CHECKED 10 FEB 66
APPROVAL 11 FEB 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL

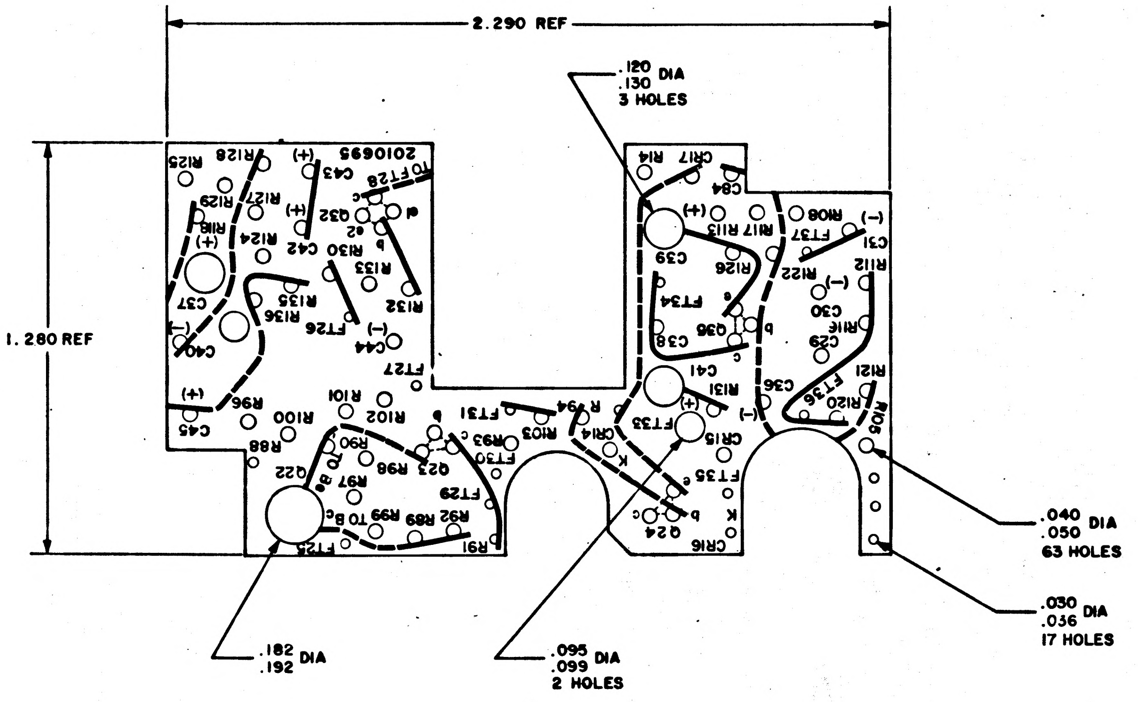
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD C
MSA & QUADRATURE REJECTION MODULE

SIZE D
CODE IDENT NO. 80230
2010694
SCALE 4:1
SHEET 1 OF 1

2010695 A REV LTR

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27830		21 FEB 66	DM



2.290 REF
1.280 REF
.120 DIA
.130
3 HOLES
.040 DIA
.050
63 HOLES
.030 DIA
.036
17 HOLES
.182 DIA
.192
.095 DIA
.099
2 HOLES
2010695

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

REF: DRAWING NO. 2010694 FOR PHOTOGRAPHIC MASTER.

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN ART. NIKURS 7 JAN 66
CHECKED 10 FEB 66
APPROVAL 18 FEB 66
CONTRACT 17 MAR 66 4 Apr. 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

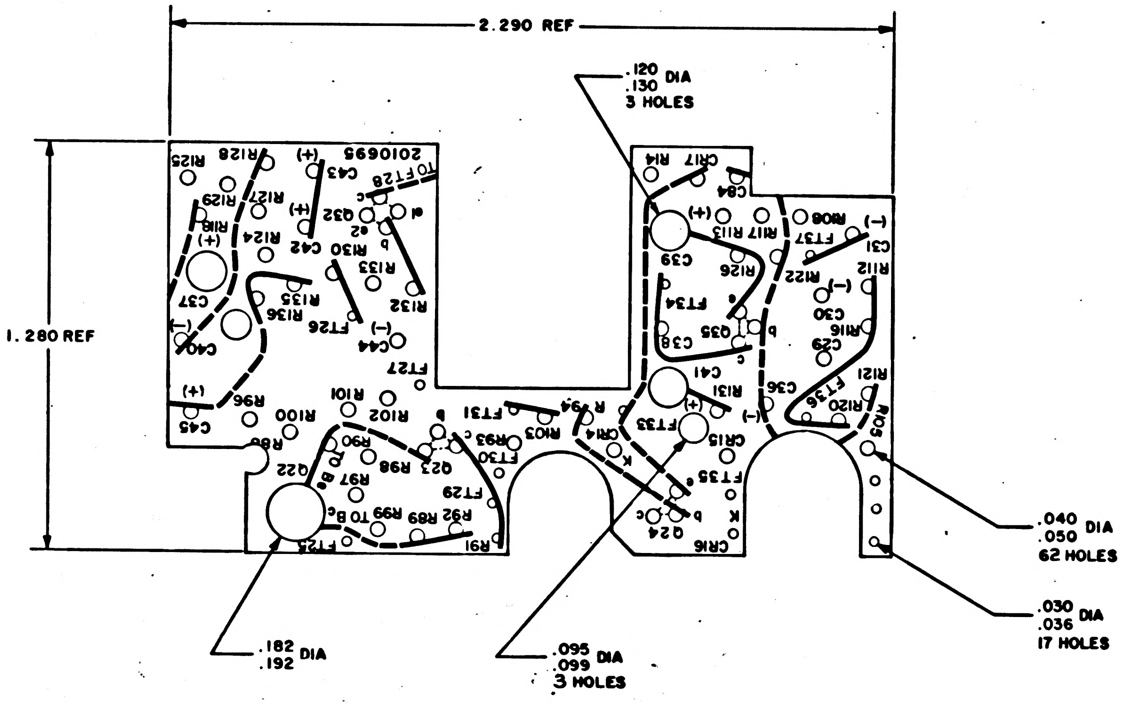
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
MSA & QUADRATURE REJECTION MODULE

SIZE D 80230 2010695
SCALE 4:1
SHEET 1 OF 1

MIL-10820 D

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 35F30		21 FEB 66	DMA
	B	REVISED PER TDRR 35030		13 NOV 67	LP



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133.
4. MARK BLACK CHARACTERS PER ND 1002019.
5. BROKEN LINE DENOTES SLEEVING.

REF: DRAWING NO. 2010694 FOR PHOTOGRAPHIC MASTER.

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

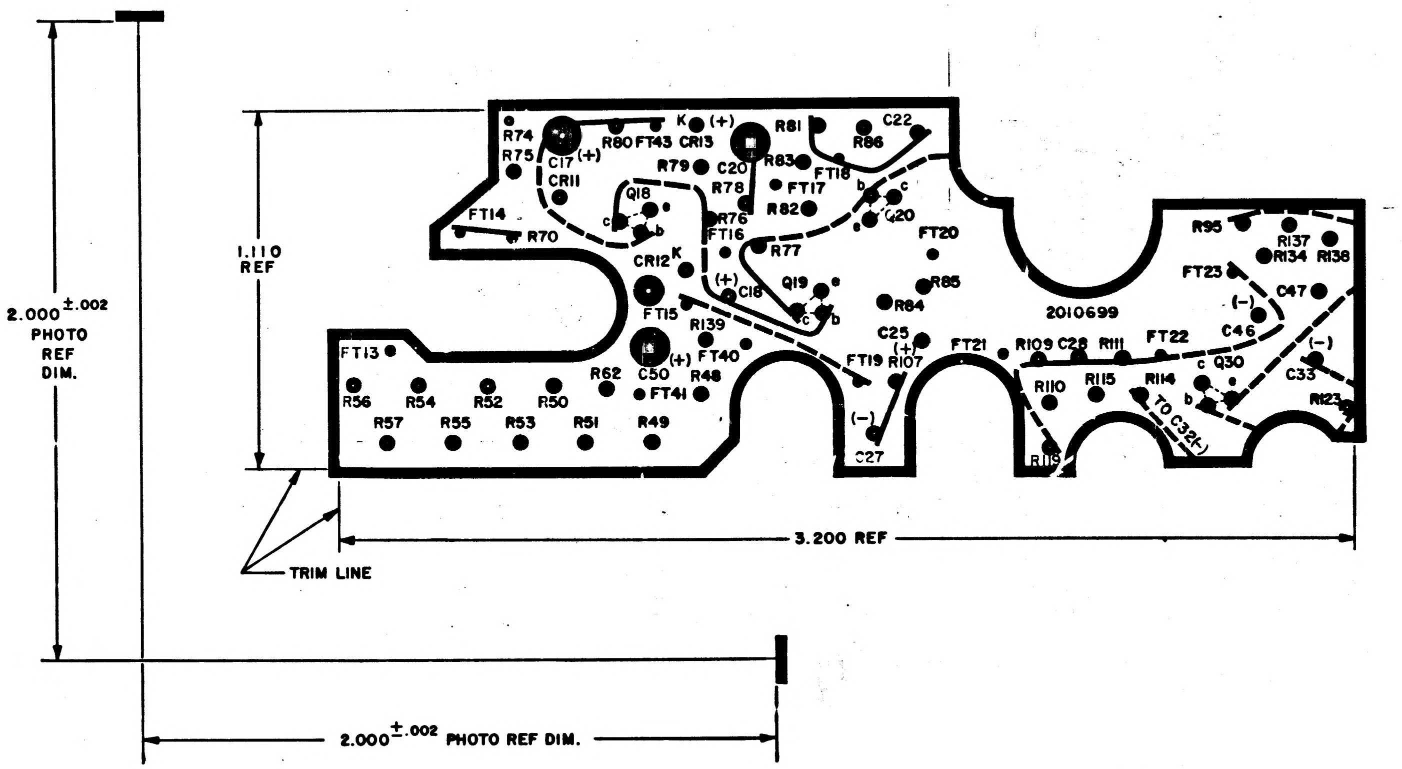
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Art. Nikurs DATE 7 JAN 66
CHECKED 10 FEB 66
APPROVAL 18 FEB 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD C
MSA & QUADRATURE REJECTION MODULE

SIZE D 80230 2010695
SCALE 4:1 SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27830		21 FEB 66	DM



R74
R75
C17 (+)
CR11
R80 FT43 CR13
K (+)
R81
R86
C22
R79
C20
R78
R83
FT18
FT17
R82
Q18
c
e
b
FT14
R70
R76
FT16
R77
b
c
Q20
e
FT20
CR12
K
(+)
C18
Q19
e
c
b
R85
R84
FT15
R139
FT40
C25
(+)
R107
FT19
FT21
FT13
R56
R54
R52
R50
R62
C50
(+)
R48
FT41
R57
R55
R53
R51
R49
(−)
C27
2010699
R95
R137
R134
R138
FT23
(−)
C46
C47
R109 C28 R111
FT22
c
Q30
e
b
(−)
C33
R110
R115
R114
TO C32(−)
R119
R123
1.110 REF
2.000 ±.002 PHOTO REF DIM.
3.200 REF
TRIM LINE
2.000 ±.002 PHOTO REF DIM.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN.
4. CUT TO WITHIN .010 OF TRIM LINE.
5. BROKEN LINE DENOTES SLEEVING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL ———
CONTRACT NAS 9-497

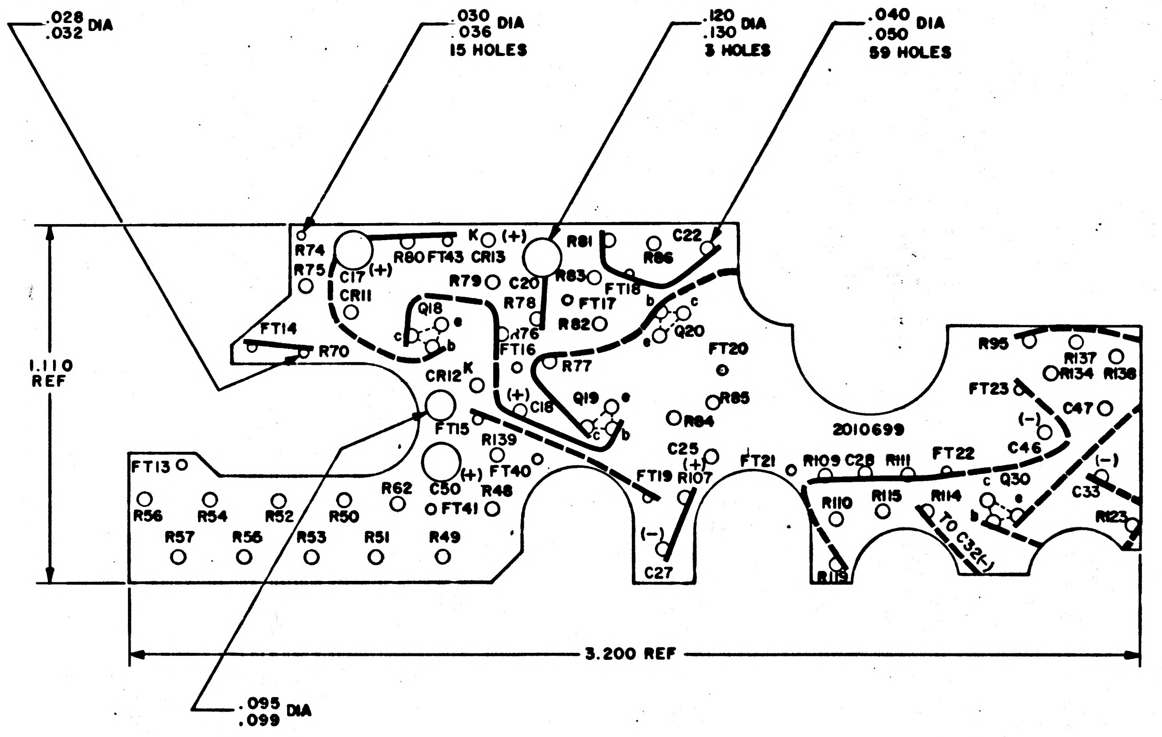
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN ART NIKURE DATE 23 DEC 65
CHECKED 10 FEB 66
APPROVAL 11 Feb 66
APPROVAL 1 MAR 66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD E
MSA & QUADRATURE REJECTION MODULE

CODE IDENT NO. 80230
SIZE D
2010698
SCALE 4:1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27830		21 FEB 66	



.028
.032 DIA
.030 DIA
.036
15 HOLES
.120 DIA
.130
3 HOLES
.040 DIA
.050
59 HOLES
1.110
REF
3.200 REF
.095 DIA
.099
R74
R75
C17 (+)
CR11
R80
FT43
CR13
K
(+)
R81
R86
C22
R79
C20
R78
R83
FT17
FT18
R82
Q18
Q20
FT14
R70
R76
FT16
R77
FT20
CR12
K
(+)
C18
Q19
R85
R84
FT15
R139
FT40
C25
(+)
FT19
R107
FT21
R109
C28
R111
FT22
2010699
FT13
R62
C50
(+)
R48
FT41
R56
R54
R52
R50
R57
R58
R53
R51
R49
(−)
C27
R110
R115
R114
R119
TO C32(−)
Q30
R95
R137
R134
R138
FT23
C47
(−)
C46
(−)
C33
R123
c
b
e

REF: DRAWING NO. 2010698 FOR PHOTOGRAPHIC MASTER.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

2007238	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

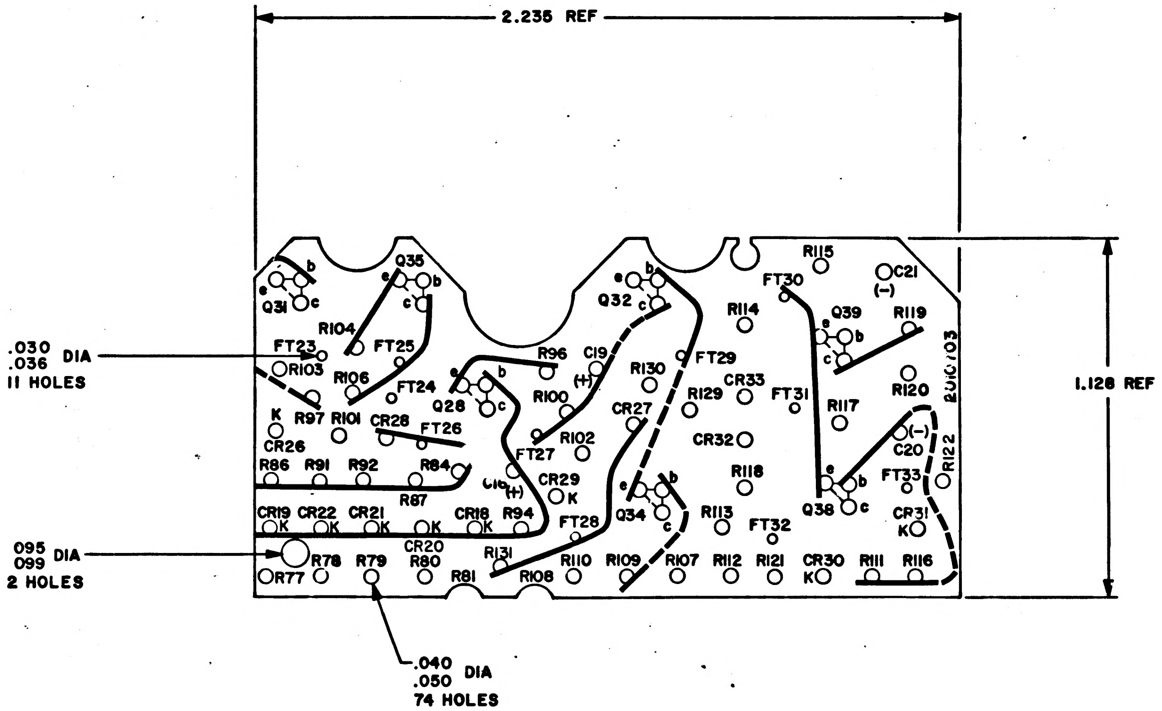
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Art. Nikure DATE 28 DEC 65
CHECKED 10 FEB 66
APPROVAL 22 FEB 66
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD E
MSA & QUADRATURE
REJECTION MODULE

CODE IDENT NO. 80230 SIZE D 2010699
SCALE 4:1 SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27967		28 FEB 66	Dit


2.235 REF
1.126 REF
.030
.036 DIA
11 HOLES
095 DIA
099
2 HOLES
.040
.050 DIA
74 HOLES
2010703
Q31
e
b
c
Q35
R104
FT23
R103
FT25
R106
FT24
K
R97
R101
CR28
FT26
CR26
R86
R91
R92
R84
R87
CR19
CR22
CR21
CR18
R94
CR20
R78
R79
R80
R81
R77
Q28
R96
C19
(+)
R100
R102
FT27
C16
(+)
CR29
FT28
R131
R108
R110
R109
Q32
R130
FT29
CR27
R129
CR33
CR32
R118
Q34
R113
R107
R112
R121
R114
R115
FT30
C21
(−)
Q39
R119
R120
FT31
R117
FT32
Q38
C20
(−)
FT33
R122
CR31
CR30
R111
R116

REF. DRAWING:
NO. 2010702 PHOTOGRAPHIC MASTER

NOTES.
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133.
4. MARK BLACK CHARACTERS PER ND 1002019.
5. BROKEN LINE DENOTES SLEEVING.

2007254	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

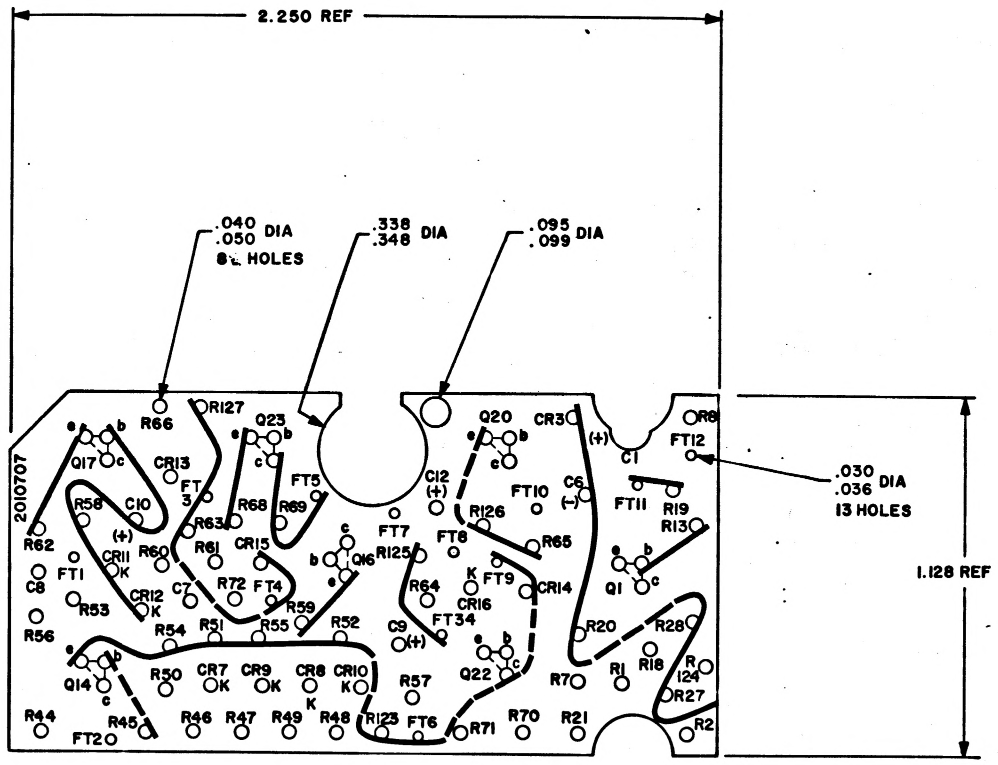
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. Holak DATE 13 Dec 65
CHECKED Gammill 29 Jan 66
APPROVAL RV Vessonto 6 Feb 66
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
MODE MODULE

CODE IDENT NO. 80230
SIZE D
2010703
SCALE 4/1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27967		28 FEB 66	



2.250 REF
.040 .050 DIA 8[illegible] HOLES
.338 .348 DIA
.095 .099 DIA
.030 .036 DIA 13 HOLES
1.128 REF
2010707
R66
R127
Q23
Q20
CR3
R8
FT12
Q17
CR13
FT3
FT5
C12 (+)
R126
FT10
C6 (–)
C1
FT11
R19
R13
R58
C10
R68
R69
R62
R63
R61
CR15
FT7
FT8
R65
C8
FT1
CR11 K
R60
Q16
R125
K FT9
CR14
Q1
R53
CR12 K
C7
R72
FT4
R64
CR16
R56
R54
R51
R55
R59
R52
C9 (+)
FT34
R20
R28
Q14
R50
CR7 K
CR9 K
CR8 K
CR10 K
R57
Q22
R7
R1
R18
R124
R27
R44
FT2
R45
R46
R47
R49
R48
R123
FT6
R71
R70
R21
R2
e
b
c
(+)

REF. DRAWING:
NO. 2010706 PHOTOGRAPHIC MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

2007254	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
CONTRACT NAS 9-497

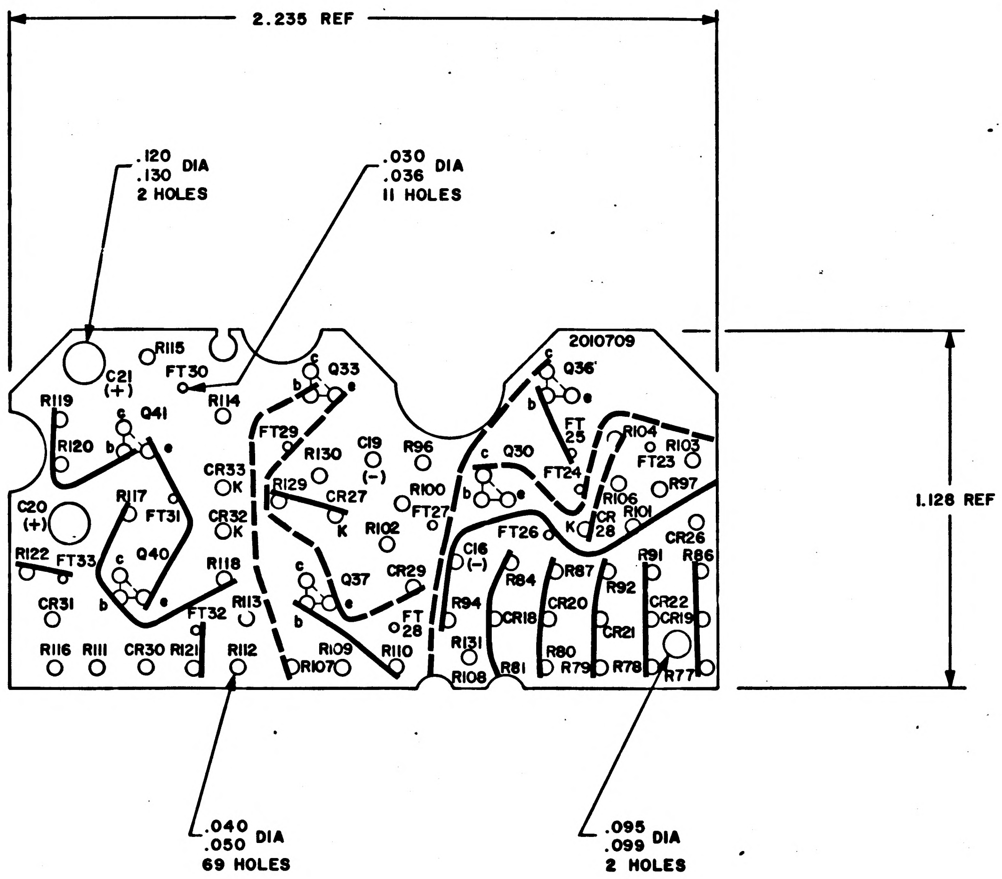
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Wolski DATE 13 DEC 65
CHECKED 26 Jan 66
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD D
MODE MODULE

CODE IDENT NO. 80230
SIZE D
2010707
SCALE 4/1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27967		28 FEB 66	



2.235 REF
.120 .130 DIA 2 HOLES
.030 .036 DIA 11 HOLES
1.126 REF
.040 .050 DIA 69 HOLES
.095 .099 DIA 2 HOLES
2010709
C21 (+)
R115
FT30
R114
R119
R120
Q41
c
b
e
Q33
Q36
FT29
R130
C19 (−)
R96
CR33 K
CR32 K
R129
CR27
K
R100
FT27
R102
C20 (+)
R117
FT31
R122
FT33
Q40
CR31
R118
FT32
R113
Q37
CR29
FT 28
R116
R111
CR30
R121
R112
R107
R109
R110
Q30
FT 25
FT24
R104
R103
FT23
R97
R106
CR 28
R101
FT26
C16 (−)
CR26
R84
R87
R92
R91
R86
R94
CR18
CR20
CR21
CR22
CR19
R131
R108
R81
R80
R79
R78
R77

REF DRAWING
NO 2010708 PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK BLACK CHARACTERS PER ND1002015
3. MATERIAL: .031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE.
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
5. BROKEN LINE DENOTES SLEEVING.

2007254	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J Holski DATE 20 DEC 65
CHECKED 29 Mar 66
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

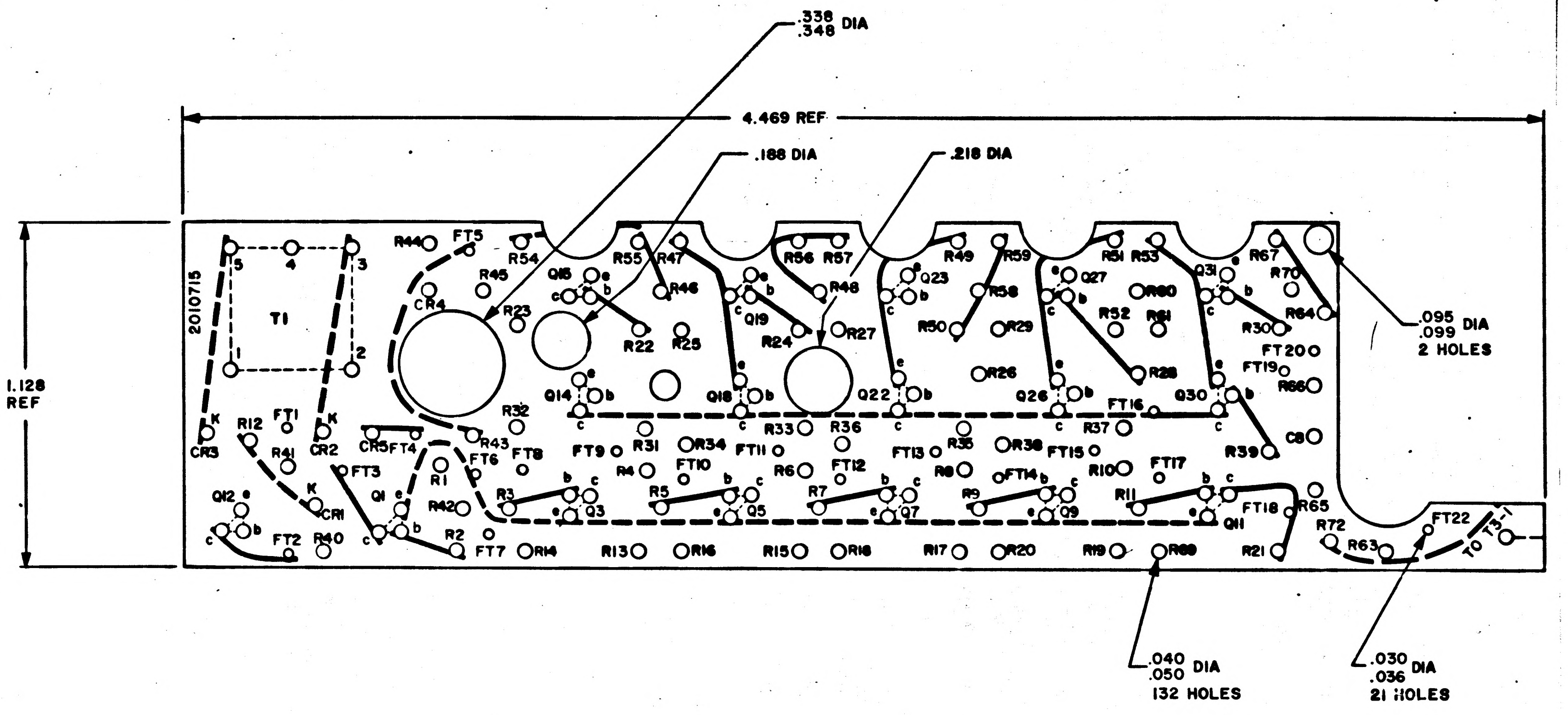
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD B
MODE MODULE

CODE IDENT NO. SIZE D 2010709
SCALE 4/1 SHEET 1 OF 1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 27831		9 MAR 66	


.338
.348 DIA
4.469 REF
.188 DIA
.218 DIA
1.128 REF
.095
.099 DIA
2 HOLES
.040
.050 DIA
132 HOLES
.030
.036 DIA
21 HOLES
2010715
T1
1
2
3
4
5
CR1
CR2
CR3
CR4
CR5
K
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT9
FT10
FT11
FT12
FT13
FT14
FT15
FT16
FT17
FT18
FT19
FT20
FT22
Q1
Q3
Q5
Q7
Q9
Q11
Q12
Q14
Q15
Q18
Q19
Q22
Q23
Q26
Q27
Q30
Q31
e
b
c
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
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R28
R29
R30
R31
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R33
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R36
R37
R38
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
R51
R52
R53
R54
R55
R56
R57
R58
R59
R60
R61
R63
R64
R65
R66
R67
R69
R70
R72
C8
TO T3-1

NOTES:

1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE.
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133.
4. MARK BLACK CHARACTERS PER ND1002019.
5. BROKEN LINE DENOTES SLEEVING.

REF DRAWING:
2010714 PHOTOGRAPHIC MASTER

NEXT ASSY	USED ON
2007237	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .010 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J. Wolski DATE 28 JAN 66
CHECKED J. GRIEB 18 FEB 66
APPROVAL E. [illegible] 28 FEB 66
APPROVAL R. [illegible] 29 MAR 66 [illegible] 4 Apr '66
NASA APPROVAL B. C. METZGER
MIT APPROVAL [illegible] 66

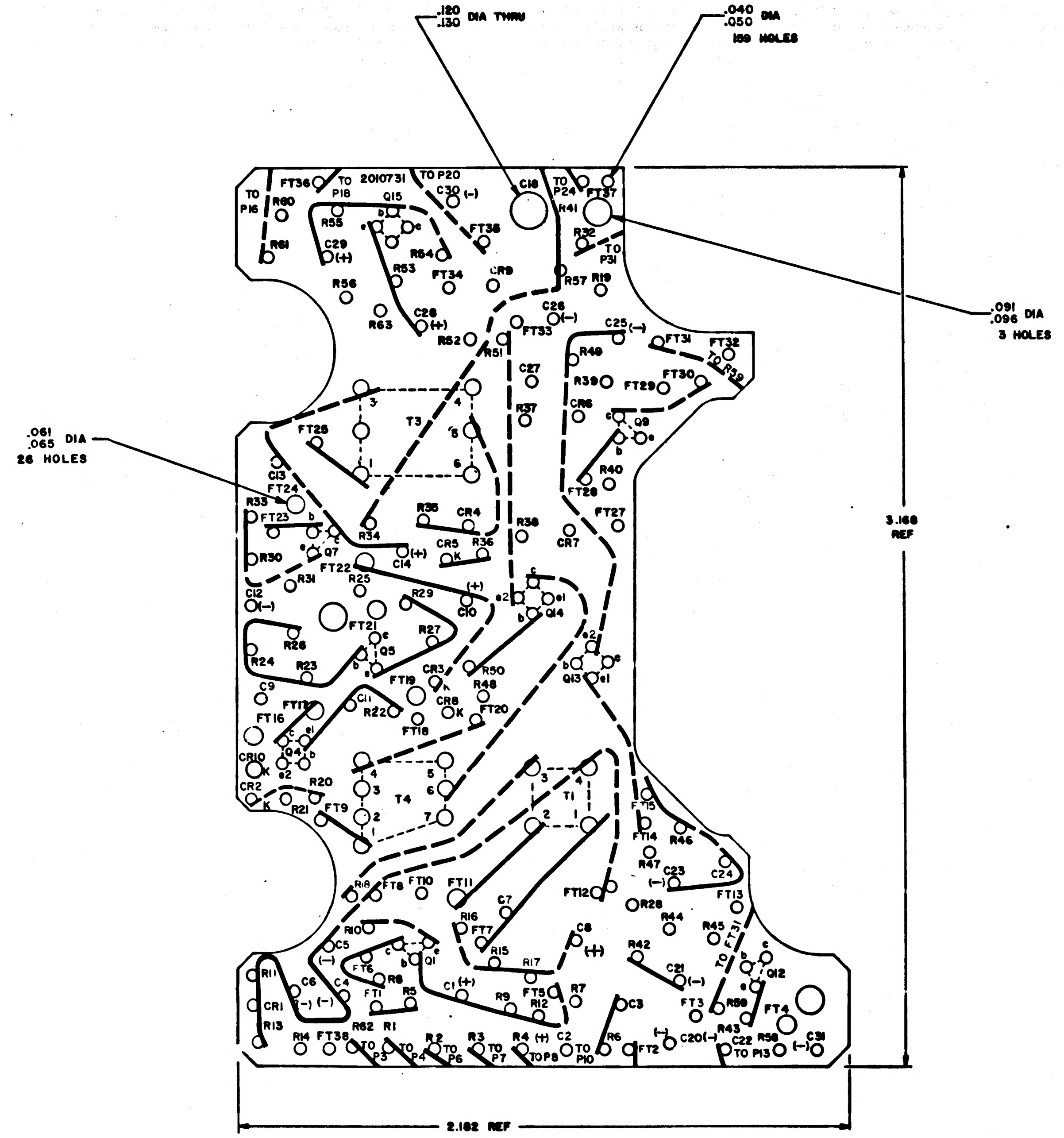
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD A
D/A CONVERTER

CODE IDENT NO. 80230
SIZE D
2010715
SCALE 4/1
SHEET 1 OF 1

NOTICE WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		INITIAL RELEASE CLASS A PER TDRR 24692			22 APRIL 66	



.120 DIA THRU
.130
.040 DIA
.050
199 HOLES
.091 DIA
.096
3 HOLES
.061 DIA
.065
26 HOLES
3.168 REF
2.182 REF
2010731
TO P16
TO P18
TO P20
TO P24
TO P31
FT36
FT37
C16
T1
T3
T4
Q1
Q4
Q5
Q7
Q9
Q12
Q13
Q14
Q15
TO P3
TO P4
TO P6
TO P7
TO P8
TO P10
TO P13

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THICK PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND1002133
4. MARK BLACK CHARACTERS PER ND1002019
5. BROKEN LINE DENOTES SLEEVING

REF DRAWING:
DWG 2010735 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2010734	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN M. Zmarzak 19 APR 66
CHECKED [illegible] 20 APR 66
APPROVED [illegible]
APPROVED [illegible]
APPROVED MIT M G Marley 6-2-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

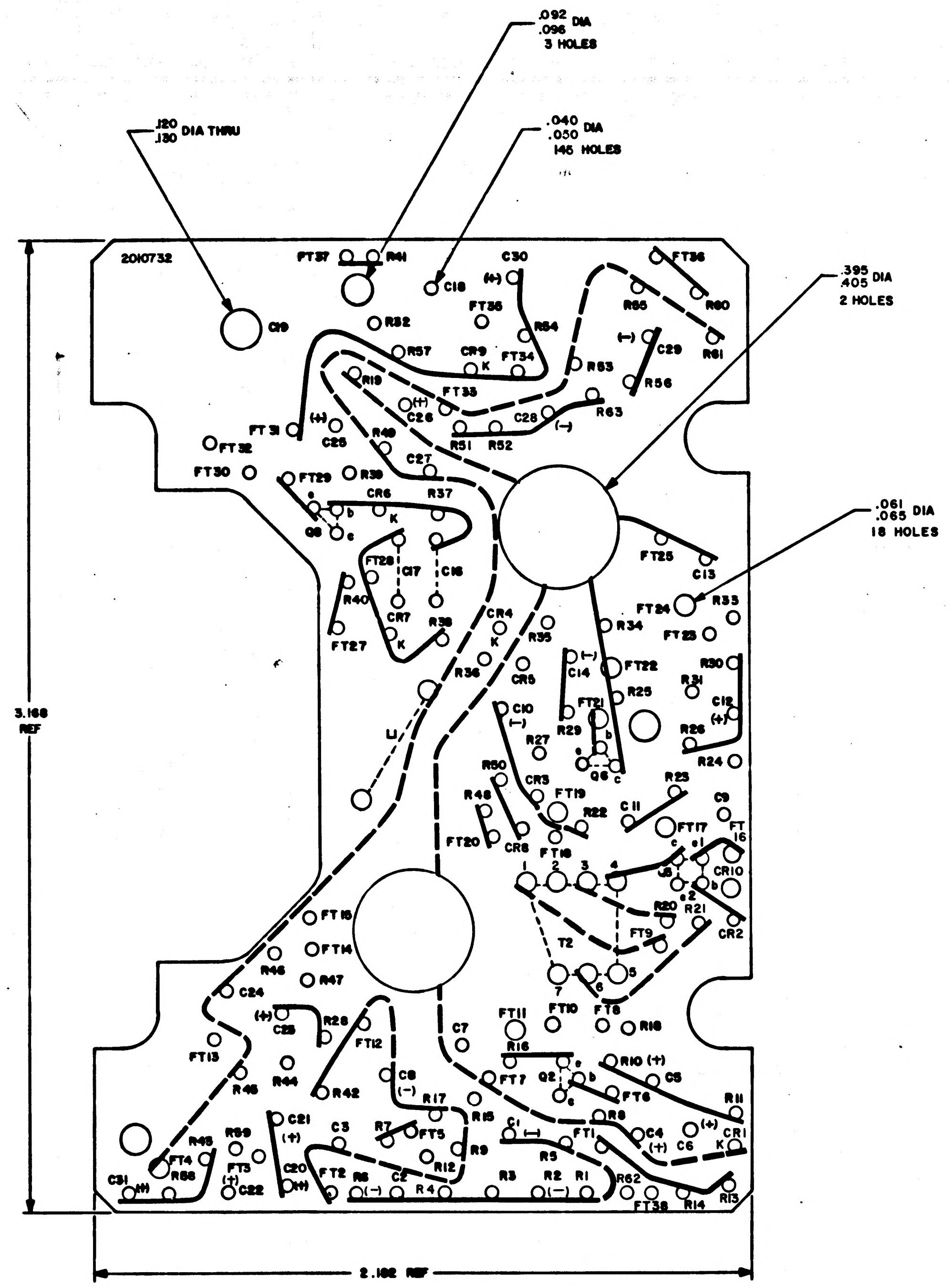
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230 SIZE E DRAWING NO. 2010731
SCALE 5/1 SHEET 1 OF 1

2010731 A

NOTICE WHEN GOVERNMENT DRAWINGS SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		INITIAL RELEASE CLASS A PER TDRR 29460			22 APRIL 66	



.092 .096 DIA 3 HOLES
.120 .130 DIA THRU
.040 .050 DIA 145 HOLES
.395 .405 DIA 2 HOLES
.061 .065 DIA 18 HOLES
3.168 REF
2.182 REF
2010732
FT37
R41
C30
(+)
C18
FT36
C19
R32
FT35
R54
R55
R60
R57
CR9
K
FT34
R53
(−)
C29
R61
R56
R19
FT33
(+)
C26
C28
(−)
R63
FT31
(+)
C25
R49
R51
R52
FT32
C27
FT30
FT29
R39
CR6
R37
e
b
c
Q8
K
FT28
C17
C16
FT25
C13
R40
CR7
R38
FT24
R33
K
CR4
R34
FT27
K
R35
FT23
R36
CR5
C14
(−)
FT22
R30
R31
R25
C10
(−)
FT21
C12
(+)
R29
R26
L1
R27
b
e
Q6
c
R24
R50
CR3
R23
FT19
C9
R48
R22
C11
FT17
FT 16
FT20
CR8
FT18
c
e1
Q5
CR10
1
2
3
4
b
e2
R20
R21
FT15
CR2
FT9
FT14
T2
R46
R47
5
6
7
C24
FT10
FT8
R18
(+)
C23
R28
FT11
FT12
C7
R16
R10 (+)
FT13
C8
(−)
FT7
Q2
e
b
c
C5
R44
R42
FT6
R45
R17
R15
R8
R11
R59
C21
(+)
C3
R7
FT5
C1
(−)
FT1
C4
(+)
C6
CR1
K
R43
FT4
R58
FT3
(+)
C22
C20
(+)
R12
R9
R5
C31
(+)
FT2
R6
(−)
C2
R4
R3
R2
(−)
R1
R62
FT38
R14
R13

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: PLASTIC SHEET .031 THK PER MIL-P-18177 TYPE GEE
3. MARK BLACK CHARACTERS PER ND 1002019
4. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002123
5. BROKEN LINE DENOTES SLEE G

REF DRAWING:
DRAWING NO. 2010736 FOR PHOTOGRAPHIC MASTER

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

2010734	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN M. T. [illegible] 19 APR 66
CHECKED [illegible] 20 APR 66
APPROVED [illegible] 66
APPROVED [illegible]
APPROVED MIT [illegible] 6-7-66
A. G. METCALF
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

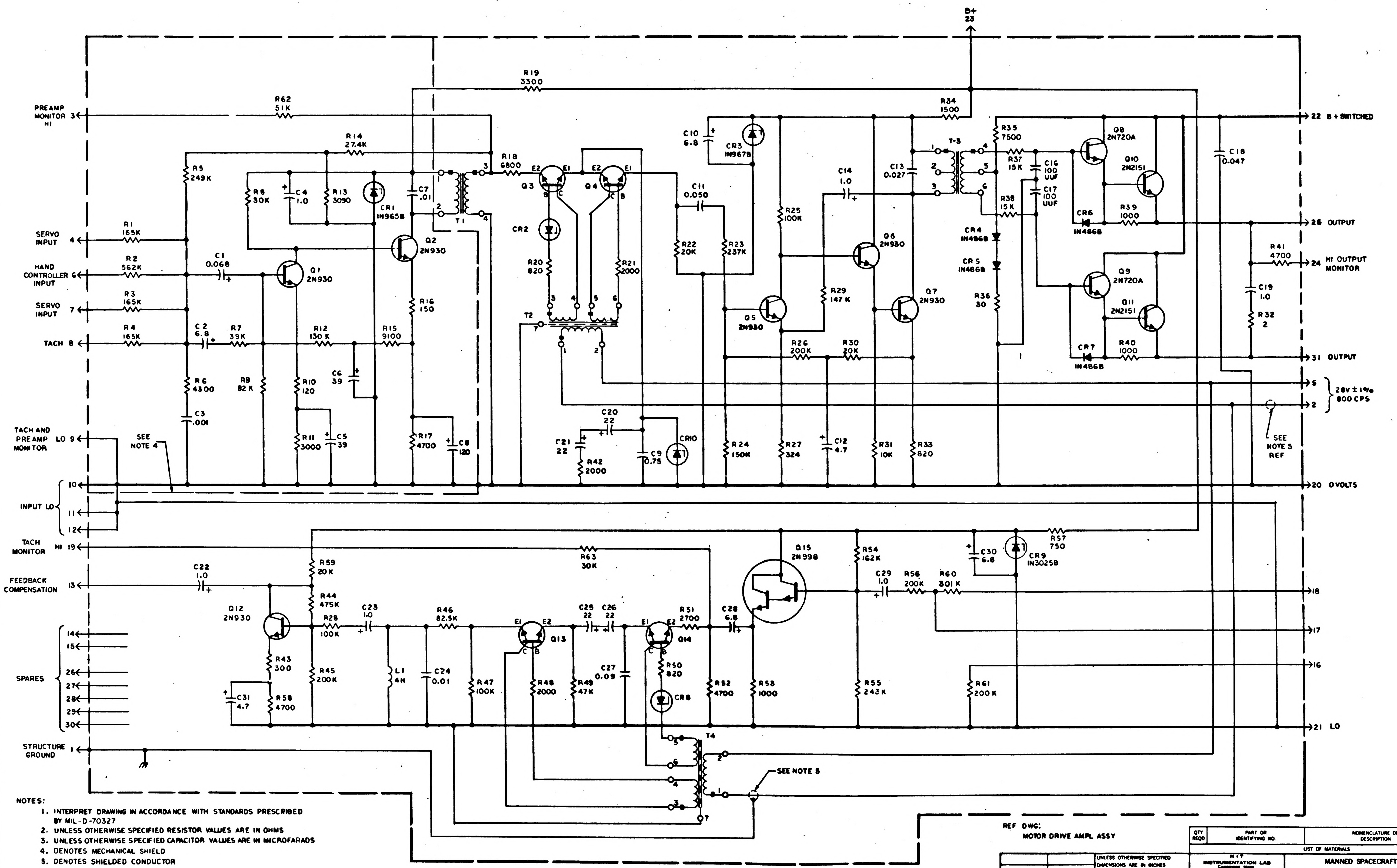
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010732
SCALE 8/1
SHEET 1 OF 1

2010732 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE CLASS A PER TDRR 27400	22 APRIL 66	



B+ 23
PREAMP MONITOR HI 3
SERVO INPUT 4
HAND CONTROLLER INPUT 6
SERVO INPUT 7
TACH 8
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
INPUT LO 10 11 12
TACH MONITOR HI 19
FEEDBACK COMPENSATION 13
SPARES 14 15 26 27 28 29 30
STRUCTURE GROUND 1
R62 51K
R14 27.4K
R19 3300
R18 6800
R5 249K
R1 165K
R2 562K
R3 165K
R4 165K
C1 0.068
C2 6.8
R7 39K
R12 130K
R15 9100
R8 30K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
Q1 2N930
Q2 2N930
R16 150
R6 4300
C3 .001
R9 82K
R10 120
C6 39
R11 3000
C5 39
R17 4700
C8 120
E2 E1 Q3 B C
E2 E1 Q4 C B
CR2
R20 820
R21 2000
T2
C20 22
C21 22
R42 2000
C9 0.75
CR10
C10 6.8
CR3 1N967B
C11 0.050
R22 20K
R23 237K
R24 150K
R25 100K
C14 1.0
Q5 2N930
Q6 2N930
Q7 2N930
R26 200K
R29 147K
R30 20K
R27 324
C12 4.7
R31 10K
R33 820
R34 1500
C13 0.027
T-3
R35 7500
R37 15K
R38 15K
C16 100 UUF
C17 100 UUF
CR4 1N486B
CR5 1N486B
R36 30
Q8 2N720A
Q10 2N2151
Q9 2N720A
Q11 2N2151
CR6 1N486B
CR7 1N486B
R39 1000
R40 1000
C18 0.047
R41 4700
C19 1.0
R32 2
22 B+ SWITCHED
25 OUTPUT
24 HI OUTPUT MONITOR
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
Q15 2N998
R54 162K
C30 6.8
CR9 1N3025B
R57 750
R59 20K
R63 30K
C22 1.0
Q12 2N930
R44 475K
R28 100K
C23 1.0
R46 82.5K
C25 22
C26 22
R51 2700
C28 6.8
C29 1.0
R56 200K
R60 301K
18
17
16
R43 300
R58 4700
C31 4.7
R45 200K
L1 4H
C24 0.01
R47 100K
E1 E2 Q13 C B
R48 2000
R49 47K
C27 0.09
E1 E2 Q14 C B
R50 820
CR8
R52 4700
R53 1000
R55 243K
R61 200K
21 LO
T4
SEE NOTE 5

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN DATE 66
CHECKED 18 APR 66
APPROVAL R Gunwood 18 APR 66
APPROVAL
NASA APPROVAL
MIT APPROVAL W C Markey 6-7-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010733
SCALE —
WT —
SHEET 1 OF 2

2010733 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 29460		22 APRIL 66	

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	±1%	1/8 W
R 2	1010374-5		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364-711		249K	↓	↓
R 6	1006750-47		4300	±2%	1/4 W
R 7	1006750-70		39K	±2%	1/4 W
R 8	1006750-67		30K	±2%	1/4 W
R 9	-78		82K		
R 10	-10		120		
R 11	↓ -43		3000		
R 12	1006750-83		130K	↓	↓
R 13	1010364-345		3090	±1%	1/8 W
R 14	1010364-527		27.4K	±1%	1/8 W
R 15	1006750-55		9100	±2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	↓ -39		2000		
R 22	1006750-63		20K	↓	↓
R 23	1010364-707		237K	±1%	1/8 W
R 24	1010364-669		150K	±1%	1/8 W
R 25	1006750-80		100K	±2%	1/4 W
R 26	1010364-693		200K	±1%	1/8 W
R 27	1010364-157		324	±1%	1/8 W
R 28	1010364-635		100K	±1%	1/8 W
R 29	1010364-667		147K	±1%	1/8 W
R 30	1006750-63		20K	±2%	1/4 W
R 31	1006750-56		10K	±2%	1/4 W
R 32	1006788-22		2	±1%	1/4W
R 33	1006750-30		820	±2%	1/4W
R 34	1006750-36		1500	±2%	1/4W
R 35	1006750-53		7500	±2%	1/4W
R 36	1010369-138		30	±5%	1/8 W
R 37	1006750-60		15K	±2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	↓ -39		2000		
R 43	1006750-19		300	↓	↓
R 44	1010364-765		475K	±1%	1/8 W
R 45	1010364-693		200K	±1%	1/8 W
R 46	1010364-61[illegible]		82.5K	±1%	1/8W
R 47	1006750-80		100K	±2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	↓ -48		4700		
R 53	1006750-32		1000	↓	↓
R 54	1010364-675		162K	±1%	1/8 W
R 55	1010364-709		243K	±1%	1/8W
R 56	1010364-693		200K	±1%	1/8W
R 57	1010604-16		750	±1%	1 W
R 58	1006750-48		4700	±2%	1/4 W
R 59	1006750-63		20K	±2%	1/4 W
R 60	1010364-727		301K	±1%	1/8 W
R 61	1010364-693		200K	±1%	1/8 W
R 62	1006750-73	↓	51K	±2%	1/4 W
R 63	1006750-67	RESISTOR	30K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-55	CAPACITOR	0.068	±10%	35 VDC
C 2	1006755-2		6.8	±10%	6
C 3	1010264-1		0.001	±5%	200
C 4	1006755-69		1.0	±10%	35
C 5	1006755-13		39	±10%	10
C 6	1006755-13		39	±10%	10
C 7	1010264-13		0.01	±5%	200
C 8	1006755-15		120	±10%	10
C 9	1010279-110		0.75		15
C 10	1006755-79		6.8		35
C 11	1010279-216		0.050		35
C 12	1006755-10		4.7	↓	10
C 13	1010264-18		0.027	±5%	200
C 14	1006755-69		1.0	±10%	35
C 16	1010359-5		100UUF	±10%	200
C 17	1010359-5		100UUF	±10%	200
C 18	1010264-21		0.047	±5%	200
C 19	1010264-37		1.0	±5%	200
C 20	1006755-21		22	±10%	15
C 21	1006755-21		22	±10%	15
C 22	1006755-69		1.0	±10%	35
C 23	1006755-69		1.0	±10%	35
C 24	1010264-13		0.01	±5%	200
C 25	1006755-21		22	±10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755-79		6.8		35
C 29	1006755-69		1.0		35
C 30	1006755-79	↓	6.8		35 ↓
C 31	1006755-10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1010830-9	DIODE			
CR2	1010372-11				
CR3	1010830-11				
CR4	1010392-1		IN486B		
CR5	1010392-1		IN486B		
CR6	1010392-1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	↓	IN3025B		
CR10	1010372-1	DIODE			
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397-1	TRANSISTOR	2N930		
Q 6	1010397-1		2N930		
Q 7	1010397-1		2N930		
Q 8	1010357-1		2N720A		
Q 9	1010357-1		2N720A		
Q10 Q11	1010269-2	↓	2N2151	MATCHED PAIR	
Q12	1010397-1	TRANSISTOR	2N930		
Q13	1010367	CHOPPER			
Q14	1010367	CHOPPER			
Q15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
CONTRACT
DRAWN DATE
CHECKED 18 APR 66
APPROVAL
APPROVAL
NASA APPROVAL A. C. [illegible]
MIT APPROVAL 6-7-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

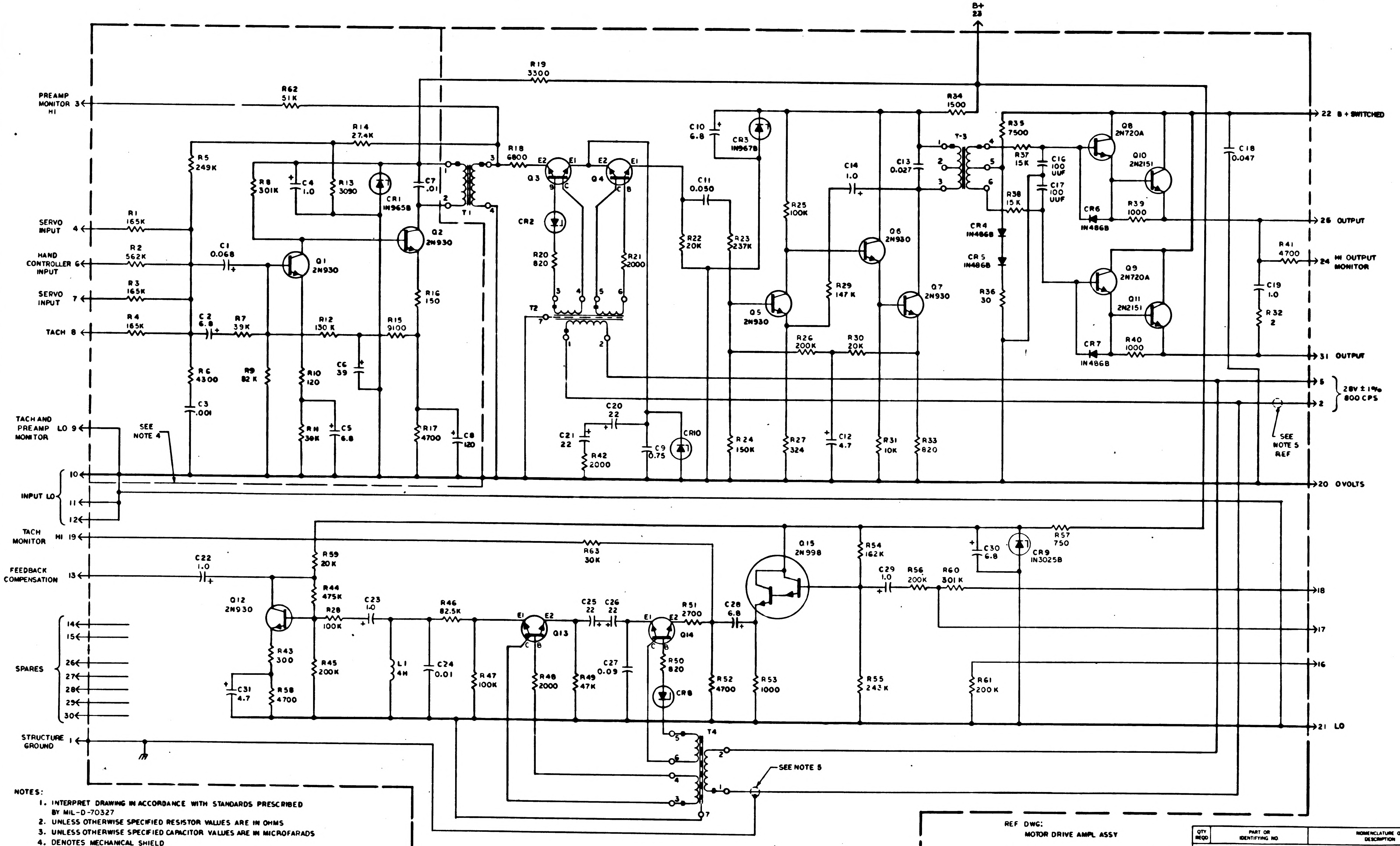
CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010733
SCALE —
WT —
SHEET 2 OF 2

2010733 A

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE CLASS A PER TDRR	22 APRIL 66	
B	REVISED PER TDRR 30374	9 AUG 66	B / JT


B+ 23
R19 3300
PREAMP MONITOR HI 3
R62 51K
R14 27.4K
R18 6800
R5 249K
R8 301K
C4 1.0
R13 3090
CR1 1N965B
C7 .01
T1
Q3
Q4
E2 E1 B C
CR2
R20 820
R21 2000
T2
C10 6.8
CR3 1N967B
C11 0.050
R22 20K
R23 237K
R34 1500
C14 1.0
C13 0.027
T-3
R35 7500
R37 15K
C16 100 UUF
C17 100 UUF
R38 15K
C18 0.047
Q8 2N720A
Q10 2N2151
R39 1000
CR6 1N486B
22 B+ SWITCHED
25 OUTPUT
R41 4700
24 HI OUTPUT MONITOR
C19 1.0
R32 2
Q9 2N720A
Q11 2N2151
CR7 1N486B
R40 1000
31 OUTPUT
CR4 1N486B
CR5 1N486B
R36 30
R25 100K
Q6 2N930
Q5 2N930
Q7 2N930
R29 147K
R26 200K
R30 20K
SERVO INPUT 4
R1 165K
HAND CONTROLLER INPUT 6
R2 562K
C1 0.068
Q1 2N930
Q2 2N930
SERVO INPUT 7
R3 165K
TACH 8
R4 165K
C2 6.8
R7 39K
R12 130K
R15 9100
R16 150
C6 39
R6 4300
R9 82K
R10 120
C3 .001
R11 30K
C5 6.8
R17 4700
C8 120
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
C20 22
C21 22
R42 2000
C9 0.75
CR10
R24 150K
R27 324
C12 4.7
R31 10K
R33 820
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
INPUT LO 10 11 12
20 0 VOLTS
TACH MONITOR HI 19
R63 30K
R59 20K
Q15 2N998
R54 162K
C30 6.8
CR9 1N3025B
R57 750
FEEDBACK COMPENSATION 13
C22 1.0
Q12 2N930
R44 475K
R28 100K
C23 1.0
R46 82.5K
C25 22
C26 22
R51 2700
C28 6.8
C29 1.0
R56 200K
R60 301K
18
17
16
SPARES 14 15 26 27 28 29 30
R43 300
C31 4.7
R58 4700
R45 200K
L1 4H
C24 0.01
R47 100K
Q13
R48 2000
R49 47K
C27 0.09
Q14
R50 820
CR8
R52 4700
R53 1000
R55 243K
R61 200K
21 LO
STRUCTURE GROUND 1
T4
SEE NOTE 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN [illegible] 66
CHECKED [illegible] 18 APR 66
APPROVAL [illegible]
APPROVAL [illegible] 4/28
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 6-7-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010733
SCALE —
WT —
SHEET 1 OF 2

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REVISIONS

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 2447		22 APRIL 66	
B		REVISED PER TDRR 30374	TDRR 30374	24 AUG 66	JJB

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364 - 677	RESISTOR	165K	± 1 %	1/8 W
R 2	1010374 - 5		562K		
R 3	1010364 - 677		165K		
R 4	1010364 - 677		165K		
R 5	1010364 - 711		249K		
R 6	1006750 - 47		4300	± 2 %	1/4 W
R 7	1006750 - 70		39K	± 2 %	1/4 W
R 8	1010364 - 727		301K	± 1 %	1/8 W
R 9	- 78		82K		
R 10	- 10		120		
R 11	1006750 - 70		39 K	± 2 %	1/4 W
R 12	1006750 - 83		130 K		
R 13	1010364 - 345		3090	± 1 %	1/8 W
R 14	1010364 - 527		27.4K	± 1 %	1/8 W
R 15	1006750 - 55		9100	± 2 %	1/4 W
R 16	- 12		150		
R 17	- 48		4700		
R 18	- 52		6800		
R 19	- 44		3300		
R 20	- 30		820		
R 21	- 39		2000		
R 22	1006750 - 63		20K		
R 23	1010364 - 707		237K	± 1 %	1/8 W
R 24	1010364 - 669		150K	± 1 %	1/8 W
R 25	1006750 - 80		100K	± 2 %	1/4 W
R 26	1010364 - 693		200K	± 1 %	1/8 W
R 27	1010364 - 157		324	± 1 %	1/8 W
R 28	1010364 - 635		100K	± 1 %	1/8 W
R 29	1010364 - 667		147 K	± 1 %	1/8 W
R 30	1006750 - 63		20 K	± 2 %	1/4 W
R 31	1006750 - 56		10 K	± 2 %	1/4 W
R 32	1006788 - 22		2	± 1 %	1/4 W
R 33	1006750 - 30		820	± 2 %	1/4 W
R 34	1006750 - 36		1500	± 2 %	1/4 W
R 35	1006750 - 53		7500	± 2 %	1/4 W
R 36	1010369 - 138		30	± 5 %	1/8 W
R 37	1006750 - 60		15K	± 2 %	1/4 W
R 38	- 60		15K		
R 39	- 32		1000		
R 40	- 32		1000		
R 41	- 48		4700		
R 42	- 39		2000		
R 43	1006750 - 19		300		
R 44	1010364 - 765		475K	± 1 %	1/8 W
R 45	1010364 - 693		200K	± 1 %	1/8 W
R 46	1010364 - 619		82.5K	± 1 %	1/8 W
R 47	1006750 - 80		100K	± 2 %	1/4 W
R 48	- 39		2000		
R 49	- 72		47K		
R 50	- 30		820		
R 51	- 42		2700		
R 52	- 48		4700		
R 53	1006750 - 32		1000		
R 54	1010364 - 675		162K	± 1 %	1/8 W
R 55	1010364 - 709		243K	± 1 %	1/8 W
R 56	1010364 - 693		200K	± 1 %	1/8 W
R 57	1010604 - 16		750	± 1 %	1 W
R 58	1006750 - 48		4700	± 2 %	1/4 W
R 59	1006750 - 63		20K	± 2 %	1/4 W
R 60	1010364 - 727		301 K	± 1 %	1/8 W
R 61	1010364 - 693		200K	± 1 %	1/8 W
R 62	1006750 - 73		51 K	± 2 %	1/4 W
R 63	1006750 - 67	RESISTOR	30 K	± 2 %	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755 - 55	CAPACITOR	0.068	± 10 %	35 VDC
C 2	1006755 - 2		6.8	± 10 %	6
C 3	1010264 - 1		0.001	± 5 %	200
C 4	1006755 - 69		1.0	± 10 %	35
C 5	1006755 - 79		6.8	± 10 %	35
C 6	1006755 - 13		39	± 10 %	10
C 7	1010264 - 13		0.01	± 5 %	200
C 8	1006755 - 15		120	± 10 %	10
C 9	1010279 - 110		0.75		15
C 10	1006755 - 79		6.8		35
C 11	1010279 - 216		0.050		35
C 12	1006755 - 10		4.7		10
C 13	1010264 - 18		0.027	± 5 %	200
C 14	1006755 - 69		1.0	± 10 %	35
C 16	1010359 - 5		100UUF	± 10 %	200
C 17	1010359 - 5		100UUF	± 10 %	200
C 18	1010264 - 21		0.047	± 5 %	200
C 19	1010264 - 37		1.0	± 5 %	200
C 20	1006755 - 21		22	± 10 %	15
C 21	1006755 - 21		22	± 10 %	15
C 22	1006755 - 69		1.0	± 10 %	35
C 23	1006755 - 69		1.0	± 10 %	35
C 24	1010264 - 13		0.01	± 5 %	200
C 25	1006755 - 21		22	± 10 %	15
C 26	1006755 - 21		22		15
C 27	1010279 - 219		0.09		35
C 28	1006755 - 79		6.8		35
C 29	1006755 - 69		1.0		35
C 30	1006755 - 79		6.8		35
C 31	1006755 - 10	CAPACITOR	4.7		10 VDC
L 1	1010277 - 6	INDUCTOR	4 H		
CR1	1008815 - 9	DIODE			
CR2	1010372 - 11				
CR3	1008815 - 11				
CR4	1010392 - 1		1N486B		
CR5	1010392 - 1		1N486B		
CR6	1010392 - 1		1N486B		
CR7	1010392 - 1		1N486B		
CR8	1010372 - 11				
CR9	1010829 - 10		1N3025B		
CR10	1010372 - 1	DIODE			
Q 1	1010397 - 1	TRANSISTOR	2N930		
Q 2	1010397 - 1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397 - 1	TRANSISTOR	2N 930		
Q 6	1010397 - 1		2N 930		
Q 7	1010397 - 1		2N 930		
Q 8	1010357 - 1		2N 720A		
Q 9	1010357 - 1		2N 720A		
Q 10	1010269 - 2		2N2151	MATCHED PAIR	
Q 11					
Q 12	1010397 - 1	TRANSISTOR	2N930		
Q 13	1010367	CHOPPER			
Q 14	1010367	CHOPPER			
Q 15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL —
HEAT TREATMENT —
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CAMBRIDGE, MASS.

DRAWN R. Baker DATE
CHECKED 18 APR 66
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC, MOTOR DRIVE AMPLIFIER

CODE IDENT NO	SIZE	NASA DRAWING NO
80230	E	2010733

SCALE — WT — SHEET 2 OF 2

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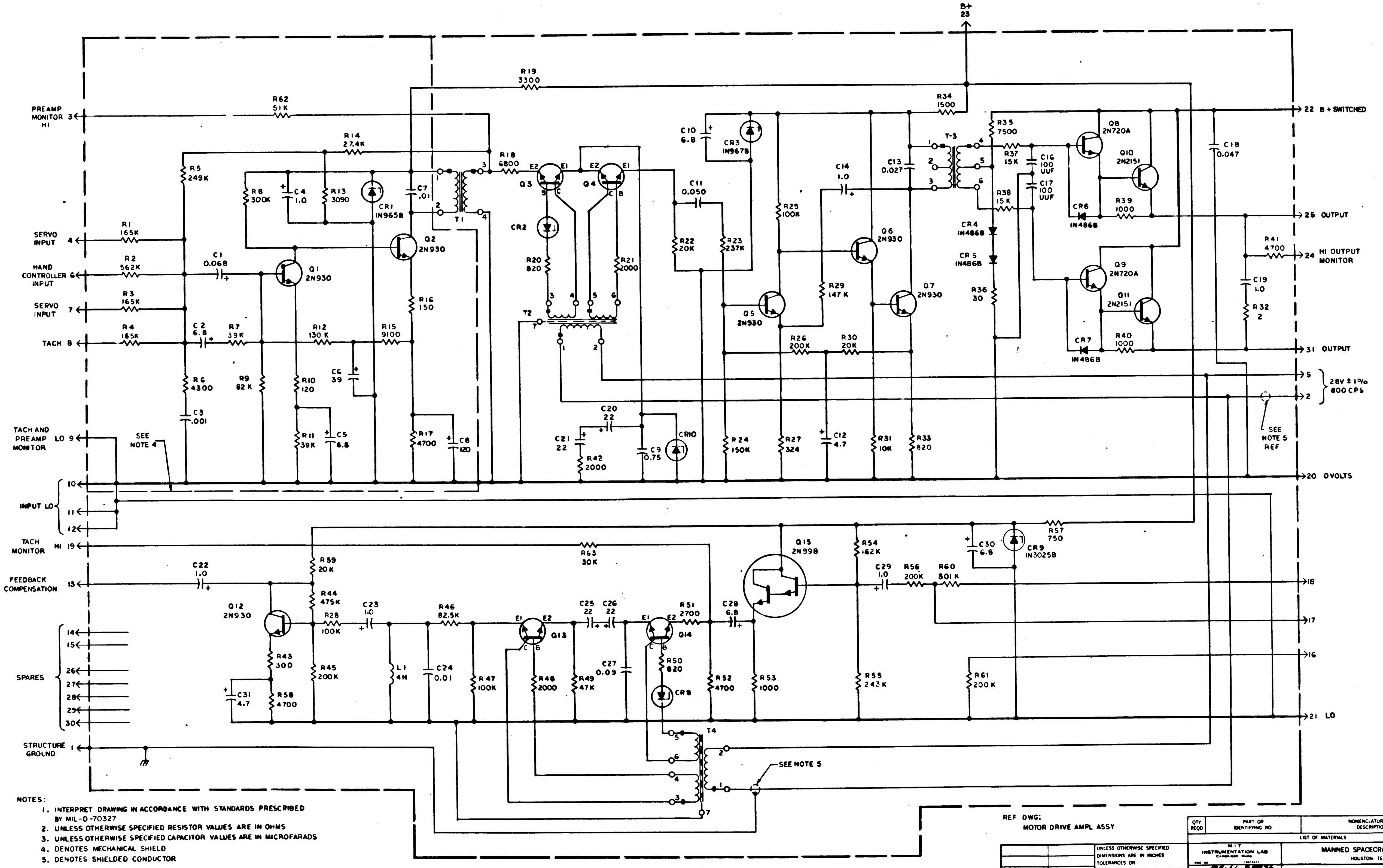
REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	INITIAL RELEASE CLASS A PER TDRR	22 APRIL 66	
B	REVISED PER TDRR 30374	[illegible] 66	JJB JI
C	REVISED PER TDRR 31088	19 SEP 66	JJB NS


B+
23
R19
3300
R62
51K
PREAMP MONITOR HI 3
R14
27.4K
R18
6800
E2
E1
Q3
Q4
C
B
R5
249K
R8
300K
C4
1.0
R13
3090
CR1
1N965B
C7
.01
1
2
3
4
T1
Q2
2N930
CR2
R20
820
R21
2000
SERVO INPUT 4
R1
165K
HAND CONTROLLER INPUT 6
R2
562K
C1
0.068
Q1
2N930
SERVO INPUT 7
R3
165K
R16
150
T2
7
5
6
TACH 8
R4
165K
C2
6.8
R7
39K
R12
130 K
R15
9100
C6
39
R6
4300
R9
82 K
R10
120
C3
.001
TACH AND PREAMP MONITOR LO 9
SEE NOTE 4
R11
39K
C5
6.8
R17
4700
C8
120
C20
22
C21
22
R42
2000
C9
0.75
CR10
C10
6.8
CR3
1N967B
C11
0.050
R22
20K
R23
237K
R25
100K
C14
1.0
Q6
2N930
Q5
2N930
R29
147 K
Q7
2N930
R26
200K
R30
20K
R24
150K
R27
324
C12
4.7
R31
10K
R33
820
R34
1500
C13
0.027
T-3
R35
7500
R37
15K
R38
15 K
C16
100 UUF
C17
100 UUF
CR4
1N486B
CR5
1N486B
R36
30
Q8
2N720A
Q10
2N2151
CR6
1N486B
R39
1000
Q9
2N720A
Q11
2N2151
CR7
1N486B
R40
1000
C18
0.047
22 B + SWITCHED
25 OUTPUT
R41
4700
24 HI OUTPUT MONITOR
C19
1.0
R32
2
31 OUTPUT
5
2
28V ± 1% 800 CPS
SEE NOTE 5 REF
20 0 VOLTS
INPUT LO 10 11 12
TACH MONITOR HI 19
R63
30K
FEEDBACK COMPENSATION 13
C22
1.0
Q12
2N930
R59
20K
R44
475K
R28
100K
C23
1.0
R46
82.5K
Q13
C25
22
C26
22
Q14
R51
2700
C28
6.8
Q15
2N998
R54
162K
C29
1.0
R56
200K
R60
301 K
C30
6.8
CR9
1N3025B
R57
750
18
17
16
SPARES 14 15 26 27 28 29 30
R43
300
C31
4.7
R58
4700
R45
200K
L1
4H
C24
0.01
R47
100K
R48
2000
R49
47K
C27
0.09
R50
820
CR8
R52
4700
R53
1000
R55
243 K
R61
200 K
21 LO
STRUCTURE GROUND 1
T4
SEE NOTE 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. DENOTES MECHANICAL SHIELD
5. DENOTES SHIELDED CONDUCTOR

REF DWG:
MOTOR DRIVE AMPL ASSY

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY | USED ON
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DRAWN [illegible] DATE
CHECKED J Hayles 18 APR 66
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL C. METZGER
MIT APPROVAL [illegible] 6 Jul 66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230 | SIZE E | NASA DRAWING NO 2010733
SCALE — | WT — | SHEET 1 OF 2

2010733 C

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REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR		22 APRIL 66	
B		REVISED PER TDRR 30374	TDRR 30374	3 AUG 66	JJB
C		REVISED PER TDRR 31099		19 SEP 66	JJB N.S.

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1010364-677	RESISTOR	165K	±1%	1/8 W
R 2	1010374-5		562K		
R 3	1010364-677		165K		
R 4	1010364-677		165K		
R 5	1010364-711		249K	↓	↓
R 6	1006750-47		4300	±2%	1/4 W
R 7	1006750-70		39K	±2%	1/4 W
R 8	1010369-92		300K	±1%	1/8 W
R 9	-78		82K		
R 10	↓ -10		120	↓	↓
R 11	1006750-70		39 K	±2%	1/4 W
R 12	1006750-83		130 K	↓	↓
R 13	1010364-345		3090	±1%	1/8 W
R 14	1010364-527		27.4K	±1%	1/8 W
R 15	1006750-55		9100	±2%	1/4 W
R 16	-12		150		
R 17	-48		4700		
R 18	-52		6800		
R 19	-44		3300		
R 20	-30		820		
R 21	↓ -39		2000		
R 22	1006750-63		20K	↓	↓
R 23	1010364-707		237K	±1%	1/8 W
R 24	1010364-669		150K	±1%	1/8 W
R 25	1006750-80		100K	±2%	1/4 W
R 26	1010364-693		200K	±1%	1/8 W
R 27	1010364-157		324	±1%	1/8 W
R 28	1010364-635		100K	±1%	1/8 W
R 29	1010364-667		147K	±1%	1/8 W
R 30	1006750-63		20K	±2%	1/4 W
R 31	1006750-56		10K	±2%	1/4W
R 32	1006788-22		2	±1%	1/4W
R 33	1006750-30		820	±2%	1/4W
R 34	1006750-36		1500	±2%	1/4W
R 35	1006750-53		7500	±2%	1/4W
R 36	1010369-138		30	±5%	1/8 W
R 37	1006750-60		15K	±2%	1/4 W
R 38	-60		15K		
R 39	-32		1000		
R 40	-32		1000		
R 41	-48		4700		
R 42	↓ -39		2000		
R 43	1006750-19		300	↓	↓
R 44	1010364-765		475K	±1%	1/8 W
R 45	1010364-693		200K	±1%	1/8 W
R 46	1010364-619		82.5K	±1%	1/8W
R 47	1006750-80		100K	±2%	1/4 W
R 48	-39		2000		
R 49	-72		47K		
R 50	-30		820		
R 51	-42		2700		
R 52	↓ -48		4700		
R 53	1006750-32		1000	↓	↓
R 54	1010364-675		162K	±1%	1/8 W
R 55	1010364-709		243K	±1%	1/8W
R 56	1010364-693		200K	±1%	1/8W
R 57	1010604-16		750	±1%	1 W
R 58	1006750-48		4700	±2%	1/4 W
R 59	1006750-63		20K	±2%	1/4 W
R 60	1010364-727		301 K	±1%	1/8 W
R 61	1010364-693		200K	±1%	1/8 W
R 62	1006750-73	↓	51 K	±2%	1/4 W
R 63	1006750-67	RESISTOR	30K	±2%	1/4 W

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 1	1006755-55	CAPACITOR	0.068	±10%	35 VDC
C 2	1006755-2		6.8	±10%	6
C 3	1010264-1		0.001	±5%	200
C 4	1006755-69		1.0	±10%	35
C 5	1006755-79		6.8	±10%	35
C 6	1006755-13		39	±10%	10
C 7	1010264-13		0.01	±5%	200
C 8	1006755-15		120	±10%	10
C 9	1010279-110		0.75		15
C 10	1006755-79		6.8		35
C 11	1010279-216		0.050		35
C 12	1006755-10		4.7	↓	10
C 13	1010264-18		0.027	±5%	200
C 14	1006755-69		1.0	±10%	35
C 16	1010359-5		100UUF	±10%	200
C 17	1010359-5		100UUF	±10%	200
C 18	1010264-21		0.047	±5%	200
C 19	1010264-37		1.0	±5%	200
C 20	1006755-21		22	±10%	15
C 21	1006755-21		22	±10%	15
C 22	1006755-69		1.0	±10%	35
C 23	1006755-69		1.0	±10%	35
C 24	1010264-13		0.01	±5%	200
C 25	1006755-21		22	±10%	15
C 26	1006755-21		22		15
C 27	1010279-219		0.09		35
C 28	1006755-79		6.8		35
C 29	1006755-69		1.0		35
C 30	1006755-79	↓	6.8		35 ↓
C 31	1006755-10	CAPACITOR	4.7	↓	10 VDC
L 1	1010277-6	INDUCTOR	4 H		
CR1	1008815-9	DIODE			
CR2	1010372-11				
CR3	1008815-11				
CR4	1010392-1		IN486B		
CR5	1010392-1		IN486B		
CR6	1010392-1		IN486B		
CR7	1010392-1		IN486B		
CR8	1010372-11				
CR9	1010829-10	↓	IN3025B		
CR10	1010372-1	DIODE			
Q 1	1010397-1	TRANSISTOR	2N930		
Q 2	1010397-1	TRANSISTOR	2N930		
Q 3	1010367	CHOPPER			
Q 4	1010367	CHOPPER			
Q 5	1010397-1	TRANSISTOR	2N930		
Q 6	1010397-1		2N930		
Q 7	1010397-1		2N930		
Q 8	1010357-1		2N720A		
Q 9	1010357-1		2N720A		
Q 10	1010269-2		2N2151	MATCHED PAIR	
Q 11		↓			
Q 12	1010397-1	TRANSISTOR	2N930		
Q 13	1010367	CHOPPER			
Q 14	1010367	CHOPPER			
Q 15	1010342	TRANSISTOR	2N998		
T 1	1010759	TRANSFORMER			
T 2	1010753	TRANSFORMER			
T 3	1010752	TRANSFORMER			
T 4	1010753	TRANSFORMER			

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

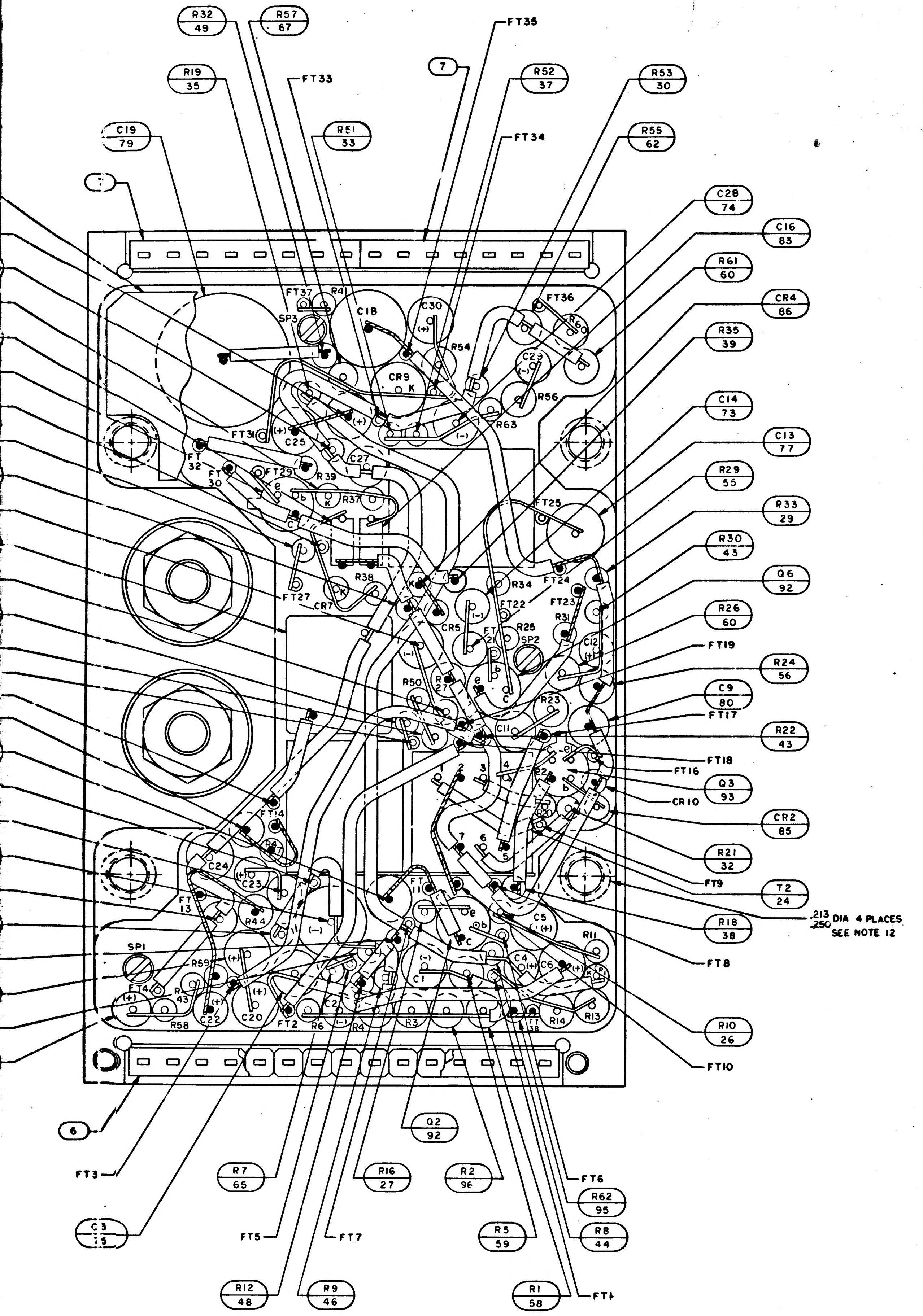
MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN R. Baker DATE 15 Apr 66
CHECKED Hayles 18 APR 66
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

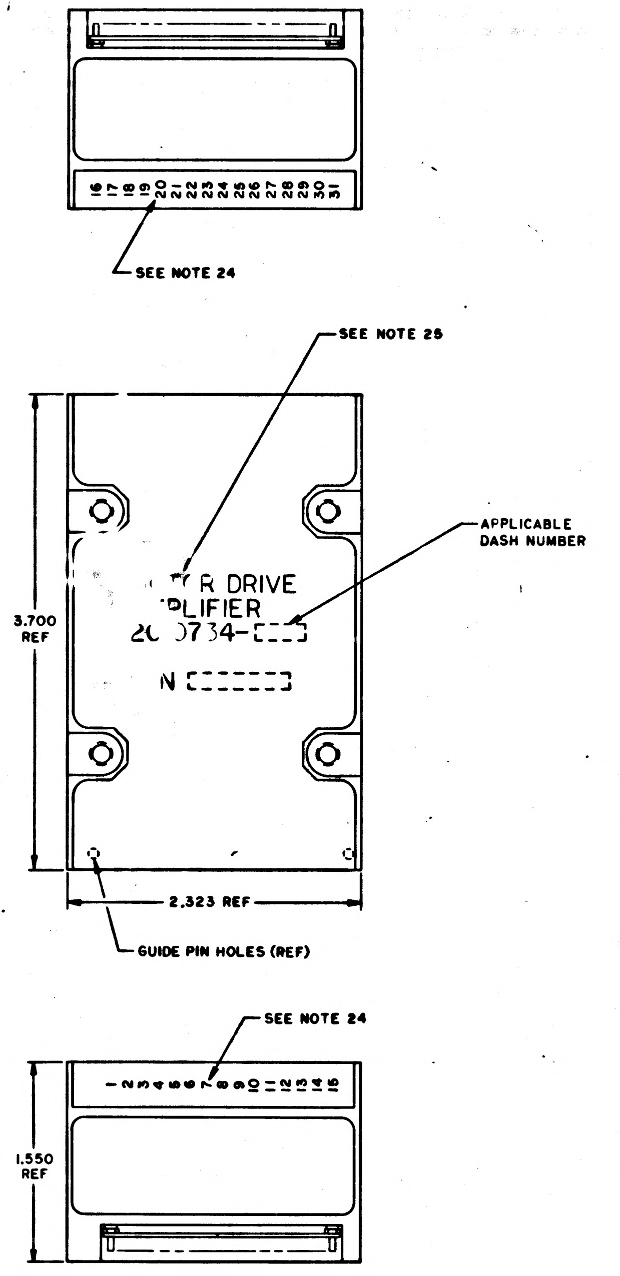
SCHEMATIC,
MOTOR DRIVE AMPLIFIER

CODE IDENT NO 80230
SIZE E
NASA DRAWING NO 2010733
SCALE —
WT —
SHEET 2 OF 2

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		INITIAL RELEASE CLASS A PER TDRR 27460			22 APRIL 66	



R32 49
R57 67
R19 35
FT33
FT35
7
R52 37
R53 30
C19 79
RE1 33
FT34
R55 62
C28 74
C16 83
R61 60
CR4 86
R35 39
C14 73
C13 77
R29 55
R33 29
R30 43
Q6 92
R26 60
FT19
R24 56
C9 80
FT17
R22 43
FT18
FT16
Q3 93
CR10
CR2 85
R21 32
FT9
T2 24
.213 .250 DIA 4 PLACES SEE NOTE 12
R18 38
FT8
R10 26
FT10
FT37
R41
SP3
C18
C30
FT36
R60
R54
C29
C27
CR9
K
R56
R63
FT31
C25
C27
FT 32
FT 30
FT29
R39
R37
FT25
R38
FT27
CR7
R34
FT24
FT22
FT23
R31
CR5
R25
SP2
C12
R50
R27
R23
C11
FT14
C24
FT 13
C23
R44
F1
C5
R11
SP1
R59
FT4
R43
C22
C20
FT2
R6
R4
C1
C4
C6
R14
R13
R58
6
FT3
Q2 92
R7 65
R16 27
R2 96
FT6
R62 95
C3 75
FT5
FT7
R5 59
R8 44
R12 48
R9 46
R1 58
FT1



16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
SEE NOTE 24
SEE NOTE 25
3.700 REF
OR DRIVE
PLIFIER
20 0734-
N
APPLICABLE DASH NUMBER
2.323 REF
GUIDE PIN HOLES (REF)
SEE NOTE 24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1.550 REF

MARKING VIEWS
SCALE 2/1

	2010733	SCHEMATIC	REF
AR	1010848-2	WIRE, ELECTRICAL	99
1	1006755-55	CAPACITOR	98
1	1010372-1	DIODE	97
1	1010374-5	RESISTOR	96
1	1006750-73	RESISTOR	95
1	1010277-6	INDUCTOR	94
4	1010367	CHOPPER	93
6	1010397-1	TRANSISTOR	92
2	1010357-1	TRANSISTOR	91
1	1010342	TRANSISTOR	90
1	1010269-2	TRANSISTOR (MATCHED PAIR)	89
1	1010830 -11	DIODE	88
1	1010830-9	DIODE	87
4	1010392-1	DIODE	86
2	1010372-11	DIODE	85
1	1010829-10	DIODE	84
2	1010359-5	CAPACITOR	83
1	1010279-219	CAPACITOR	82
1	1010279-216	CAPACITOR	81
1	1010279-110	CAPACITOR	80
1	1010264-37	CAPACITOR	79
1	1010264-21	CAPACITOR	78
1	1010264-18	CAPACITOR	77
2	1010264-13	CAPACITOR	76
1	1010264-1	CAPACITOR	75
3	1006755-79	CAPACITOR	74
5	1006755-69	CAPACITOR	73
4	1006755-21	CAPACITOR	72
1	1006755-15	CAPACITOR	71
2	1006755-13	CAPACITOR	70
2	1006755-10	CAPACITOR	69
1	1006755-2	CAPACITOR	68
1	1010604-16	RESISTOR	67
1	1010369-138	RESISTOR	66
1	1006750-70	RESISTOR	65
1	1010364-765	RESISTOR	64
1	1010364-727	RESISTOR	63
1	1010364-709	RESISTOR	62
1	1010364-707	RESISTOR	61
4	1010364-693	RESISTOR	60
1	1010364-711	RESISTOR	59
3	1010364-677	RESISTOR	58
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1	1010364-669	RESISTOR	56
1	1010364-667	RESISTOR	55
1	1010364-635	RESISTOR	54
1	1010364-619	RESISTOR	53
1	1010364-527	RESISTOR	52
1	1010364-675	RESISTOR	51
1	1010364-157	RESISTOR	50
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1	1006750-83	RESISTOR	48
2	1006750-80	RESISTOR	47
1	1006750-78	RESISTOR	46
1	1006750-72	RESISTOR	45
2	1006750-67	RESISTOR	44
3	1006750-63	RESISTOR	43
1	1006750-56	RESISTOR	42
1	1006750-55	RESISTOR	41
2	1006750-60	RESISTOR	40
1	1006750-53	RESISTOR	39
1	1006750-52	RESISTOR	38
4	1006750-48	RESISTOR	37
1	1006750-47	RESISTOR	36
1	1006750-44	RESISTOR	35
1	1006750-43	RESISTOR	34
1	1006750-42	RESISTOR	33
3	1006750-39	RESISTOR	32
1	1006750-36	RESISTOR	31
3	1006750-32	RESISTOR	30
3	1006750-30	RESISTOR	29
1	1006750-19	RESISTOR	28
1	1006750-12	RESISTOR	27
1	1006750-10	RESISTOR	26
1	1010759	TRANSFORMER	25
2	1010753	TRANSFORMER	24
1	1010752	TRANSFORMER	23
AR	1010807-17	WIRE, SHIELDED	22
AR	MIL-I-15126	INSUL. TAPE-TYPE MFT 2.5, 1/2 WIDE	21
			20
AR	1006776-21	INSULATION SLEEVING	19
AR	1006776-20	INSULATION SLEEVING	18
			17
AR	1006757-1	WIRE, ELECTRICAL	16
1	2008265	SHIELD	15
1	2008093-000	TERMINAL, THREADED	14
2	MS20341-10B	NUT, HEX	13
4	1008071-2	WASHER, FLAT	12
4	1008024-1	WASHER, INSULATOR	11
2	2008020-1	BUSHING, INSULATOR	10
6	1008161-3	SCREW, CAP, SLOTTED HEAD	9
3	1015135-019	SPACER, NYLON	8
2	1008540-8	GASKET, CONNECTOR	7
1	1008540-15	GASKET, CONNECTOR	6
1	2010732	WIRING BOARD BOTTOM	5
1	2010731	WIRING BOARD TOP	4
31	1006782-5	CONTACT, WRAPOST-MALE MINAT	3
31	1006775	INSULATOR, WRAPOST-MALE MINAT	2
1	2008175	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

2010734 A

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R Blake 13 APR 66
CHECKED J Taylor 13 APR 66
APPROVED 13 APR 66
APPROVED
APPROVED MIT 6-7-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

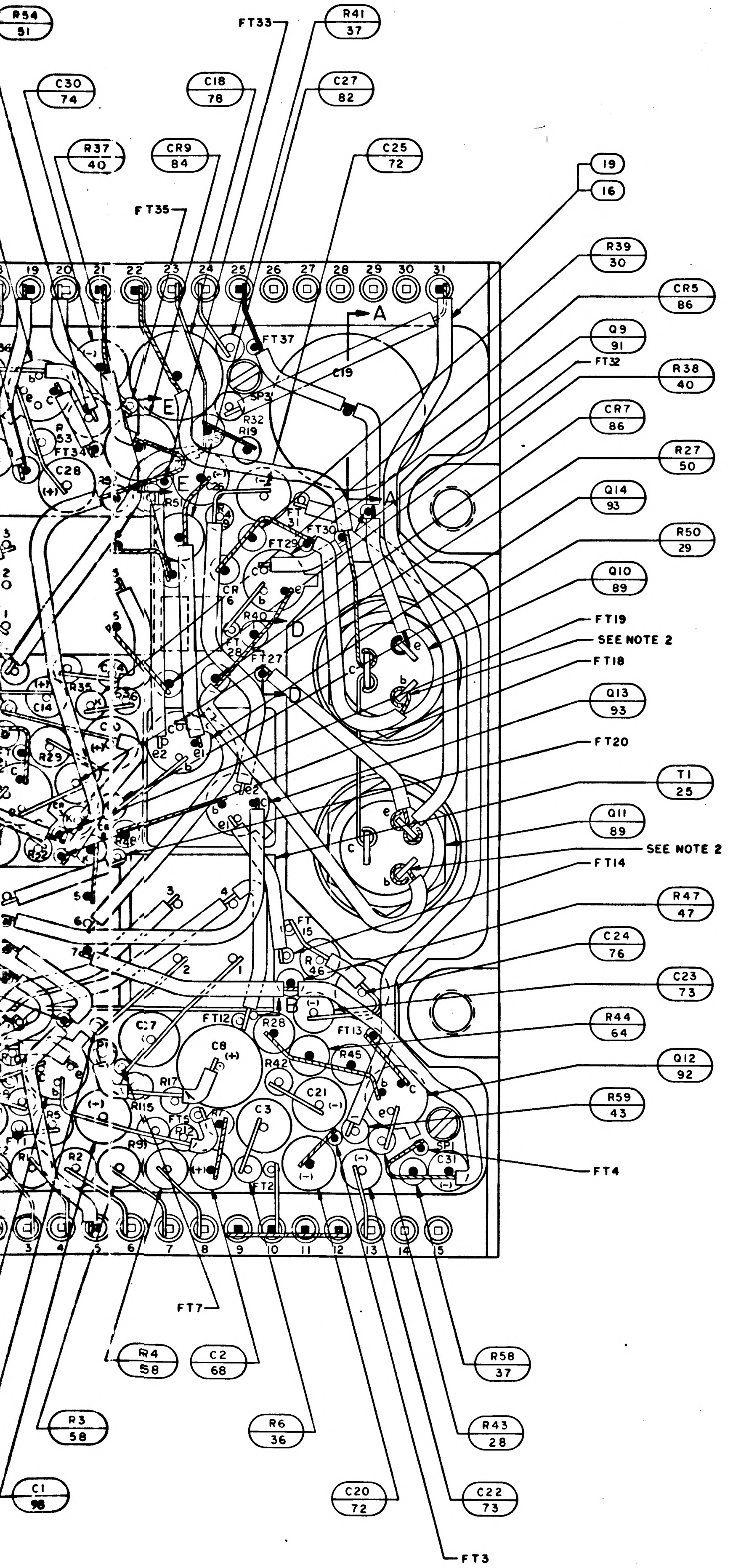
MOTOR DRIVE AMPLIFIER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010734
SCALE 5/1
SHEET 1 OF 1

2010734 A SH 1 of 1

MASTER

E3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FT33
R41 37
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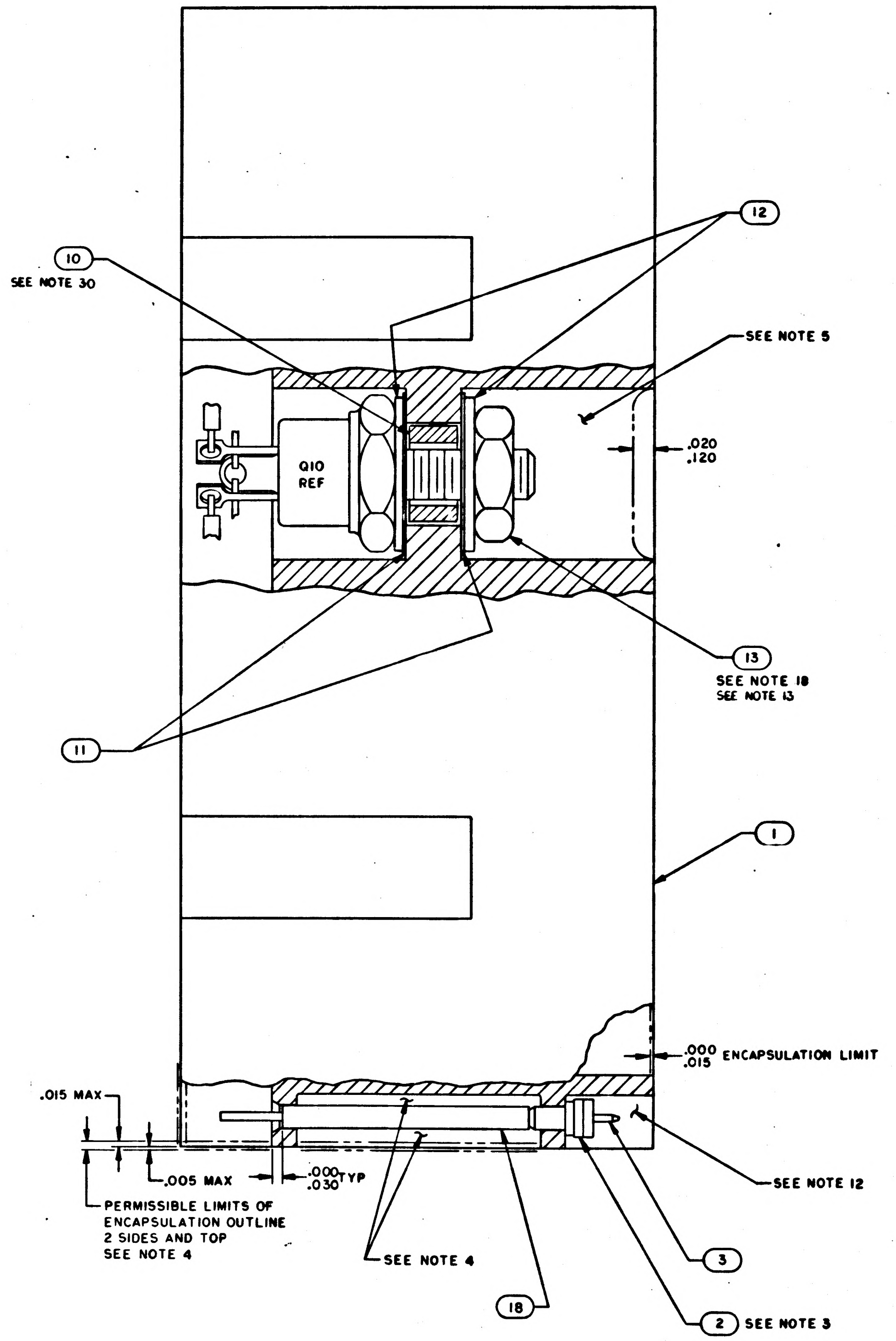
C18 78
C27 82
R37 40
CR9 84
C25 72
FT35
19
16
R39 30
CR5 86
Q9 91
FT32
R38 40
CR7 86
R27 50
Q14 93
R50 29
Q10 89
FT19
SEE NOTE 2
FT18
Q13 93
FT20
T1 25
Q11 89
SEE NOTE 2
FT14
R47 47
C24 76
C23 73
R44 64
Q12 92
R59 43
FT4
FT7
R4 58
C2 68
R3 58
R6 36
R58 37
R43 28
C1 98
C20 72
C22 73
FT3
A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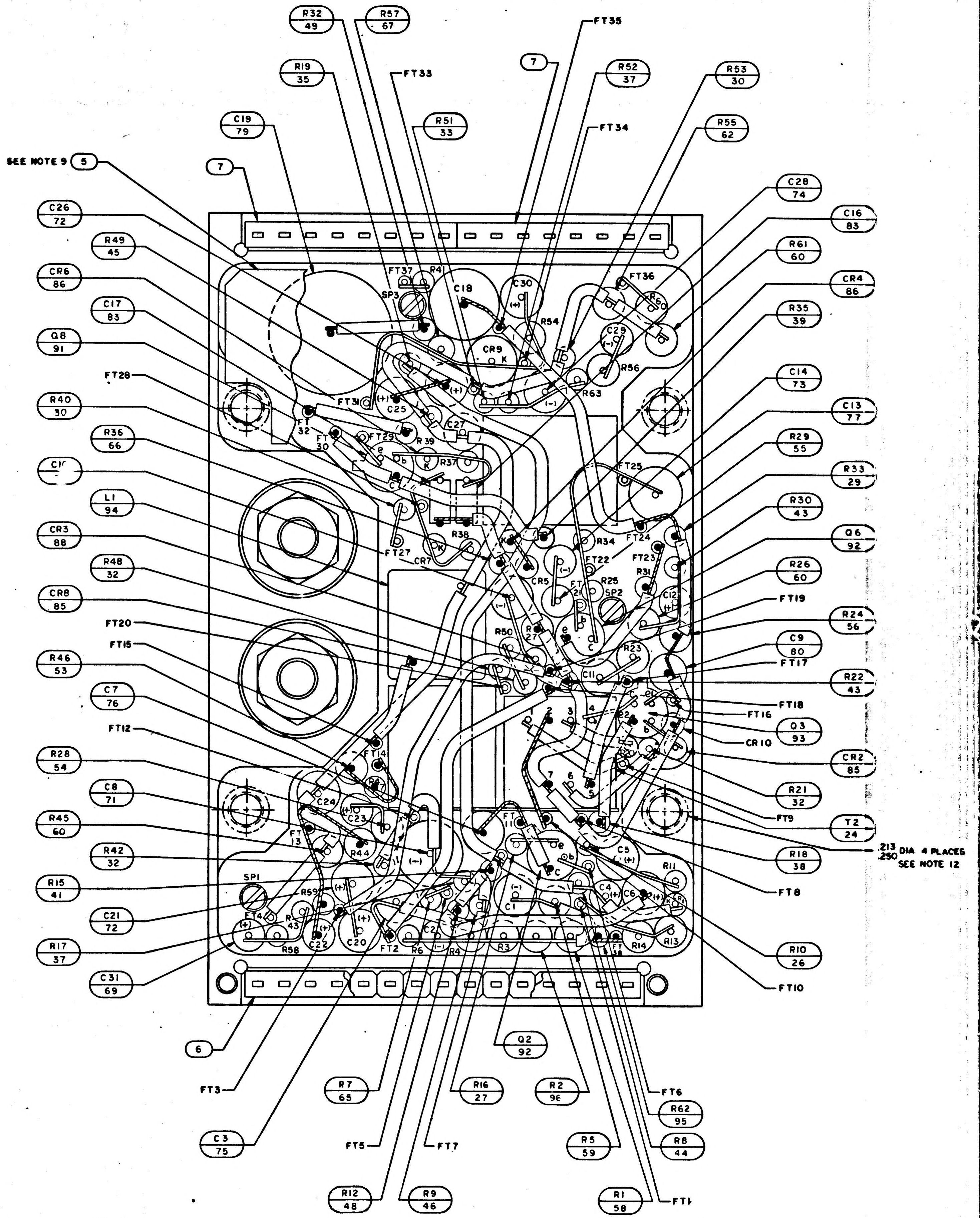
SEE NOTE 30
12
SEE NOTE 5
Q10 REF
.020
.120
11
13
SEE NOTE 18
SEE NOTE 13
1
.000
.015
ENCAPSULATION LIMIT
.015 MAX
.005 MAX
.000
.030
TYP
PERMISSIBLE LIMITS OF ENCAPSULATION OUTLINE 2 SIDES AND TOP SEE NOTE 4
SEE NOTE 4
SEE NOTE 12
3
18
2
SEE NOTE 3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R57 67
FT35
R19 35
FT33
7
R52 37
R53 30
C19 79
R51 33
FT34
R55 62
SEE NOTE 9
5
7
C28 74
C26 72
C16 83
R49 45
R61 60
CR6 86
CR4 86
C17 83
R35 39
Q8 91
FT28
C14 73
R40 30
C13 77
R36 66
R29 55
R33 29
L1 94
R30 43
CR3 88
Q6 92
R48 32
R26 60
CR8 85
FT19
FT20
R24 56
FT15
C9 80
FT17
R46 53
R22 43
C7 76
FT18
FT16
FT12
Q3 93
CR10
R28 54
CR2 85
C8 71
R21 32
FT9
R45 60
T2 24
.213
.250
DIA 4 PLACES
SEE NOTE 12
R42 32
R18 38
R15 41
FT8
C21 72
R17 37
R10 26
C31 69
FT10
6
FT3
Q2 92
FT6
R7 65
R16 27
R2 96
R62 95
C3 75
FT5
FT7
R5 59
R8 44
R12 48
R9 46
R1 58
FT1

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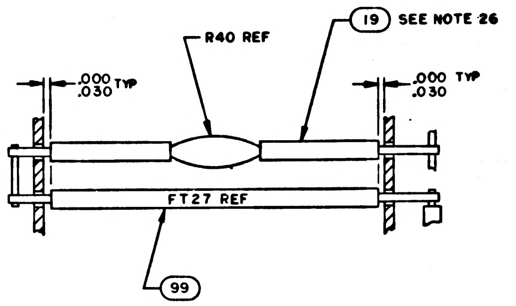
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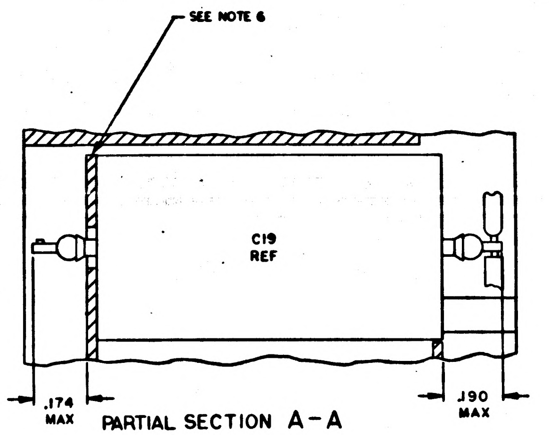
19 SEE NOTE 26
.000 .030 TYP
.000 .030 TYP
FT27 REF
99

PARTIAL SECTION D-D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C19 REF
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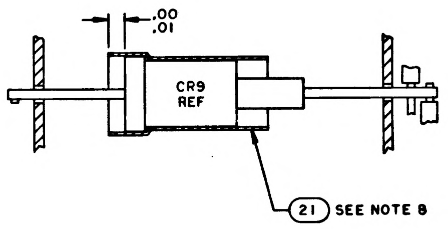
.190 MAX

PARTIAL SECTION A-A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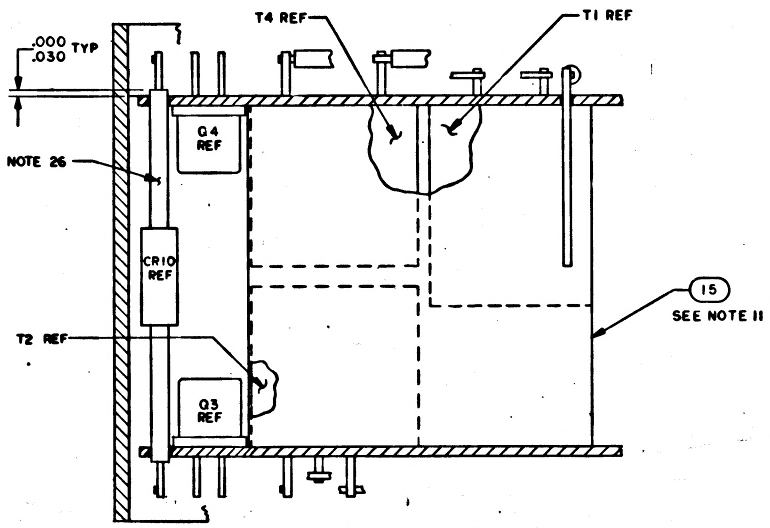
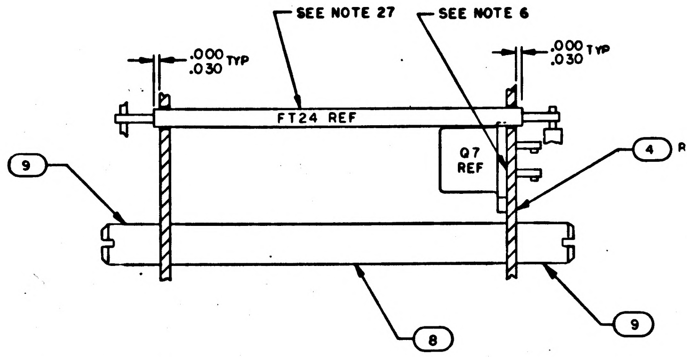
CR9 REF
21 SEE NOTE 8

PARTIAL SECTION E-E


T4 REF
T1 REF
.000 .030 TYP
SEE NOTE 26
Q4 REF
CR10 REF
T2 REF
Q3 REF
15 SEE NOTE 11

PARTIAL SECTION B-B


SEE NOTE 27
SEE NOTE 6
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FT24 REF
Q7 REF
4 REF
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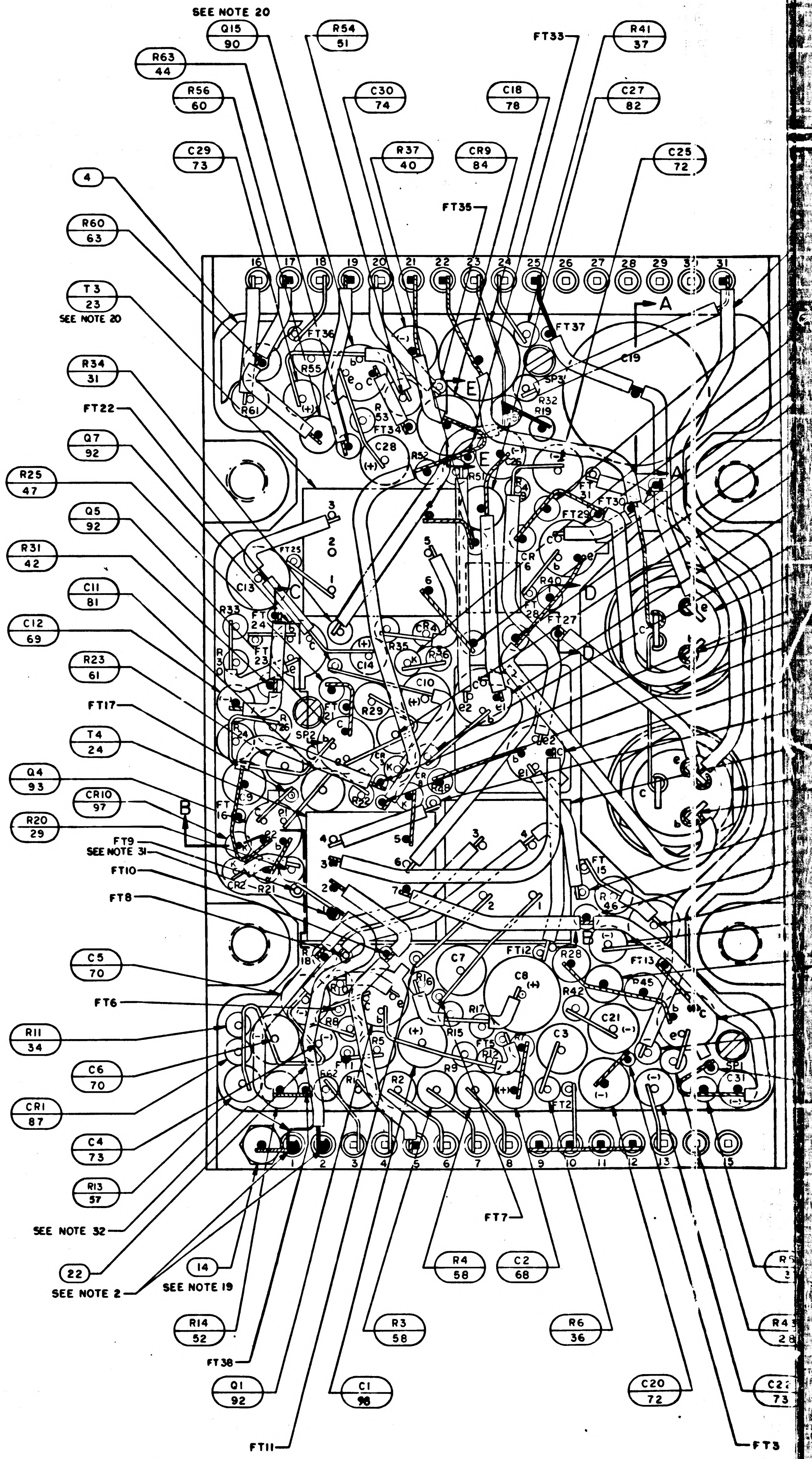
9
8

PARTIAL SECTION C-C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CR9 84
C25 72
4
FT35
R60 63
T3 23
SEE NOTE 20
R34 31
FT22
Q7 92
R25 47
Q5 92
R31 42
C11 81
C12 69
R23 61
FT17
T4 24
Q4 93
CR10 97
R20 29
B
FT9
SEE NOTE 31
FT10
FT8
C5 70
FT6
R11 34
C6 70
CR1 87
C4 73
R13 57
SEE NOTE 32
22
SEE NOTE 2
14
SEE NOTE 19
R4 58
C2 68
FT7
R14 52
FT38
R3 58
R6 36
Q1 92
C1 98
C20 72
FT11
FT3
A
C19
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D
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C10
R35
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SP2
C7
C8
FT12
FT13
R28
R42
R45
C21
C3
R15
R17
R9
R2
R5
R8
R18
R21
CR2
R46
FT2
C31
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND 1002071
3. ASSEMBLE FIND NO. 2 AND FIND NO. 3 TO FIND NO. 1 PER ND1002136
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. ENCAPSULATE PER ND1002117
6. BOND FIND NO. 23, 24 (T4), 25, 90, 93, (Q4, Q13, Q14), 91 (Q9) AND 92 (Q1, Q5, Q7, Q12) TO FIND NO. 4 AND BOND FIND NO. 24 (T2), 83, 93 (Q3), 92 (Q2, Q6) 91 (Q8), 79 AND 94 TO FIND NO. 5 PER ND1002004 TYPE I
7.
8. BOND FIND NO. 21 TO FIND NO. 84 PER MIL-I-15126, CONDITION C-2/23/50 BEFORE ASSEMBLY
9. BOND FIND NO. 5 TO FIND NO. 1 PER ND 1002004 TYPE I
10. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007118
11. BOND FIND NO. 15 TO FIND NO. 25 AND 24 PER ND 1002004 TYPE I
12. INDICATED AREA TO BE FREE OF ENCAPSULATION COMPOUND
13. APPLY SEALING COMPOUND MIL-S-22473, GRADE A TO FIND NO. 13
14. AR DENOTES AS REQUIRED
15. FT DENOTES FEED THRU
16. + DENOTES POSITIVE SIDE OF CAPACTOR
17. K DENOTES CATHODE SIDE OF DIODE
18. MOUNTING TORQUE FOR FIND NO. 13 TO BE 12-14 INCH POUNDS
19. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
20. TRIM UNUSED LEAD OF FIND NO. 23 AND 90, .010/.030 FROM CASE
21. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
22. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
23. BLACK DOT AND BLACK WIRING INDICATES SPECIAL LEVEL WIRING
24. MARK .060/.100 HIGH WHITE CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN
25. MARK .100/.140 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
26. TYPICAL SLEEVING FOR FIND NOS. 26 THRU 69, 73, 85 THRU 88, 95, 96 AND 97
27. TYPICAL SLEEVING FOR FEED THRUS 4, 9, 11, 16, 17, 19, 21, 22 AND 24
28. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
29. WELD PER ND 1002005
30. STAKE FIND NO. 10 TO FIND NO. 1 PER ND1002009, METHOD J
31. SOLDER FIND NO. 22 TO T4-1 PER ND 1002071 CARE MUST BE TAKEN THAT SHIELD & DRAINWIRE OF FIND NO. 22 DO NOT CONTACT T4-1 LEAD AND RIBBON RUN TO FT9
32. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 22
33. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH ISOPROFYL ALCOHOL PRIOR TO ENCAPSULATION
34. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT.

2010734 A SH 1

APOLLO G&N Specification
PS2010734 REV A
Original Issue Date: 3 May, 1966
Release Authority: TDRR 28453
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MOTOR DRIVE AMPLIFIER ASSEMBLY

DRAWING NO. 2010734

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
6/7/66	A	29474	4, 14 RDG/AL	MGM	ACM

This specification consists of page 1 to 16 inclusive.

APPROVALS	C. METZGER NASA/MSC	MIT/IL	E. G. Powers R. Greenwood ACSP

3.1.6 Minimum Output. The output of the amplifier shall be a minimum of 30V for both 0° and π phase input signals when the following conditions exist:

a. A degraded supply voltage.
b. A 10V input signal applied to the servo input.

3.1.7 Frequency Response. When the following conditions exist, the frequency response of the amplifier shall be as specified in Table I. When an unbalance occurs at the output, the output determination shall be an average value.

a. A nominal supply voltage.

b. An 800 cps suppressed carrier input signal to the servo input which has been adjusted in amplitude at various modulation frequencies to provide an output of 10V pp.

3.1.8 Amplifier Feedthrough. The amplifier output shall be 0.2V maximum and 0.05V minimum for the following conditions:

a. Nominal Supply voltage applied
b. A 0.5V input signal to the hand controller input
c. Pin 22 disconnected from the positive supply voltage.

TABLE I

FREQUENCY RESPONSE

MODULATION FREQUENCY (cps) ±5%	INPUT SIGNAL RATIO		PHASE SHIFT * (Degrees)
	Minimum	Maximum	
0.1 (Reference)	- -	--	
0.8	0.630	0.794	
20.0	- -	--	25±10

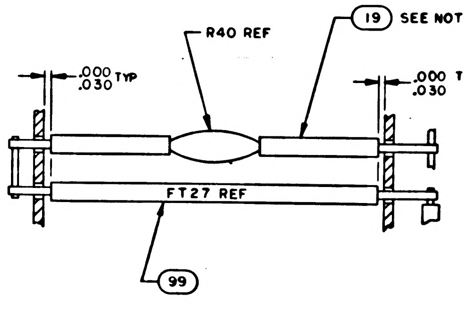
*With respect to the modulation frequency

3.1.9 Quadrature Rejection. When the following conditions exist, the 800 cps (0° or π phase) component of the output shall be less than 12V rms when the input quadrature signal is leading the reference voltage by 90.0° ±0.5° and when it is lagging the reference voltage by 90.0° ±0.5°.

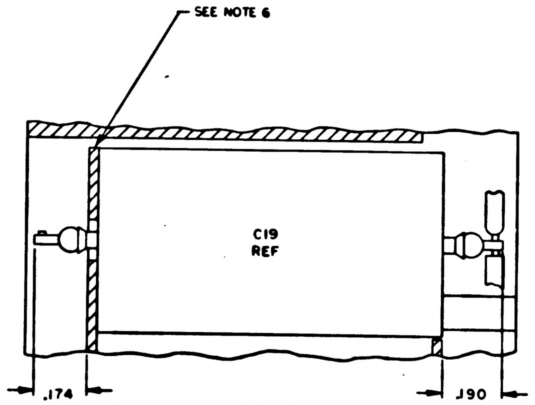
a. A nominal supply voltage.
b. A 100 mv, 800 cps quadrature input to the servo input.

3.1.10 Feedback Compensation Noise. When the following conditions exist, the output noise shall not exceed 2 mv of the 0° phase or π phase, 800 cps component, nor shall it exceed 10 mv total.

a. A nominal supply voltage.
b. Inputs to the feedback compensation shorted to signal Lo.


R40 REF
19 SEE NOTE 26
.000
.030 TYP
.000 TYP
.030
FT27 REF
99

PARTIAL SECTION D-D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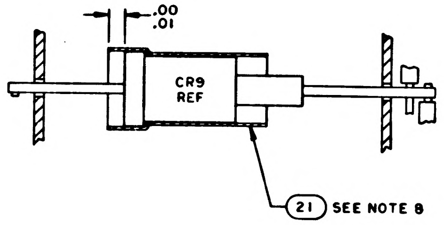
.190
MAX

PARTIAL SECTION A-A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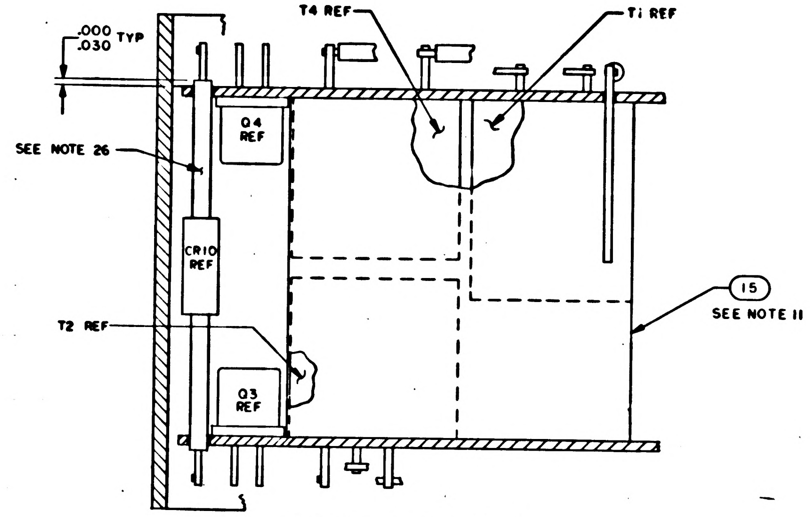
PARTIAL SECTION E-E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T4 REF
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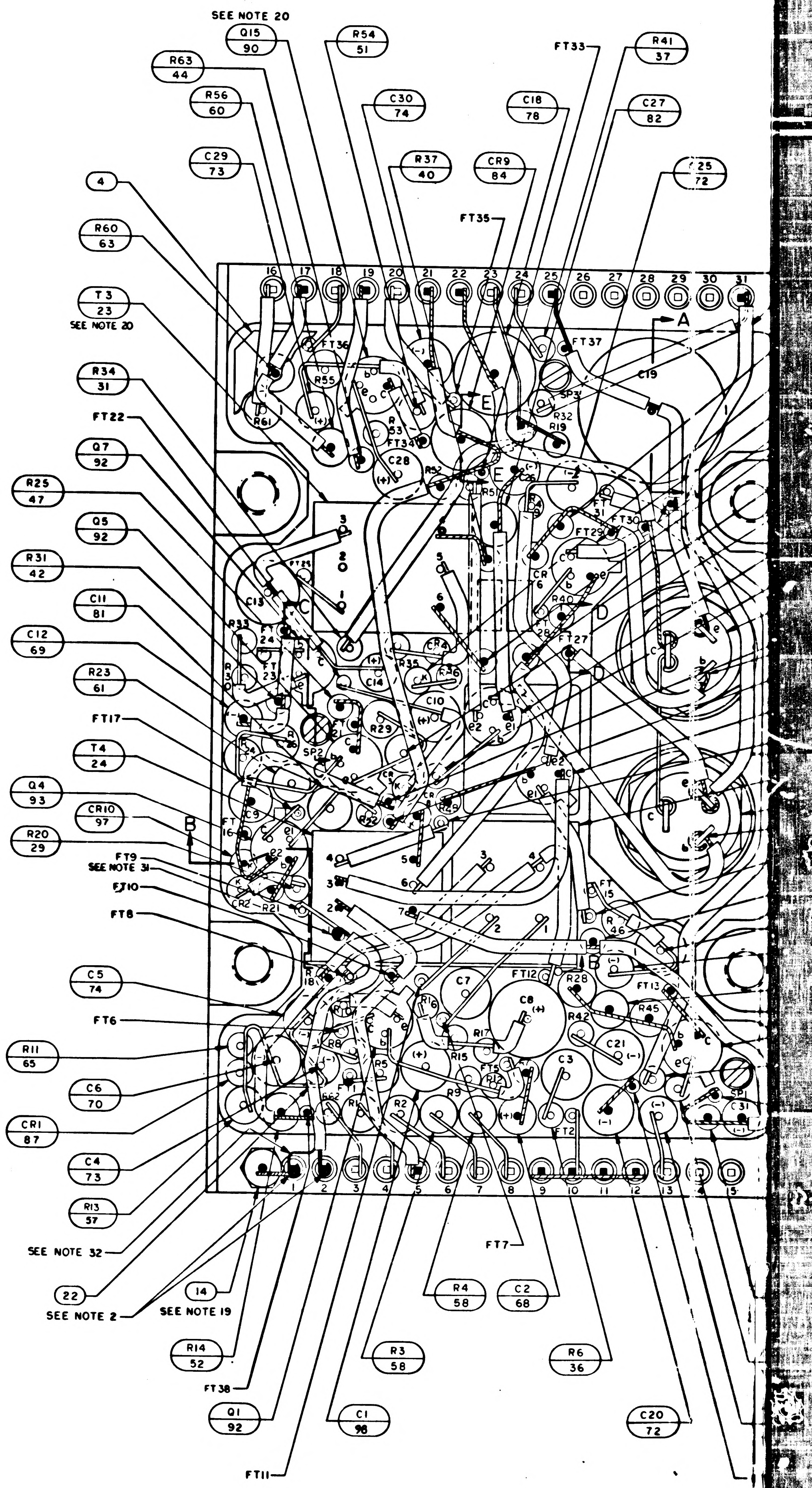
SEE NOTE 26
Q4
REF
CR10
REF
T2 REF
Q3
REF
15
SEE NOTE 11

PARTIAL SECTION B-B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R54
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R41
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FT33
R63
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R56
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C18
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C27
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C29
73
R37
40
CR9
84
C25
72
4
FT35
R60
63
T3
23
SEE NOTE 20
R34
31
FT22
Q7
92
R25
47
Q5
92
R31
42
C11
81
C12
69
R23
61
FT17
T4
24
Q4
93
CR10
97
R20
29
B
FT9
SEE NOTE 31
FT10
FT8
C5
74
FT6
R11
65
C6
70
CR1
87
C4
73
R13
57
SEE NOTE 32
22
SEE NOTE 2
14
SEE NOTE 19
R14
52
FT38
Q1
92
FT11
C1
98
R3
58
R4
58
C2
68
FT7
R6
36
C20
72
A
C19
FT37
FT36
R55
R61
R32
R19
C28
FT34
FT29
FT30
C13
FT24
FT27
C14
C10
R29
SP2
C9
R21
R46
FT12
R28
FT13
C7
C8
R42
R45
C21
C3
R15
R16
R17
R8
R5
R2
R9
C31
FT2
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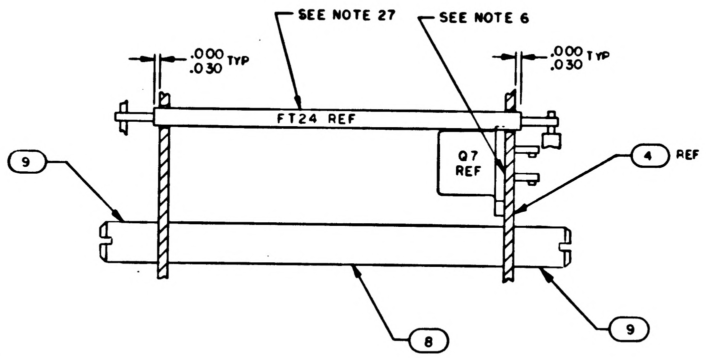
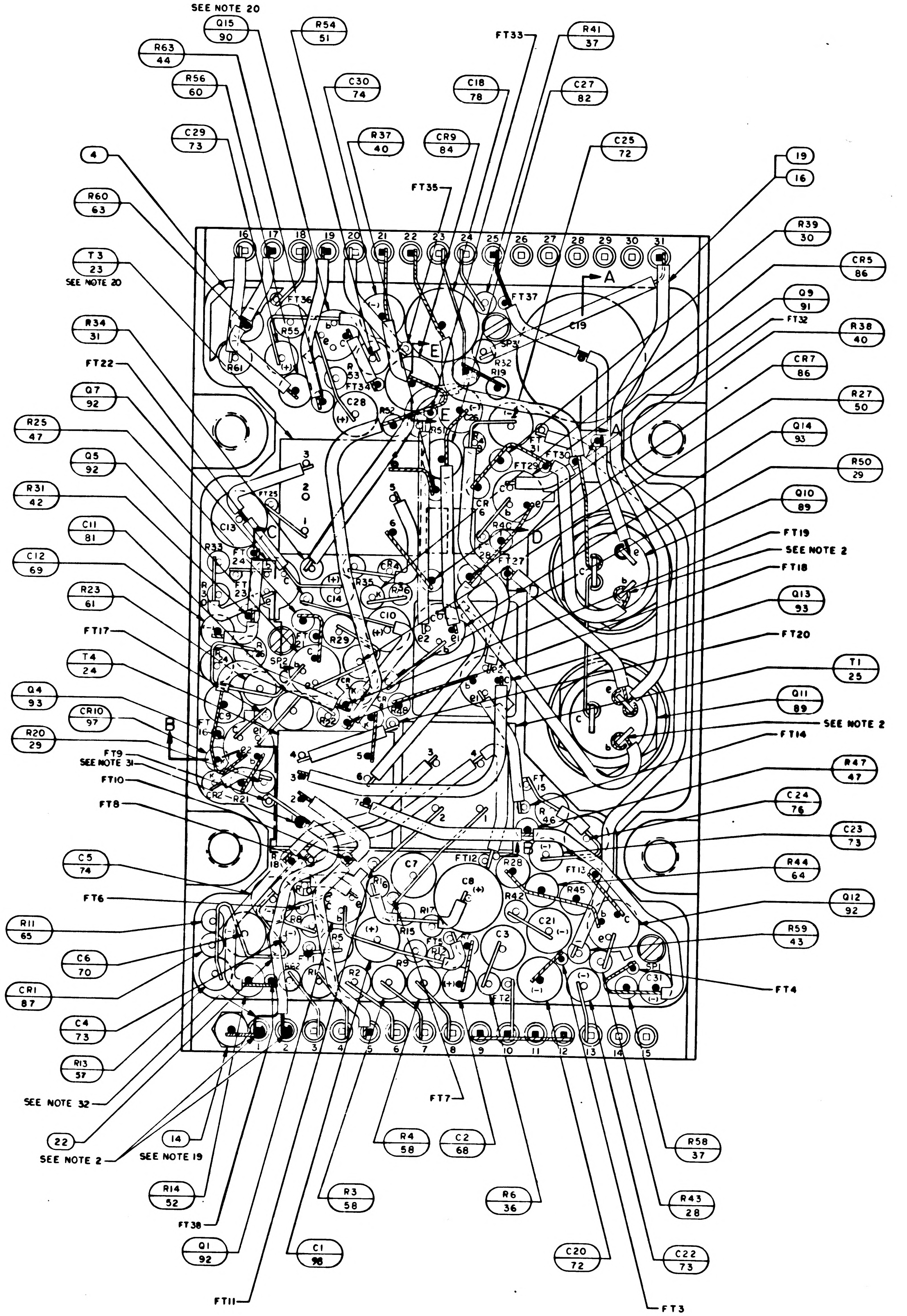

SEE NOTE 27
SEE NOTE 6
.000
.030 TYP
.000 TYP
.030
FT24 REF
Q7
REF
9
4 REF
8
9

PARTIAL SECTION C-C

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND 1002071
3. ASSEMBLE FIND NO. 2 AND FIND NO. 3 TO FIND NO. 1 PER ND 1002136
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. ENCAPSULATE PER ND1002117
6. BOND FIND NO. 23, 24 (T4), 25, 90, 93 (Q4, Q13, Q14) 91 (Q9) AND 92 (Q1, Q5, Q7, Q12) TO FIND NO. 4 AND BOND FIND NO. 24 (T2), 83, 93 (Q3), 92 (Q2, Q6) 91 (Q8), 79 AND 94 TO FIND NO. 5 PER ND1002004 TYPE I
7.
8. BOND FIND NO. 21 TO FIND NO. 84 PER MIL-I-15126, CONDITION C-2/23/50 BEFORE ASSEMBLY
9. BOND FIND NO. 5 TO FIND NO. 1 PER ND 1002004 TYPE I
10. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007118
11. BOND FIND NO. 15 TO FIND NO. 25 AND 24 PER ND 1002004 TYPE I
12. INDICATED AREA TO BE FREE OF ENCAPSULATION COMPOUND
13. APPLY SEALING COMPOUND MIL-S-22473, GRADE A TO FIND NO. 13
14. AR DENOTES AS REQUIRED
15. FT DENOTES FEED THRU
16. + DENOTES POSITIVE SIDE OF CAPACTOR
17. K DENOTES CATHODE SIDE OF DIODE
18. MOUNTING TORQUE FOR FIND NO. 13 TO BE 12-14 INCH POUNDS
19. MOUNTING TORQUE FOR FIND NO. 14 TO BE 15-20 INCH OUNCES
20. TRIM UNUSED LEAD OF FIND NO. 23 AND 90, .010/.030 FROM CASE
21. BLACK DOT AND CROSS HATCHED WIRING INDICATES UPPER LEVEL WIRING
22. WHITE DOT AND CLEAR WIRING INDICATES LOWER LEVEL WIRING
23. BLACK DOT AND BLACK WIRING INDICATES SPECIAL LEVEL WIRING
24. MARK .060/.100 HIGH WHITE CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN
25. MARK .100/.140 HIGH WHITE CHARACTERS PER ND1002019 AND SERIALIZE PER ND1002023. CENTRALIZE AS SHOWN
26. TYPICAL SLEEVING FOR FIND NOS. 26 THRU 69, 73, 85 THRU 88, 95, 96 AND 97
27. TYPICAL SLEEVING FOR FEED THRUS 4, 9, 11, 16, 17, 19, 21, 22 AND 24
28. UNLESS OTHERWISE SPECIFIED, ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
29. WELD PER ND1002005
30. STAKE FIND NO. 10 TO FIND NO. 1 PER ND1002009, METHOD J
31. SOLDER FIND NO. 22 TO T4-1 PER ND 1002071 CARE MUST BE TAKEN THAT SHIELD & DRAINWIRE OF FIND NO. 22 DO NOT CONTACT T4-1 LEAD AND RIBBON RUN TO FT9
32. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 22
33. CLEAN MODULE WHERE POSSIBLE BY DEGREASING WITH ISOPROFYL ALCOHOL PRIOR TO ENCAPSULATION
34. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT.

2010734 B SH 1 OF 1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T3 23
SEE NOTE 20
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T1 25
T4 24
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Q4 93
SEE NOTE 2
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SEE NOTE 31
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C5 74
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FT6
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R11 65
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C6 70
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CR1 87
C4 73
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R4 58
C2 68
R58 37
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SEE NOTE 2
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SEE NOTE 19
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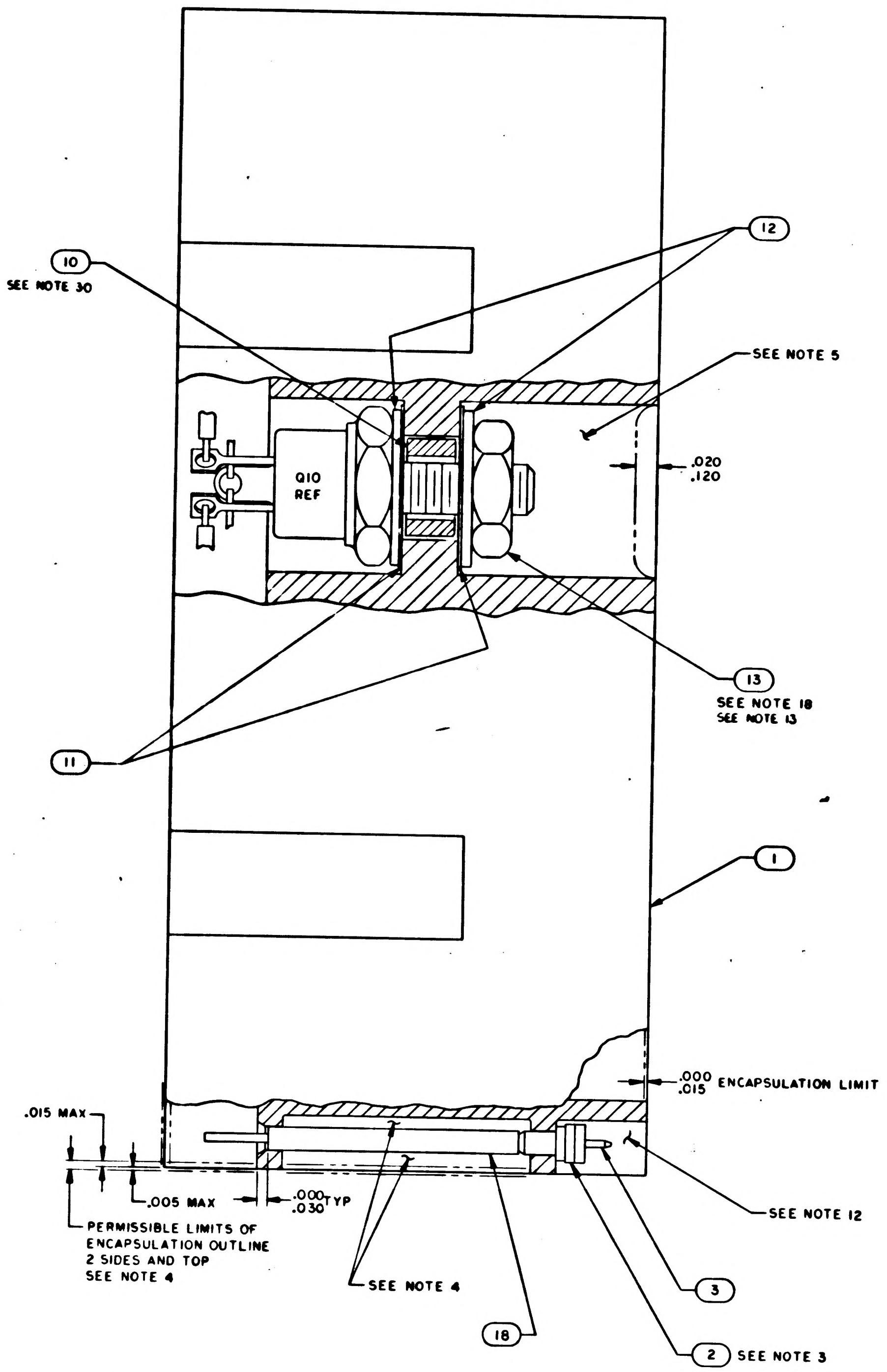
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SEE NOTE 5
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SEE NOTE 18
SEE NOTE 13
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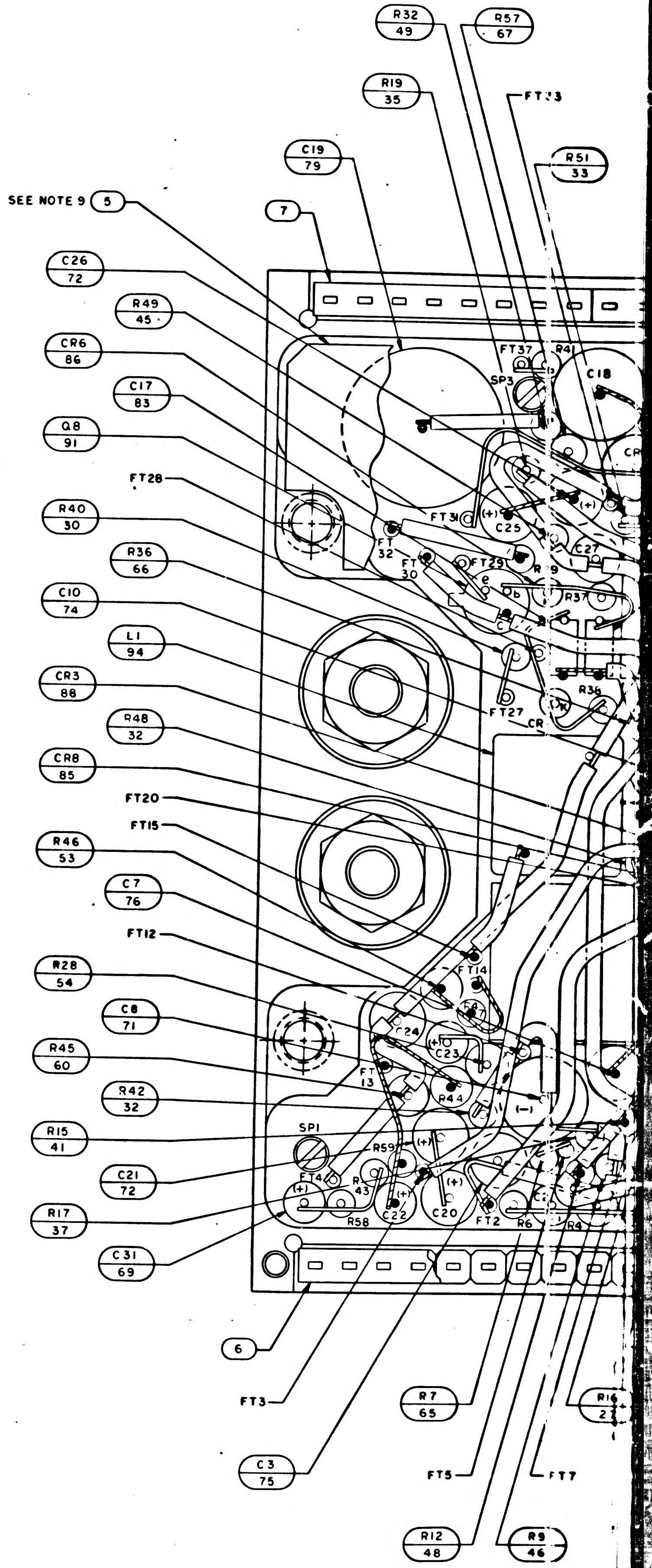
.015 MAX
.005 MAX
.000
.030 TYP
PERMISSIBLE LIMITS OF ENCAPSULATION OUTLINE 2 SIDES AND TOP SEE NOTE 4
SEE NOTE 4
SEE NOTE 12
3
18
2 SEE NOTE 3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FT28
R40 30
R36 66
C10 74
L1 94
CR3 88
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CR8 85
FT20
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C7 76
FT12
R28 54
C8 71
R45 60
R42 32
R15 41
C21 72
R17 37
C31 69
6
FT3
R7 65
C3 75
FT5
FT7
R12 48
R9 46

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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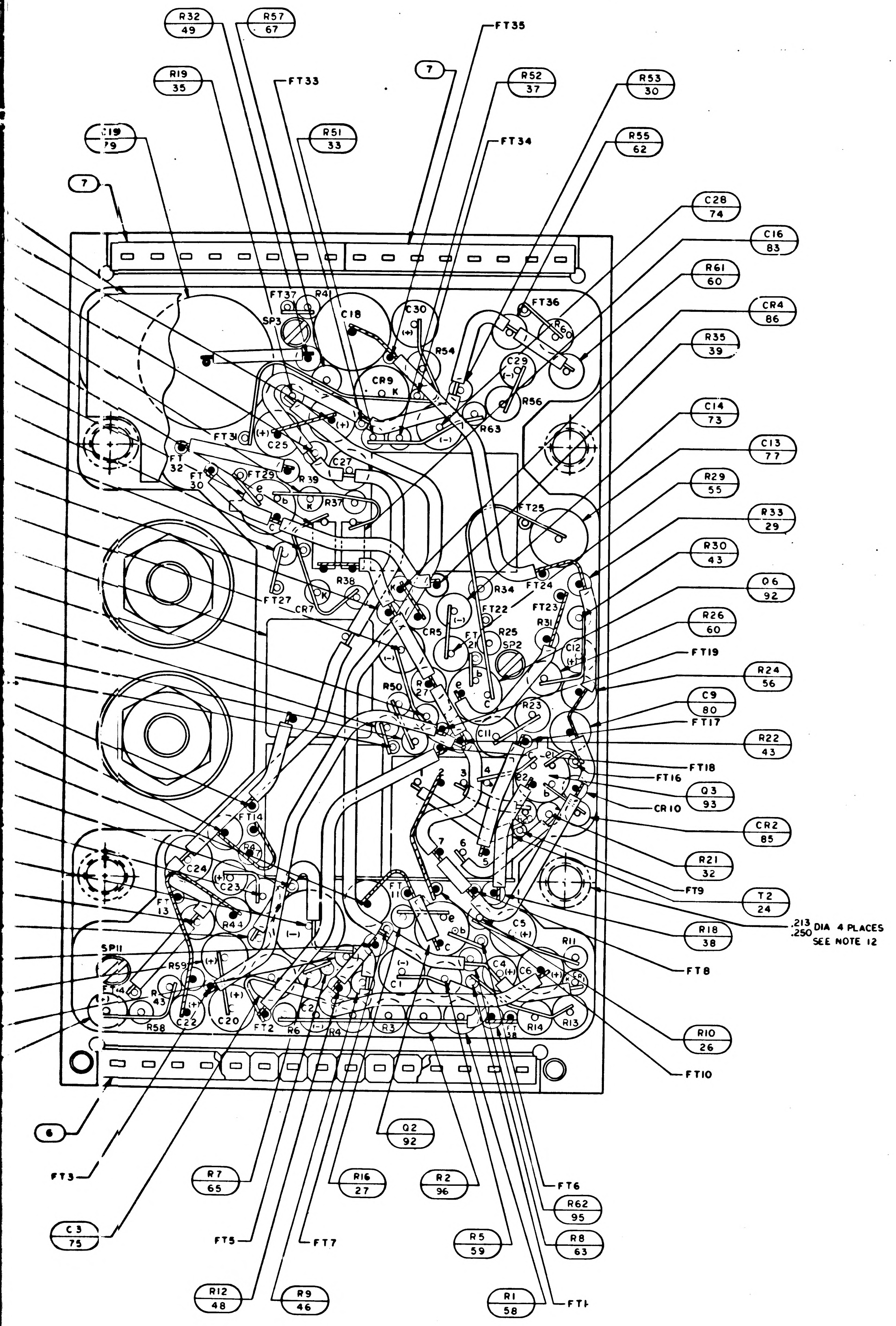
B		REVISED PER TDRR 30374	JJB	JI	9 AUG 66	



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FT34
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C16 83
R61 60
CR4 86
R35 39
C14 73
C13 77
R29 55
R33 29
R30 43
Q6 92
R26 60
FT19
R24 56
C9 80
FT17
R22 43
FT18
FT16
Q3 93
CR10
CR2 85
R21 32
FT9
T2 24
R18 38
FT8
R10 26
FT10
.213 .250 DIA 4 PLACES SEE NOTE 12
6
FT3
C3 75
R7 65
FT5
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FT7
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R5 59
R1 58
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FT6
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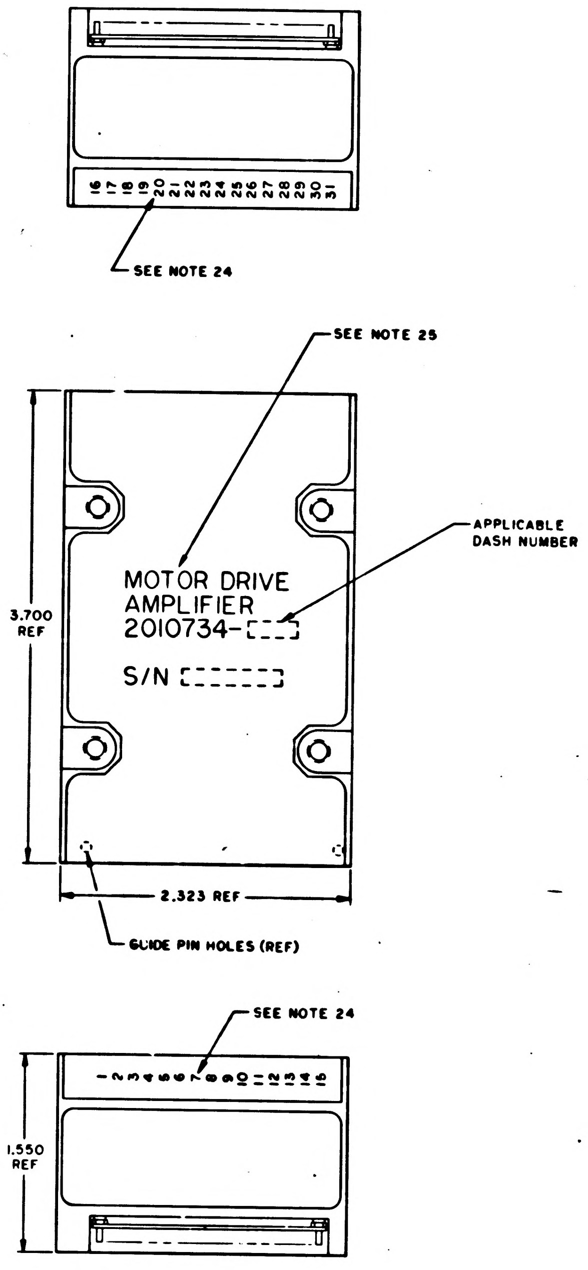


SEE NOTE 24
SEE NOTE 25
APPLICABLE DASH NUMBER
MOTOR DRIVE AMPLIFIER
2010734-
S/N
3.700 REF
2.323 REF
GUIDE PIN HOLES (REF)
SEE NOTE 24
1.550 REF

MARKING VIEWS
SCALE 2/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO
☒	2010733	SCHEMATIC	REF
AR	1010848-2	WIRE, ELECTRICAL	99
1	1006755-55	CAPACITOR	98
1	1010372-1	DIODE	97
1	1010374-5	RESISTOR	96
1	1006750-73	RESISTOR	95
1	1010277-6	INDUCTOR	94
4	1010367	CHOPPER	93
6	1010397-1	TRANSISTOR	92
2	1010357-1	TRANSISTOR	91
1	1010342	TRANSISTOR	90
1	1010269-2	TRANSISTOR (MATCHED PAIR)	89
1	1008815-11	DIODE	88
1	1008815-9	DIODE	87
4	1010392-1	DIODE	86
2	1010372-11	DIODE	85
1	1010829-10	DIODE	84
2	1010359-5	CAPACITOR	83
1	1010279-219	CAPACITOR	82
1	1010279-216	CAPACITOR	81
1	1010279-110	CAPACITOR	80
1	1010264-37	CAPACITOR	79
1	1010264-21	CAPACITOR	78
1	1010264-18	CAPACITOR	77
2	1010264-13	CAPACITOR	76
1	1010264-1	CAPACITOR	75
4	1006755-79	CAPACITOR	74
5	1006755-69	CAPACITOR	73
4	1006755-21	CAPACITOR	72
1	1006755-15	CAPACITOR	71
1	1006755-13	CAPACITOR	70
2	1006755-10	CAPACITOR	69
1	1006755-2	CAPACITOR	68
1	1010604-16	RESISTOR	67
1	1010369-138	RESISTOR	66
2	1006750-70	RESISTOR	65
1	1010364-765	RESISTOR	64
1	1010364-727	RESISTOR	63
1	1010364-709	RESISTOR	62
1	1010364-707	RESISTOR	61
4	1010364-693	RESISTOR	60
1	1010364-711	RESISTOR	59
3	1010364-677	RESISTOR	58
1	1010364-345	RESISTOR	57
1	1010364-669	RESISTOR	56
1	1010364-667	RESISTOR	55
1	1010364-635	RESISTOR	54
1	1010364-619	RESISTOR	53
1	1010364-527	RESISTOR	52
1	1010364-675	RESISTOR	51
1	1010364-157	RESISTOR	50
1	1006788-22	RESISTOR	49
1	1006750-83	RESISTOR	48
2	1006750-80	RESISTOR	47
1	1006750-78	RESISTOR	46
1	1006750-72	RESISTOR	45
1	1006750-67	RESISTOR	44
3	1006750-63	RESISTOR	43
1	1006750-56	RESISTOR	42
1	1006750-55	RESISTOR	41
2	1006750-60	RESISTOR	40
1	1006750-53	RESISTOR	39
1	1006750-52	RESISTOR	38
4	1006750-48	RESISTOR	37
1	1006750-47	RESISTOR	36
1	1006750-44	RESISTOR	35
1	1010369-92	RESISTOR	34
1	1006750-42	RESISTOR	33
3	1006750-39	RESISTOR	32
1	1006750-36	RESISTOR	31
3	1006750-32	RESISTOR	30
3	1006750-30	RESISTOR	29
1	1006750-19	RESISTOR	28
1	1006750-12	RESISTOR	27
1	1006750-10	RESISTOR	26
1	1010759	TRANSFORMER	25
2	1010753	TRANSFORMER	24
1	1010752	TRANSFORMER	23
AR	1010807-17	WIRE, SHIELDED	22
AR	MIL-I-15126	INSUL. TAPE-TYPE MFT 2.5, 1/2 WIDE	21
			20
AR	1006776-21	INSULATION SLEEVING	19
AR	1006776-20	INSULATION SLEEVING	18
			17
AR	1006757-1	WIRE, ELECTRICAL	16
1	2008265	SHIELD	15
1	2008093-000	TERMINAL, THREADED	14
2	MS20341-10B	NUT, HEX	13
4	1008071-2	WASHER, FLAT	12
4	1008024-1	WASHER, INSULATOR	11
2	2008020-1	BUSHING, INSULATOR	10
6	1008161-3	SCREW, CAP, SLOTTED HEAD	9
3	1015135-019	SPACER, NYLON	8
2	1008540-8	GASKET, CONNECTOR	7
1	1008540-15	GASKET, CONNECTOR	6
1	2010732	WIRING BOARD BOTTOM	5
1	2010731	WIRING BOARD TOP	4
31	1006782-5	CONTACT, WRAPOST-MALE MINAT	3
31	1006775	INSULATOR, WRAPOST-MALE MINAT	2
1	2008175	FRAME	1

011 LIST OF MATERIALS

2010734B

3H

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R. Blake 25 Mar 66
CHECKED J. Taylor 18 Apr 66
APPROVED 19 Apr 66
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

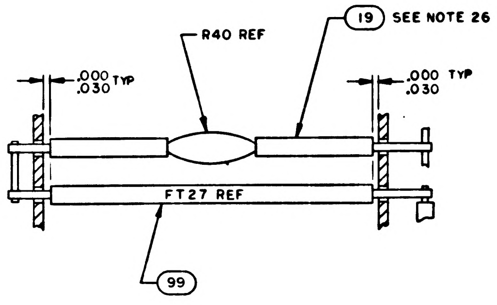
MOTOR DRIVE AMPLIFIER
ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO. 2010734
SCALE 5/1 SHEET 1 OF 1

010734 B SH 1

3-/2010734

NOTICE – WHEN GOVERNMENT OR OTHER DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.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19 SEE NOTE 26
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FT27 REF
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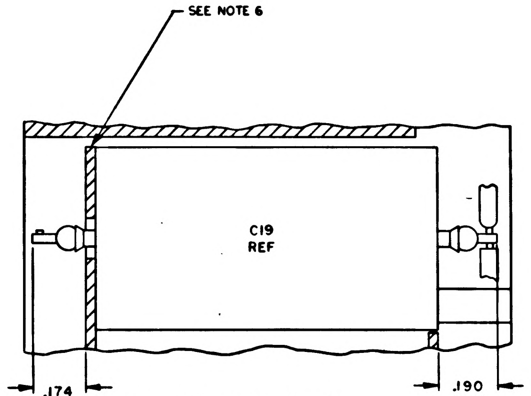
PARTIAL SECTION D-D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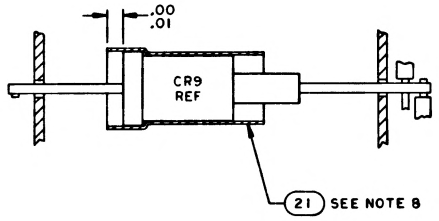
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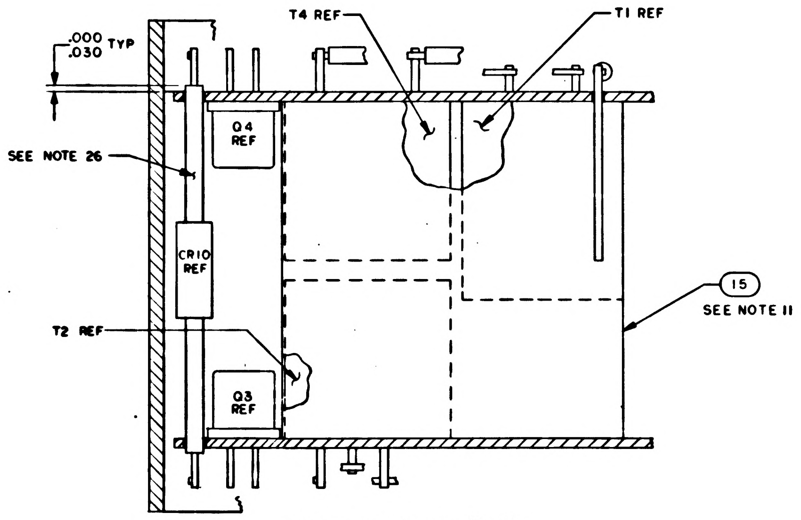
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T1 REF
Q4
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T2 REF
Q3
REF
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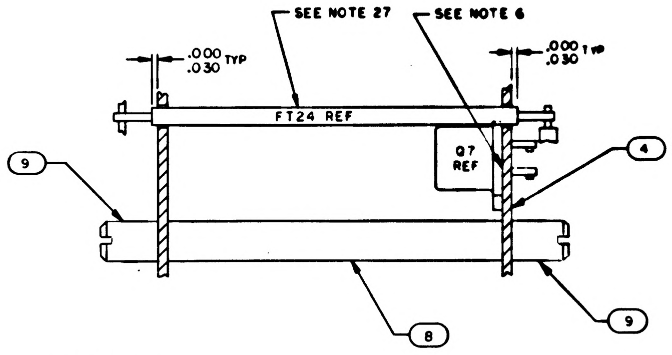
SEE NOTE 11

PARTIAL SECTION B-B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Q7
REF
4 REF
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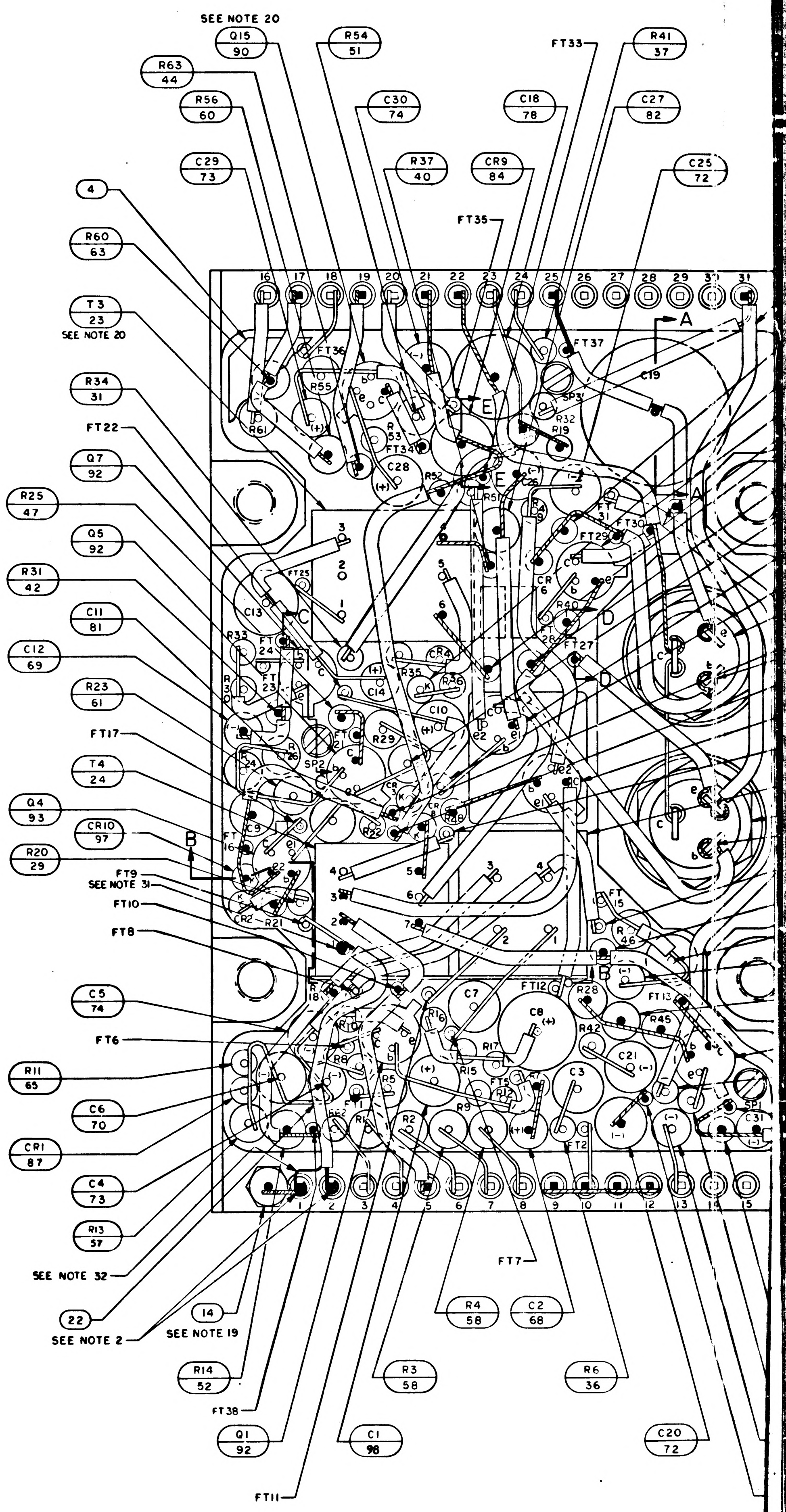
PARTIAL SECTION C-C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C25 72
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FT35
R60 63
T3 23
SEE NOTE 20
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FT22
Q7 92
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Q5 92
R31 42
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CR1 87
C4 73
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SEE NOTE 2
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SEE NOTE 19
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FT38
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R8
CR2
CR4
CR6
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND 1002071
3. ASSEMBLE FIND NO. 2 AND FIND NO. 3 TO FIND NO. 1 PER ND1002136
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. ENCAPSULATE PER ND1002117
6. BOND FIND NO. 23, 24 (T4), 25, 90, 93, (Q4, Q13, Q14), 91 (Q9) AND 92 (Q1, Q5, Q7, Q12) TO FIND NO. 4 AND BOND FIND NO. 24 (T2), 83, 93 (Q3), 92 (Q2, Q6) 91 (Q8), 79 AND 94 TO FIND NO. 5 PER ND1002004 TYPE I
7.
8. BOND FIND NO. 21 TO FIND NO. 84 PER MIL-I-15126, CONDITION C-2/23/50 BEFORE ASSEMBLY
9. BOND FIND NO. 5 TO FIND NO. 1 PER ND 1002004 TYPE I
10. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PS 2007118
11. BOND FIND NO. 15 TO FIND NO. 25 AND 24 PER ND 1002004 TYPE I
12. INDICATED AREA TO BE FREE OF ENCAPSULATION COMPOUND
13. APPLY SEALING COMPOUND MIL-S-22473, GRADE A TO FIND NO. 13
14. AR DENOTES AS REQUIRED
15. FT DENOTES FEED THRU
16. + DENOTES POSITIVE SIDE OF CAPACTOR
17. K DENOTES CATHODE SIDE OF DIODE
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31. SOLDER FIND NO. 22 TO T4-1 PER ND 1002071 CARE MUST BE TAKEN THAT SHIELD & DRAINWIRE OF FIND NO. 22 DO NOT CONTACT T4-1 LEAD AND RIBBON RUN TO FT9
32. REPRESENTS DRAINWIRE OF SHIELD OF FIND NO. 22
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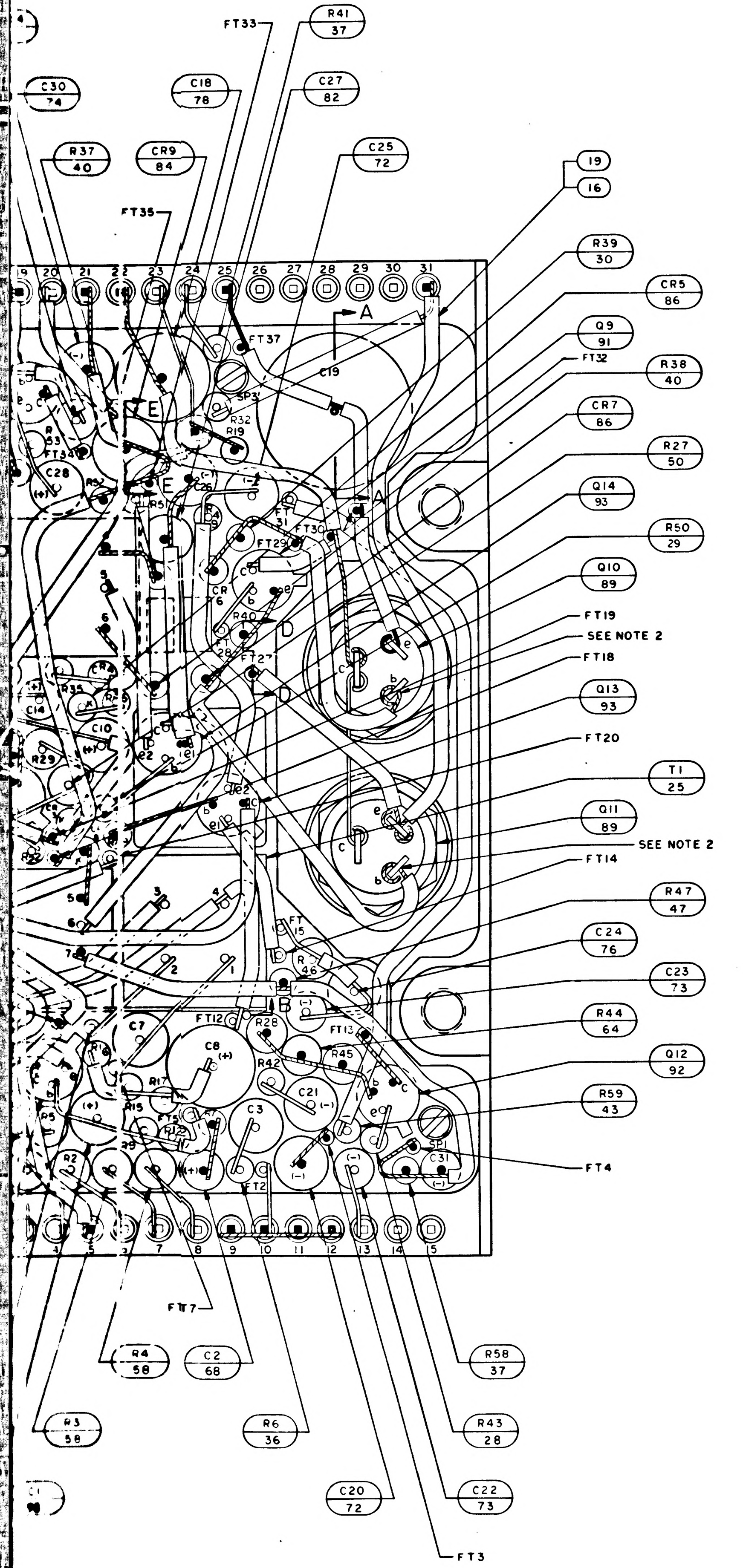
34. EXCEPT FOR THE MODULE MOUNTING SURFACE, PAINT ALL SURFACES PER ND1002279 USING 1010992 PRIMER AND 1008809-4 PAINT. CONNECTOR PIN-BLADES AND INSULATORS TO BE FREE OF PAINT.

2010734 C SH 1 OF 1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FT32
R38 40
CR7 86
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Q14 93
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Q10 89
FT19
SEE NOTE 2
FT18
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FT20
T1 25
Q11 89
SEE NOTE 2
FT14
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C24 76
C23 73
R44 64
Q12 92
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R4 58
C2 68
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R6 36
R43 28
R58 37
C20 72
C22 73
FT3
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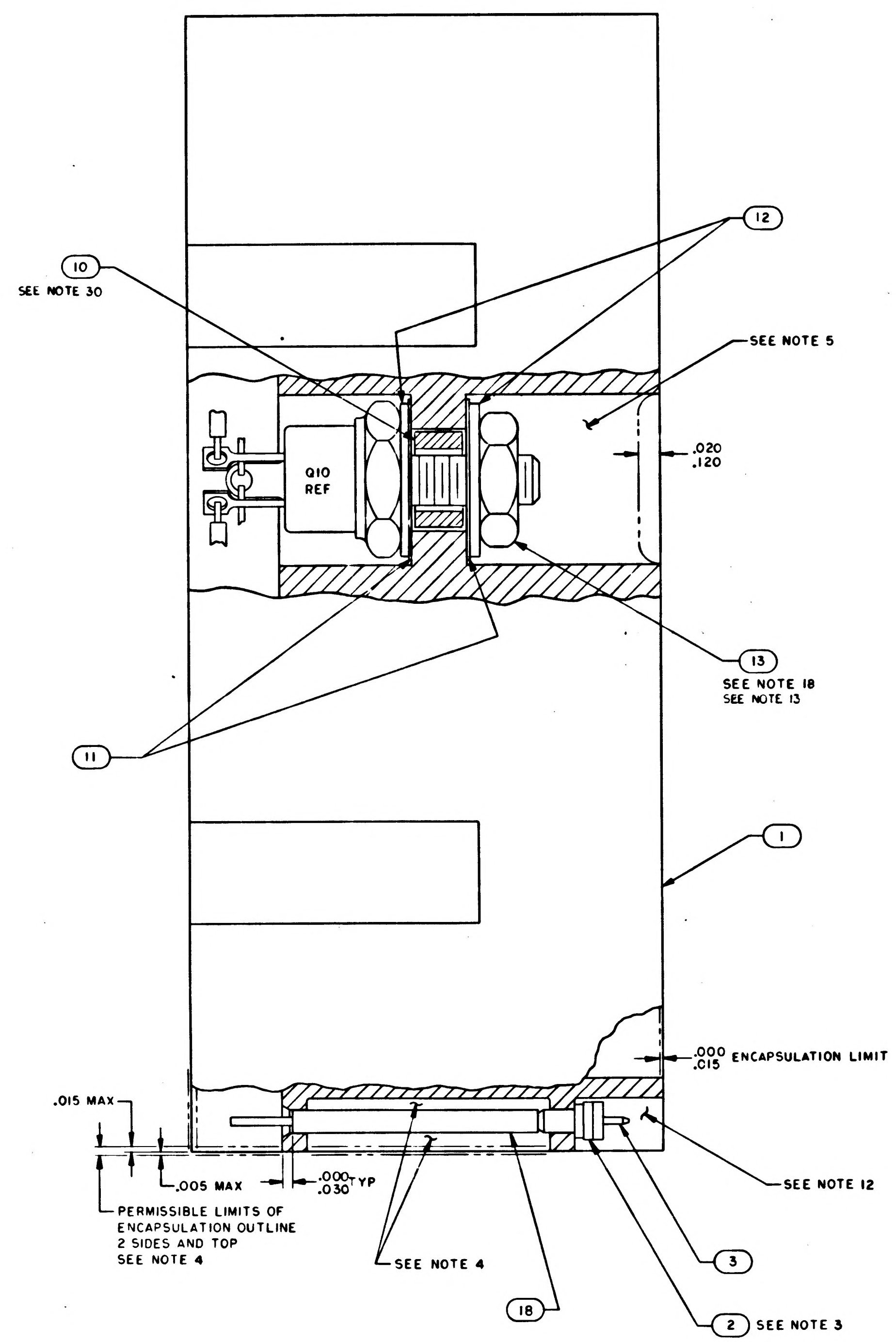
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SEE NOTE 5
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SEE NOTE 18
SEE NOTE 13
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.015 ENCAPSULATION LIMIT
.015 MAX
.005 MAX
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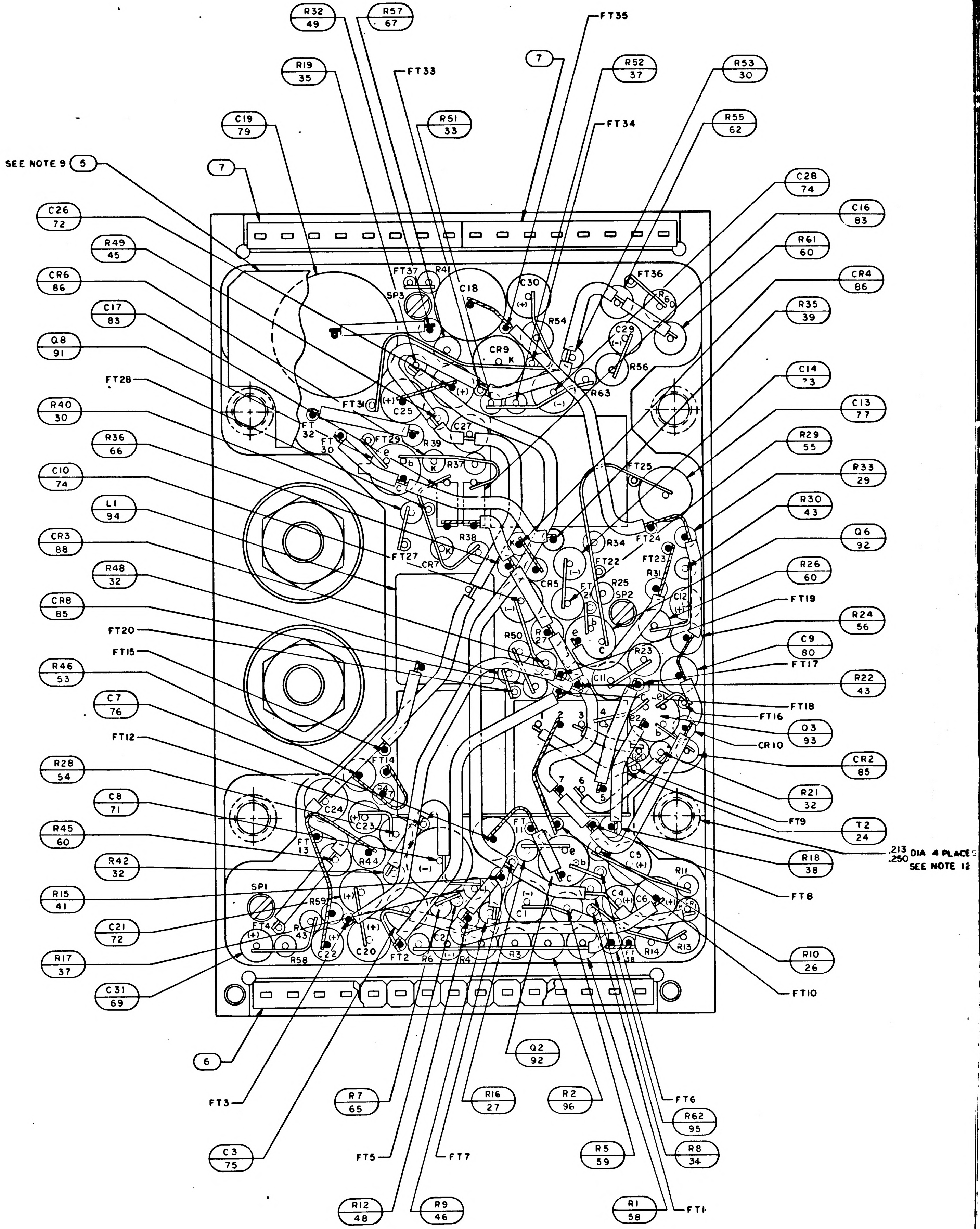
.030 TYP
PERMISSIBLE LIMITS OF ENCAPSULATION OUTLINE 2 SIDES AND TOP SEE NOTE 4
SEE NOTE 4
18
SEE NOTE 12
3
2 SEE NOTE 3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C28 74
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C17 83
R35 39
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FT28
C14 73
R40 30
C13 77
R36 66
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C10 74
R33 29
L1 94
R30 43
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Q6 92
R48 32
R26 60
CR8 85
FT19
FT20
R24 56
FT15
C9 80
R46 53
FT17
R22 43
C7 76
FT18
FT16
FT12
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R28 54
CR2 85
C8 71
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T2 24
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.250 DIA 4 PLACES
SEE NOTE 12
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FT8
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R10 26
C31 69
FT10
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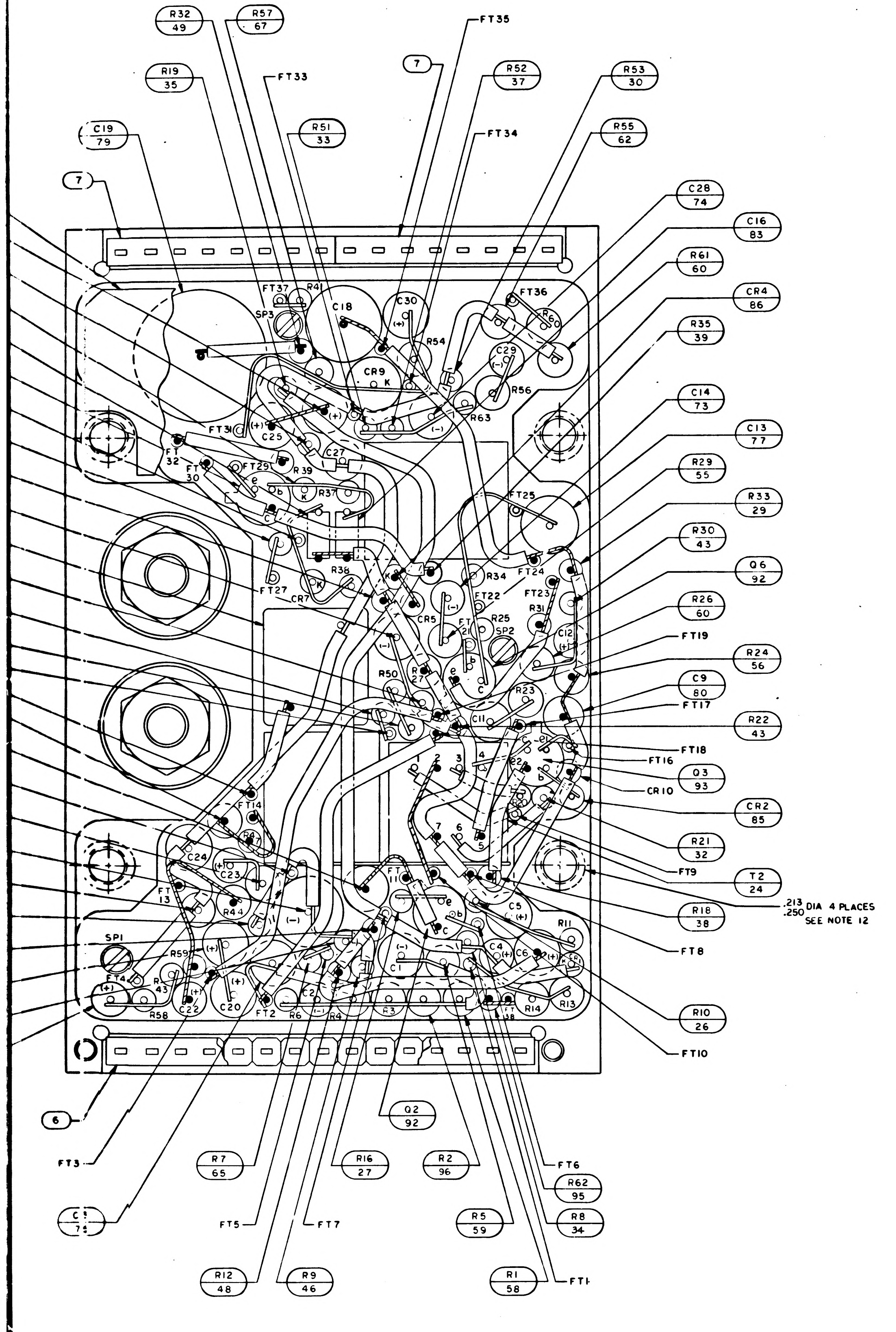
FT3
Q2 92
R7 65
R16 27
R2 96
FT6
R62 95
C3 75
FT5
FT7
R5 59
R8 34
R12 48
R9 46
R1 58
FT1

2010734 C SH 1

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		INITIAL RELEASE CLASS A PER TDRR			22 APRIL 66	
B		REVISED PER TDRR 30374	JJB	JI	9 AUG 66	
C		REVISED PER TDRR 31098	JSD		20 SEP 66	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R57 67
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R19 35
FT33
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R53 30
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FT34
R55 62
C19 79
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C28 74
C16 83
R61 60
CR4 86
R35 39
C14 73
C13 77
R29 55
R33 29
R30 43
Q6 92
R26 60
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R24 56
C9 80
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R22 43
FT18
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Q3 93
CR10
CR2 85
R21 32
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T2 24
R18 38
FT8
R10 26
FT10
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6
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R2 96
Q2 92
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R8 34
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R5 59
R12 48
R9 46
R1 58
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SP3
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C30
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CR9
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R39
C27
R37
FT25
FT27
CR7
R38
R34
FT24
FT22
FT23
CR5
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R31
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C12
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C24
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FT13
R44
SP1
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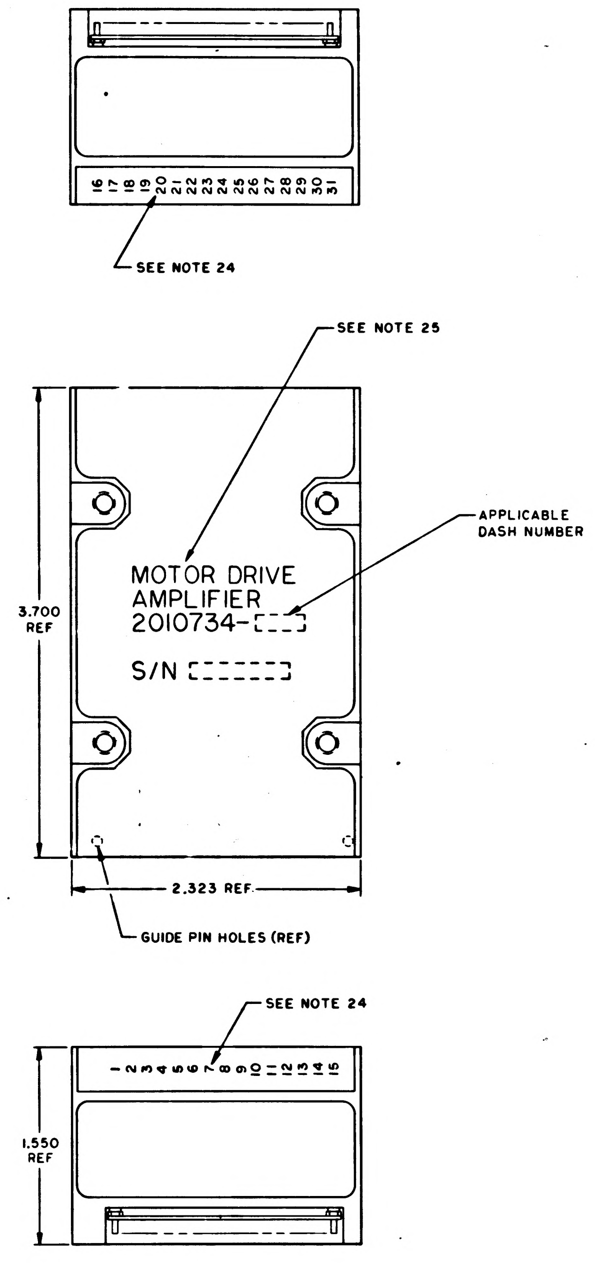
C6


SEE NOTE 24
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
SEE NOTE 25
MOTOR DRIVE
AMPLIFIER
2010734-
S/N
APPLICABLE DASH NUMBER
3.700 REF
2.323 REF.
GUIDE PIN HOLES (REF)
SEE NOTE 24
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1.550 REF

MARKING VIEWS
SCALE 2/1

☒	2010733	SCHEMATIC	REF
AR	1010848-2	WIRE, ELECTRICAL	99
1	1006755-55	CAPACITOR	98
1	1010372-1	DIODE	97
1	1010374-5	RESISTOR	96
1	1006750-73	RESISTOR	95
1	1010277-6	INDUCTOR	94
4	1010367	CHOPPER	93
6	1010397-1	TRANSISTOR	92
2	1010357-1	TRANSISTOR	91
1	1010342	TRANSISTOR	90
1	1010269-2	TRANSISTOR (MATCHED PAIR)	89
1	1008815-11	DIODE	88
1	1008815-9	DIODE	87
4	1010392-1	DIODE	86
2	1010372-11	DIODE	85
1	1010829-10	DIODE	84
2	1010359-5	CAPACITOR	83
1	1010279-219	CAPACITOR	82
1	1010279-216	CAPACITOR	81
1	1010279-110	CAPACITOR	80
1	1010264-37	CAPACITOR	79
1	1010264-21	CAPACITOR	78
1	1010264-18	CAPACITOR	77
2	1010264-13	CAPACITOR	76
1	1010264-1	CAPACITOR	75
4	1006755-79	CAPACITOR	74
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1	1006755-2	CAPACITOR	68
1	1010604-16	RESISTOR	67
1	1010369-138	RESISTOR	66
2	1006750-70	RESISTOR	65
1	1010364-765	RESISTOR	64
1	1010364-727	RESISTOR	63
1	1010364-709	RESISTOR	62
1	1010364-707	RESISTOR	61
4	1010364-693	RESISTOR	60
1	1010364-711	RESISTOR	59
3	1010364-677	RESISTOR	58
1	1010364-345	RESISTOR	57
1	1010364-669	RESISTOR	56
1	1010364-667	RESISTOR	55
1	1010364-635	RESISTOR	54
1	1010364-619	RESISTOR	53
1	1010364-527	RESISTOR	52
1	1010364-675	RESISTOR	51
1	1010364-157	RESISTOR	50
1	1006788-22	RESISTOR	49
1	1006750-83	RESISTOR	48
2	1006750-80	RESISTOR	47
1	1006750-78	RESISTOR	46
1	1006750-72	RESISTOR	45
1	1006750-67	RESISTOR	44
3	1006750-63	RESISTOR	43
1	1006750-56	RESISTOR	42
1	1006750-55	RESISTOR	41
2	1006750-60	RESISTOR	40
1	1006750-53	RESISTOR	39
1	1006750-52	RESISTOR	38
4	1006750-48	RESISTOR	37
1	1006750-47	RESISTOR	36
1	1006750-44	RESISTOR	35
1	1010369 -92	RESISTOR	34
1	1006750-42	RESISTOR	33
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1	1006750-36	RESISTOR	31
3	1006750-32	RESISTOR	30
3	1006750-30	RESISTOR	29
1	1006750-19	RESISTOR	28
1	1006750-12	RESISTOR	27
1	1006750-10	RESISTOR	26
1	1010759	TRANSFORMER	25
2	1010753	TRANSFORMER	24
1	1010752	TRANSFORMER	23
AR	1010807-17	WIRE, SHIELDED	22
AR	MIL-I-15126	INSUL. TAPE-TYPE MFT 2.5, 1/2 WIDE	21
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AR	1006776-21	INSULATION SLEEVING	19
AR	1006776-20	INSULATION SLEEVING	18
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AR	1006757-1	WIRE, ELECTRICAL	16
1	2008265	SHIELD	15
1	2008093-000	TERMINAL, THREADED	14
2	MS20341-10B	NUT, HEX	13
4	1008071-2	WASHER, FLAT	12
4	1008024-1	WASHER, INSULATOR	11
2	2008020-1	BUSHING, INSULATOR	10
6	1008161-3	SCREW, CAP, SLOTTED HEAD	9
3	1015135-019	SPACER, NYLON	8
2	1008540-8	GASKET, CONNECTOR	7
1	1008540-15	GASKET, CONNECTOR	6
1	2010732	WIRING BOARD BOTTOM	5
1	2010731	WIRING BOARD TOP	4
31	1006782-5	CONTACT, WRAPOST-MALE MINAT	3
31	1006775	INSULATOR, WRAPOST-MALE MINAT	2
1	2008175	FRAME	1
QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS		

2010734 C

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY	USED ON
APPLICATION	

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN RG Blake 13 APR 66
CHECKED JW Taylor 18 APR 66
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MOTOR DRIVE AMPLIFIER ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010734
SCALE 5/1
SHEET 1 OF 1

2010734

2010734 C SH 1 of 1

3/2010734

APOLLO G&N Specification
PS2010734 REV C
Original Issue Date: 3 May 1966
Release Authority: TDRR 28453
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MOTOR DRIVE AMPLIFIER ASSEMBLY

DRAWING NO. 2010734

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
Ⓜ 6/7/66	A	29474	4, 14 RDG/ar	MGM	ACM
Ⓜ 11/3/66	B	31784	3, 4, 6, 13 RDG/ar	MGM EA	--
1/12/67	C	32626	6, 16 RDG/ar	MGM EA	—

This specification consists of page 1 to 16 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	S R Gorgy MIT/IL		E. J. Powers R. Greenwood AC

APOLLO G&N Specification
PS2010734 REV C
Original Issue Date: 3 May 1966
Release Authority: TDRR 28453
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MOTOR DRIVE AMPLIFIER ASSEMBLY

DRAWING NO. 2010734

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				AC	NASA
(M) 6/7/66	A	29474	4, 14 RDG/ar	MGM	ACM
(M) 11/3/66	B	31784	3, 4, 6, 13 RDG/ar	MGM EA	--
1/12/67	C	32626	6, 16 RDG/ar	MGM EA	--

This specification consists of page 1 to 16 inclusive.

APPROVALS
A. C. METZGER NASA/MSC
S R Gorgy MIT/IL 3 May 66
AC E.T. Powers R. Greenwood

TABLE III

FEEDBACK COMPENSATION FREQUENCY RESPONSE

MODULATION FREQUENCY (cps) ±5%	INPUT SIGNAL RATIO*1		PHASE SHIFT *2 (Degrees)
	Min	Max	
10 (reference)	--	--	--
0.16	0.4	0.53	--
0.32	--	--	45±10

*1 Where input signal ratio $= \frac{\text{input signal at 10 cps}}{\text{input signal at 0.16 cps}}$

*2 With respect to 10 cps modulation.

3.1.15 **Preamp Monitor.** The gain from input to output shall be 2.4 V/V ±15 percent when the following conditions exist.

a. A nominal supply voltage.

b. An 800 cps signal applied and adjusted to provide a preamp monitor output of 0.3V ±10 percent.

3.1.16 **Tach Monitor.** The gain from input to output shall be 0.082 V/V ±10 percent under the following conditions:

a. A nominal supply voltage applied.

b. An 800 cps signal applied to, and adjusted to provide a tach monitor output of 0.3V ±10 percent.

3.2 PRODUCT CONFIGURATION

3.2.1 **Drawings.** The configuration of the assembly shall be in accordance with Drawing 2010734 and all drawings and engineering data referenced thereon.

3.2.2 **Maximum Weight.** Not applicable.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 **DC Resistance.** DC resistance shall be as specified in Table IV.

c. An 800 cps suppressed carrier input signal with 10 cps modulation applied to terminals 17 (Hi) and 21 (Lo) and adjusted in amplitude to provide an output of 3V pp between terminals 13 (Hi) and 12 (Lo) at each modulation frequency specified in Table III.

4.3.19 Preamp Monitor. With the following conditions established, the gain from input to output shall be 2.40±0.36 V/V.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).

b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).

c. Terminals 6, 7 and 8 connected to terminal 10.

d. An 800 cps input signal applied to terminals 4 (Hi) and 10 (Lo) and adjusted to provide an output of 0.30±0.03V between terminals 3 (Hi) and 10 (Lo).

4.3.20 Tach Monitor. With conditions "a" and "b" of 4.3.19 established and with an 800 cps input signal applied to terminals 17 (Hi) and 21 (Lo) and adjusted to provide an output of 0.30±0.03V between terminals 19 (Hi) and 10 (Lo), the gain from input to output shall be 0.0820±0.0082 V/V.

4.3.21 Weight. Not applicable.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None

ETP:ims

APOLLO G&N Specification

PS2010734 REV —
Original Issue Date: 3 May 1966
Release Authority: TDRR 28453
Class A Release

CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

MOTOR DRIVE AMPLIFIER ASSEMBLY

DRAWING NO. 2010734

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 16 inclusive.

APPROVALS	A. C. METZGER NASA/MSC	S R Jerzy MIT/IL	E. T. Powers R. Greenwood ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Current Drain

a. Nominal DC Supply Voltage. Current drain from the dc power supply shall be as follows when the supply voltage is nominal:

  (1) A maximum of 75 ma when there is no amplifier input.

  (2) A maximum of 360 ma when the 800 cps signal is applied between any amplifier input Hi and amplifier input Lo, with the input adjusted to provide a 30V output to the amplifier output load.

b. Enhanced DC Supply Voltage. Current drain from the dc power supply shall be 40±4 ma when the supply voltage is enhanced and the amplifier output load is disconnected.

3.1.2 Noise. The output noise shall not exceed 0.5V (0° or π phase) for the 800 cps component and 1V total when the supply voltage is nominal.

3.1.3 Gain. The amplifier 0° and π phase gain shall be as follows, when the supply voltage is nominal and the input amplitude is adjusted to provide an 800 cps component output of 10V.

a. A gain of 2200 V/V ±20 percent when an 800 cps signal is applied to the servo inputs and the tach input.

b. A gain of 645 V/V ±20 percent when an 800 cps signal is applied to the hand controller input.

3.1.4 Gain Linearity. When the following conditions exist, the 0° phase gain at each output voltage shall be within ±10 percent of the 800 cps component 0° phase gain in 3.1.3.

a. A nominal supply voltage.

b. An 800 cps, 0° phase signal applied to the servo input and adjusted for 800 cps component outputs of 3V and 30V.

3.1.5 Phase Shift. The phase shift of the output with respect to the input shall be 180° ±15° for both 0° and π phase input signals under the following conditions:

a. A nominal supply voltage.

b. An 800 cps input signal applied to the servo input and the amplitude adjusted for an output of 5V from the output Hi to dc supply common.

3.1.6 Minimum Output. The output of the amplifier shall be a minimum of 30V for both 0° and π phase input signals when the following conditions exist:

a. A degraded supply voltage.
b. A 10V input signal applied to the servo input.

3.1.7 Frequency Response. When the following conditions exist, the frequency response of the amplifier shall be as specified in Table I. When an unbalance occurs at the output, the output determination shall be an average value.

a. A nominal supply voltage.

b. An 800 cps suppressed carrier input signal to the servo input which has been adjusted in amplitude at various modulation frequencies to provide an output of 10V pp.

3.1.8 Amplifier Feedthrough. The amplifier ~~output shall be 0.2V maximum and~~ 0.05V [illegible] ~~minimum for the following conditions~~: the following conditions:

a. Nominal Supply voltage applied
b. A 0.5V input signal to the hand controller input
c. Pin 23 disconnected from pin 22.

TABLE I

FREQUENCY RESPONSE

MODULATION FREQUENCY, (cps) ±5%	INPUT SIGNAL RATIO		PHASE SHIFT * (Degrees)
	Minimum	Maximum	
0.1 (Reference)	- -	—	
0.8	0.630	0.794	
20.0	- -	—	25±10

*With respect to the modulation frequency

3.1.9 Quadrature Rejection. When the following conditions exist, the 800 cps (0° or π phase) component of the output shall be less than 12V rms when the input quadrature signal is leading the reference voltage by 90.0° ±0.5° and when it is lagging the reference voltage by 90.0° ±0.5°.

a. A nominal supply voltage.
b. A 100 mv, 800 cps quadrature input to the servo input.

3.1.10 Feedback Compensation Noise. When the following conditions exist, the output noise shall not exceed 2 mv of the 0° phase or π phase, 800 cps component, nor shall it exceed 10 mv total.

a. A nominal supply voltage.
b. Inputs to the feedback compensation shorted to signal Lo.

TABLE III

FEEDBACK COMPENSATION FREQUENCY RESPONSE

MODULATION FREQUENCY (cps) ±5%	INPUT SIGNAL RATIO*1		PHASE SHIFT*2 (Degrees)
	Min	Max	
10 (reference)	—	—	—
0.16	0.4	0.5	—
0.32	—	—	45±10

*1 Where input signal ratio $= \frac{\text{input signal at 10 cps}}{\text{input signal at 0.16 cps}}$

*2 With respect to 10 cps modulation.

3.1.15 Preamp Monitor. The gain from input to output shall be 2.4 V/V ±15 percent when the following conditions exist.

a. A nominal supply voltage.

b. An 800 cps signal applied and adjusted to provide a preamp monitor output of 0.3V ±10 percent.

3.1.16 Tach Monitor. The gain from input to output shall be 0.982 V/V ±10 percent under the following conditions:

a. A nominal supply voltage applied.

b. An 800 cps signal applied to, and adjusted to provide a tach monitor output of 0.3V ±10 percent.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2010734 and all drawings and engineering data referenced thereon.

3.2.2 Maximum Weight. The maximum weight of the assembly shall be 0.575 pound.

3.2.3 Standards of Manufacturing, Manufacturing Process and Production

3.2.3.1 DC Resistance. DC resistance shall be as specified in Table IV.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).
b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).
c. Terminals 4, 6, 7 and 8 connected to terminal 10.

4.3.7 Gain. With the conditions below established, the gain from input to output shall be as specified in Table VI.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).

b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).

c. An 800 cps 0° or π phase (as required) input signal applied sequentially to the terminals specified in Table VI while connecting the unused input terminals to terminal 10.

d. The 0° or π phase, 800 cps output component between terminals 25 (Hi) and 31 (Lo) adjusted to 10V.

TABLE VI

AMPLIFIER GAIN

TEST	INPUT TERMINAL		INPUT PHASE	GAIN REQUIRED (10V/V_{IN})	
	Hi	Lo		Min.	Max.
a	4	10	0°	1760	2640
b	4	10	π	1760	2640
c	6	10	0°	516	774
d	7	10	0°	1760	2640
e	8	10	0°	1760	2640

4.3.8 Gain Linearity. Amplifier gain linearity shall be as follows:

a. With the following conditions established, the 0° phase gain shall be within ±10 percent of the 800 cps, 0° phase gain obtained in test "a" of Table VI (above):

(1) Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).

(2) Reference voltage applied to terminals 2 (Hi) and 5 (Lo).

(3) Terminals 6, 7 and 8 connected to terminal 10.

(4) An 800 cps input signal applied to terminals 4 (Hi) and 10 (Lo) and adjusted to provide an 800 cps output component of 3V between terminals 25 (Hi) and 31 (Lo).

b. With the conditions in "a" (above) established except with the 800 cps input signal adjusted to provide an 800 cps output component of 30V, the 0° phase gain shall be within ±10 percent of the 800 cps, 0° phase gain obtained in test "a" of Table VI.

4.3.9 Phase Shift. With the conditons specified below established, the phase shift of the 800 cps output component with respect to the input shall be 180° ±15° for both 0° and π phase inputs.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).

b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).

c. Terminals 6, 7 and 8 connected to terminal 10.

d. An 800 cps, 0° phase input signal applied to terminals 4 (Hi) and 10 (Lo) and adjusted to provide an output of 5.0±0.5V between terminal 25 and dc supply common.

e. Condition "d" (above) repeated with an 800 cps, π phase input signal.

4.3.10 Minimum Output. With the following conditions established, the minimum output between terminals 25 (Hi) and 31 (Lo) shall be 30V for 0° and π phase input signals.

a. Degraded dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).
b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).
c. A 10V, 800 cps signal applied to terminals 4 (Hi) and 10 (Lo).

4.3.11 Frequency Response. With the conditions specified below established, the ratio of the input signal required at 0.1 cps to the input signal required at 0.8 cps shall be 0.63 min, 0.794 max. When an unbalance occurs at the output, the output measurement shall be an average value. The phase shift of the output with respect to the input at 20 cps shall be 25° ±10°.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).

b. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).

c. Terminals 6, 7 and 8 connected to terminal 10.

d. An 800 cps suppressed carrier input signal applied to terminals 4 (Hi) and 10 (Lo) and adjusted in amplitude, at each modulation frequency specified in Table I, to provide 10V pp output between terminals 25 (Hi) and dc supply common (Lo).

4.3.12 Amplifier Feedthrough. With the following conditions established, the 800 cps, amplifier output shall be 0.2V max and 0.05 V min. [illegible] and 0.05V min.

a. Nominal dc supply voltage applied to terminals 22 (Hi) and 20 (Lo).
b. Terminal 23 disconnected from terminal 22.
c. Reference voltage applied to terminals 2 (Hi) and 5 (Lo).
d. Terminals 6, 7 and 8 connected to terminal 10.
e. A 0.5V, 800 cps, 0 phase input applied to terminals 4 (Hi) and 10 (Lo).

d.

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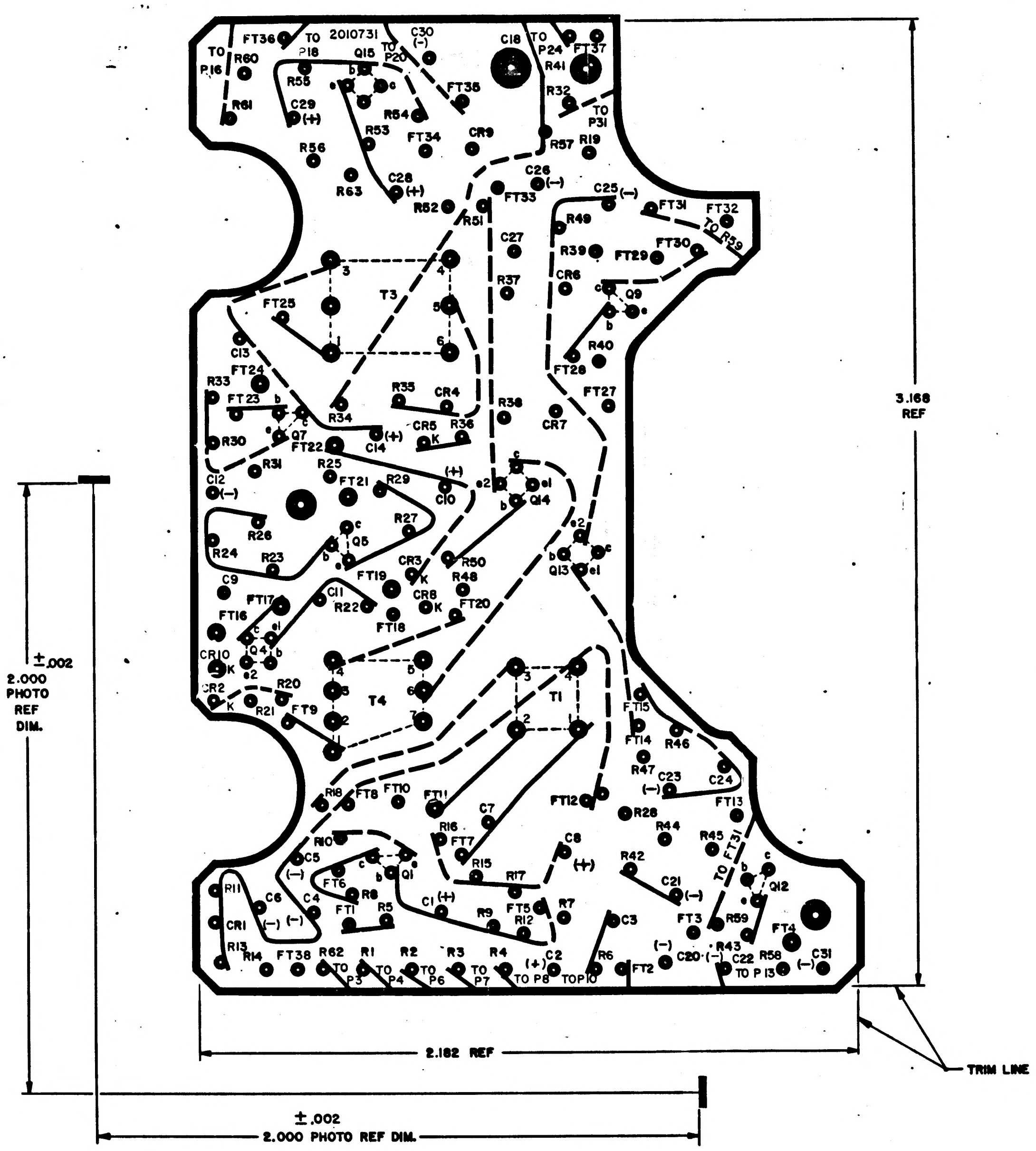
REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		INITIAL RELEASE CLASS A PER TDRR 14460			22 APRIL 66	



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD, SHALL INSURE DIMENSIONAL STABILITY.
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2010734	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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INSTRUMENTATION LAB
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DRAWN M.T. [illegible] 19 APR 66
CHECKED [illegible] 20 APR 66
APPROVED R. [illegible] 20 APR 66
APPROVED [illegible]
APPROVED MIT [illegible] 6-7-66
A. C. METZGER
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD TOP
MOTOR DRIVE AMPLIFIER

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010735
SCALE 5/1
SHEET 1 OF 1

2010735 A

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REVISIONS						
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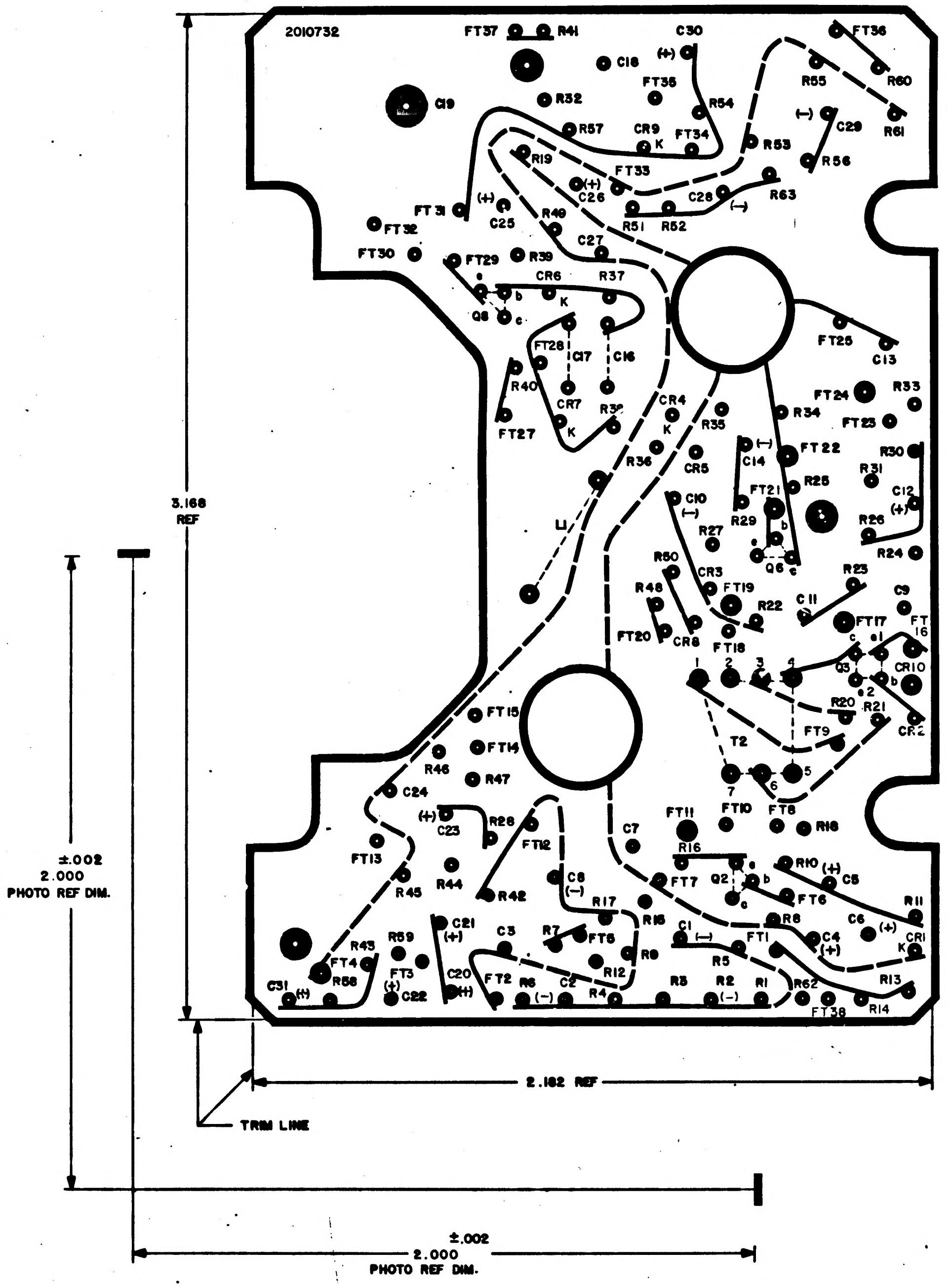
A		INITIAL RELEASE CLASS A PER TDRR 24430			22 APRIL 66	


2010732
FT37
R41
C30
FT36
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R57
CR9
K
FT34
R53
R56
R19
FT33
(+)
C26
C28
(−)
R63
FT31
(+)
C25
R49
R51
R52
FT32
C27
FT30
FT29
R39
e
CR6
R37
b
K
Q8
c
FT28
C17
C16
FT26
C13
R40
CR7
R38
CR4
FT24
R33
K
K
R35
R34
FT23
FT27
R36
CR5
(−)
C14
FT22
R30
C10
(−)
FT21
R25
R31
C12
(+)
L1
R27
R29
b
e
Q6
c
R26
R24
R50
CR3
R23
R48
FT19
R22
C11
C9
FT17
FT 16
FT20
CR8
FT18
c
e1
1
2
3
4
Q3
CR10
b
e2
R20
R21
CR2
FT15
T2
FT9
FT14
R46
R47
7
6
5
C24
(+)
C23
R28
FT11
FT10
FT8
R18
C7
FT12
R16
FT13
e
R10
(+)
C5
Q2
b
c
C8
(−)
FT7
FT6
R45
R44
R42
R17
R11
R15
R8
C6
C21
(+)
C3
R7
FT5
C1
(−)
FT1
C4
(+)
(+)
CR1
K
R43
R59
R9
R5
FT4
R12
C31
(+)
R58
FT3
(+)
C22
C20
(+)
FT2
R6
(−)
C2
R4
R3
R2
(−)
R1
R62
R13
FT38
R14
3.168
REF
±.002
2.000
PHOTO REF DIM.
2.182 REF
TRIM LINE
±.002
2.000
PHOTO REF DIM.

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY
3. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN
4. CUT TO WITHIN .010 OF TRIM LINE

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

2010734	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN M.V. Yamasaki 19 APR 66
CHECKED 20 APR 66
APPROVED R. Greenwood 20 APR 66
APPROVED
APPROVED MIT 6-7-66
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD BOTTOM
MOTOR DRIVE AMPLIFIER

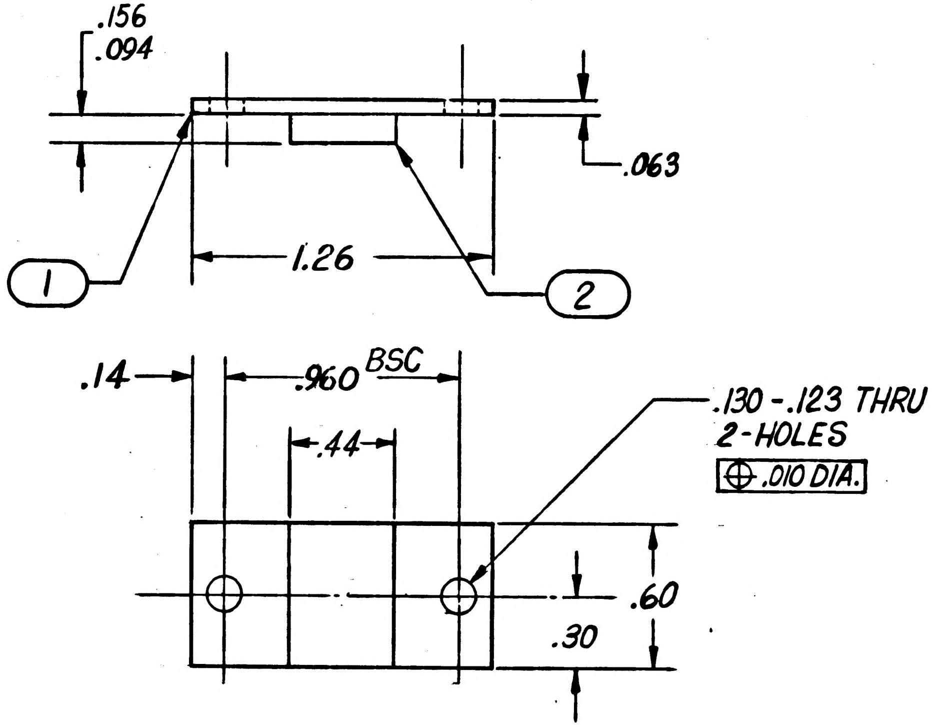
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010736
SCALE 5/1
SHEET 1 OF 1

2010736 A

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29603		27 MAY 66	Dmf

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: a. PER QQ-A-250/4 TEMPER T3 2024-T3 AL. ALLOY
   b. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK PER MIL-R-6130.
3. FINISH: CHROMIC ANODIZE PER MIL-A-8625 TYPE I. CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. BOND ITEM 2 TO ITEM 1 USING ITEM 3 CENTRALIZE AS SHOWN.
6. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.



	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	3	AR	MIL-A-5092, TYPE II	ADHESIVE
SEE NOTE 2b	2	1	2010738-002	PAD, CUSHIONING
SEE NOTE 2a & 3	1	1	2010738-001	PLATE, CLAMP

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010743-011	
2010745-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN C. Knotek DATE 20 APRIL 66
CHECKED
APPROVAL J. Petrang 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL M. B. McKinley 6-14-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP, RETAINING
(INSEPARABLE ASSEMBLY)

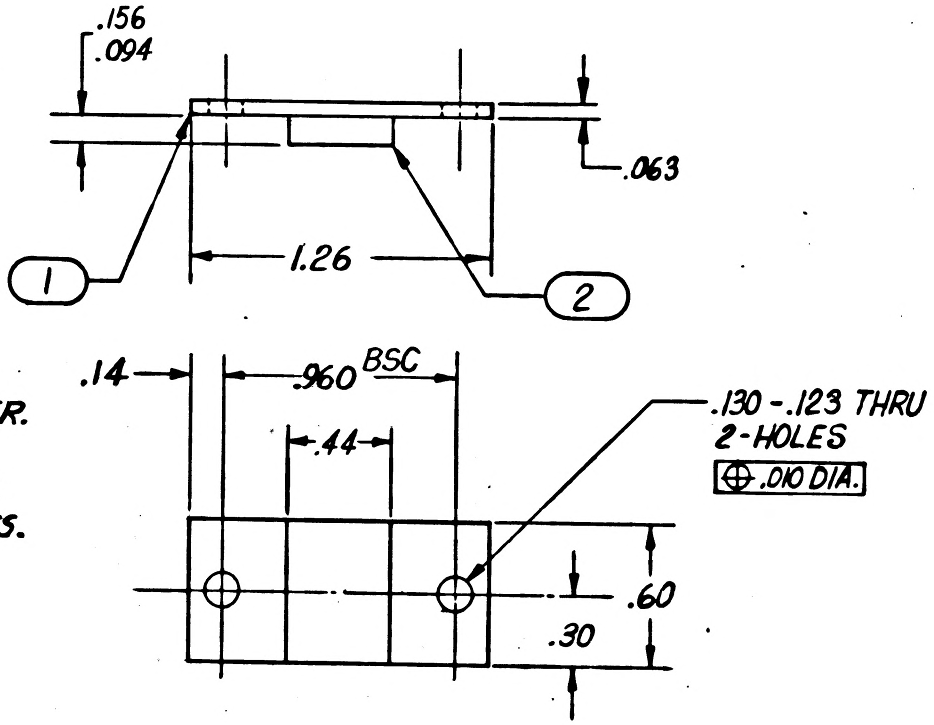
SIZE C
CODE IDENT NO. 80230
2010738
SCALE 2:1
SHEET 1 OF 1

2010738

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 24103		27 MAY 66	
	B	REVISED PER TDRR 33282		27 MAR 67	JJB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: a. PER QQ-A-250/4 TEMPER T3 2024-T3 AL. ALLOY
   b. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK PER MIL-R-6130.
3. FINISH: CHROMIC ANODIZE PER MIL-A-8625 TYPE I. CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. BOND ITEM 2 TO ITEM 1 USING ITEM 3 CENTRALIZE AS SHOWN.
6. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
8. PAINT ALL SURFACES EXCEPT ITEM 2 PER ND 1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1002543-003 PER ND 1002291, TYPE II EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.



	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	3	AR	MIL-A-5092, TYPE II	ADHESIVE
SEE NOTE 2b	2	1	2010738-002	PAD, CUSHIONING
SEE NOTE 2a & 3	1	1	2010738-001	PLATE, CLAMP

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010743-011	
2010745-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT
DRAWN C. Krotek DATE 20 APRIL 66
CHECKED
APPROVAL J. Petrang 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL E. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP, RETAINING
(INSEPARABLE ASSEMBLY)

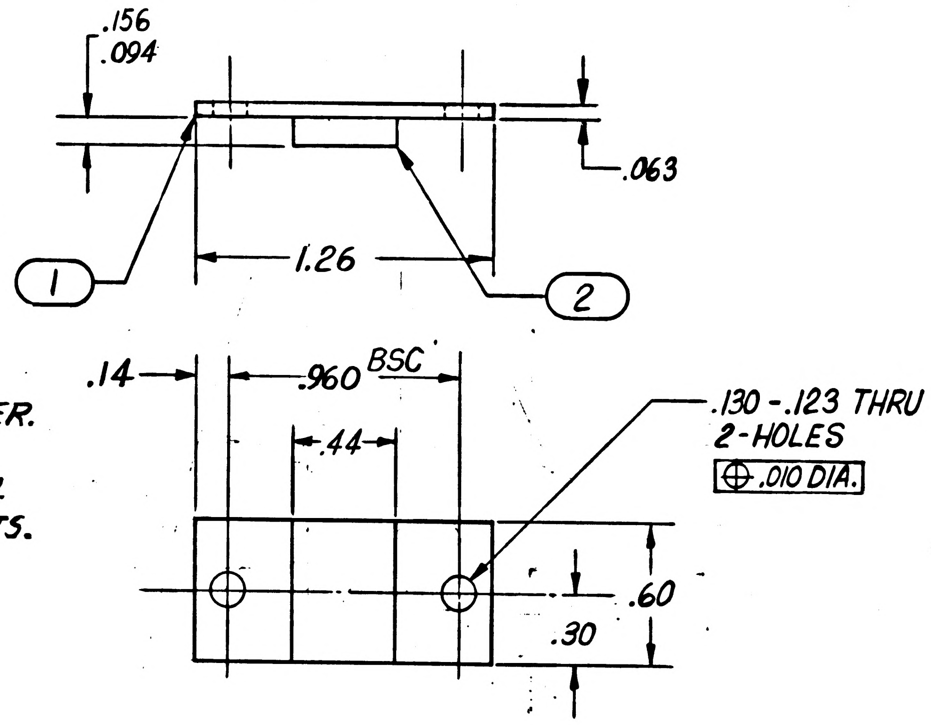
SIZE C
CODE IDENT NO. 80230
2010738
SCALE 2:1
SHEET 1 OF 1

2010738

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 24103		27 MAY 66	
	B	REVISED PER TDRR 33282		27 MAR 67	JJB
	C	REVISED PER TDRR 34104		11 JUL 67	JK JAC

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL : a. PER QQ-A-250/4 TEMPER T3 2024-T3 AL. ALLOY
   b. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK PER MIL-R-6130.
3. FINISH : CHROMIC ANODIZE PER MIL-A-8625 TYPE I. CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. BOND ITEM 2 TO ITEM 1 USING ITEM 3 CENTRALIZE AS SHOWN.
6. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
8. PAINT ALL SURFACES EXCEPT ITEM 2 PER ND1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1012543-003 PER ND1002291, TYPE II EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.



SEE NOTE 7	3	AR	MIL-A-5092, TYPE II	ADHESIVE
SEE NOTE 2b	2	1	2010738-002	PAD, CUSHIONING
SEE NOTE 2a & 3	1	1	2010738-001	PLATE, CLAMP

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	AR	MIL-A-5092, TYPE II	ADHESIVE
2	1	2010738-002	PAD, CUSHIONING
1	1	2010738-001	PLATE, CLAMP

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010743-011	
2010745-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO
CONTRACT
DRAWN C. Krstek DATE 20 APRIL 66
CHECKED
APPROVAL J. Petranj 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL M. C. METZGER
MIT APPROVAL 6/14/6

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP, RETAINING
(INSEPARABLE ASSEMBLY)

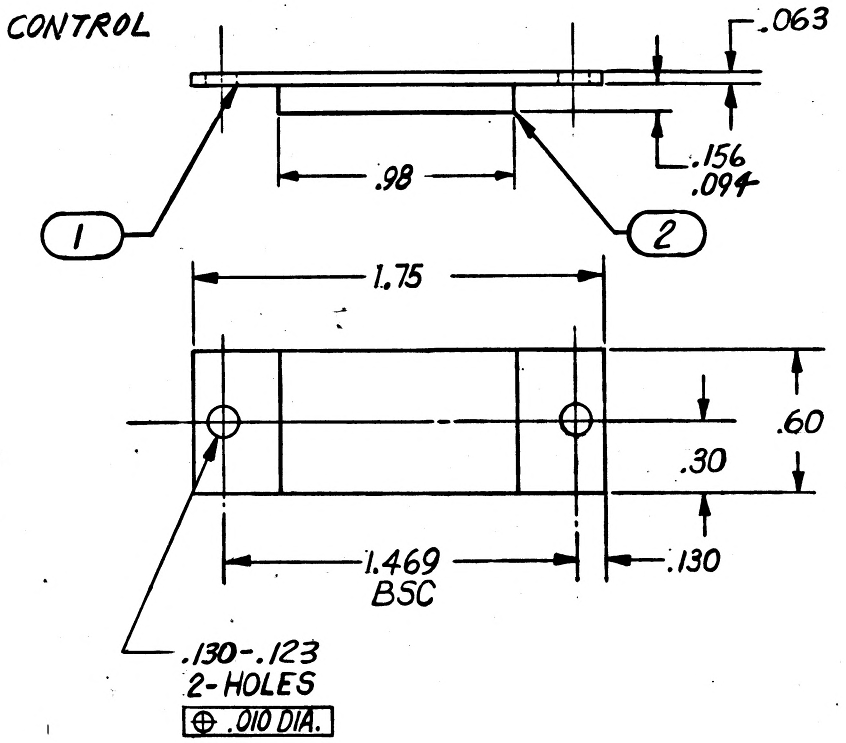
SIZE C
CODE IDENT NO. 80230
2010738
SCALE 2:1
SHEET 1 OF 1

MIL-1082D D

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29548		27 MAY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.
2. MATERIAL: a. PER QQ-A-250/4 TEMPER T3 2024-T3 AL ALY.
   b. RUBBER, CELLULAR, CHEMICALLY BLOWN, BLACK TYPE II, GRADE A, MEDIUM PER MIL-R-6130.
3. FINISH: CHROMIC ANODIZE PER MIL-A-8625 TYPE I CLEAR
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. BOND ITEM 2 TO ITEM 1 USING ITEM 3. CENTRALIZE AS SHOWN.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.



	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	3	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 2b	2	1	2010739-002	PAD, CUSHIONING
SEE NOTE 2a&3	1	1	2010739-001	PLATE, CLAMP

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6010656-011	
6010655-011	
2010744-021	
2010744-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN C. Knotek DATE 22 APRIL 66
CHECKED
APPROVAL J. Petrang 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL M.O. Hoke 6-14-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

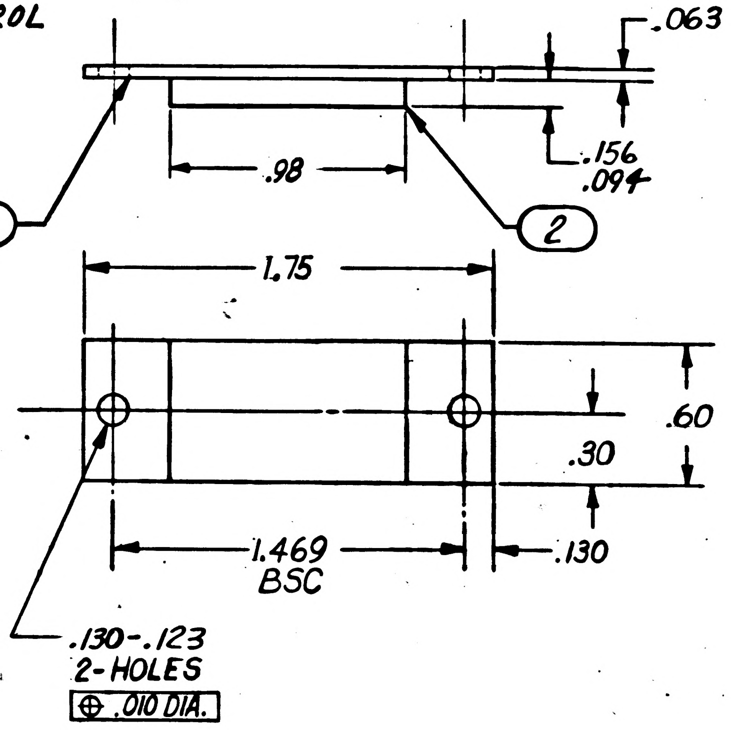
CLAMP, RETAINING
(INSEPARABLE ASSEMBLY)

SIZE C
CODE IDENT NO. 80230
2010739
SCALE 2:1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29548		27 MAY 66	
	B	REVISED PER TDRR 33283		27 MAR 67	JJB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.
2. MATERIAL: a. PER QQ-A-250/4 TEMPER T3 2024-T3 AL ALY.
   b. RUBBER, CELLULAR, CHEMICALLY BLOWN, BLACK TYPE II, GRADE A, MEDIUM PER MIL-R-6130.
3. FINISH: CHROMIC ANODIZE PER MIL-A-8625 TYPE I CLEAR
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. BOND ITEM 2 TO ITEM 1 USING ITEM 3. CENTRALIZE AS SHOWN.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
8. PAINT ALL SURFACES EXCEPT ITEM 2 PER ND 1002289, TYPE III. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISO-PROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.



	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	3	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 2b	2	1	2010739-002	PAD, CUSHIONING
SEE NOTE 2a 3	1	1	2010739-001	PLATE, CLAMP

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6010656-011	
6010655-011	
2010744-021	
2010744-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN C. Knotek DATE 22 APRIL 66
CHECKED
APPROVAL J. Petrany 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

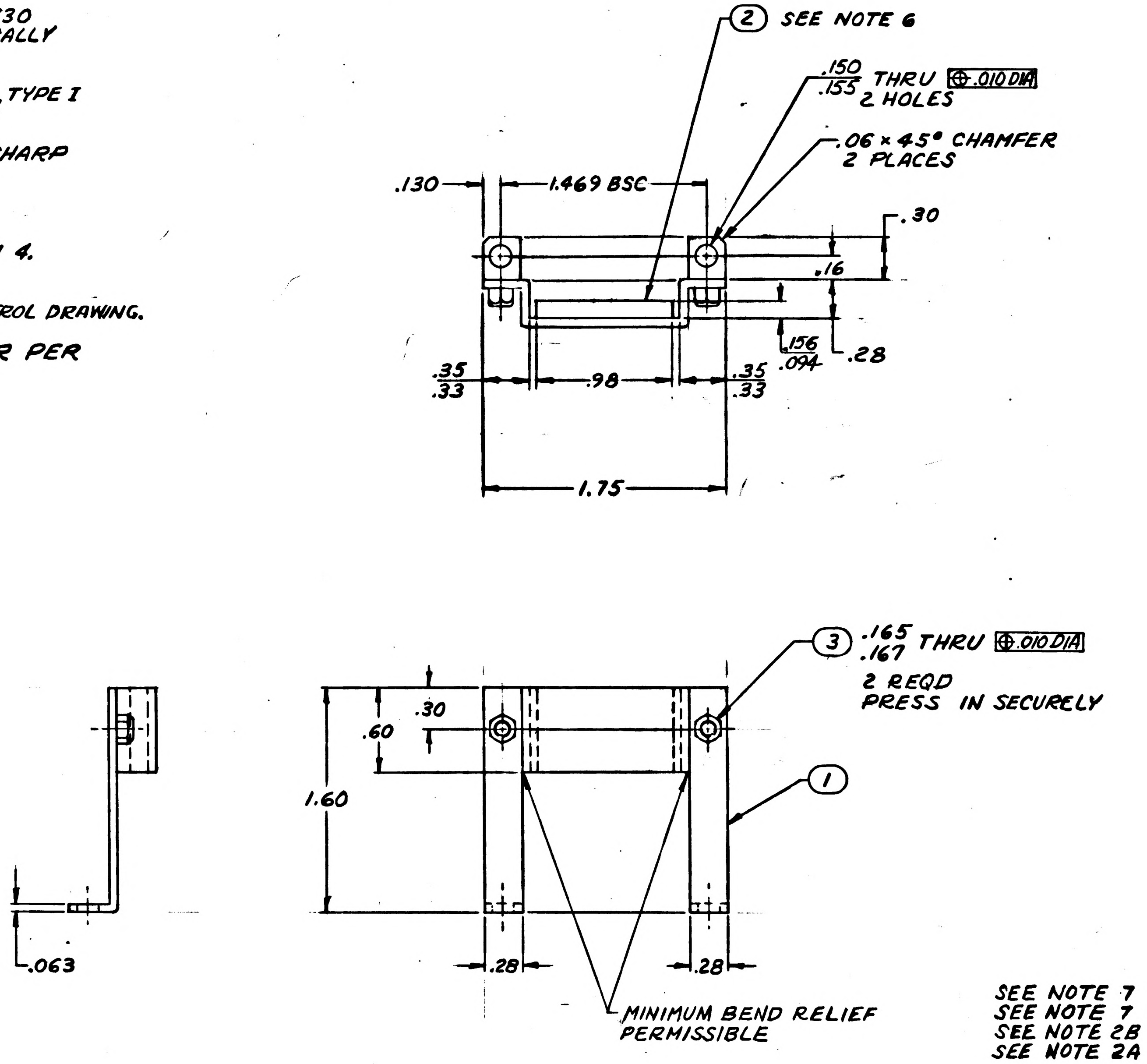
CLAMP, RETAINING
(INSEPARABLE ASSEMBLY)

SIZE C
CODE IDENT NO. 80230
2010739
SCALE 2:1
SHEET 1 OF 1

2010740 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 29598		27 MAY 66	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL:
   A. ALUM ALLOY PER QQ-A-250/8, TEMPER H32 5052-H32.
   B. RUBBER, CELLULAR PER MIL-R-6130 TYPE II, GRADE A, MEDIUM, CHEMICALLY BLOWN, BLACK.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE I CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. ALL INSIDE BEND RADII .015R MAX.
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4. CENTRALIZE AS SHOWN.
7. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.



② SEE NOTE 6
.150 .155 THRU ⊕ .010 DIA 2 HOLES
.06 × 45° CHAMFER 2 PLACES
.130
1.469 BSC
.30
.16
.156 .094
.28
.35 .33
.98
.35 .33
1.75
③ .165 .167 THRU ⊕ .010 DIA 2 REQD PRESS IN SECURELY
.30
.60
1.60
①
.063
.28
.28
MINIMUM BEND RELIEF PERMISSIBLE

SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010740-002	PAD
SEE NOTE 2A	1	1	2010740-001	BRACKET
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6010656-011	
6010655-011	
2010744-001	
2010744-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
CONTRACT
DRAWN B. Olson DATE 21 APR 66
CHECKED
APPROVAL J. Patrangy 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL 6-14-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010740
SCALE 2/1
SHEET 1 OF 1

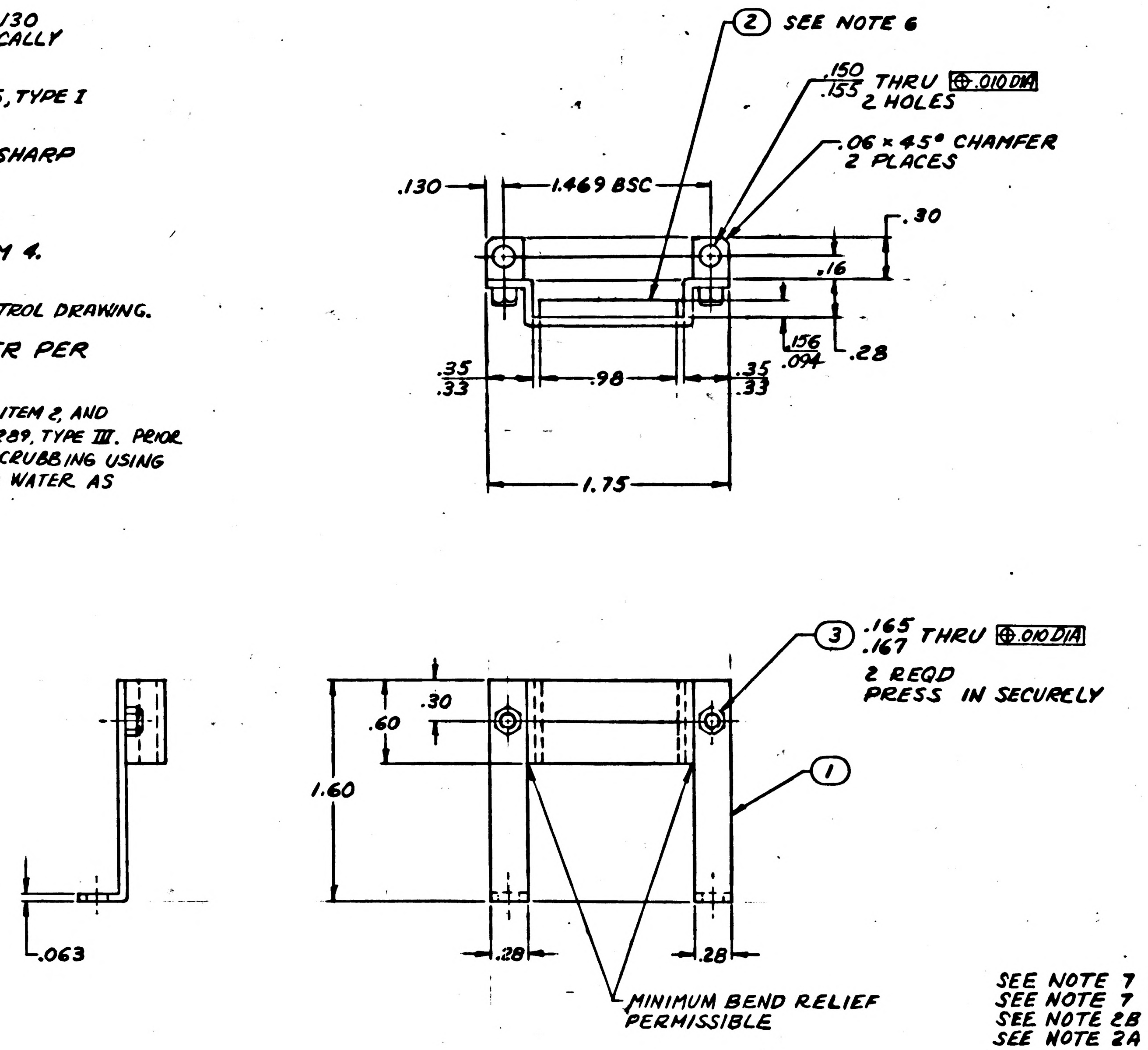
MASTER

IL 1077D-K

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 29598		27 MAY 66	
B		REVISED PER TDRR 33284		27 MAR 67	CFB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL:
   A. ALUM ALLOY PER QQ-A-250/8, TEMPER H32 5052-H32.
   B. RUBBER, CELLULAR PER MIL-R-6130 TYPE II, GRADE A, MEDIUM, CHEMICALLY BLOWN, BLACK.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE I CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. ALL INSIDE BEND RADII .015R MAX.
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4. CENTRALIZE AS SHOWN.
7. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. PAINT ALL SURFACES EXCEPT THRU HOLES, ITEM 2, AND THREADED HOLE IN ITEM 3, PER ND 1002289, TYPE III. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.


② SEE NOTE 6
.150/.155 THRU ⊕.010 DIA
2 HOLES
.06 × 45° CHAMFER
2 PLACES
.130
1.469 BSC
.30
.16
.156/.094
.28
.35/.33
.98
.35/.33
1.75
③ .165/.167 THRU ⊕.010 DIA
2 REQD
PRESS IN SECURELY
①
.30
.60
1.60
.063
.28
.28
MINIMUM BEND RELIEF PERMISSIBLE

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010740-002	PAD
SEE NOTE 2A	1	1	2010740-001	BRACKET

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6010656-011	
6010655-011	
2010744-001	
2010744-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 21 APR 66
CHECKED
APPROVAL J. Pitrango 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

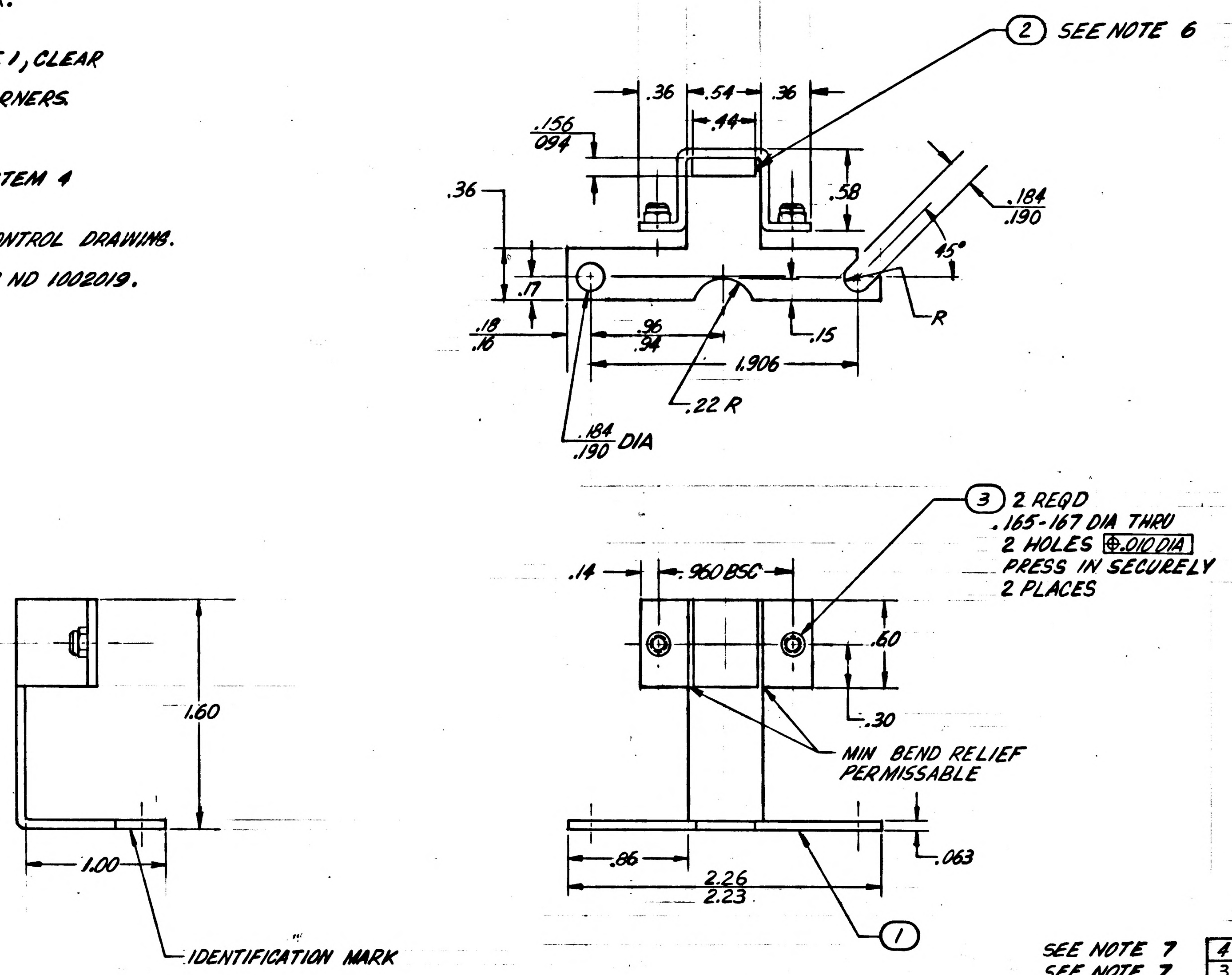
BRACKET, THERMOCOUPLE (INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010740
SCALE 2/1
SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 29599		27 MAY 66	

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D 70327.
2. MATERIAL:
   A. QQ-A-250/8, TEMPER H32, ALUM ALLOY 5052, H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN TYPE II, GRADE A, MEDIUM, BLACK. PER MIL-R-6130.
3. FINISH: ANODIZE PER MIL-A-8625 TYPE I, CLEAR
4. MUST BE FREE FROM BURRS & SHARP CORNERS.
5. ALL INSIDE BEND RADII, .015 R MAX
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4 CENTRALIZE AS SHOWN
7. VENDOR ITEM; SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.



② SEE NOTE 6
.36
.54
.36
.44
.156
.094
.58
.36
.184
.190
45°
.17
R
.18
.16
.96
.94
.15
1.906
.22 R
.184
.190 DIA
③ 2 REQD
.165-167 DIA THRU
2 HOLES ⊕ .010 DIA
PRESS IN SECURELY
2 PLACES
.14
.960 BSC
.60
.30
MIN BEND RELIEF PERMISSABLE
1.60
1.00
IDENTIFICATION MARK
.86
2.26
2.23
.063
①

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010741-002	PAD
SEE NOTE 2A	1	1	2010741-001	BRACKET, THERMOCOUPLE

LIST OF PARTS AND MATERIALS

2010743-011	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Y. Levendusky DATE 21 APR 66
CHECKED
APPROVAL J Petrangi 2 MAY 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL MG Whaley 6-1-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010741
SCALE
SHEET

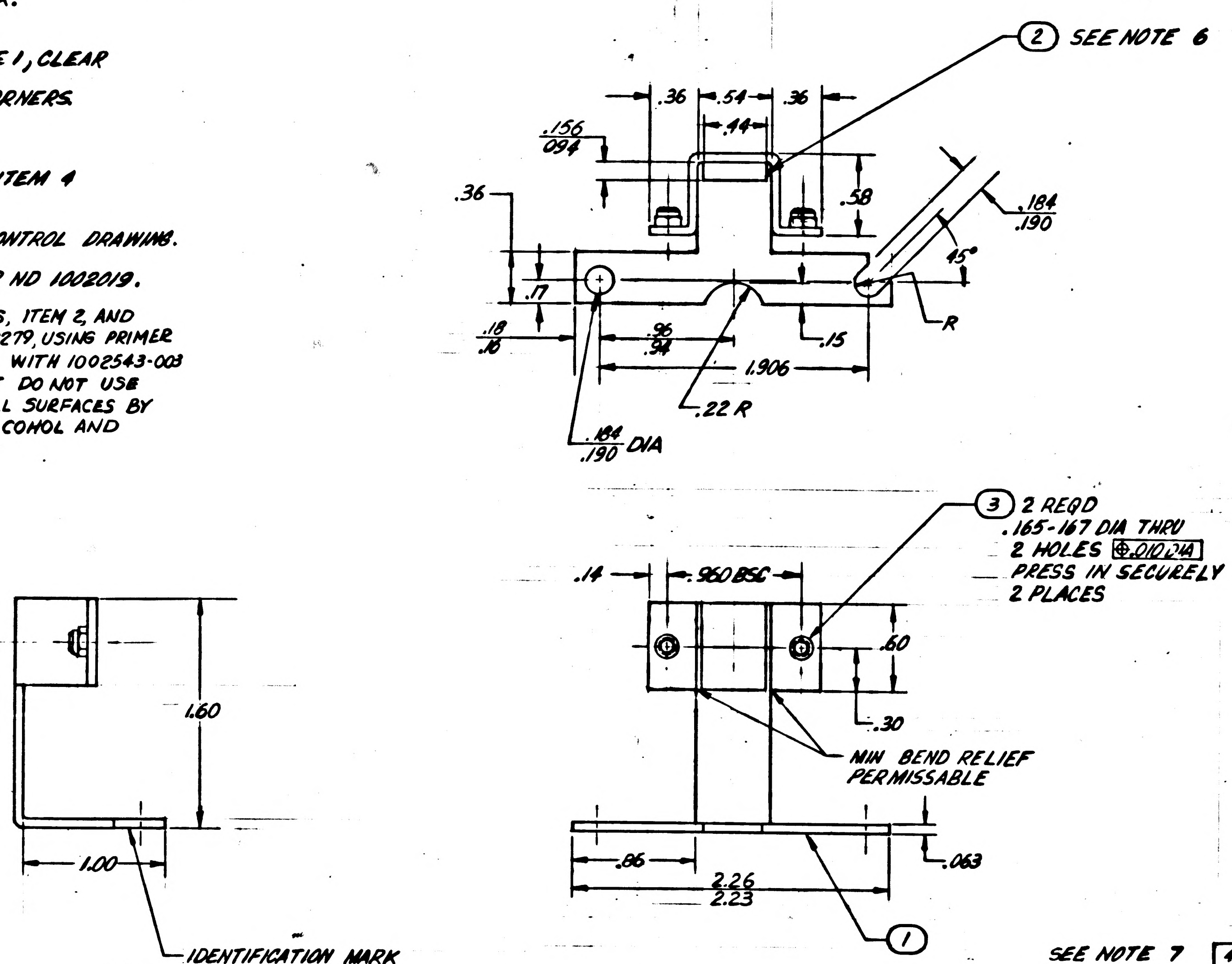
B | 2010741 | 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 27599		27 MAY 66	
B		REVISED PER TDRR 33285		27 MAR 67	CFB

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D 70327.
2. MATERIAL:
   A. QQ-A-250/8, TEMPER H32, ALUM ALLOY 5052, H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN TYPE II, GRADE A, MEDIUM, BLACK. PER MIL-R-6130.
3. FINISH: ANODIZE PER MIL-A-8625 TYPE I, CLEAR
4. MUST BE FREE FROM BURRS & SHARP CORNERS.
5. ALL INSIDE BEND RADII, .015 R MAX
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4 CENTRALIZE AS SHOWN
7. VENDOR ITEM; SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. PAINT ALL SURFACES EXCEPT THRU HOLES, ITEM 2, AND THREADED HOLE IN ITEM 3, PER ND 1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1002543-003 PAINT PER ND 1002291, TYPE II, EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.



② SEE NOTE 6
.36
.54
.36
.44
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.094
.36
.58
.184
.190
45°
.17
R
.18
.16
.96
.94
.15
1.906
.22 R
.184
.190 DIA
③ 2 REQD
.165-.167 DIA THRU
2 HOLES ⊕.010 DIA
PRESS IN SECURELY
2 PLACES
.14
.960 BSC
.60
.30
1.60
MIN BEND RELIEF
PERMISSABLE
.86
2.26
2.23
.063
1.00
①
IDENTIFICATION MARK

SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010741-002	PAD
SEE NOTE 2A	1	1	2010741-001	BRACKET, THERMOCOUPLE
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010743-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 21 APR 66
CHECKED
APPROVAL J Petrange 2 MAY 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-1-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010741
SCALE
SHEET

C 2010741 2

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D 70327.

2. MATERIAL:
   A. QQ-A-250/8, TEMPER H32, ALUM ALLOY 5052, H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN TYPE II, GRADE A, MEDIUM, BLACK. PER MIL-R-6130.

3. FINISH: ANODIZE PER MIL-A-8625 TYPE I, CLEAR

4. MUST BE FREE FROM BURRS & SHARP CORNERS.

5. ALL INSIDE BEND RADII, .015 R MAX

6. BOND ITEM 2 TO ITEM 1 USING ITEM 4 CENTRALIZE AS SHOWN

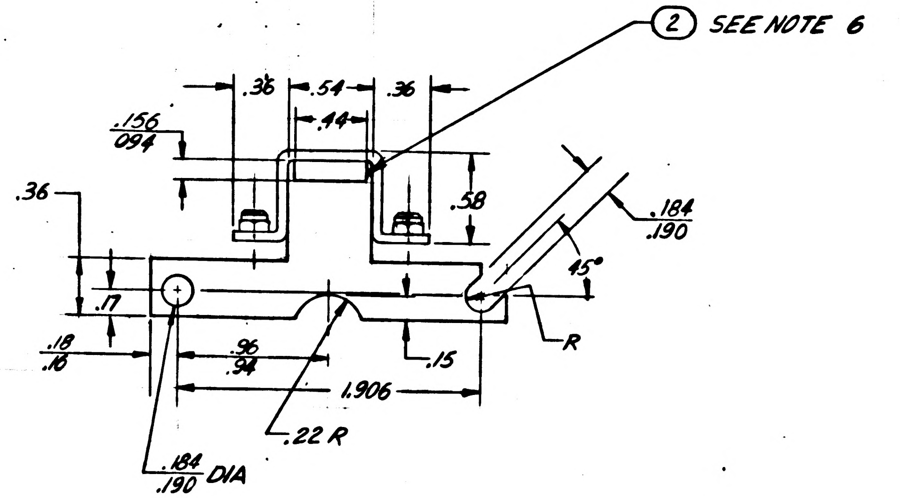
7. VENDOR ITEM; SEE SPECIFICATION CONTROL DRAWING.

8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.

9. PAINT ALL SURFACES EXCEPT THRU HOLES, ITEM 2, AND THREADED HOLE IN ITEM 3, PER ND 1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1012543-003 PAINT PER ND 1002291, TYPE II, EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 27577		27 MAY 66	
B		REVISED PER TDRR 33285		27 MAR 67	CFB
C		REVISED PER TDRR 34102		11 JUL 67	JK JAC



(2) SEE NOTE 6
.36
.54
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.44
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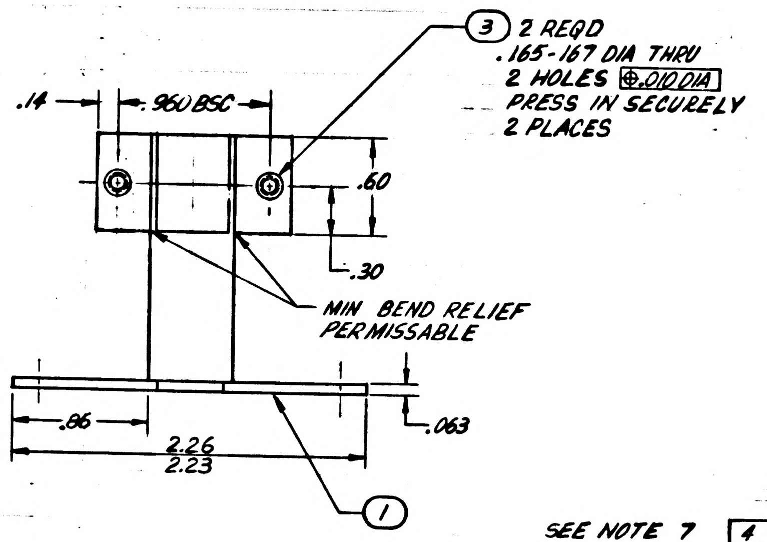
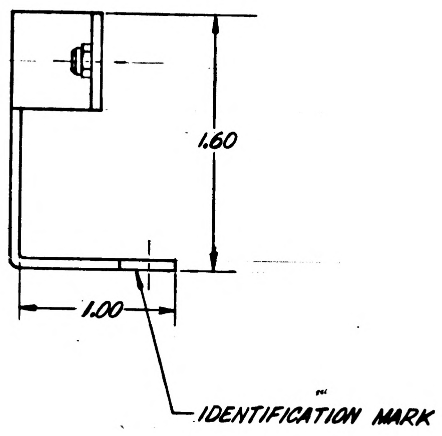
.094
.36
.58
.184
.190
45°
.17
R
.18
.16
.96
.94
.15
1.906
.22 R
.184
.190 DIA



(3) 2 REQD
.165-.167 DIA THRU
2 HOLES ⊕ .010 DIA
PRESS IN SECURELY
2 PLACES
.14
.960 BSC
.60
.30
MIN BEND RELIEF PERMISSABLE
.86
.063
2.26
2.23
(1)



1.60
1.00
IDENTIFICATION MARK

SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010741-002	PAD
SEE NOTE 2A	1	1	2010741-001	BRACKET, THERMOCOUPLE
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010743-011	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 21 APR 66
CHECKED
APPROVAL J. Petrangelo 2 MAY 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-1-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

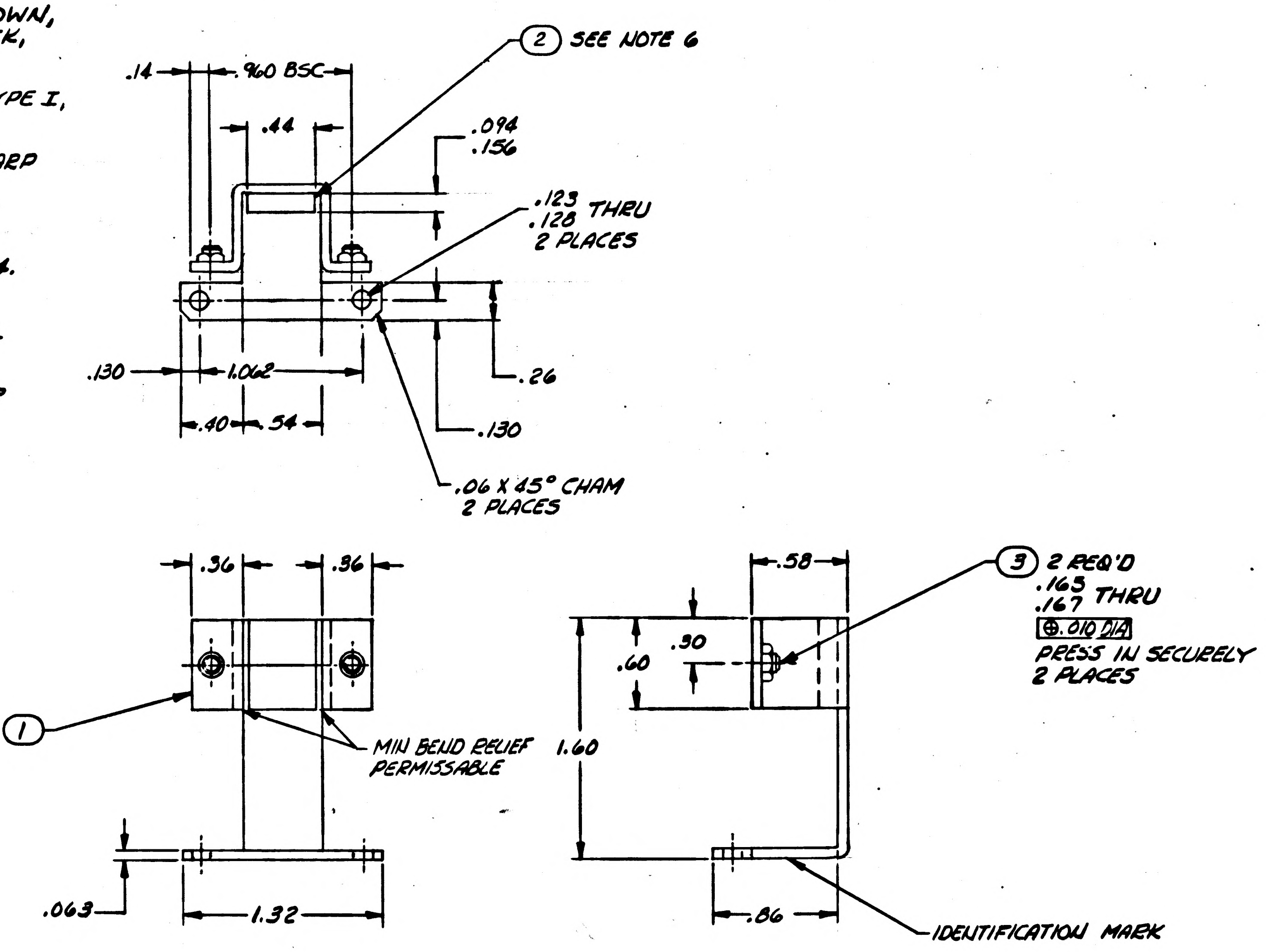
BRACKET THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010741
SCALE
SHEET

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 29603		27 MAY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL:
   A. ALUM ALLOY 5052, H32 PER QQ-A-250/8, TEMPER H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK, PER MIL-R-6130.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. ALL INSIDE BEND RADII, .015 R MAX.
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4. CENTRALIZE AS SHOWN.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND1002019.


.14
.960 BSC
.44
② SEE NOTE 6
.094
.156
.123
.128 THRU
2 PLACES
.130
1.062
.26
.40
.54
.130
.06 X 45° CHAM
2 PLACES
.36
.36
①
MIN BEND RELIEF
PERMISSABLE
.063
1.32
.58
③ 2 REQ'D
.165
.167 THRU
⊕ .010 DIA
PRESS IN SECURELY
2 PLACES
.30
.60
1.60
.86
IDENTIFICATION MARK

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010742-002	PAD
SEE NOTE 2A	1	1	2010742-001	BRACKET

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010745-011	2010745-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE 21-APR-66
CHECKED
APPROVAL J. Petrangu 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A. C.
MIT APPROVAL 6/14/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010742
SCALE 2:1
SHEET 1 OF 1

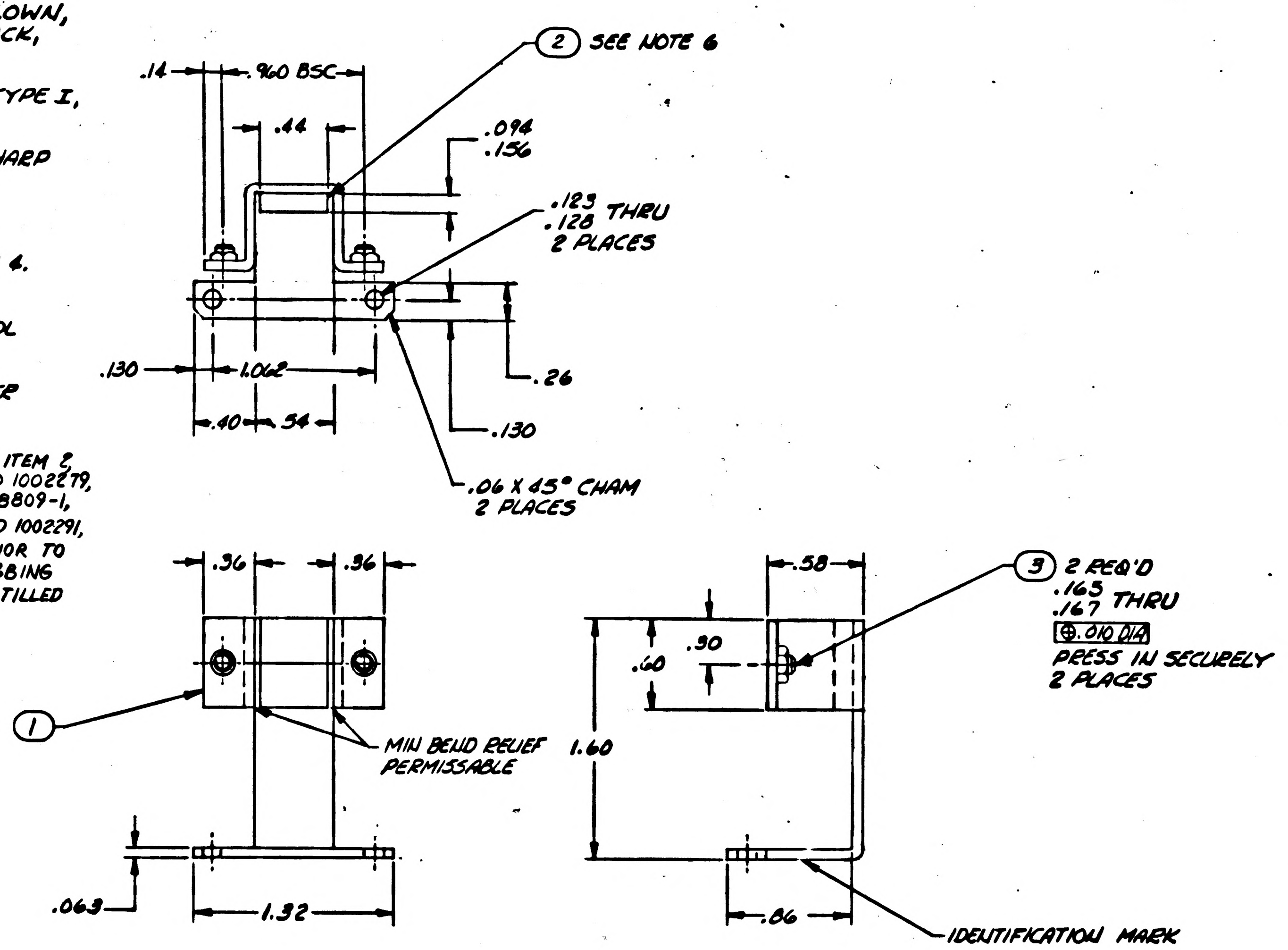
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL:
   A. ALUM ALLOY 5052, H32 PER QQ-A-250/8, TEMPER H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK, PER MIL-R-6130.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. ALL INSIDE BEND RADII, .015 R MAX.
6. BOND ITEM 2 TO ITEM 1 USING ITEM 4. CENTRALIZE AS SHOWN.
7. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. PAINT ALL SURFACES EXCEPT THRU HOLES, ITEM 2, AND THREADED HOLE IN ITEM 3, PER ND 1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1002543-003 PAINT PER ND 1002291, TYPE II, EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.

B 2010742

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
REVISIONS					
A		INITIAL RELEASE CLASS A PER TDRR 29603		27 MAY 66	
B		REVISED PER TDRR 33286		27 MAR 67	CFB



.14
.960 BSC
.44
.094
.156
2
SEE NOTE 6
.123
.128 THRU
2 PLACES
.130
1.062
.26
.40
.54
.130
.06 X 45° CHAM
2 PLACES
.36
.36
1
MIN BEND RELIEF PERMISSABLE
.063
1.32
.58
.30
.60
1.60
3
2 REQ'D
.165
.167 THRU
⊕ .010 DIA
PRESS IN SECURELY
2 PLACES
.86
IDENTIFICATION MARK

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010742-002	PAD
SEE NOTE 2A	1	1	2010742-001	BRACKET

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010745-011	2010745-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±8°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
APPROVAL

MIT INSTRUMENTATION LAB
Cambridge Mass
DRAWN 21-APR DATE '66
CHECKED
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL A C
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010742
SCALE 2:1
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL:
   A. ALUM ALLOY 5052, H32 PER QQ-A-250/8, TEMPER H32.
   B. RUBBER, CELLULAR, CHEMICALLY BLOWN, TYPE II, GRADE A, MEDIUM, BLACK, PER MIL-R-6130.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE I, CLEAR.
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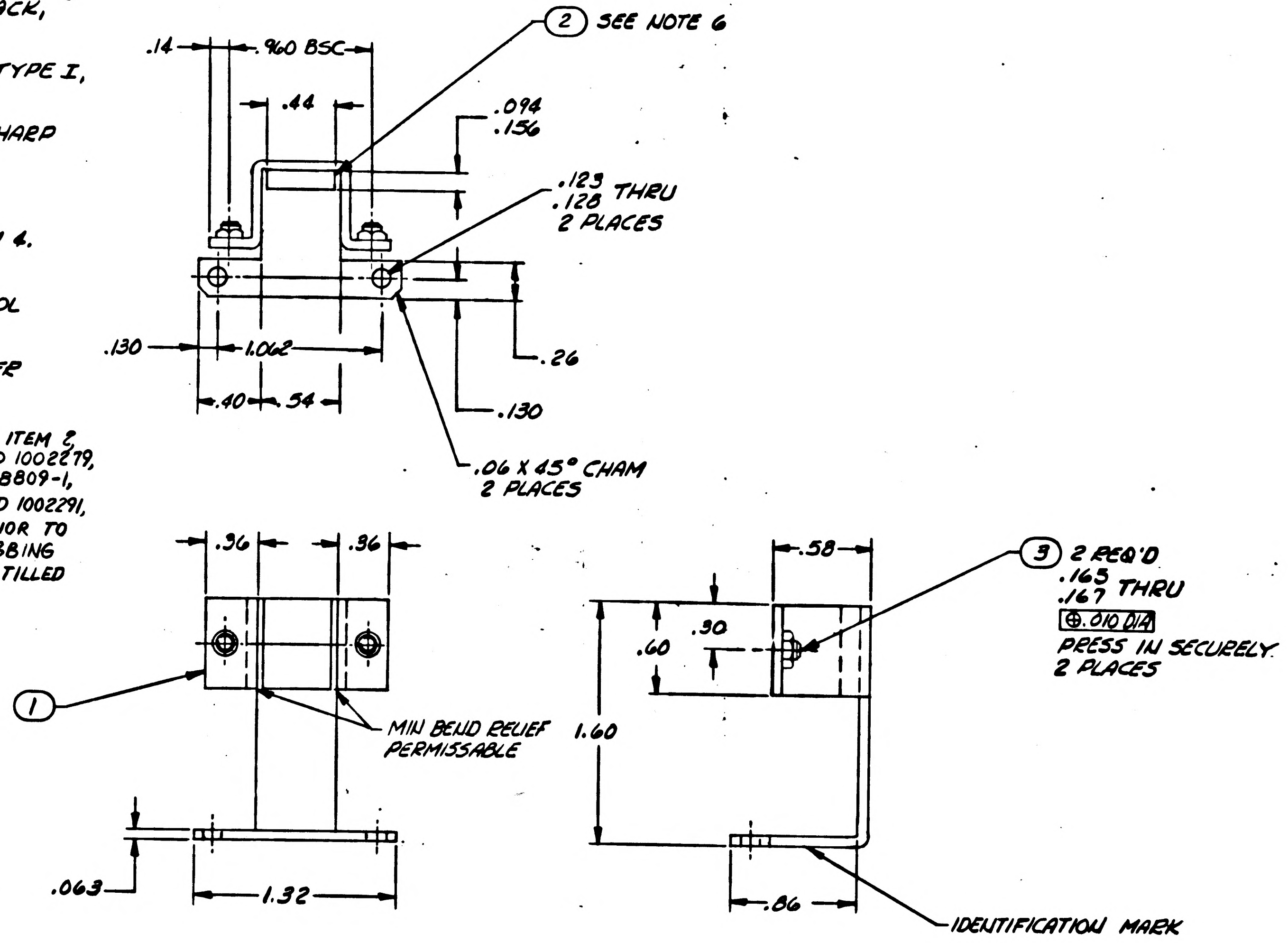
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. PAINT ALL SURFACES EXCEPT THRU HOLES, ITEM 2, AND THREADED HOLE IN ITEM 3, PER ND 1002279, USING PRIMER 1010992 AND PAINT 1008809-1, OVERCOAT WITH 1012543-003 PAINT PER ND 1002291, TYPE II, EXCEPT DO NOT USE PRIMER. PRIOR TO PAINTING CLEAN ALL SURFACES BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.

C 2010742

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 29403		27 MAY 66	
B		REVISED PER TDRR 33286		27 MAR 67	CFB
C		REVISED PER TDRR 34103		11 JUL 67	JK JAC



2 SEE NOTE 6
.14
.960 BSC
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.094
.156
.123
.128 THRU
2 PLACES
.130
1.062
.26
.40
.54
.130
.06 X 45° CHAM
2 PLACES
.36
.36
1
MIN BEND RELIEF PERMISSABLE
.063
1.32
.58
.90
.60
1.60
.86
3 2 REQ'D
.165
.167 THRU
⊕ .010 DIA
PRESS IN SECURELY
2 PLACES
IDENTIFICATION MARK

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 7	4	AR	MIL-A-5092 TYPE II	ADHESIVE
SEE NOTE 7	3	2	1011766-17	NUT, SELF-LOCKING, CLINCH
SEE NOTE 2B	2	1	2010742-002	PAD
SEE NOTE 2A	1	1	2010742-001	BRACKET

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010745-011	2010745-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

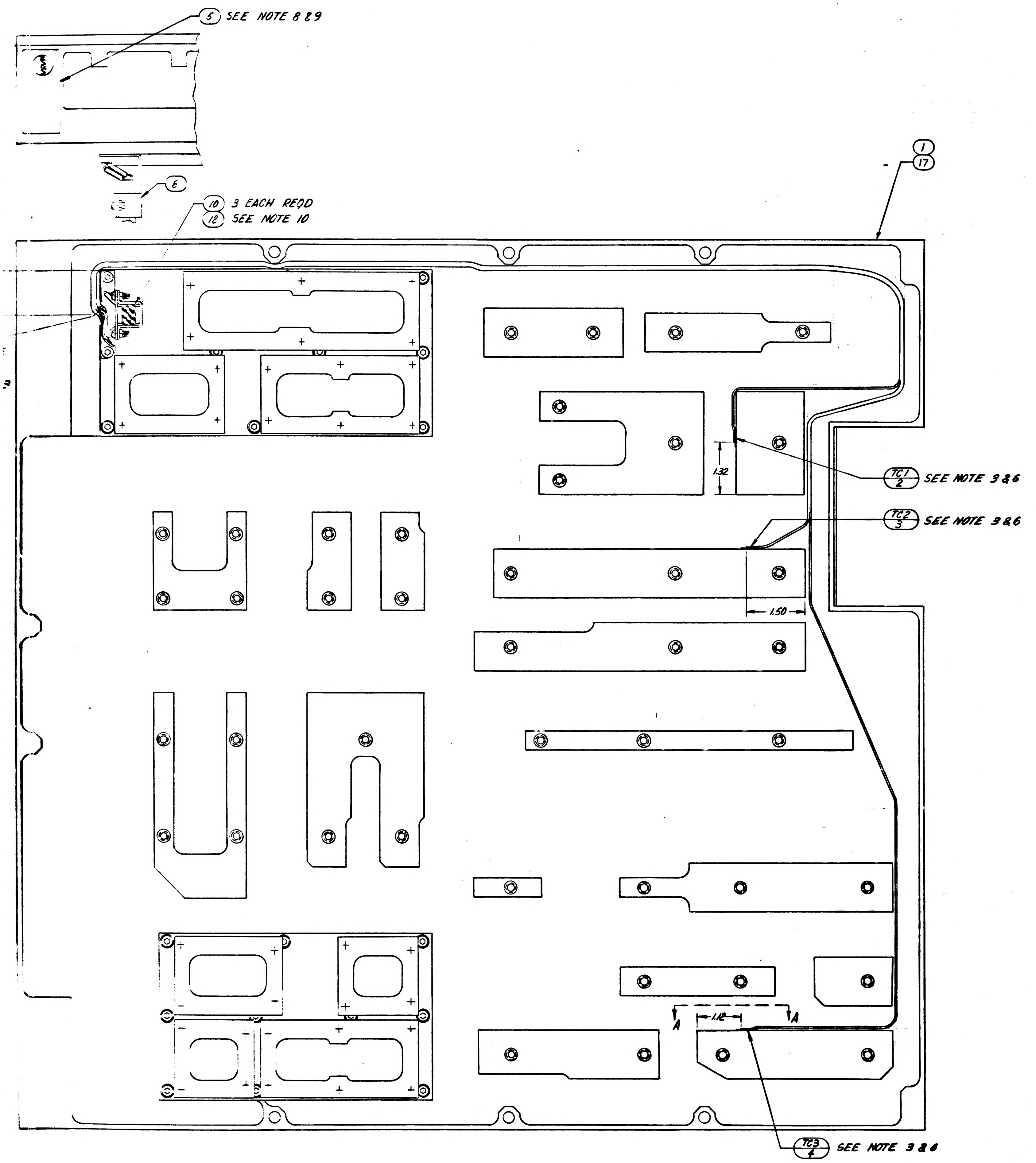
MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
CONTRACT
DRAWN DATE 21 APR 66
CHECKED
APPROVAL J. Petrang 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A. C. [illegible]
MIT APPROVAL 6/14/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, THERMOCOUPLE
(INSEPARABLE ASSEMBLY)

SIZE D
CODE IDENT NO. 80230
2010742
SCALE 2:1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 24599		27 MAY 66	



	QUANTITY REQUIRED 021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—		17	2007200-041	POWER & SERVO ASSY C/M
SEE NOTE 12	AR	AR		16	2021593	ADHESIVE
	AR	AR		15	MIL-I-15126	INSULATING TAPE TYPE MFT-2.5
	2	2		14	MS35233-15	SCREW, PAN HEAD SLOTTED
	2	2		13	NAS 1352-08-12	SCREW CAP, SOC HD
SEE NOTE 12	3	3		12	1008883-003	CONTACT, ELEC, CRIMP, SOCKET
SEE NOTE 12	3	3		11	1008883-002	CONTACT ELEC, CRIMP PIN
SEE NOTE 12	6	6		10	1008885-001	INSULATOR ASSEMBLY
SEE NOTE 12	3	3		9	1010490-142	INSULATION, SLEEVING
	2	2		8	2010737	SPACER, SLEEVE
	1	1		7	2010738	CLAMP, RETAINING 'INSEP ASSY'
	1	1		6	2010741	BRACKET THERMOCOUPLE (INSEP ASS
	1	1		5	1004260-524	NAMPLATE APOLLO G&N GSE
	1	1		4	2010746-008	THERMOCOUPLE CONTACT
	1	1		3	2010746-006	THERMOCOUPLE, CONTACT
	1	1		2	2010746-005	THERMOCOUPLE CONTACT
	—	1		1	2007200-021	POWER & SERVO ASSY C/M PSA

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 23 MAR 66 DATE
CHECKED
APPROVAL 2 MAY 66
CONTRACT
NASA APPROVAL A. C. METZGER
MIT APPROVAL

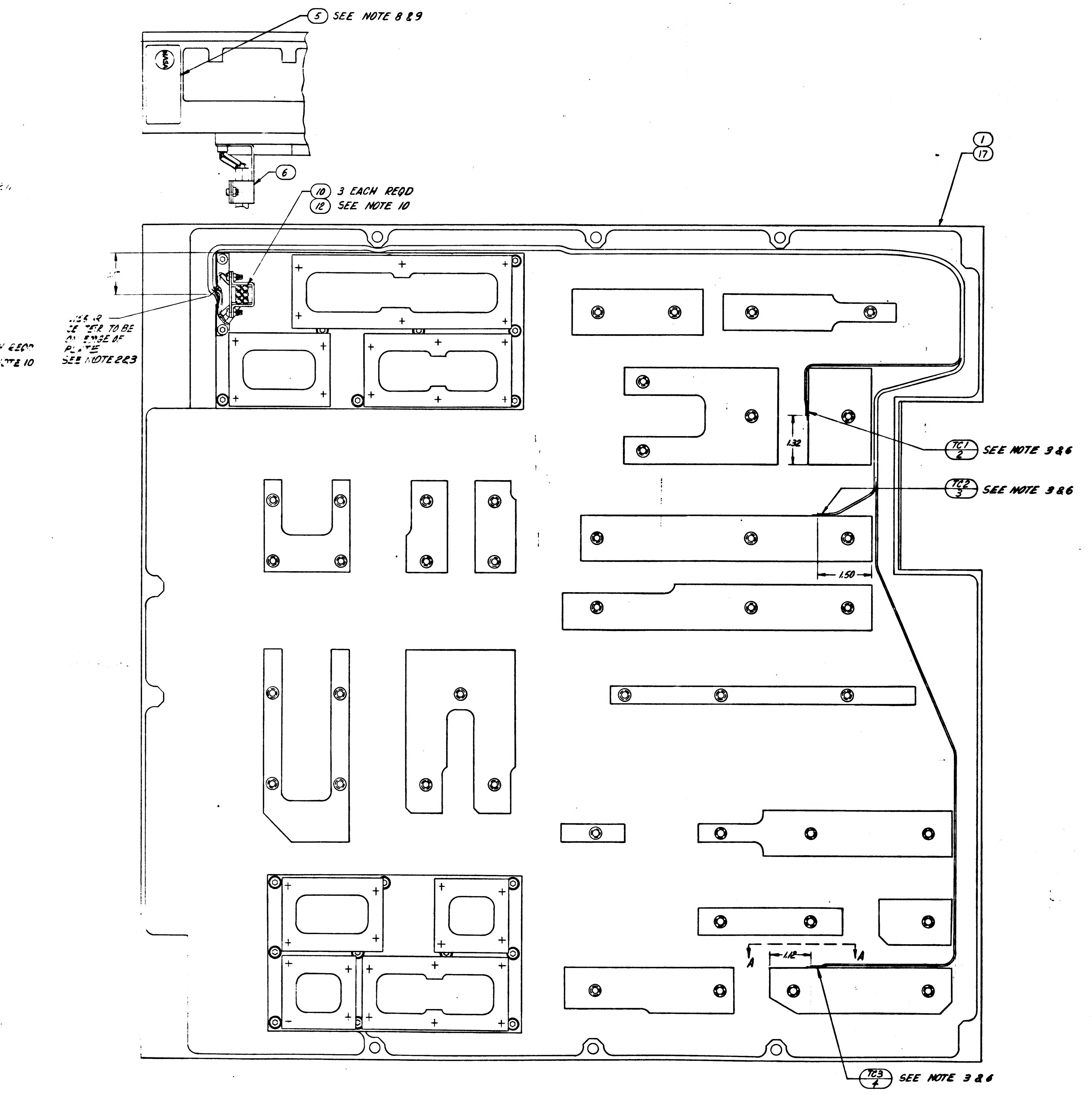
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER, SERVO AND THERMOCOUPLE
ASSEMBLY - C/M

SIZE J
CODE IDENT NO. 80230
2010743
SCALE 1/1
SHEET 1 OF 1

2010743	REV LTR A	SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		27 MAY 66	



			1	—		17	2007200-041	POWER & SERVO ASSY C/M
SEE NOTE 12			AR	AR		6	2021593	ADHESIVE
			AR	AR		5	MIL-I-15126	INSULATING TAPE TYPE MF
			2	2		4	MS35233-5	SCREW, PAN HEAD SLOTTED
			2	2		3	NAS 1352-08-2	SCREW CAP SOC HD
SEE NOTE 12			3	3		2	1008883-003	CONTACT ELEC CRIMP SOCKET
SEE NOTE 12			3	3		[illegible]	1008883-002	CONTACT ELEC CRIMP PIN
SEE NOTE 12			6	6		0	1008885-001	INSULATOR ASSEMBLY
SEE NOTE 12			3	3		9	1010490-142	INSULATION SLEEVING
			2	2		8	2010737	SPACER SLEEVE
			1	1		7	2010738	CLAMP RETAINING INSERT ASSY
			1	1		6	2010741	BRACKET THERMOCOUPLE INSERT
			1	1		5	1004260-524	NAMEPLATE APOLLO G&N SIZE
			1	1		4	2010746-008	THERMOCOUPLE CONTACT
			1	1		3	2010746-006	THERMOCOUPLE CONTACT
			1	1		2	2010746-005	THERMOCOUPLE CONTACT
			—	1		1	2007200-021	POWER & SERVO ASSY C/M ASA
			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ±

DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN 23 APR 66 DATE
CHECKED
APPROVAL
CONTRACT
NASA APPROVAL C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER, SERVO AND THERMOCOUPLE
ASSEMBLY - C/M

SIZE
CODE IDENT NO. 80230
2010743
SCALE 1/1
SHEET 1 OF 1

2010743 REV LTR A SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND 1002040.
3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACES "A" PER ND 1002236.
4. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE, TC DESIGNATION NUMBER PER ND 1002019, BLACK CHARACTERS .12 HIGH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.
5. PARTIAL REFERENCE ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER, 45
6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 15, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 16 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 15.
7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202 METHOD 302, TO CHASSES GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEG OHMS
8. BOND NAMEPLATE ITEM 5 PER ND 1002219 AND CENTRALIZE.
9. REPLACE PART WITH ITEM NUMBER INDICATED.
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 10 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 11 TO BLUE LEADS AND ITEM 12 TO RED LEAD PER ND 1002032.
11. MOUNTING TORQUE FOR ITEM 13 TO BE 21.8 - 23.8 INCH POUNDS.
12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING

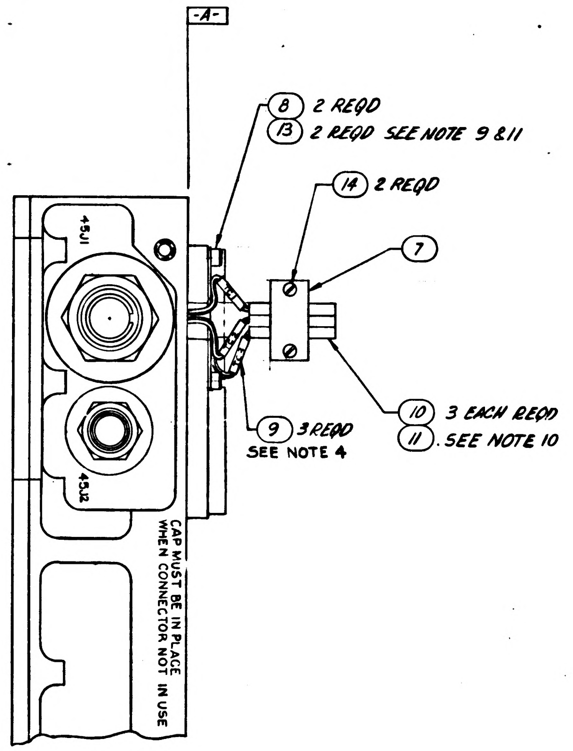
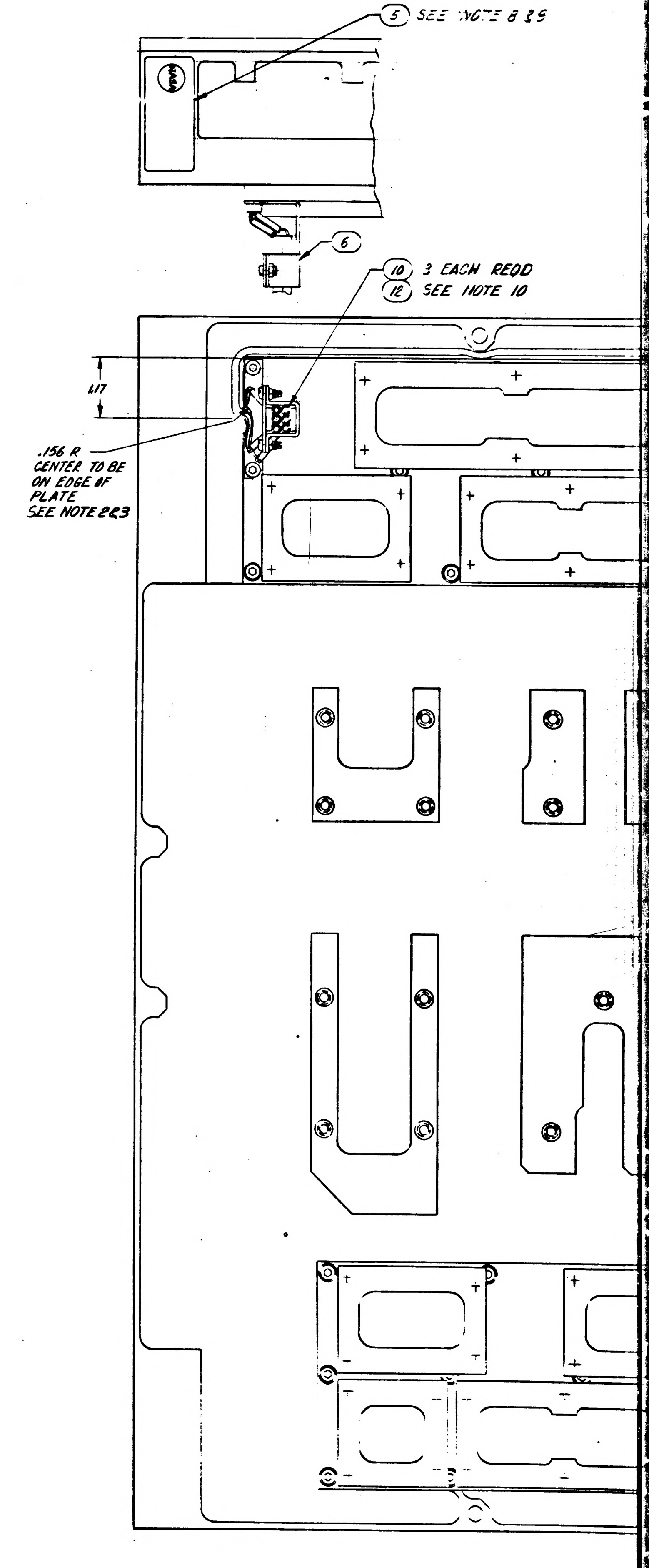
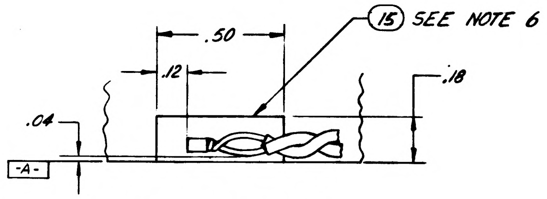

-A-
8 2 REQD
13 2 REQD SEE NOTE 9 & 11
14 2 REQD
7
45J1
45J2
9 3 REQD
SEE NOTE 4
10 3 EACH REQD
11 . SEE NOTE 10
CAP MUST BE IN PLACE
WHEN CONNECTOR NOT IN USE

TABLE I

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	PULSE TORQUE POWER SUPPLY	CG8253T
TC 2	AMPLIFIER 800 CPS 5% NEXT TO PULSE TORQUE POWER SUPPLY	CG8254T
TC 3	AMPLIFIER 800 CPS 5%	CG8255T


5 SEE NOTE 8 & 9
NASA
6
10 3 EACH REQD
12 SEE NOTE 10
1.17
.156 R
CENTER TO BE
ON EDGE OF
PLATE
SEE NOTE 2 & 3

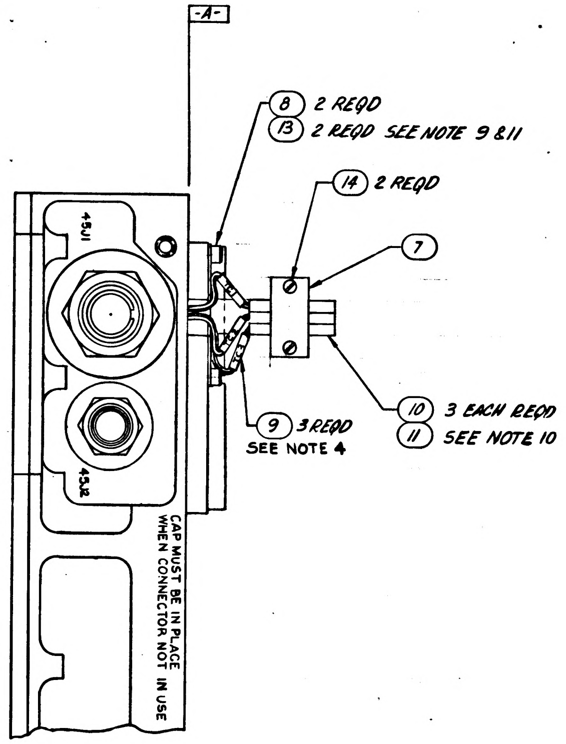

.50
.12
15 SEE NOTE 6
.18
.04
-A-

PARTIAL VIEW A-A
3 PLACES (SCALE 4:1)
SEE NOTE 3

2010743

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND 1002040.
3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACES "A" PER ND 1002236.
4. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE, TC DESIGNATION NUMBER PER ND 1002019, BLACK CHARACTERS .12 HIGH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.
5. PARTIAL REFERENCE ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER, 45
6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 15, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 16 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 15.
7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202 METHOD 302, TO CHASSES GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEG OHMS
8. BOND NAMEPLATE ITEM 5 PER ND 1002219 AND CENTRALIZE.
9. REPLACE PART WITH ITEM NUMBER INDICATED.
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 10 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 11 TO BLUE LEADS AND ITEM 12 TO RED LEAD PER ND 1002032.
11. MOUNTING TORQUE FOR ITEM 13 TO BE 21.8 - 23.8 INCH POUNDS.
12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING


-A-
8 2 REQD
13 2 REQD SEE NOTE 9 & 11
14 2 REQD
7
45J1
45J2
9 3 REQD SEE NOTE 4
10 3 EACH REQD
11 SEE NOTE 10
CAP MUST BE IN PLACE WHEN CONNECTOR NOT IN USE

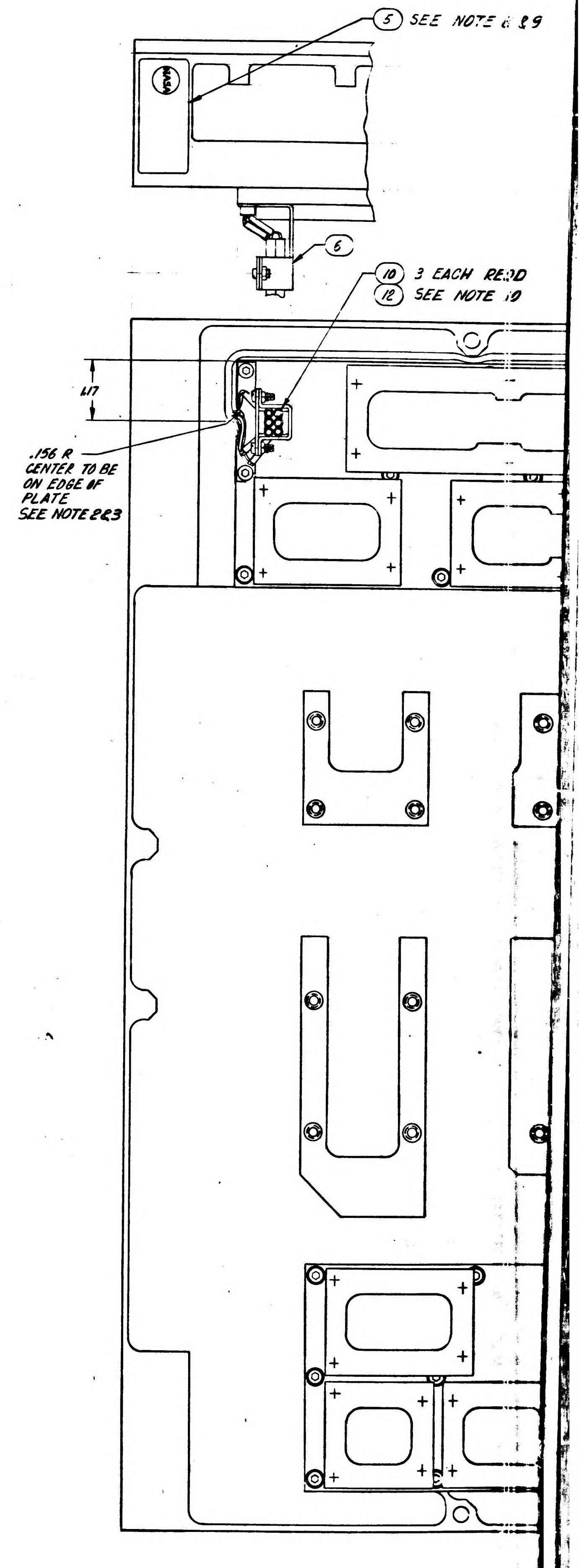
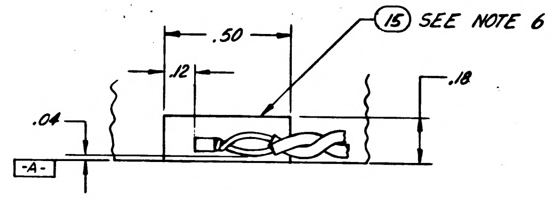
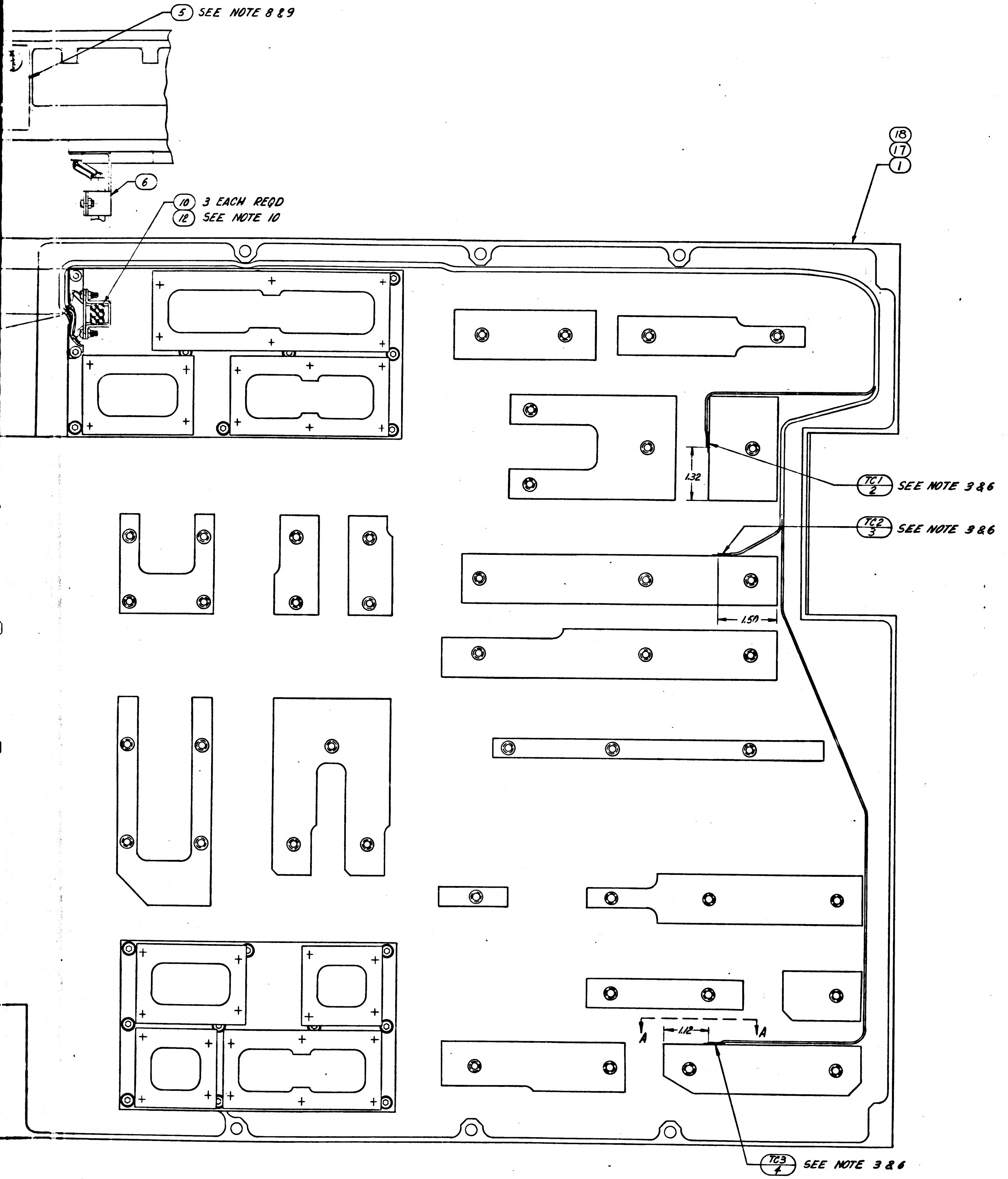

5 SEE NOTE 8 & 9
NASA
6
10 3 EACH REQD
12 SEE NOTE 10
1.17
.156 R CENTER TO BE ON EDGE OF PLATE SEE NOTE 2&3

TABLE I

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	PULSE TORQUE POWER SUPPLY	CG8253T
TC 2	AMPLIFIER 800 CPS 5% NEXT TO PULSE TORQUE POWER SUPPLY	CG8254T
TC 3	AMPLIFIER 800 CPS 5%	CG8255T


.50
.12
.04
.18
-A-
15 SEE NOTE 6

PARTIAL VIEW A-A
3 PLACES (SCALE 4:1)
SEE NOTE 3



REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 24599		27 MAY 66	
	B	REVISED PER TDRR 32395		12 JAN 67	REP / EJB

					ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	031	021	011	EFFECTIVITY			
	1	–	–		18	2007200-091	POWER & SERVO ASSY C/M PSA
	–	1	–		17	2007200-041	POWER & SERVO ASSY C/M
SEE NOTE 12	AR	AR	AR		16	2021593	ADHESIVE
	AR	AR	AR		15	MIL-I-15126	INSULATING TAPE TYPE MFT-2.5
	2	2	2		14	MS35233-15	SCREW, PAN HEAD, SLOTTED
	2	2	2		13	NAS 1352-08-12	SCREW, CAP, SOC HD
SEE NOTE 12	3	3	3		12	1008883-003	CONTACT, ELEC, CRIMP, SOCKET
SEE NOTE 12	3	3	3		11	1008883-002	CONTACT, ELEC, CRIMP, PIN
SEE NOTE 12	6	6	6		10	1008885-001	INSULATOR ASSEMBLY
SEE NOTE 12	3	3	3		9	1010490-142	INSULATION, SLEEVING
	2	2	2		8	2010737	SPACER, SLEEVE
	1	1	1		7	2010738	CLAMP, RETAINING (INSEP ASSY)
	1	1	1		6	2010741	BRACKET THERMOCOUPLE (INSEP ASSY)
	1	1	1		5	1004260-524	NAMPLATE, APOLLO G&N, GSE
	1	1	1		4	2010746-008	THERMOCOUPLE, CONTACT
	1	1	1		3	2010746-006	THERMOCOUPLE, CONTACT
	1	1	1		2	2010746-005	THERMOCOUPLE, CONTACT
	–	–	1		1	2007200-021	POWER & SERVO ASSY C/M PSA
	QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 23 APR 66
CHECKED
APPROVAL 2 MAY 66
CONTRACT
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER, SERVO AND THERMOCOUPLE ASSEMBLY - C/M

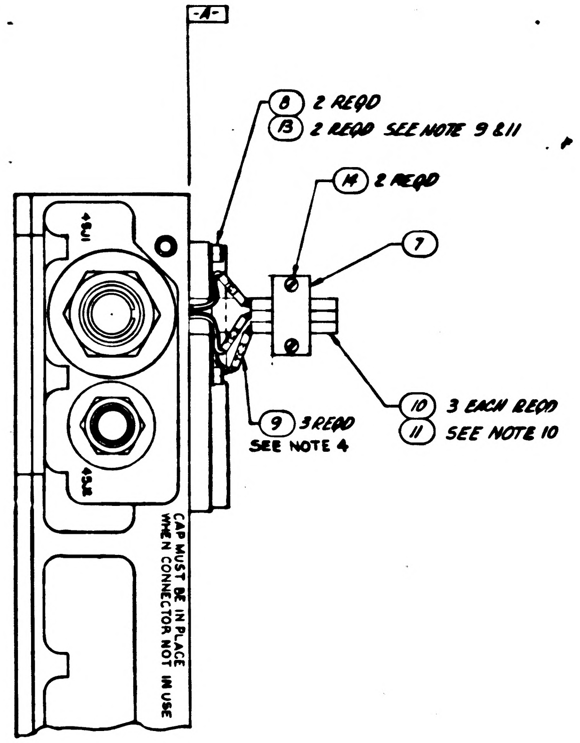
SIZE J
CODE IDENT NO. 80230
2010743
SCALE 1/1
SHEET 1 OF 1

2010743 REV LTR B SHEET 1 OF 1

2/2010743

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND 1002040.
3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACES "A" PER ND 1002236.
4. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE. TC DESIGNATION NUMBER PER ND 1002019, BLACK CHARACTERS .12 HIGH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.
5. PARTIAL REFERENCE ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER, 45
6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 15, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 16 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 15.
7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202 METHOD 302, TO CHASSES GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEG OHMS
8. BOND NAMEPLATE ITEM 5 PER ND 1002219 AND CENTRALIZE.
9. REPLACE PART WITH ITEM NUMBER INDICATED.
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 10 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 11 TO BLUE LEADS AND ITEM 12 TO RED LEAD PER ND 1002032.
11. MOUNTING TORQUE FOR ITEM 13 TO BE 21.8 - 23.8 INCH POUNDS.
12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING
13. APPLY FILLET OF SEALANT 10006338-000 AT INTERFACE OF TWO OUTPUT CONNECTOR PLATES AND THE ENCAPSULATED SURFACE OF THE HEADER IN PLANE -A-. FILLET TO EXTEND 3/16 INCH ON CONNECTOR PLATE AND HEADER SURFACE AND HAVE A 5/16 RADIUS. CLEAN AREAS TO BE SEALED BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.
14. WHEN UNIT IS DELIVERED TO FIELD SITE, CLEAN AREAS TO BE SEALED ON THERMOCOUPLE BRACKET AND AROUND CONNECTOR PLATES BY SCRUBBING, USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS. APPLY FILLET OF SEALANT 1006338-000 AT INTERFACE OF ITEM 6 AND THE MATING SURFACE OF ITEM 19. APPLY SEALANT TO HEAD OF ITEM 14 AND NUTS ON ITEM 6 COMPLETELY COVERING THE END OF ITEM 14. COVER HEAD OF ITEM 13 OVERLAPPING 1/16 ON ITEM 19.



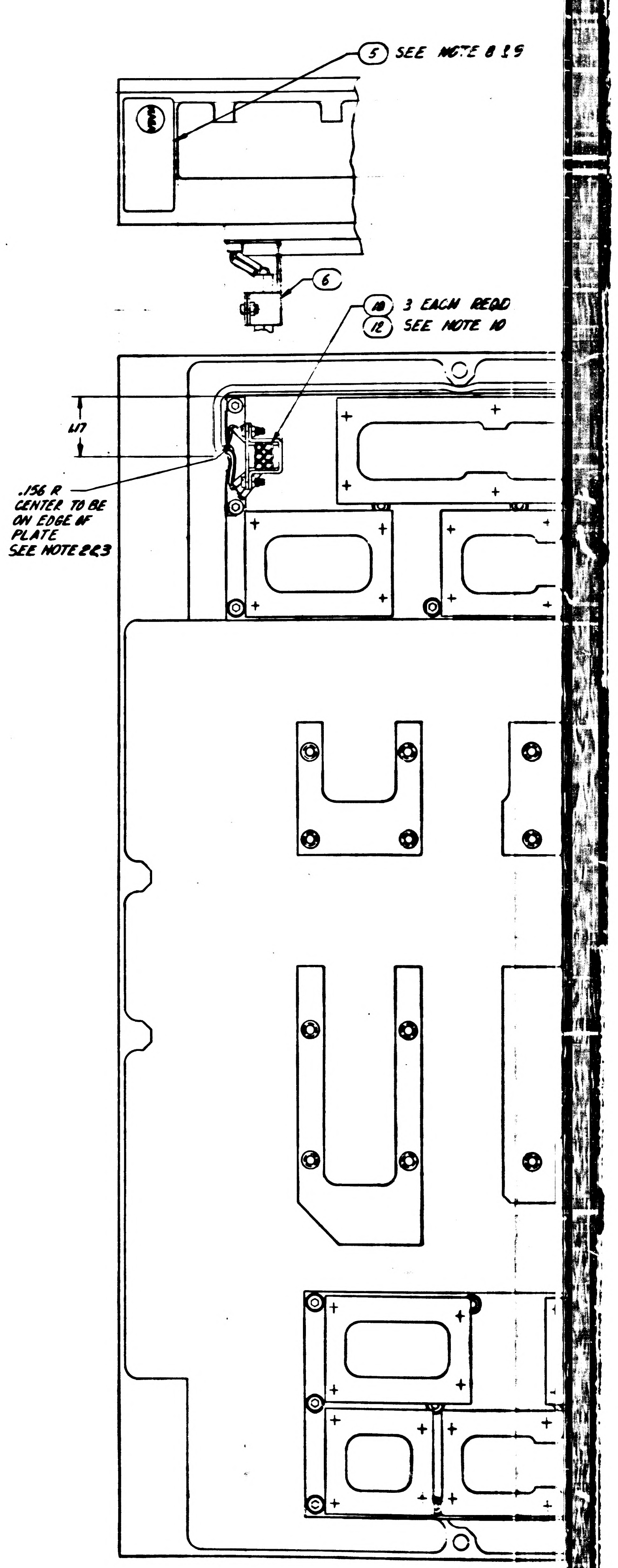
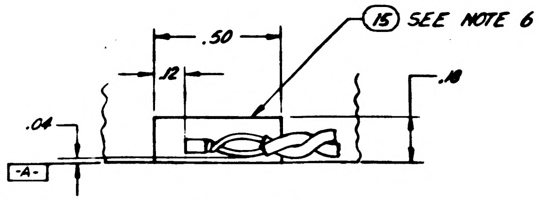


TABLE I

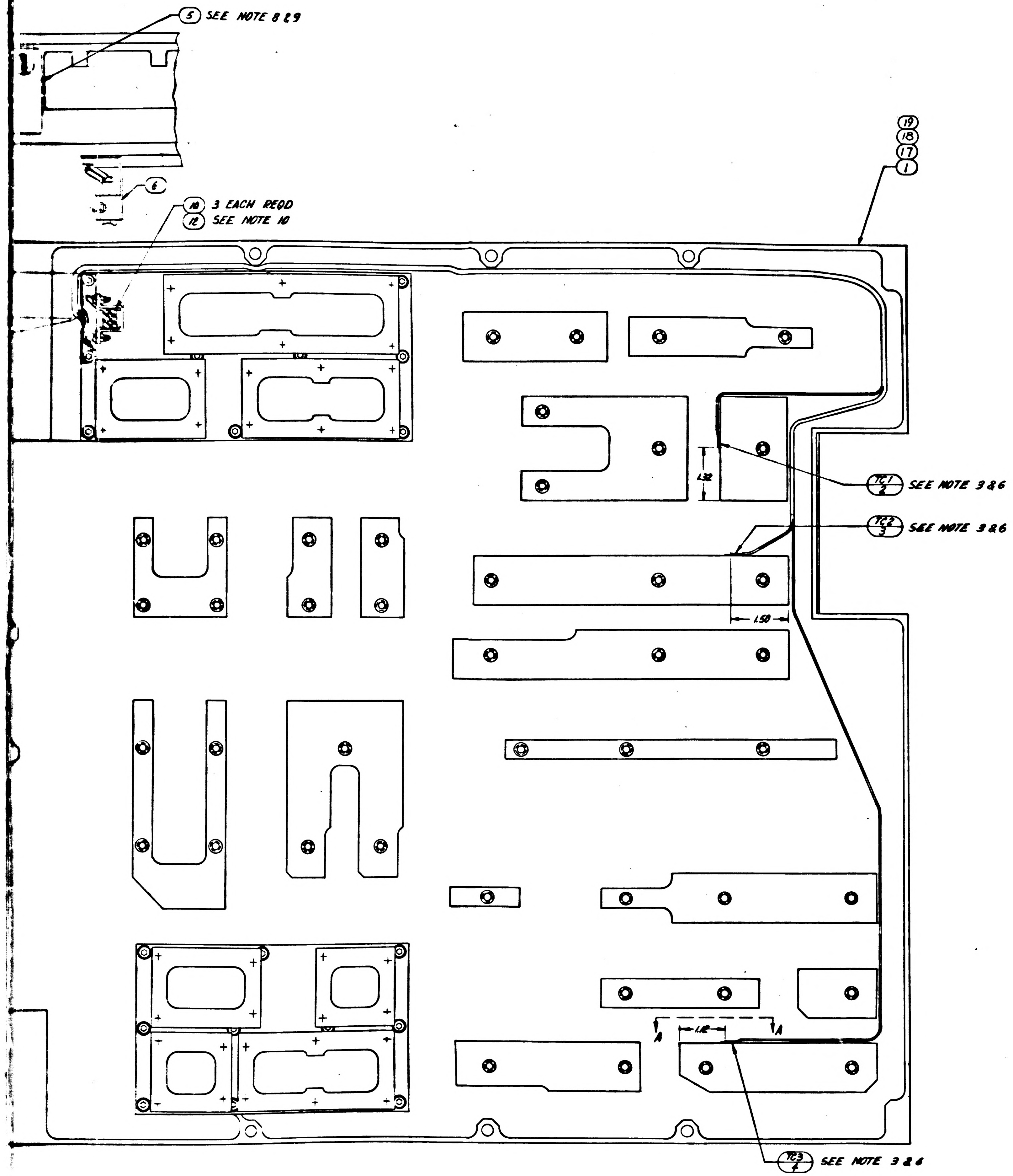
THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	PULSE TORQUE POWER SUPPLY	CG8253T
TC 2	AMPLIFIER 800 CPS 5% NEXT TO PULSE TORQUE POWER SUPPLY	CG8254T
TC 3	AMPLIFIER 800 CPS 5%	CG8255T



PARTIAL VIEW A-A
3 PLACES (SCALE 4:1)
SEE NOTE 3

2010743 C

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR [illegible] 99		27 MAY 66	
	B	REVISED PER TDRR 32395			REP 6X
	C	REVISED PER TDRR 33287			CFB ED



	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR					20	1006338-000	SEALING COMPOUND, SILCONE RUBBER
	1					19	2007200-101	POWER & SERVO ASSY. C/M PSA
		1	-	-		18	2007200-091	POWER & SERVO ASSY C/M PSA
	-	-	1	-		17	2007200-041	POWER & SERVO ASSY C/M
SEE NOTE 12	AR	AR	AR	AR		16	2021593	ADHESIVE
	AR	AR	AR	AR		15	MIL-I-15126	INSULATING TAPE TYPE MFT-2.5
	2	2	2	2		14	MS35233-15	SCREW, PAN HEAD, SLOTTED
	2	2	2	2		13	NAS 1352-08-12	SCREW CAP, SOC HD
SEE NOTE 12	3	3	3	3		12	1008883-003	CONTACT, ELEC, CRIMP, SOCKET
SEE NOTE 12	3	3	3	3		11	1008883-002	CONTACT, ELEC, CRIMP PIN
SEE NOTE 12	6	6	6	6		10	1008885-001	INSULATOR ASSEMBLY
SEE NOTE 12	3	3	3	3		9	1010490-142	INSULATION, SLEEVING
	2	2	2	2		8	2010737	SPACER, SLEEVE
	1	1	1	1		7	2010738	CLAMP, RETAINING (MSEP ASSY)
	1	1	1	1		6	2010741	BRACKET THERMOCOUPLE (MSEP ASSY)
	1	1	1	1		5	1004260-524	NAMPLATE APOLLO G&N GSE
	1	1	1	1		4	2010746-008	THERMOCOUPLE CONTACT
	1	1	1	1		3	2010746-006	THERMOCOUPLE, CONTACT
	1	1	1	1		2	2010746-005	THERMOCOUPLE, CONTACT
	-	-	-	1		1	2007200-021	POWER & SERVO ASSY C/M PSA
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN [illegible] DATE 25 AUG 66
CHECKED
APPROVAL [illegible]
CONTRACT
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER, SERVO AND THERMOCOUPLE
ASSEMBLY - C/M

SIZE J | CODE IDENT NO. 80230 | 2010743

SCALE 1/1 | SHEET 1 OF 1

2010743 | C

2/2010743

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND 1002040.

3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACES "A" PER ND 1002236.

4. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE, TC DESIGNATION NUMBER PER ND 1002019, BLACK CHARACTERS .12 INCH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.

5. PARTIAL REFERENCE ARE SHOWN: FOR COMPLETE DESIGNATION, PREFIX WITH UNIT NUMBER, 45

6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 15, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 16 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 15.

7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202 METHOD 302, TO CHASSES GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEG OHMS

8. BOND NAMEPLATE ITEM 5 PER ND 1002219 AND CENTRALIZE.

9. REPLACE PART WITH ITEM NUMBER INDICATED.

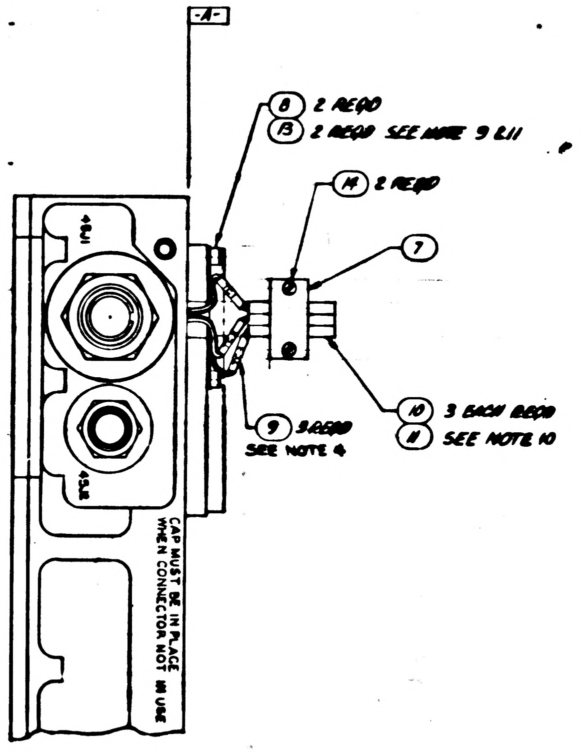
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 10 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 11 TO BLUE LEADS AND ITEM 12 TO RED LEAD PER ND 1002032.

11. MOUNTING TORQUE FOR ITEM 13 TO BE 21.8 - 23.8 INCH POUNDS.

12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING

~~13. APPLY FILLET OF SEALANT 1006338-000 AT INTERFACE OF TWO OUTPUT CONNECTOR PLATES AND THE ENCAPSULATED SURFACE OF THE HEADER IN PLANE -A-. FILLET TO EXTEND 3/16 INCH ON CONNECTOR PLATE AND HEADER SURFACE AND HAVE A 5/16 RADIUS. CLEAN AREAS TO BE SEALED BY SCRUBBING USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS.~~

14. WHEN UNIT IS DELIVERED TO FIELD SITE, CLEAN AREAS TO BE SEALED ON THERMOCOUPLE BRACKET AND AROUND CONNECTOR PLATES BY SCRUBBING, USING FREON, ISOPROPYL ALCOHOL AND DISTILLED WATER AS SOLVENTS. APPLY FILLET OF SEALANT 1006338-000 AT INTERFACE OF ITEM 6 AND THE MATING SURFACE OF ITEM 19. APPLY SEALANT TO HEAD OF ITEM 14 AND NUTS ON ITEM 6 COMPLETELY COVERING THE END OF ITEM 14. COVER HEAD OF ITEM 13 OVERLAPPING 1/16 ON ITEM 12



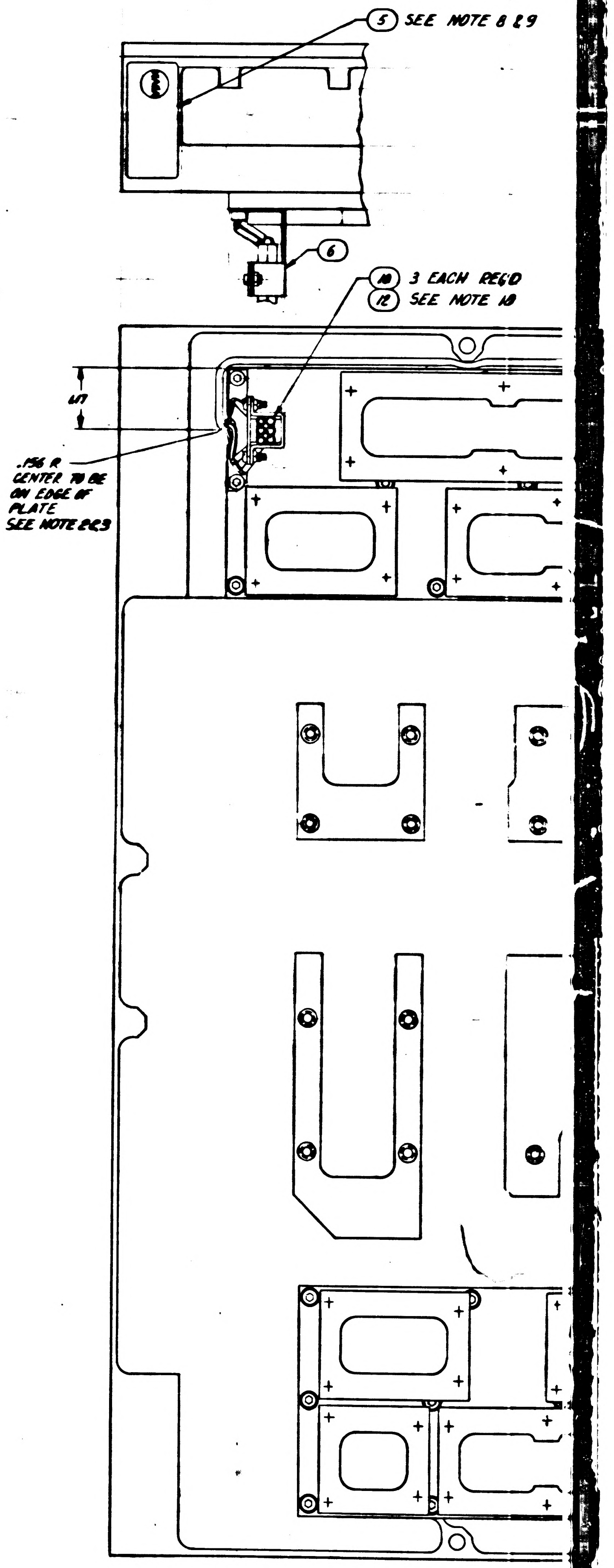
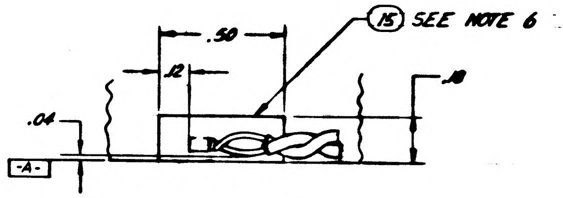


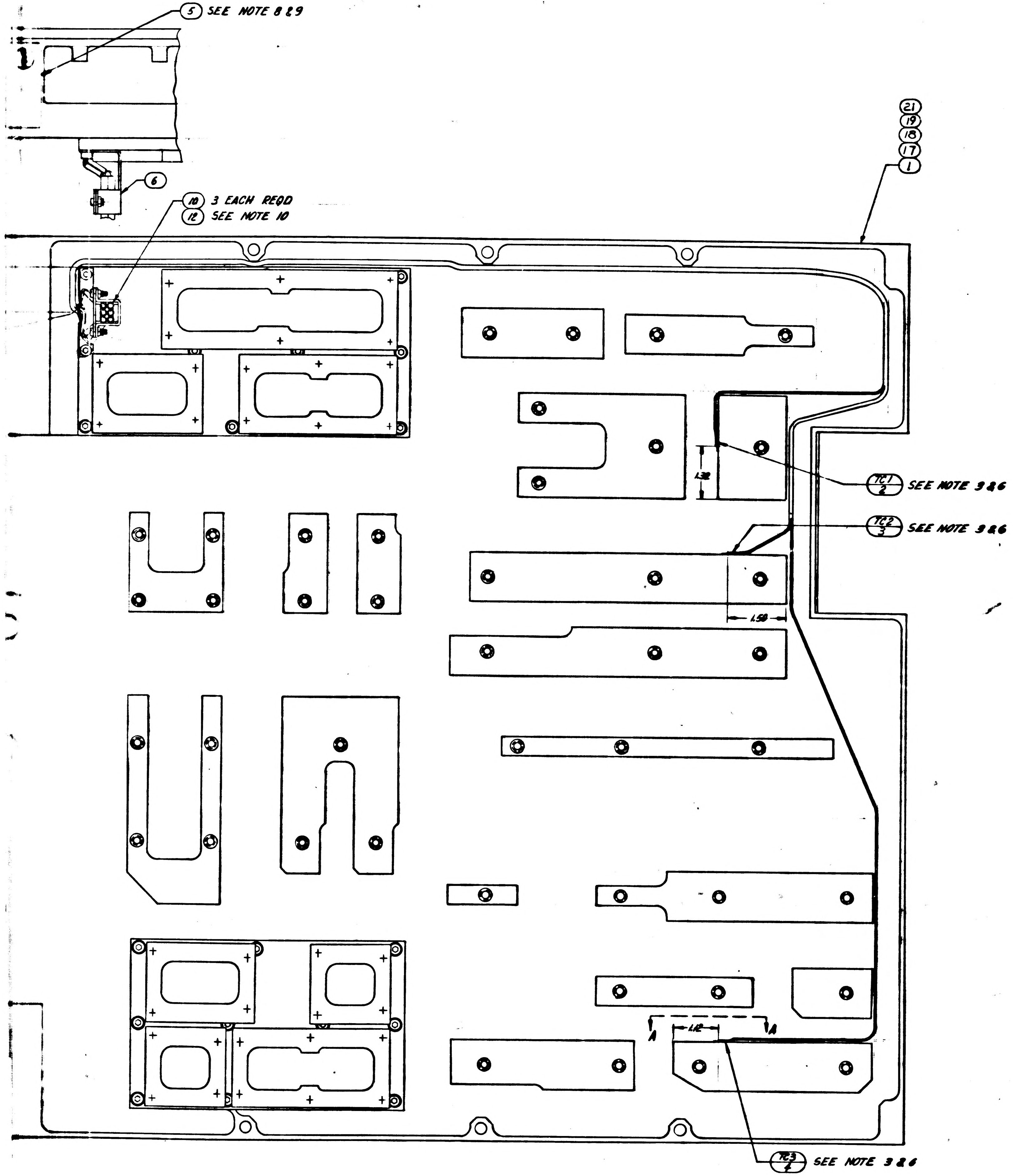
TABLE I

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	PULSE TORQUE POWER SUPPLY	CG8253T
TC 2	AMPLIFIER 800 CPS 5% NEXT TO PULSE TORQUE POWER SUPPLY	CG8254T
TC 3	AMPLIFIER 800 CPS 5%	CG8255T



PARTIAL VIEW A-A
3-PLACES (SCALE 4:1)
SEE NOTE 3

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR	CHG NO.	27 MAY 66	
	B	REVISED PER TDRR 32395		12 JAN 67	REP
	C	REVISED PER TDRR 33287		27 MAR 67	CFB
	D	REVISED PER TDRR 34424		AUG 67	



	QUANTITY REQUIRED								
	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	–	–	–	–		21	2007200-131	POWER & SERVO ASSY C/M PSA
		~~AR~~					~~20~~	~~1006338-000~~	~~SEALING COMPOUND, SILICONE RUBBER~~
	–	1	–	–	–		19	2007200-101	POWER & SERVO ASSY. C/M PSA
	–	–	1	–	–		18	2007200-091	POWER & SERVO ASSY C/M PSA
	–	–	–	1	–		17	2007200-041	POWER & SERVO ASSY C/M
SEE NOTE 12	AR	AR	AR	AR	AR		16	2021593	ADHESIVE
	AR	AR	AR	AR	AR		15	MIL-I-15126	INSULATING TAPE TYPE MFT-2.5
	2	2	2	2	2		14	MS 35233-15	SCREW, PAN HEAD, SLOTTED
	2	2	2	2	2		13	NAS 1352-08-12	SCREW, CAP, SOC HD
SEE NOTE 12	3	3	3	3	3		12	1008883-003	CONTACT, ELEC, CRIMP, SOCKET
SEE NOTE 12	3	3	3	3	3		11	1008883-002	CONTACT, ELEC, CRIMP, PIN
SEE NOTE 12	6	6	6	6	6		10	1008885-001	INSULATOR ASSEMBLY
SEE NOTE 12	3	3	3	3	3		9	1010490-142	INSULATION, SLEEVING
	2	2	2	2	2		8	2010737	SPACER, SLEEVE
	1	1	1	1	1		7	2010738	CLAMP, RETAINING (MSEP ASSY)
	1	1	1	1	1		6	2010741	BRACKET THERMOCOUPLE (MSEP ASSY)
	1	1	1	1	1		5	1004260-534	NAMEPLATE APOLLO G&N, GSE
	1	1	1	1	1		4	2010746-008	THERMOCOUPLE, CONTACT
	1	1	1	1	1		3	2010746-006	THERMOCOUPLE, CONTACT
	1	1	1	1	1		2	2010746-005	THERMOCOUPLE, CONTACT
	–	–	–	–	1		1	2007200-021	POWER & SERVO ASSY C/M PSA

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN [illegible] DATE 25 [illegible] 66
CHECKED
APPROVAL [illegible]
CONTRACT
NASA APPROVAL G. B. METZGER
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER, SERVO AND THERMOCOUPLE
ASSEMBLY: C/M

SIZE J
CODE IDENT NO. 80230
2010743
SCALE 1/1
SHEET 1 OF 1

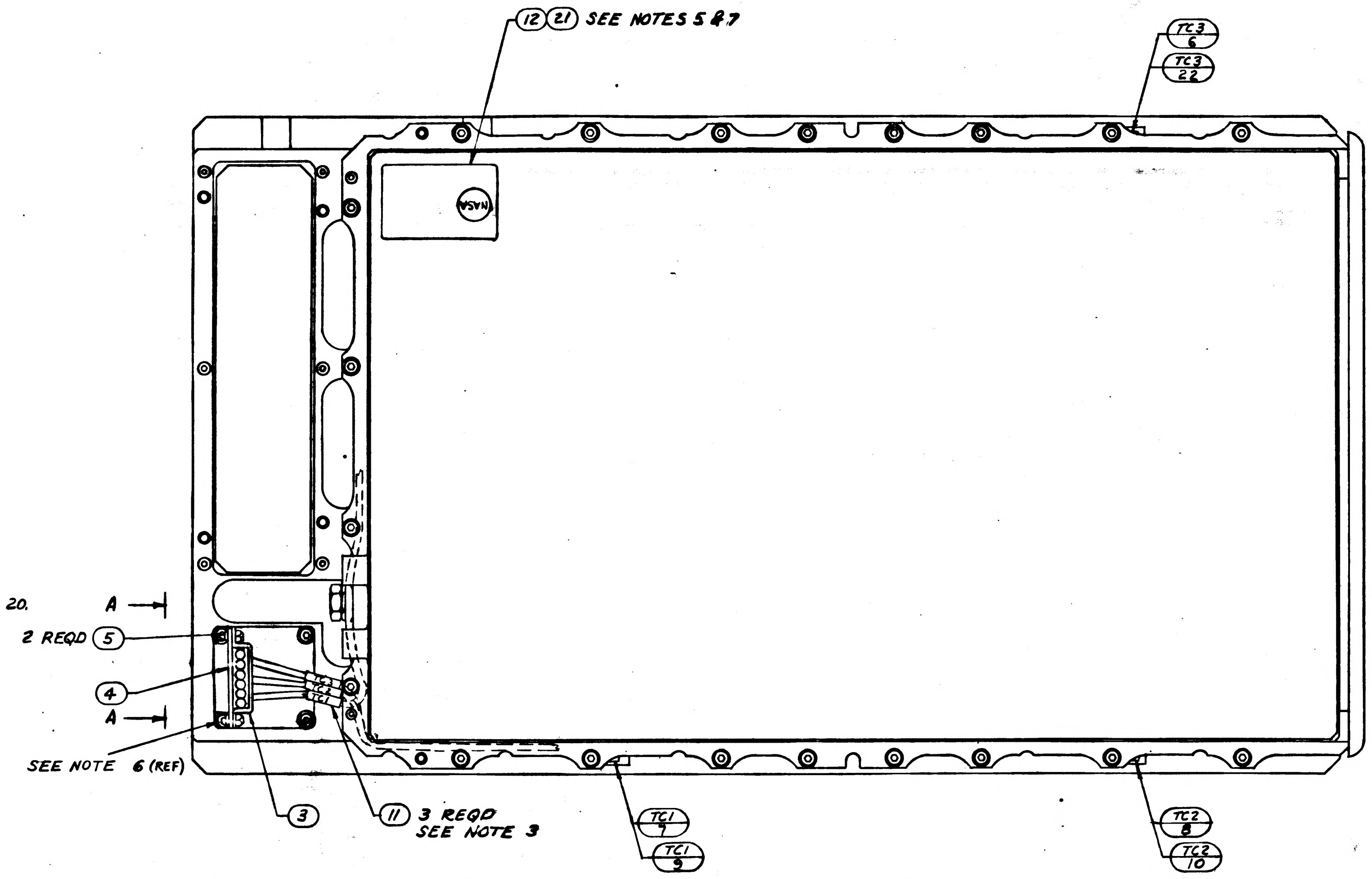
2010743 REV D

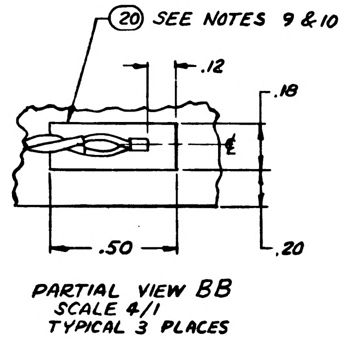
2/2010743

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 14598		27 MAY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 15 TO 17 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. FOR 021 CONFIGURATION ONLY.
3. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE TC DESIGNATION NUMBER PER ND1002019, BLACK CHARACTERS, .12 HIGH. LOCATE SLEEVE ON THERMOCOUPLE LEADS BETWEEN THE BRACKET AND THE LAST TIE POINT BEFORE THE BRACKET. MARKING SHALL BE VISIBLE.
4. MEGGER ALL THERMOCOUPLE LEADS WITH 500 VDC PER MIL-STD-202, METHOD 302. TO CHASSIS GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS.
5. BOND NAMEPLATE IN PLACE PER ND1002219.
6. MOUNTING TORQUE TO BE 11.6 TO 12.6 INCH POUNDS.
7. REPLACE PART WITH ITEM NUMBER INDICATED.
8. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 28 TO 29 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. STRIP INSULATION FROM EACH LEAD .8 TO .24 INCH. CRIMP ITEM 16 TO BLUE LEAD AND ITEM [illegible] TO RED LEAD PER ND1002032. FOR 011 CONFIGURATION ONLY.
9. REMOVE PAINT AND THE ANODIZE ON THE AREA UNDER THE INSULATING TAPE. REFINISH SURFACE PER ND1002040. DO NOT EPOXY COAT
10. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 20. BOND THERMOCOUPLE IN PLACE USING ITEM 13 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 20. ITEM 13 TO COMPLETELY COVER REFINISHED SURFACE.
11. TIE INSULATED LEADS TO NUTS AS SHOWN, WITH A KNOT BETWEEN INSULATION AND NUT USING ITEM 19.
12. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
13. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER 40.

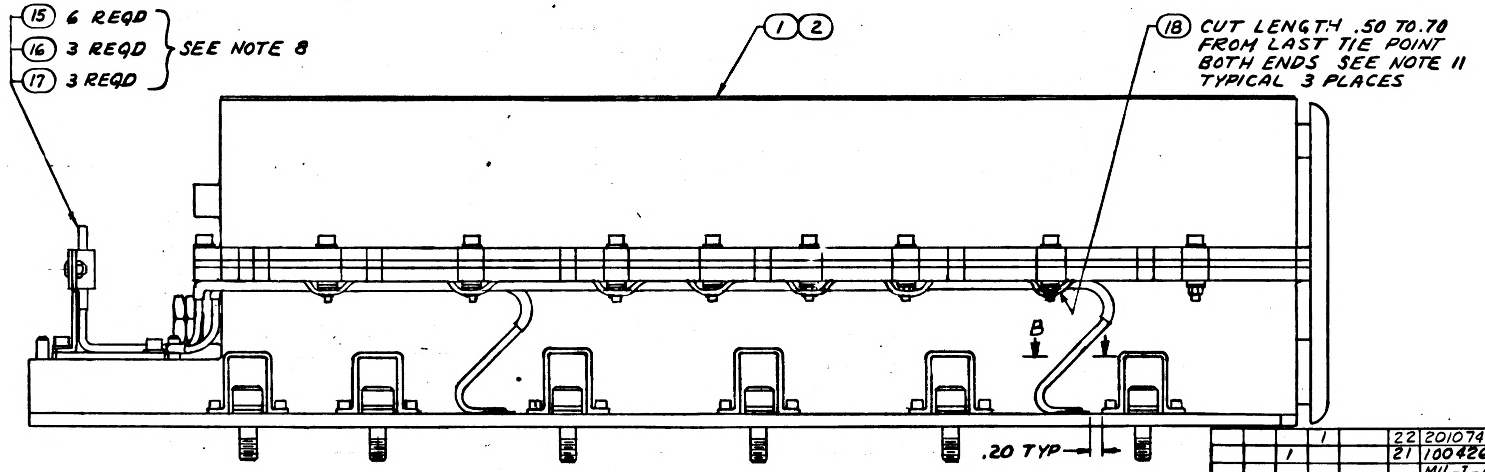




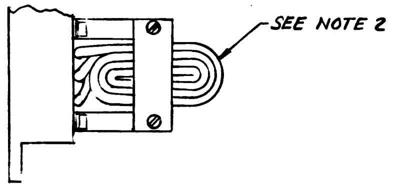
PARTIAL VIEW BB
SCALE 4/1
TYPICAL 3 PLACES

TABLE 1

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)	
		C/M	LEM
TC1	POWER SUPPLY	CG8272T	GG 8113 T
TC2	READ COUNTER	CG8271 T	GG 8114 T
TC3	READ COUNTER	CG 8273T	GG 8115 T



(15) 6 REQD
(16) 3 REQD
(17) 3 REQD
SEE NOTE 8
(1)(2)
(18) CUT LENGTH .50 TO .70 FROM LAST TIE POINT BOTH ENDS SEE NOTE 11 TYPICAL 3 PLACES
B
.20 TYP



PARTIAL VIEW AA

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
				1		22	2010746-009	THERMOCOUPLE, CONTACT
			1			21	1004260-522	NAMEPLATE
			AR	AR		20	MIL-I-15126 TYPE MFT-2.5	INSULATING TAPE, PRESSURE SENSITIVE
SEE NOTE 12			AR	AR		19	1012507-4	TAPE, LACING AND TYING
SEE NOTE 12			AR	AR		18	1010490-984	INSULATION, SLEEVING-ELEC
SEE NOTE 12				3		17	1008883-003	CONTACT, ELECTRICAL, SOCKET
SEE NOTE 12				3		16	1008883-002	CONTACT, ELECTRICAL, PIN
SEE NOTE 12				6		15	1008885-001	INSULATOR ASSY, CONNECTOR
SEE NOTE 12			AR	AR		13	2021593	ADHESIVE
				1		12	1004260-521	NAMEPLATE
SEE NOTE 12			3	3		11	1010490-142	INSULATION, SLEEVING-ELEC
				1		10	2010746-007	THERMOCOUPLE, CONTACT
				1		9	2010746-006	THERMOCOUPLE, CONTACT
			1			8	2010746-005	THERMOCOUPLE, CONTACT
			1			7	2010746-003	THERMOCOUPLE, CONTACT
			1			6	2010746-001	THERMOCOUPLE, CONTACT
			2	2		5	MS35233-15	SCREW
			1	1		4	2010739	CLAMP, RETAINING
			1	1		3	2010740	BRACKET, THERMOCOUPLE
			1			2	2007222-041	COUPLING DATA UNIT ASSY
				1		1	2007222-031	COUPLING DATA UNIT ASSY

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 27 APR 66
CHECKED
APPROVAL J Petrangelo
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

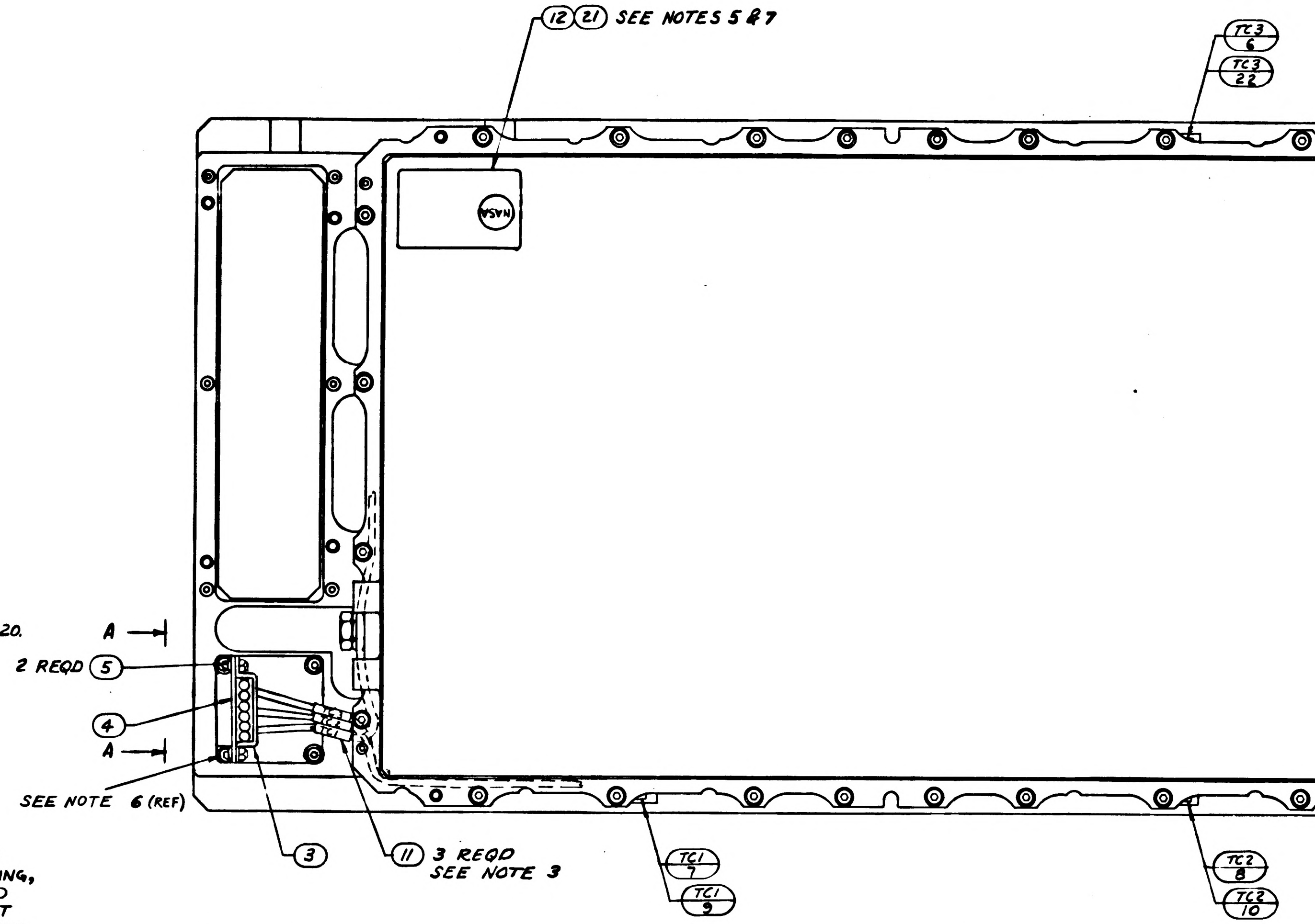
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

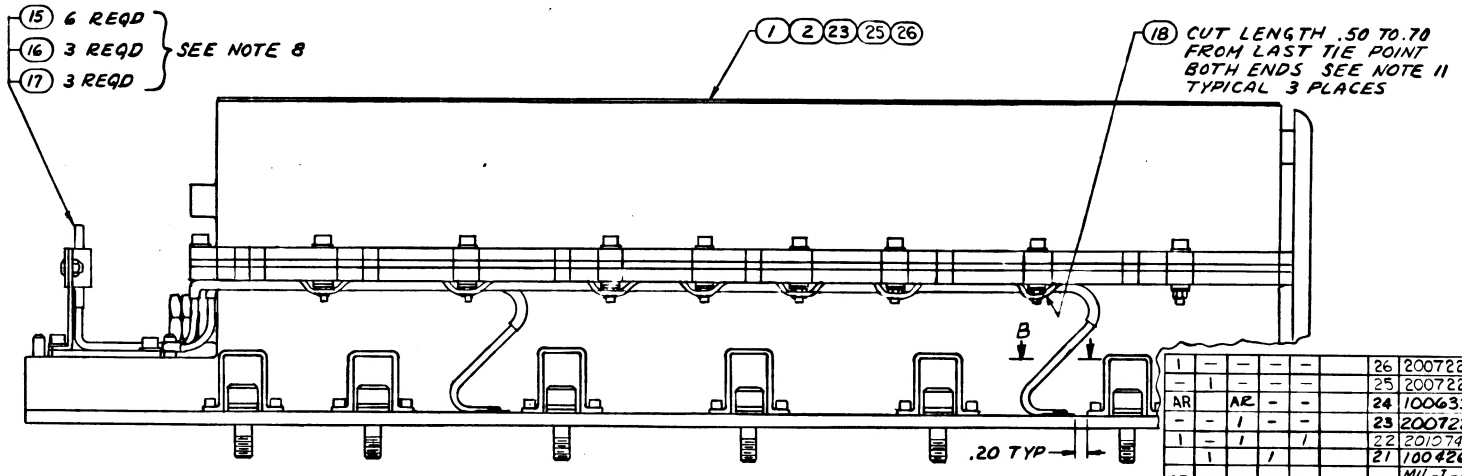
COUPLING DATA UNIT
AND THERMOCOUPLE
ASSEMBLY

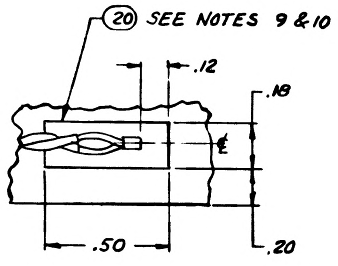
SIZE E
CODE IDENT NO. 80230
2010744
SCALE 1/1
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 15 TO 17 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. FOR 021 AND 041 CONFIGURATIONS ONLY.
3. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE TC DESIGNATION NUMBER PER ND1002019, BLACK CHARACTERS, .12 HIGH. LOCATE SLEEVE ON THERMOCOUPLE LEADS BETWEEN THE BRACKET AND THE LAST TIE POINT BEFORE THE BRACKET. MARKING SHALL BE VISIBLE.
4. MEGGER ALL THERMOCOUPLE LEADS WITH 500 VDC PER MIL-STD-202, METHOD 302. TO CHASSIS GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS.
5. BOND NAMEPLATE IN PLACE PER ND1002219.
6. MOUNTING TORQUE TO BE 11.6 TO 12.6 INCH POUNDS.
7. REPLACE PART WITH ITEM NUMBER INDICATED.
8. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 28 TO 29 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH. CRIMP ITEM 16 TO BLUE LEAD AND ITEM 17 TO RED LEAD PER ND1002032. FOR 011, 031 AND 051 CONFIGURATIONS ONLY.
9. REMOVE PAINT AND THE ANODIZE ON THE AREA UNDER THE INSULATING TAPE. REFINISH SURFACE PER ND1002040. DO NOT EPOXY COAT
10. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 20. BOND THERMOCOUPLE IN PLACE USING ITEM 13 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 20. ITEM 13 TO COMPLETELY COVER REFINISHED SURFACE.
11. TIE INSULATED LEADS TO NUTS AS SHOWN, WITH A KNOT BETWEEN INSULATION AND NUT USING ITEM 19.
12. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
13. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER 40.
14. WHEN UNIT IS DELIVERED TO FIELD SITE, AREAS TO BE SEALED ON THE THERMOCOUPLE BRACKET ARE TO BE CLEANED BY SCRUBBING, USING AS SOLVENTS DISTILLED WATER, ISOPROPYL ALCOHOL AND FREON TF IN THE ORDER NAMED. APPLY A FILLET OF SEALANT 1006338-000 AT THE INTERFACE OF ITEM 3 AND TEST CONNECTOR COVER OF ITEM 23. APPLY SEALANT TO HEAD OF (2) ITEM 5 AND (2) NUTS ON ITEM 3 TO COMPLETELY COVER THE END OF ITEM 5. COVER WITH SEALANT, THE HEAD OF (2) FRONT SCREWS ON THE TEST CONNECTOR COVER. THIS NOTE APPLIES TO THE 031 CONFIGURATION ONLY.



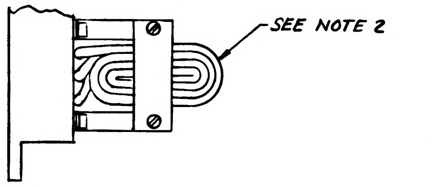

15
6 REQD
16
3 REQD
17
3 REQD
SEE NOTE 8
1
2
23
25
26
18
CUT LENGTH .50 TO .70 FROM LAST TIE POINT BOTH ENDS SEE NOTE 11 TYPICAL 3 PLACES
B
.20 TYP



PARTIAL VIEW BB
SCALE 4/1
TYPICAL 3 PLACES

TABLE 1

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)	
		C/M	LEM
TC1	POWER SUPPLY	CG8272T	GG8113T
TC2	READ COUNTER	CG8271T	GG8114T
TC3	READ COUNTER	CG8273T	GG8115T



PARTIAL VIEW AA

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		27 MAY 66	
	B	REVISED PER TDRR 33286		67	
	C	REVISED PER TDRR 33332		APR 67	DR SC

	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—	—	—	—		26	2007222-151	COUPLING DATA UNIT ASSEMBLY
	—	1	—	—	—		25	2007222-141	COUPLING DATA UNIT ASSEMBLY
	AR		AR	-	-		24	1006338-000	SEALING COMPOUND
	-	-	1	-	-		23	2007222-071	COUPLING DATA UNIT ASS'Y
	1	-	1		1		22	2010746-009	THERMOCOUPLE, CONTACT
		1		1			21	1004260-522	NAMEPLATE
	AR	AR	AR	AR	AR		20	MIL-I-15126 TYPE MFT-2.5	INSULATING TAPE, PRESSURE SENSITIVE
SEE NOTE 12	AR	AR	AR	AR	AR		19	1012507-4	TAPE, LACING AND TYING
SEE NOTE 12	AR	AR	AR	AR	AR		18	1010490-984	INSULATION, SLEEVING ELEC
SEE NOTE 12	3		3		3		17	1008883-003	CONTACT, ELECTRICAL, SOCKET
SEE NOTE 12	3		3		3		16	1008883-002	CONTACT, ELECTRICAL, PIN
SEE NOTE 12	6		6		6		15	1008885-001	INSULATOR ASSY, CONNECTOR
SEE NOTE 12	AR	AR	AR	AR	AR		13	2021593	ADHESIVE
	1		1		1		12	1004260-521	NAMEPLATE
SEE NOTE 12	3	3	3	3	3		11	1010490-142	INSULATION, SLEEVING-ELEC
	1		1		1		10	2010746-007	THERMOCOUPLE, CONTACT
	1		1		1		9	2010746-006	THERMOCOUPLE, CONTACT
		1		1			8	2010746-005	THERMOCOUPLE, CONTACT
		1		1			7	2010746-003	THERMOCOUPLE, CONTACT
		1		1			6	2010746-001	THERMOCOUPLE, CONTACT
	2	2	2	2	2		5	MS35233-15	SCREW
	1	1	1	1	1		4	2010739	CLAMP, RETAINING
	1	1	1	1	1		3	2010740	BRACKET, THERMOCOUPLE
		—		1			2	2007222-041	COUPLING DATA UNIT ASSY
	—		—		1		1	2007222-031	COUPLING DATA UNIT ASSY

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 27 APR 66
CHECKED
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

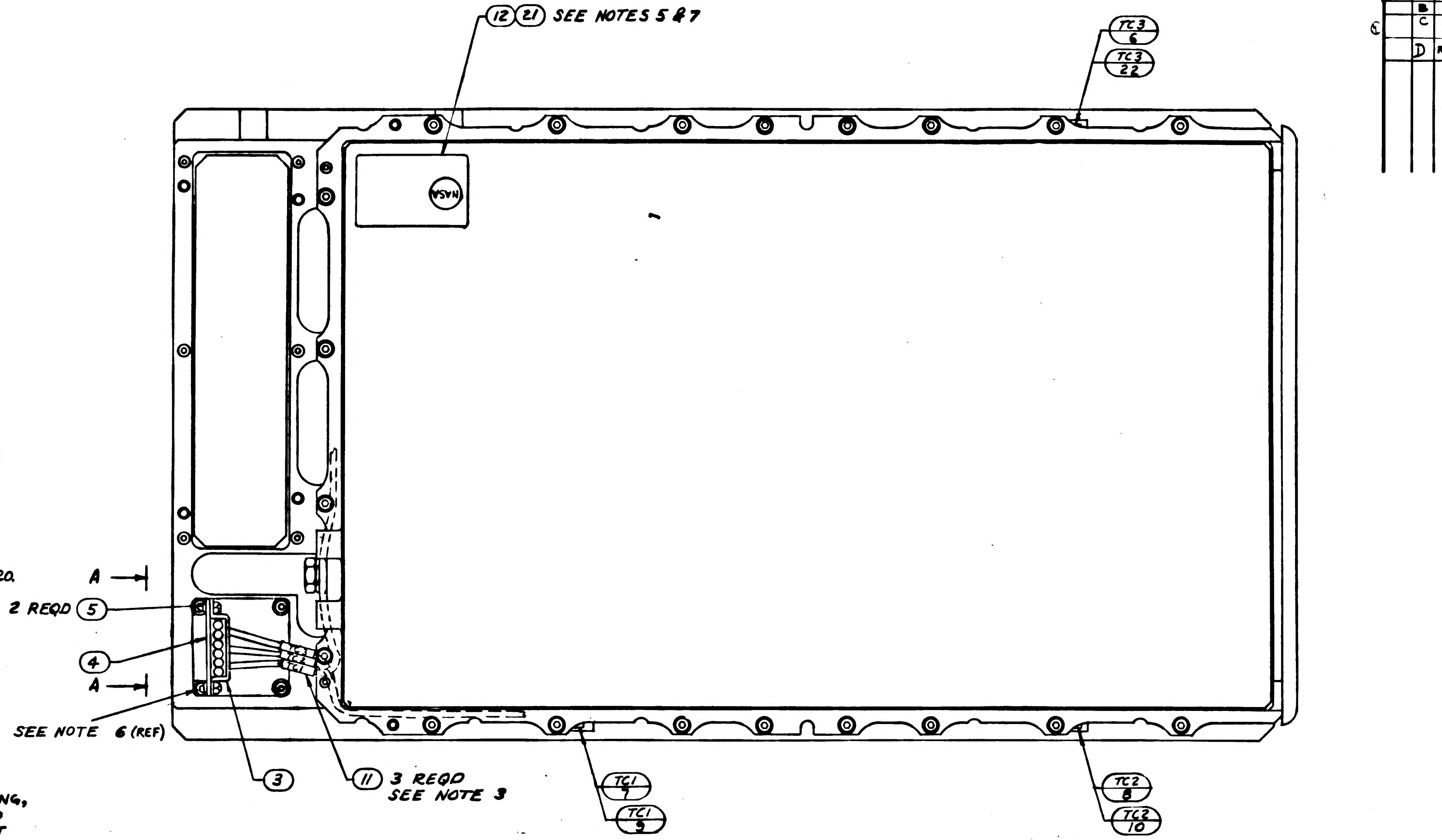
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

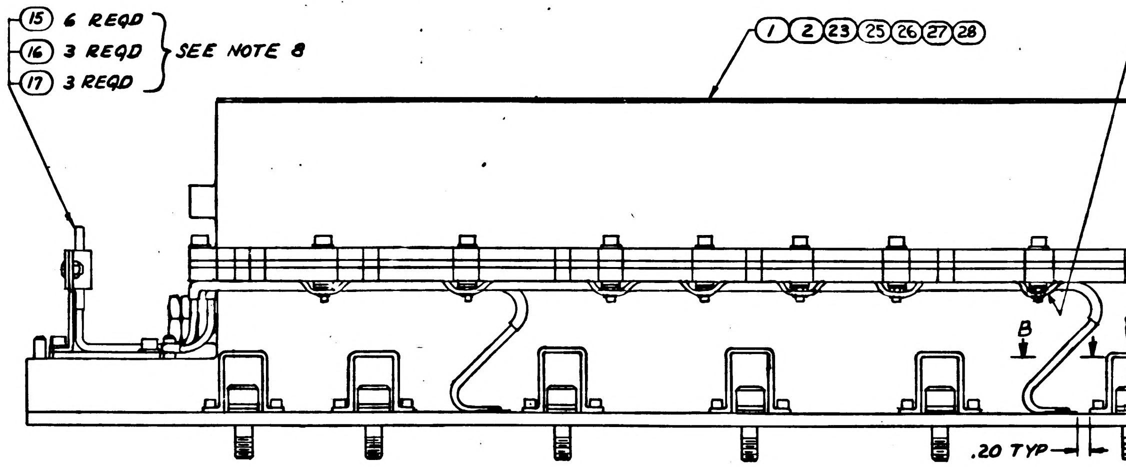
COUPLING DATA UNIT
AND THERMOCOUPLE
ASSEMBLY

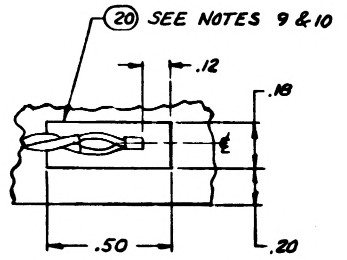
SIZE E
CODE IDENT NO. 80230
2010744
SCALE 1/1
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 15 TO 17 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. FOR 021,041 AND 061 CONFIGURATIONS ONLY.
3. EACH SLEEVE TO BE MARKED WITH ITS RESPECTIVE THERMOCOUPLE TC DESIGNATION NUMBER PER ND1002019, BLACK CHARACTERS, .12 HIGH. LOCATE SLEEVE ON THERMOCOUPLE LEADS BETWEEN THE BRACKET AND THE LAST TIE POINT BEFORE THE BRACKET. MARKING SHALL BE VISIBLE.
4. MEGGER ALL THERMOCOUPLE LEADS WITH 500 VDC PER MIL-STD-202, METHOD 302. TO CHASSIS GROUND. RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS.
5. BOND NAMEPLATE IN PLACE PER ND1002219.
6. MOUNTING TORQUE TO BE 11.6 TO 12.6 INCH POUNDS.
7. REPLACE PART WITH ITEM NUMBER INDICATED.
8. THERMOCOUPLE LEADS TO BE CUT TO LENGTH OF 28 TO 29 INCHES MEASURED FROM THE LAST TIE POINT BEFORE THE BRACKET. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH. CRIMP ITEM 16 TO BLUE LEAD AND ITEM 17 TO RED LEAD PER ND1002032. FOR 011, 031,05 AND 071 CONFIGURATIONS ONLY.
9. REMOVE PAINT AND THE ANODIZE ON THE AREA UNDER THE INSULATING TAPE. REFINISH SURFACE PER ND1002040. DO NOT EPOXY COAT
10. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 20. BOND THERMOCOUPLE IN PLACE USING ITEM 13 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 20. ITEM 13 TO COMPLETELY COVER REFINISHED SURFACE.
11. TIE INSULATED LEADS TO NUTS AS SHOWN, WITH A KNOT BETWEEN INSULATION AND NUT USING ITEM 19.
12. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
13. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN; FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER 40.
14. WHEN UNIT IS DELIVERED TO FIELD SITE, AREAS TO BE SEALED ON THE THERMOCOUPLE BRACKET ARE TO BE CLEANED BY SCRUBBING, USING AS SOLVENTS DISTILLED WATER, ISOPROPYL ALCOHOL AND FREON TF IN THE ORDER NAMED. APPLY A FILLET OF SEALANT 1006338-003 AT THE INTERFACE OF ITEM 3 AND TEST CONNECTOR COVER OF ITEM 23,26 OR 28 AS APPLICABLE. APPLY SEALANT TO HEAD OF (2) ITEMS 5 AND (2) NUTS ON ITEM 3 TO COMPLETELY COVER THE END OF ITEM 5. COVER WITH SEALANT, THE HEAD OF (2) FRONT SCREWS ON THE TEST CONNECTOR COVER. THIS NOTE APPLIES TO THE 031, 051 AND 071 CONFIGURATION ONLY.



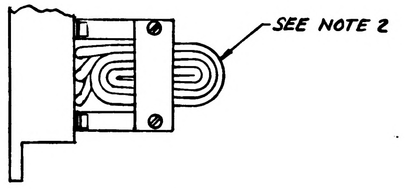

(15) 6 REQD
(16) 3 REQD
(17) 3 REQD
SEE NOTE 8
(1)(2)(23)(25)(26)(27)(28)
(18) CUT LENGTH .50 TO .70 FROM LAST TIE POINT BOTH ENDS SEE NOTE 11 TYPICAL 3 PLACES
B
.20 TYP



PARTIAL VIEW BB
SCALE 4/1
TYPICAL 3 PLACES

TABLE 1

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF) C/M	DESIGNATION NO. (REF) LEM
TC1	POWER SUPPLY	CG8272T	GG8113T
TC2	READ COUNTER	CG8271T	GG8114T
TC3	READ COUNTER	CG8273T	GG8115T



PARTIAL VIEW AA

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR		27 MAY 66	
	B	REVISED PER TDRR 33286		67	
	C	REVISED PER TDRR 33332		APR 67	DR SC
	D	REVISED PER TDRR 34533		19 SEP 67	

	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—	—	—	—	—	—		28	2007222-201	COUPLING DATA UNIT ASSEMBLY
	—	1	—	—	—	—	—		27	2007222-211	COUPLING DATA UNIT ASSEMBLY
	—	—	1	—	—	—	—		26	2007222-151	COUPLING DATA UNIT ASSEMBLY
	—	—	—	1	—	—	—		25	2007222-141	COUPLING DATA UNIT ASSEMBLY
	AR	—	AR		AR	—	—		24	1006338-003	SEALING COMPOUND
	—	—	—	—	1	—	—		23	2007222-071	COUPLING DATA UNIT ASS'Y
	1	—	1	—	1		1		22	2010746-009	THERMOCOUPLE, CONTACT
	—	1		1		1			21	1004260-522	NAMEPLATE
	AR	AR	AR	AR	AR	AR	AR		20	MIL-I-15126 TYPE MFT-2.5	INSULATING TAPE, PRESSURE SENSITIVE
SEE NOTE 12	AR	AR	AR	AR	AR	AR	AR		19	1012507-4	TAPE, LACING AND TYING
SEE NOTE 12	AR	AR	AR	AR	AR	AR	AR		18	1010490-984	INSULATION, SLEEVING-ELEC
SEE NOTE 12	3	—	3		3		3		17	1008883-003	CONTACT, ELECTRICAL, SOCKET
SEE NOTE 12	3	—	3		3		3		16	1008883-002	CONTACT, ELECTRICAL, PIN
SEE NOTE 12	6	—	6		6		6		15	1008885-001	INSULATOR ASSY, CONNECTOR
SEE NOTE 12	AR	AR	AR	AR	AR	AR	AR		13	2021593	ADHESIVE
	1	—	1		1		1		12	1004260-521	NAMEPLATE
SEE NOTE 12	3	3	3	3	3	3	3		11	1010490-142	INSULATION, SLEEVING-ELEC
	1	—	1		1		1		10	2010746-007	THERMOCOUPLE, CONTACT
	1	—	1		1		1		9	2010746-006	THERMOCOUPLE, CONTACT
	—	1		1		1			8	2010746-005	THERMOCOUPLE, CONTACT
	—	1		1		1			7	2010746-003	THERMOCOUPLE, CONTACT
	—	1		1		1			6	2010746-001	THERMOCOUPLE, CONTACT
	2	2	2	2	2	2	2		5	MS35233-[illegible]	SCREW
	1	1	1	1	1	1	1		4	2010739	CLAMP, RETAINING
	1	1	1	1	1	1	1		3	2010740	BRACKET, THERMOCOUPLE
	—	—		—		1			2	2007222-041	COUPLING DATA UNIT ASSY
	—	—	—		—		1		1	2007222-031	COUPLING DATA UNIT ASSY

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICABLE DASH NO. — APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 27 APR 66
CHECKED
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

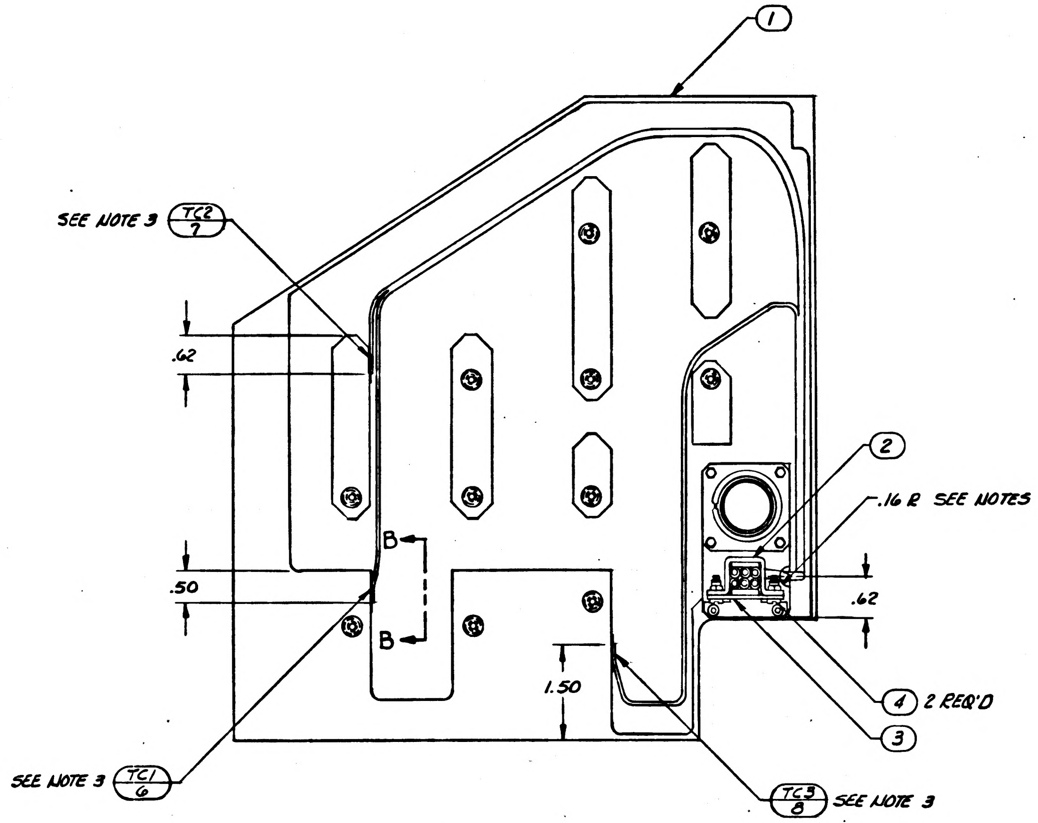
COUPLING DATA UNIT AND THERMOCOUPLE ASSEMBLY

SIZE E
CODE IDENT NO. 80230
2010744
SCALE 1/1
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MACHINED METALLIC SURFACES TO BE FINISHED PER ND1002040.
3. THERMOCOUPLE LEADS TO BE BELOW SURFACE "A" AND COMPLETELY COVERED AND EMBEDDED IN ENCAPSULANT. FILL WITH ENCAPSULANT FLUSH TO .030 BELOW SURFACE "A" PER ND1002236.
4. EACH SLEEVE TO BE MARKED WITH IT'S RESPECTIVE THERMOCOUPLE TC DESIGNATION NUMBER PER ND1002019, BLACK, CHARACTERS .12 HIGH. SLEEVE TO BE LOCATED ALONG LENGTH OF THERMOCOUPLE LEADS BETWEEN THE BRACKET AND WHERE THE WIRES EMERGE FROM THE HEADER.
5. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER, 35A2.
6. ISOLATE THERMOCOUPLE JUNCTION FROM STRUCTURAL GROUND USING ITEM 14, BOND THERMOCOUPLE LEADS IN PLACE USING ITEM 15 WITH THE JUNCTION IN INTIMATE CONTACT WITH ITEM 14.
7. MEGGER ALL THERMOCOUPLE LEADS WITH 500V DC PER MIL-STD-202, METHOD 302. TO CHASSIS GROUND RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS.
8. BOND NAMEPLATE ITEM 10 PER ND1002219.
9. REPLACE PART WITH ITEM NUMBER INDICATED.
10. CUT THERMOCOUPLE LEADS TO ALLOW FOR A STRAIN LOOP OF .50 TO 1.00 INCH WHEN ITEM 11 IS POSITIONED IN BRACKET AS SHOWN. STRIP INSULATION FROM EACH LEAD .18 TO .24 INCH AND CRIMP ITEM 12 TO BLUE LEADS AND ITEM 13 TO RED LEAD PER ND1002032.
11. MOUNTING TORQUE FOR ITEM 5 TO BE 6.2 - 6.7 INCH POUNDS.
12. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 24103		27 MAY 66	



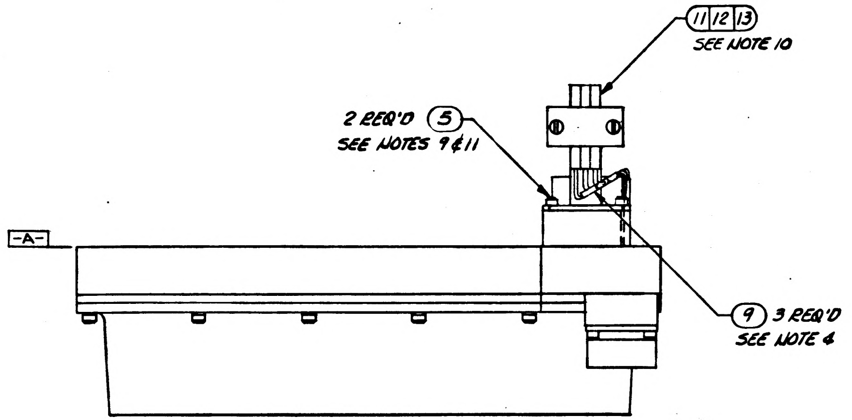
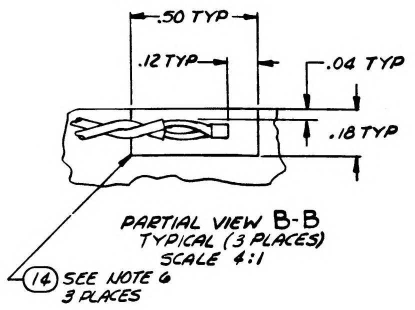
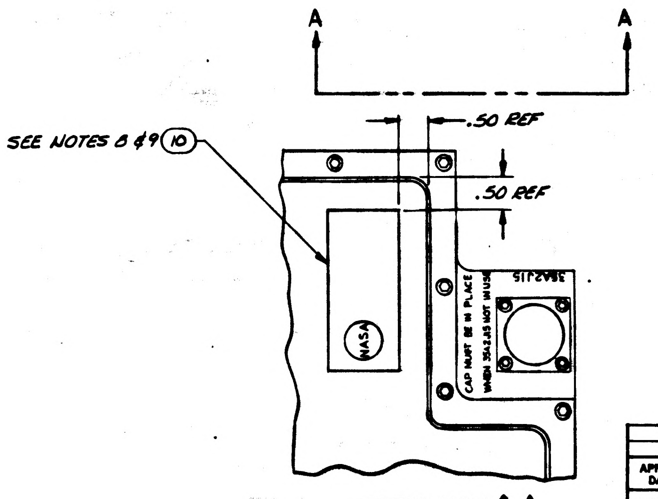


TABLE I

THERMOCOUPLE DESIGNATION	THERMOCOUPLE LOCATION WITH RESPECT TO NEAREST MODULE	DESIGNATION NO. (REF.)
TC 1	C/M PIPA CALIBRATION MODULE FOR X PIP	CG8265T
TC 2	BINARY CURRENT SWITCH MODULE FOR X PIP	CG8266T
TC 3	C/M PIPA CALIBRATION MODULE FOR Z PIP	CG8267T



PARTIAL VIEW B-B
TYPICAL (3 PLACES)
SCALE 4:1



PARTIAL VIEW A-A

SEE NOTE 12				AR		15	2021593	ADHESIVE
				AR		14	MIL-I-15126	INSULATING TAPE TYPE [illegible]-2.5
SEE NOTE 12				3		13	1008883-003	CONTACT ELEC CR VP SOCKET
SEE NOTE 12				3		12	1008883-002	CONTACT ELEC CR VP PIN
SEE NOTE 12				6		11	1008885-001	INSULATOR ASSEMBLY
				1		10	1004260-520	NAMEPLATE
SEE NOTE 12				3		9	1010490-142	INSULATION, SLEEVING
				1		8	2010746-002	THERMOCOUPLE CONTACT
				1		7	2010746-003	THERMOCOUPLE CONTACT
				1		6	2010746-004	THERMOCOUPLE, CONTACT
				2		5	NAS1352-04-16	SCREW, CAP, SOC HD
				2		4	MS35233-15	SCREW,
				1		3	2010738	CLAMP, RETAINING (INSER ASSY)
				1		2	2010742	BRACKET, THERMOCOUPLE
				1		1	2007201-011	PIPA ELECTRONICS ASSEMBLY
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN A.J. Fluder DATE 25-MAR-66
CHECKED
APPROVAL Ct... MAR 66
CONTRACT NAS9-497
NASA APPROVAL
MIT APPROVAL M. Wash... 6/14/66

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HOUSTON, TEXAS

PIPA ELECTRONICS AND
THERMOCOUPLE ASSEMBLY

SIZE E
CODE IDENT NO. 80230
2010745
SCALE 1:1
SHEET 1 OF 1

Item	Nomenclature	Document No.
j.	Self Test Logic Diagram	2016447
k.	Logic Drawer No. 2 Assembly	2016443
l.	Logic Plate Assembly No. 1	2014224
m.	Logic Plate No. 1 Diagram	2016370

VII. PROCEDURE:

NOTE: The procedure for retrofiting the Computer Test Set is presented in five parts, specifically:

1. General Instructions
2. P&M Retrofit - adding 3 capacitors
3. Self Test Retrofit - adding 1 capacitor
4. Logic Drawer #2 Retrofit - wirewrap changes
5. Retest Procedures

1. General Instructions:

1.1 Read and understand the complete procedure prior to attempting the retrofit. Do not discard any parts unless so directed. No deviation should be made from an any procedure outlined herein.

1.2 Update the Post Acceptance Data Package (PADP) as progress is made through the RIB.

1.3 All workmanship shall meet standards as defined in Workmanship Standard, AC-STD-1, dated 3 March 1964.

1.4 Refer to documents listed in Paragraph VI, part 4, for applicable ND specifications.

1.5 Inspect all work performed to ensure quality in accordance with referenced documents.

1.6 Serial number stencil marked after retrofit shall be the same serial number as before retrofit.

2. Retrofit the Programmer and Monitor Drawer, part no. 2014041-041, using retrofit kit 8104215 as follows:

2.1 Remove the Computer Test Set nameplate on the front center of the cabinet by chiseling off the heads of the drive screws. Drive the remaining portion of the drive screws into the cabinet. Dispose of removed nameplate per Paragraph IX.

2.2 Release the Programmer & Monitor Drawer Assembly, part no. 2014041-041, by unscrewing knurled captive screws, and pull the drawer out to its slide-lock position.

2.3 Lift up Logic Plate Assembly No. 3 to slide-lock position and disconnect the cable connectors.

2.4 Remove the Logic Plate Assembly from the drawer by removing retaining screws (two places) and place the assembly in a clean area. Retain hardware for reassembly.

2.5 Remove the black protective cover by unscrewing cross-head screws (16 places). Retain cover and screws for reassembly.

2.6 Remove from retrofit kit three 1 uf, 35 V capacitors, part number CS13AFC10K, and assemble insulation sleeving (1006776-197), also supplied in kit, to the leads of the capacitors.

2.7 Reference drawing 2014336 and add the capacitors to the following pin locations using solder and soldering tools per ND 1002071.

Capacitor No.	Pos. Location	Neg. Location
C21	3A17-13	3A17-20
C22	3B34-10	3B31-20
C23	3A17-1	3A18-20

2.8 Reference drawing 2014336. Remove stencil "041" from part number on top of frame support using Chem-Stripper and cotton swabs.

2.9 Neutralize action of Chem-Stripper with isopropyl alcohol and cotton swabs. Clean area throughly.

2.10 Apply new dash number "051" using stencil and white ink supplied in kit, and brush or air-operated equipment. Stencil per ND 1002019.

2.11 Re-assemble black protective cover with hardware retained from step 2.5.

2.12 Remount Logic Plate Assembly No. 3 on to support brackets in chassis. Attach cable connectors and secure assembly with hardware retained from step 2.4. Lower plate to its operating position.

2.13 Remove the nameplate from the side of the Programmer & Monitor Drawer Assembly by using a pocket knife being careful not to mar the surface of the assembly. Dispose of name plate per Paragraph IX.

2.14 Remove excess adhesive from assembly using Methyl Ethyl Ketone and cotton swabs.

WARNING:

Methyl Ethyl Ketone gives off toxic fumes and is flammable. Use only in a well-ventilated area and avoid open flames.

2.15 Remove nameplate (1004260-283) from kit. Note serial number on nameplate removed in step 2.13 and stencil the same number in the applicable block on the new nameplate using stencil supplied in kit ("RAY" etc.), black ink, supplied in kit, and brush or air-operated equipment. Stencil per ND 1002019.

2.16 Reference drawing 2014041. Bond new nameplate to the location indicated by the drawing using adhesive (MIL-A-5092) and cotton swabs.

2.17 Release slide lock and return the Programmer & Monitor Drawer Assembly to its operating position. Secure handle hardware.

3. Retrofit the Self Test Drawer Assembly, part number 2014366-031, using retrofit kit 8104215 as follows:

3.1 Release the Self Test Drawer Assembly by unscrewing knurled captive screws and pull the drawer out to its slide-lock position.

3.2 Remove the black protective cover on the Logic Plate Assembly by unscrewing cross-head screws (16 places). Retain cover and screws for reassembly.

3.3 Remove from retrofit kit one 750 pf, 500 V capacitor, part no. CY22C751G, and assemble insulation sleeving (MIL-I-631), also supplied in kit, to the leads of the capacitor.

3.4 Reference drawing 2014362 and add the capacitor to the following locations using solder and soldering tools per ND 1002071.

Capacitor No.	From	To
C22	1A13-20	1A9-8

3.5 Loosen captive hardware (4 places) and pivot Logic Plate Assembly so that stenciling on side is facing up.

3.6 Reference drawing 2014362. Remove stencil "031" from part number on top of frame support using Chem-Stripper and cotton swabs.

3.7 Neutralize action of Chem-Stripper with isopropyl alcohol and cotton swabs. Clean area throughly.

3.8 Apply new dash number "041" using stencil and white ink supplied in kit, and brush or air-operated equipment. Stencil per ND 1002019.

3.9 Return Logic Plate Assemb o its operating position and secure captive hardware (4 places).

3.10 Re-assemble black protectiv cover with hardware retained from step 3.2.

3.11 Remove the nameplate from the side of the Self Test Drawer Assembly using a pocket knife being careful not to mar the surface of the assembly. Dispose of the nameplate per Paragraph IX.

3.12 Remove excess adhesive from assembly using Methyl Ethyl Ketone and cotton swabs.

WARNING:

Methyl Ethyl Ketone gives off toxic fumes and is flammable. Use only in a well-ventilated area and avoid open flames.

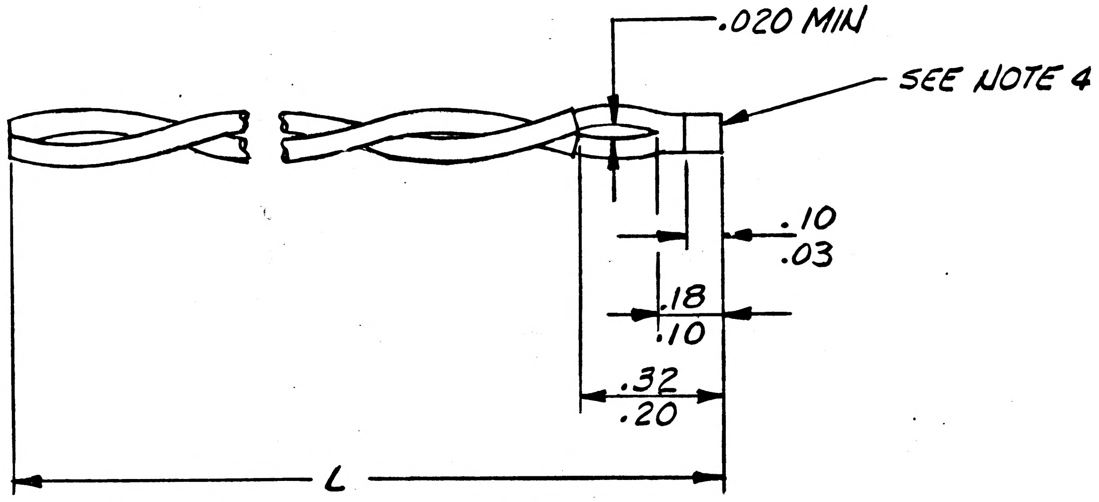
3.13 Remove nameplate (1004260-279) from kit. Note serial number on nameplate removed in step 3.11 and stencil the same number in the applicable block on the new nameplate using stencil supplied in kit ("RAY" etc.), black ink, supplied in kit, and brush or air-operated equipment. Stencil per ND 1002019.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29594		27 MAY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAKE FROM 1008887-001.
3. THERMOCOUPLE JUNCTION TO BE PREPARED AND FORMED AS SHOWN. THE STRANDS OF COPPER AND CONSTANTAN WIRES ARE TO BE INTERLACED AT THE END OF THE JUNCTION BEFORE TWISTING, BY ALTERNATING THE COPPER AND CONSTANTAN STRANDS. ONLY THE TIP OF THE JUNCTION SHALL BE BRAZED.
4. BRAZE PER MIL-B-7883, TYPE I, USING 50% Ag BEARING SILVER SOLDER PER QQ-S-561, CLASS 4 AND TYPE B FLUX PER FED. SPEC O-F-499.
5. IDENTIFY USING DRAWING NUMBER WITH APPLICABLE DASH NUMBER PER ND1002019.
6. THE PART NUMBER IS THE DRAWING NUMBER PLUS THE APPLICABLE DASH NUMBER.

DASH NUMBER	LENGTH (L) INCHES ±.25
-001	44
-002	20
-003	25
-004	30
-005	34
-006	39
-007	47
-008	54
-009	56



NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± ___ 3 PLACE DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE. MASS.
DWG. NO. CONTRACT
DRAWN DATE 26-APR-66
CHECKED
APPROVAL J. Petrany 2 MAY 66
CONTRACT NAS 9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-14-66

MANNED
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HOUSTON, TEXAS

THERMOCOUPLE, CONTACT

SIZE C
CODE IDENT NO. 80230
2010746
SCALE —
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29574		27 MAY 66	

	1	–	–		5	6010656-021	PTA & THERMOCOUPLE ASSY
	–	1	–		4	6010656-011	PTA & THERMOCOUPLE ASSY
	–	–	1		3	2010745-011	PEA & THERMOCOUPLE ASSY
	1	1	–		2	2018699-021	IMU & THERMOCOUPLE ASSY
	–	–	1		1	2018699-011	IMU & THERMOCOUPLE ASSY
	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN DATE 4 MAY 66
CHECKED 12 MAY 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL A. G. METZGER
MIT APPROVAL 6-14-66

MANNED
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HOUSTON, TEXAS

IMU AND
ASSOCIATED ELECTRONICS
THERMOCOUPLE ASSEMBLY

SIZE C
CODE IDENT NO. 80230
2010747
SCALE —
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29574		27 MAY 66	
	B	REVISED PER TDRR 33290		27 MAR 67	JJB

041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	-	-	-		6	2010745-021	PEA & THERMOCOUPLE ASS'Y
-	1	-	-		5	6010656-021	PTA & THERMOCOUPLE ASSY
-	-	1	-		4	6010656-011	PTA & THERMOCOUPLE ASSY
-	-	-	1		3	2010745-011	PEA & THERMOCOUPLE ASSY
-	1	1	-		2	2018699-021	IMU & THERMOCOUPLE ASSY
1	-	-	1		1	2018699-011	IMU & THERMOCOUPLE ASSY

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN R W Read DATE 4 MAY 66
CHECKED Naylor 12 MAY 66
APPROVAL F M Stupanik 7/6/66
CONTRACT NAS9-497
NASA APPROVAL A. G. METZGER
MIT APPROVAL M C Whiteley 6-14-66

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HOUSTON, TEXAS

IMU AND
ASSOCIATED ELECTRONICS
THERMOCOUPLE ASSEMBLY

SIZE C
CODE IDENT NO. 80230
2010747
SCALE —
SHEET 1 OF 1

MIL-10885 D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29574		27 MAY 66	
	B	REVISED PER TDRR 33290		27 MAR 67	JJB
	C	REVISED PER TDRR 34739		2 OCT 67	JRK RWH

061	051	C41	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	-	-	-	-	-		8	2018699-041	IMU & THERMOCOUPLE ASSY
-	1	-	-	-	-		7	2018699-031	IMU & THERMOCOUPLE ASSY
-	1	1	-	-	-		6	2010745-021	PEA & THERMOCOUPLE ASS'Y
1	-	-	1	-	-		5	6010656-021	PTA & THERMOCOUPLE ASSY
-	-	-	-	1	-		4	6010656-011	PTA & THERMOCOUPLE ASSY
-	-	-	-	-	1		3	2010745-011	PEA & THERMOCOUPLE ASSY
-	-	-	1	1	-		2	2018699-021	IMU & THERMOCOUPLE ASSY
-	-	1	-	-	1		1	2018699-011	IMU & THERMOCOUPLE ASSY

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT

DRAWN R W Keigel DATE 4 MAY 66
CHECKED 12 MAY 66
APPROVAL 6-14-66
CONTRACT NAS9-497
NASA APPROVAL A. C. METZGER
MIT APPROVAL 6-14-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

IMU AND
ASSOCIATED ELECTRONICS
THERMOCOUPLE ASSEMBLY

SIZE	CODE IDENT NO.	
C	80230	2010747
SCALE —		SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 29574		27 MAY 66	
	B	REVISED PER TDRR 33290		27 MAR 67	JJB
	C	REVISED PER TDRR 34739		2 OCT 67	JRK RWH
	D	REVISED PER TDRR 35578		12 FEB 68	J.W

QUANTITY REQUIRED 061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
-	1	-	-	-	-		9	2010745-031	PEA & THERMOCOUPLE ASSY
1	-	-	-	-	-		8	2018699-041	IMU & THERMOCOUPLE ASSY
-	1	-	-	-	-		7	2018699-031	IMU & THERMOCOUPLE ASSY
-	-	1	-	-	-		6	2010745-021	PEA & THERMOCOUPLE ASS'Y
1	-	-	1	-	-		5	6010656-021	PTA & THERMOCOUPLE ASSY
-	-	-	-	1	-		4	6010656-011	PTA & THERMOCOUPLE ASSY
-	-	-	-	-	1		3	2010745-011	PEA & THERMOCOUPLE ASSY
-	-	-	1	1	-		2	2018699-021	IMU & THERMOCOUPLE ASSY
-	-	1	-	-	1		1	2018699-011	IMU & THERMOCOUPLE ASSY

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN DATE 4 MAY 66
CHECKED 12 MAY 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL A.G. METZGER
MIT APPROVAL 6-14-

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IMU AND
ASSOCIATED ELECTRONICS
THERMOCOUPLE ASSEMBLY

SIZE C
CODE IDENT NO. 80230
2010747
SCALE —
SHEET 1 OF 1

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
		A	INITIAL RELEASE CLASS A PER TDRR 30292	23 JUNE 66	

Charleston 21 JUN 66

REV												
SHEET												
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN 26 MAY 66 (DAY MO YR)
CHECKER 10 JUN 66
ENGINEER 22 JUN 66
APPROVAL
CONTR NO.
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "J"
(G & N THERMO-VACUUM)

SIZE	CODE IDENT. NO	
A	80230	2010748

SCALE NONE
SHEET 1 OF 11

MIL 1377A6 12-65

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER FIGURES 1 AND 2 ON THE CONFIGURATION SHEET.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	LACE HARNESS USING ITEM 8.
4	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
5	THE SUFFIX LETTER OF A LEAD IDENTIFICATION IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER - L - BLUE R - RED A - FROM END SHIELD
6	GRID MODULE IS ONE INCH BASIC FOR DIMENSIONING. UNLESS OTHERWISE SPECIFIED HARNESS DRAWING IS SHOWN AT TRUE POSITION. CENTERS OF HARNESS FEATURES SHALL BE WITHIN +.25 OR -.25 AND ENDS OF LEADS AND ACCESSORIES +.12 OR -.12 INCH TOLERANCE OF THE TRUE POSITIONS SHOWN. ALL TOLERANCES APPLY REGARDLESS OF FEATURE SIZE.
7	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBERS 56 FOR COMPLETE CIRCUIT POINT.
8	CRIMP CONTACTS PER ND1002032.
9	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM FOR COPPER LEADS AND LESS THAN 10 OHMS FOR CONSTANTAN LEADS.
10	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN EACH PIN AND ALL OTHER PINS.

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 2 OF 11

NOTE NUMBER	GENERAL NOTES DESCRIPTION
11	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019. SERIALIZE PER ND1002023.
12	MARK SLEEVING WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH BLACK PER ND1002019.

LEAD TOLERANCE CHART

	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+.25-.25	+.25-.25	+.25-.25	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 3 OF 11

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010748-001	1008887-001 CABLE, THERMOCOUPLE 24AWG TWISTED SHIELDED PAIR 100 FEET TOTAL LENGTH
4	2	1	1010771-305	CONNECTOR PLUG
	3	REF	1010770- 4	CONTACT SOCKET, COPPER SUPPLIED WITH 1010771
	4	REF	1010770- 6	CONTACT SOCKET, CONSTANTAN, SUPPLIED WITH 1010771
	5	17	1008883-001	CONTACT SOCKET, COPPER
	6	17	1008883-004	CONTACT PIN, CONSTANTAN
	7	14	1008885-001	INSULATOR ASSEMBLY
4	8	AR	1012507- 4	TAPE, LACING
4	9	17	1010490-232	INSULATION, SLEEVING (HEAT SHRINKABLE)
	11	1	1010490-217	INSULATION, SLEEVING (HEAT SHRINKABLE)
	12	1	1010933-104	CLAMP, CONNECTOR
	13	1	1010734- 16	GROMMET
	14	1	1010490-516	INSULATION SLEEVING (HEAT SHRINKABLE)
	15	1	1010490-912	INSULATION SLEEVING (HEAT SHRINKABLE)
	16	1	2010748-002	WIRE PER 1010789-006, 22AWG, YEL, 5 FT TOT LG
	17	17	1010402- 2	SLEEVE, SOLDER

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 4 OF 11

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
J	1	1				1.75 2.00	1.50 1.75				1 2	17 9	
J	1A	16		SHLD J1 P33-1	1				.25 .13	NO NO		3	
J	1L			P33-2 TC1-COP	1 17				.13 .20	NO NO		3 5	
J	1R			P33-3 TC1-CONST	1 16				.13 .20	NO NO		4 6	
J	2	1				2.50 2.00	2.25 1.75				1 2	17 9	
J	2A	16		SHLD J2 P33-4	1				.25 .13	NO NO		3	
J	2L			P33-5 TC2-COP	1 35				.13 .20	NO NO		3 5	
J	2R			P33-6 TC2-CONST	1 34				.13 .20	NO NO		4 6	
J	3	1				1.75 2.00	1.50 1.75				1 2	17 9	
J	3A	16		SHLD J3 P33-7	1				.25 .13	NO NO		3	
J	3L			P33-8 TC3-COP	1 23				.13 .20	NO NO		3 5	
J	3R			P33-9 TC3-CONST	1 22				.13 .20	NO NO		4 6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 5 OF 11

WIRING HARNESS J 2010748

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
J 4	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 4A	16		SHLD J4 P33-10	 1				.25 .13	NO NO		 3	
J 4L			P33-11 TC4-COP	1 9				.13 .20	NO NO		3 5	
J 4R			P33-12 TC4-CONST	1 8				.13 .20	NO NO		4 6	
J 5	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 5A	16		SHLD J5 P33-13	 1				.25 .13	NO NO		 3	
J 5L			P33-14 TC5-COP	1 33				.13 .20	NO NO		3 5	
J 5R			P33-15 TC5-CONST	1 32				.13 .20	NO NO		4 6	
J 6	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 6A	16		SHLD J6 P33-16	 1				.25 .13	NO NO		 3	
J 6L			P33-17 TC6-COP	1 29				.13 .20	NO NO		3 5	
J 6R			P33-18 TC6-CONST	1 28				.13 .20	NO NO		4 6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 6 OF 11

MIL 2084 9-65

WIRING HARNESS J 2010748

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
J 7	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 7A	16		SHLD J7 P33-19	 1				.25 .13	NO NO		 3	
J 7L			P33-20 TC7-COP	1 21				.13 .20	NO NO		3 5	
J 7R			P33-21 TC7-CONST	1 20				.13 .20	NO NO		4 6	
J 8	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 8A	16		SHLD J8 P33-22	 1				.25 .13	NO NO		 3	
J 8L			P33-23 TC8-COP	1 7				.13 .20	NO NO		3 5	
J 8R			P33-24 TC8-CONST	1 6				.13 .20	NO NO		4 6	
J 9	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 9A	16		SHLD J9 P33-25	 1				.25 .13	NO NO		 3	
J 9L			P33-26 TC9-COP	1 5				.13 .20	NO NO		3 5	
J 9R			P33-27 TC9-CONST	1 4				.13 .20	NO NO		4 6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 7 OF 11

MIL 2084 9-65

WIRING HARNESS J 2010748

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
J 10	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 10A	16		SHLD J10 P33-28	 1				.25 .13	NO NO		 3	
J 10L			P33-29 TC10-COP	1 31				.13 .20	NO NO		3 5	
J 10R			P33-30 TC10-CONST	1 30				.13 .20	NO NO		4 6	
J 11	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 11A	16		SHLD J11 P33-31	 1				.25 .13	NO NO		 3	
J 11L			P33-32 TC11-COP	1 27				.13 .20	NO NO		3 5	
J 11R			P33-33 TC11-CONST	1 26				.13 .20	NO NO		4 6	
J 12	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 12A	16		SHLD J12 P33-34	 1				.25 .13	NO NO		 3	
J 12L			P33-35 TC12-COP	1 25				.13 .20	NO NO		3 5	
J 12R			P33-36 TC12-CONST	1 24				.13 .20	NO NO		4 6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 8 OF 11

MIL 2084 9-65

WIRING HARNESS J 2010748

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
J 13	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 13A	16		SHLD J13 P33-37	 1				.25 .13	NO NO		 3	
J 13L			P33-38 TC13-COP	1 19				.13 .20	NO NO		3 5	
J 13R			P33-39 TC13-CONST	1 18				.13 .20	NO NO		4 6	
J 14	1				2.50 2.00	2.25 1.75				1 2	17 9	
J 14A	16		SHLD J14 P33-40	 1				.25 .13	NO NO		 3	
J 14L			P33-41 TC14-COP	1 11				.13 .20	NO NO		3 5	
J 14R			P33-42 TC14-CONST	1 10				.13 .20	NO NO		4 6	
J 15	1				1.75 2.00	1.50 1.75				1 2	17 9	
J 15A	16		SHLD J15 P33-43	 1				.25 .13	NO NO		 3	
J 15L			P33-44 TC15-COP	1 13				.13 .20	NO NO		3 5	
J 15R			P33-45 TC15-CONST	1 12				.13 .20	NO NO		4 6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 9 OF 11

MIL 2084 9-65

WIRING HARNESS J 2010748

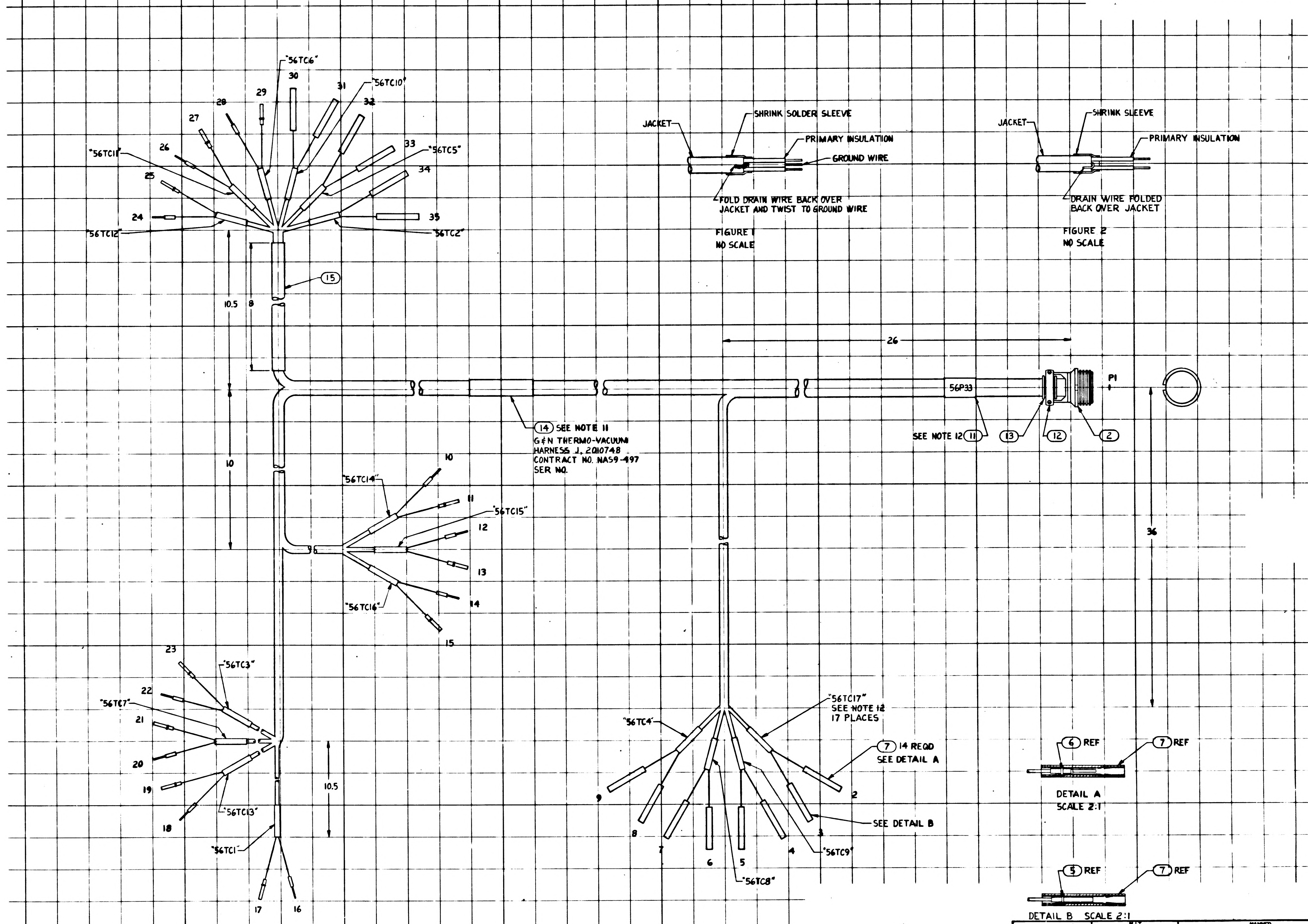
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
J 16	1				2.50	2.25				1	17	
					2.00	1.75				2	9	
J 16A	16		SHLD J16					.25	NO			
			P33-46	1				.13	NO		3	
J 16L			P33-47	1				.13	NO		3	
			TC16-COP	15				.20	NO		5	
J 16R			P33-48	1				.13	NO		4	
			TC16-CONST	14				.20	NO		6	
J 17	1				1.75	1.50				1	17	
					2.00	1.75				2	9	
J 17A	16		SHLD J17					.25	NO			
			P33-49	1				.13	NO		3	
J 17L			P33-50	1				.13	NO		3	
			TC17-COP	3				.20	NO		5	
J 17R			P33-51	1				.13	NO		4	
			TC17-CONST	2				.20	NO		6	

SIZE	CODE IDENT NO.	
A	80230	2010748
SCALE-NONE	REV LTR A	SHEET 10 OF 11

REVISIONS 3C292

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

SEE SHEET 1 FOR REVISION RECORD


"56TC6"
30
29
28
27
26
25
24
31
"56TC10"
32
33
"56TC5"
34
35
"56TC11"
"56TC12"
"56TC2"
15
10.5
8
10
JACKET
SHRINK SOLDER SLEEVE
PRIMARY INSULATION
GROUND WIRE
FOLD DRAIN WIRE BACK OVER JACKET AND TWIST TO GROUND WIRE
FIGURE 1
NO SCALE
JACKET
SHRINK SLEEVE
PRIMARY INSULATION
DRAIN WIRE FOLDED BACK OVER JACKET
FIGURE 2
NO SCALE
26
56P33
P1
14 SEE NOTE 11
G&N THERMO-VACUUM
HARNESS J, 2010748
CONTRACT NO. NAS9-497
SER NO.
SEE NOTE 12 11
13
12
2
"56TC14"
10
11
"56TC15"
12
13
14
"56TC16"
15
36
23
"56TC3"
22
"56TC7"
21
20
19
18
"56TC13"
"56TC1"
17
16
10.5
"56TC17"
SEE NOTE 12
17 PLACES
"56TC4"
7 14 REQD
SEE DETAIL A
9
8
7
6
5
4
3
2
SEE DETAIL B
"56TC9"
"56TC8"
6 REF
7 REF
DETAIL A
SCALE 2:1
5 REF
7 REF
DETAIL B SCALE 2:1
7
4
22

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES
± ± ±

DO NOT SCALE THIS DRAWING

MATERIAL
—

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN L Koahn DATE 26 MAY 66
CHECKED 8 JUN 66
APPROVAL 18 JUN 66
CONTRACT

NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "J"
(G&N THERMO-VACUUM)

SIZE	CODE IDENT NO.	
E	80230	2010748

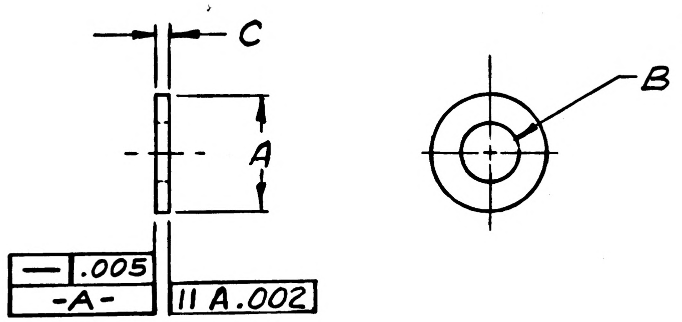
SCALE FULL
SHEET 11 OF 11

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER D.O. 62161		6-30 66	E.L. / J.E.G.
	B	INITIAL RELEASE CLASS A PER TDRR 31182		14 JUL 66	WS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: 6061-T6 AL ALLOY PER QQ-A-225/8, TEMPER T6.
3. FINISH: CHEMICAL FILM PER MIL-C-5541, TYPE II, GRADE C, CLASS 3.
4. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$.
5. MUST BE FREE FROM BURRS.
6. ALL CORNERS .010 MAX R OR CHAMFER.
7. IDENTIFY USING DRAWING NUMBER AND APPLICABLE DASH NUMBER PER ND1002019.

DASH NUMBER	DIAMETER -A-	DIAMETER -B-	THICKNESS -C-
001	.438-.428	.217-.222	.064-.060
002	.504-.500	.295-.300	.044-.040



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG. NO. CONTRACT DRAWN R.G. Olson DATE 15 JUN 66 CHECKED J. GRIEB 16 JUN 66 APPROVAL CONTRACT NAS 9-497	MANNED SPACECRAFT CENTER HOUSTON, TEXAS WASHER, FLAT	
DO NOT SCALE THIS DRAWING MATERIAL SEE NOTE 2	NASA APPROVAL P. Jacob 9/23/66 CCB APPROVAL 9/22/66	SIZE C	CODE IDENT NO. 80230	2010752
APPROVAL		SCALE NONE	SHEET 1 OF 1

NEXT ASSY	USED ON
APPLICATION	

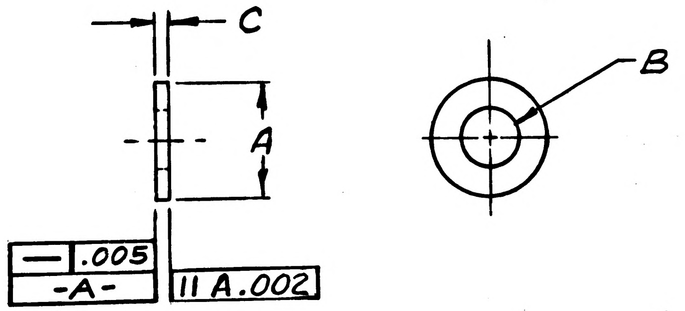
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: 6061-T6 AL ALLOY PER QQ-A-225/8, TEMPER T6.
3. FINISH: CHEMICAL FILM PER MIL-C-5541, TYPE II, GRADE C, CLASS 3.
4. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$.
5. MUST BE FREE FROM BURRS.
6. ALL CORNERS .010 MAX R OR CHAMFER.
7. IDENTIFY USING DRAWING NUMBER AND APPLICABLE DASH NUMBER PER ND1002019.

DASH NUMBER	DIAMETER -A-	DIAMETER -B-	THICKNESS -C-
001	.438 - .428	.217 - .222	.064 - .060
002	.504 - .500	.295 - .300	.044 - .040
003	.364 - .354	.223 - .233	.064 - .060
004	.210 - .200	.130 - .120	.064 - .060

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER D.O. 62161		6-30 66	E.L. J.E.G.
	B	INITIAL RELEASE CLASS A PER TDRR 31182		14 JUL 66	WD
	C	REVISED PER TDRR 31206		2 OCT 66	JM DPW



NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DWG. NO. CONTRACT

DRAWN R.H. Olson 15 JUN 66 DATE
CHECKED J. GRIEB 16 JUN 66
APPROVAL
CONTRACT NAS 9-497

NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER, FLAT

SIZE C
CODE IDENT NO. 80230
2010752

SCALE NONE
SHEET 1 OF 1

MIL-1085D D

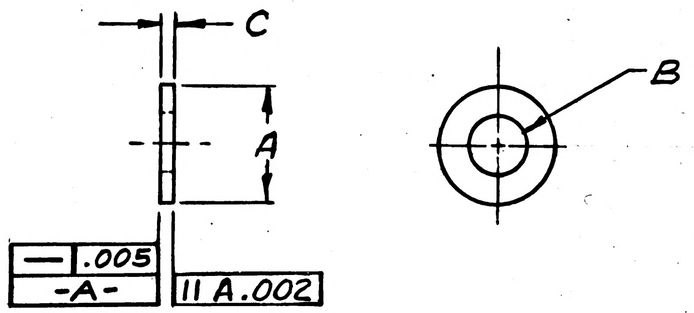
REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER D.D. 62161		6-30 66	E.L. J.E.G.
Ⓜ	B	INITIAL RELEASE CLASS A PER TDRR 31182		14 JUL 66	wk
Ⓜ	C	REVISED PER TDRR 31206		2 OCT 66	JM BPW
	D	REVISED PER TDRR 32780		2 FEB 67	AF n.W.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: 6061-T6 AL ALLOY PER QQ-A-225/8, TEMPER T6.
3. FINISH: CHEMICAL FILM PER MIL-C-5541, TYPE II, GRADE C, CLASS 3.
4. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{63}$.
5. MUST BE FREE FROM BURRS.
6. ALL CORNERS .010 MAX R OR CHAMFER.
7. IDENTIFY USING DRAWING NUMBER AND APPLICABLE DASH NUMBER PER ND1002019.

DASH NUMBER	DIAMETER -A-	DIAMETER -B-	THICKNESS -C-
001	.438 - .428	.223 - .228	.064 - .060
002	.504 - .500	.295 - .300	.044 - .040
003	.364 - .354	.223 - .233	.064 - .060
004	.210 - .200	.130 - .120	.064 - .060



NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
APPROVAL [illegible] 16 JUN 66

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN R. H. Olson DATE 15 JUN 66
CHECKED J. GRIEB 16 JUN 66
APPROVAL [illegible] 9 Sept 66
CONTRACT NAS 9-497
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL [illegible] 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

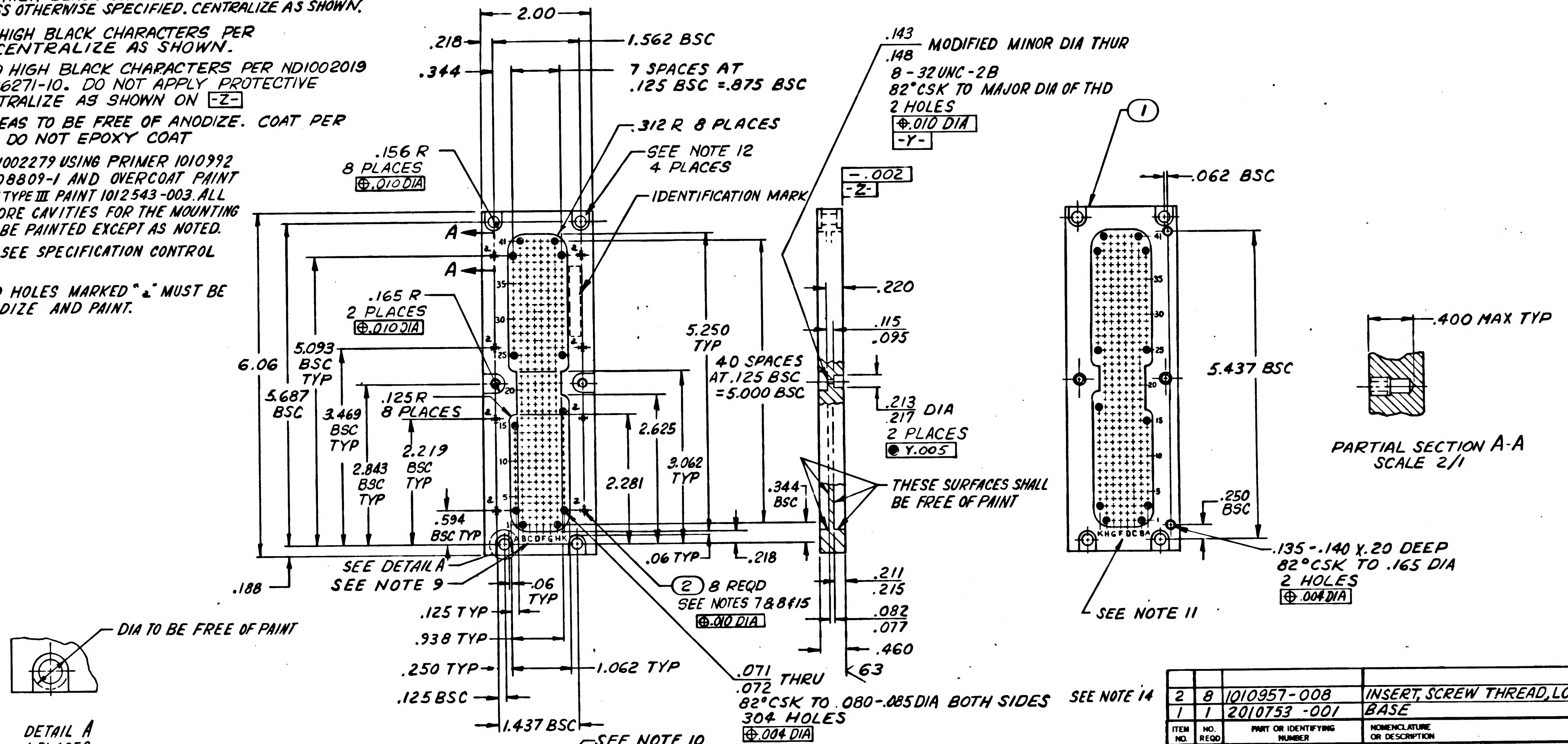
WASHER, FLAT

SIZE C
CODE IDENT NO. 80230
2010752
SCALE NONE
SHEET 1 OF 1

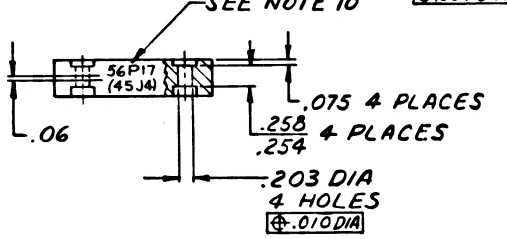
2010753 | A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "⁂" MUST BE FREE OF ANODIZE AND PAINT.



2.00
.218
.344
1.562 BSC
7 SPACES AT .125 BSC = .875 BSC
.312 R 8 PLACES
SEE NOTE 12 4 PLACES
IDENTIFICATION MARK
.156 R 8 PLACES ⊕.010 DIA
A
A
.165 R 2 PLACES ⊕.010 DIA
6.06
5.093 BSC TYP
5.687 BSC
3.469 BSC TYP
2.843 BSC TYP
.125 R 8 PLACES
2.219 BSC TYP
.594 BSC TYP
5.250 TYP
40 SPACES AT .125 BSC = 5.000 BSC
2.625
2.281
3.062 TYP
.06 TYP
.218
.188
SEE DETAIL A
SEE NOTE 9
.06 TYP
.125 TYP
.938 TYP
.250 TYP
.125 BSC
1.062 TYP
1.437 BSC
② 8 REQD SEE NOTES 7 & 8 & 15 ⊕.010 DIA
.071 .072 THRU 82°CSK TO .080-.085 DIA BOTH SIDES 304 HOLES ⊕.004 DIA
.143 .148 MODIFIED MINOR DIA THUR
8-32UNC-2B 82°CSK TO MAJOR DIA OF THD 2 HOLES ⊕.010 DIA -Y-
-.002 -Z-
.220
.115 .095
.213 .217 DIA 2 PLACES ● Y.005
.344 BSC
THESE SURFACES SHALL BE FREE OF PAINT
.211 .215
.082 .077
.460
63
①
.062 BSC
5.437 BSC
.250 BSC
.135-.140 X .20 DEEP 82°CSK TO .165 DIA 2 HOLES ⊕.004 DIA
SEE NOTE 11
.400 MAX TYP
PARTIAL SECTION A-A SCALE 2/1
DIA TO BE FREE OF PAINT
DETAIL A 4 PLACES SCALE 2:1



SEE NOTE 10
56P17 (45J4)
.06
.075 4 PLACES
.258 .254 4 PLACES
.203 DIA 4 HOLES ⊕.010 DIA

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010753 -001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014744	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES +2° −
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. Klonger DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL Basta 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/22/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P17)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230 SIZE D 2010753
SCALE 1/1 SHEET 1 OF 1

24 JUN 66

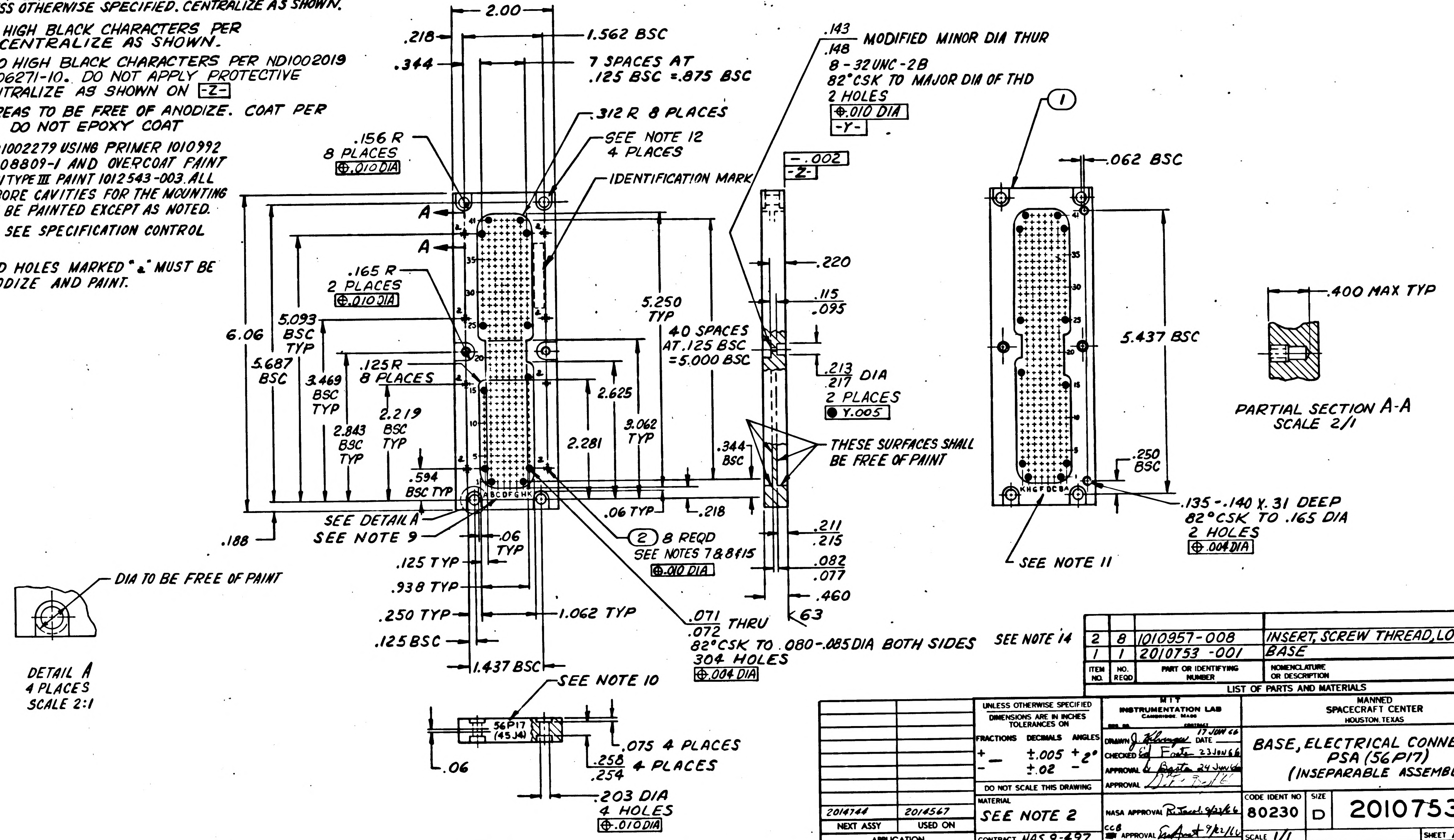
2010753

B	2010753

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10·4·66	JJB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.


2.00
.218
.344
1.562 BSC
7 SPACES AT .125 BSC =.875 BSC
.312 R 8 PLACES
SEE NOTE 12 4 PLACES
IDENTIFICATION MARK
.156 R 8 PLACES
⊕.010 DIA
A
A
.165 R 2 PLACES
⊕.010 DIA
6.06
5.093 BSC TYP
5.687 BSC
3.469 BSC TYP
2.843 BSC TYP
.125 R 8 PLACES
2.219 BSC TYP
.594 BSC TYP
2.625
2.281
3.062 TYP
5.250 TYP
40 SPACES AT .125 BSC =5.000 BSC
.188
SEE DETAIL A
SEE NOTE 9
.06 TYP
.06 TYP
.218
② 8 REQD SEE NOTES 7 & 8 & 15
⊕.010 DIA
.125 TYP
.938 TYP
.250 TYP
.125 BSC
1.062 TYP
1.437 BSC
.071 .072 THRU 82°CSK TO .080-.085 DIA BOTH SIDES 304 HOLES
⊕.004 DIA
SEE NOTE 10
56P17 (45J4)
.06
.075 4 PLACES
.258 .254 4 PLACES
.203 DIA 4 HOLES
⊕.010 DIA
DIA TO BE FREE OF PAINT
DETAIL A 4 PLACES SCALE 2:1
.143 .148 MODIFIED MINOR DIA THUR
8-32UNC-2B 82°CSK TO MAJOR DIA OF THD 2 HOLES
⊕.010 DIA
-Y-
-.002
-Z-
.220
.115 .095
.213 .217 DIA 2 PLACES
● Y.005
.344 BSC
THESE SURFACES SHALL BE FREE OF PAINT
.211 .215
.082 .077
.460
63
①
.062 BSC
5.437 BSC
.250 BSC
.135-.140 Y.31 DEEP 82°CSK TO .165 DIA 2 HOLES
⊕.004 DIA
SEE NOTE 11
.400 MAX TYP
PARTIAL SECTION A-A SCALE 2/1
SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010753 -001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014744	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.005 ±.02	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Klinger DATE 17 JUN 66
CHECKED Ed Foote 23 JUN 66
APPROVAL Basta 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P17)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE D
2010753
SCALE 1/1
SHEET 1 OF 1

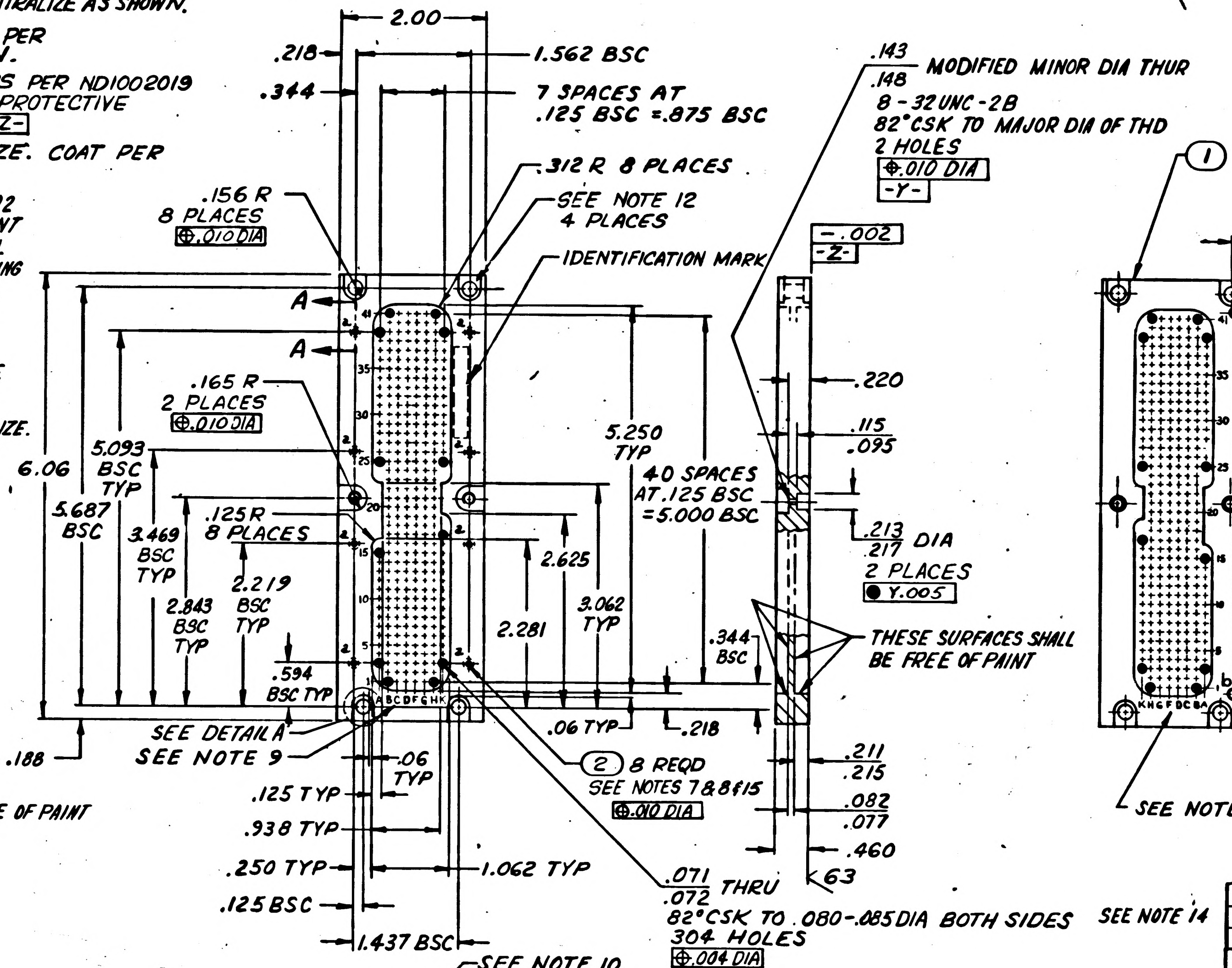
24 JUN 66

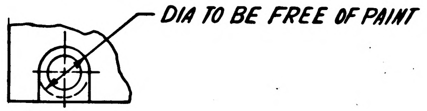
2010753

NOTES:

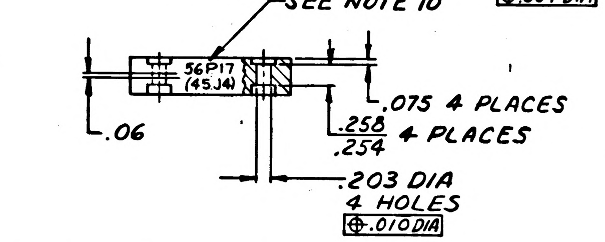
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODISE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND1002040.

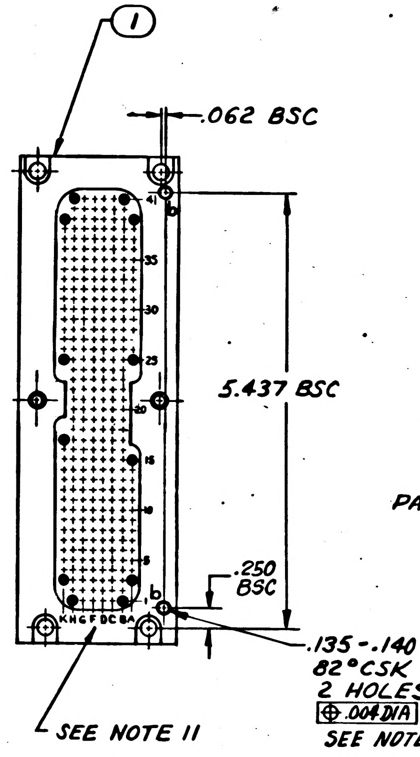
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
Ⓜ A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
Ⓜ B		REVISED PER TDRR 31205		10·4·66	JJB
C		REVISED PER TDRR 32679		25 JAN 67	ME

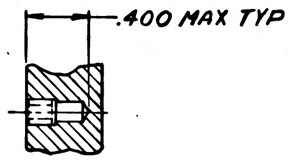

2.00
.218
.344
1.562 BSC
7 SPACES AT .125 BSC =.875 BSC
.312 R 8 PLACES
SEE NOTE 12 4 PLACES
IDENTIFICATION MARK
.156 R 8 PLACES ⊕.010 DIA
A
A
.165 R 2 PLACES ⊕.010 DIA
6.06
5.093 BSC TYP
5.687 BSC
3.469 BSC TYP
.125 R 8 PLACES
2.843 BSC TYP
2.219 BSC TYP
.594 BSC TYP
2.625
2.281
3.062 TYP
5.250 TYP
40 SPACES AT .125 BSC =5.000 BSC
SEE DETAIL A
SEE NOTE 9
.188
.06 TYP
.125 TYP
.938 TYP
.250 TYP
.125 BSC
1.062 TYP
1.437 BSC
② 8 REQD SEE NOTES 7 & 8 & 15 ⊕.010 DIA
.071 .072 THRU 82°CSK TO .080-.085 DIA BOTH SIDES 304 HOLES ⊕.004 DIA
.143 .148 MODIFIED MINOR DIA THUR 8-32UNC-2B 82°CSK TO MAJOR DIA OF THD 2 HOLES ⊕.010 DIA -Y-
-.002 -Z-
.220
.115 .095
.213 .217 DIA 2 PLACES ● Y.005
.344 BSC
THESE SURFACES SHALL BE FREE OF PAINT
.06 TYP
.218
.211 .215
.082 .077
.460
63
41
35
30
25
20
15
10
5
ABCDEFGHK
a
b


DIA TO BE FREE OF PAINT

DETAIL A
4 PLACES
SCALE 2:1


SEE NOTE 10
56P17 (45J4)
.06
.075 4 PLACES
.258 .254 4 PLACES
.203 DIA 4 HOLES ⊕.010 DIA


①
.062 BSC
5.437 BSC
.250 BSC
.135-.140 Ɣ.31 DEEP 82°CSK TO .165 DIA 2 HOLES ⊕.004 DIA
SEE NOTE 16
SEE NOTE 11
KHGFEDCBA
41
35
30
25
20
15
10
5
b



PARTIAL SECTION A-A
SCALE 2/1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010753 -001	BASE

LIST OF PARTS AND MATERIALS

2014744	2014567
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS +— − DECIMALS ±.005 ±.02 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN J. Klinger DATE 17 JUN 66
CHECKED Ed Foote 23 JUN 66
APPROVAL D. Basta 24 Jun 66
APPROVAL 9 Sept '66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66
24 JUN 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P17)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010753
SCALE 1/1
SHEET 1 OF 1

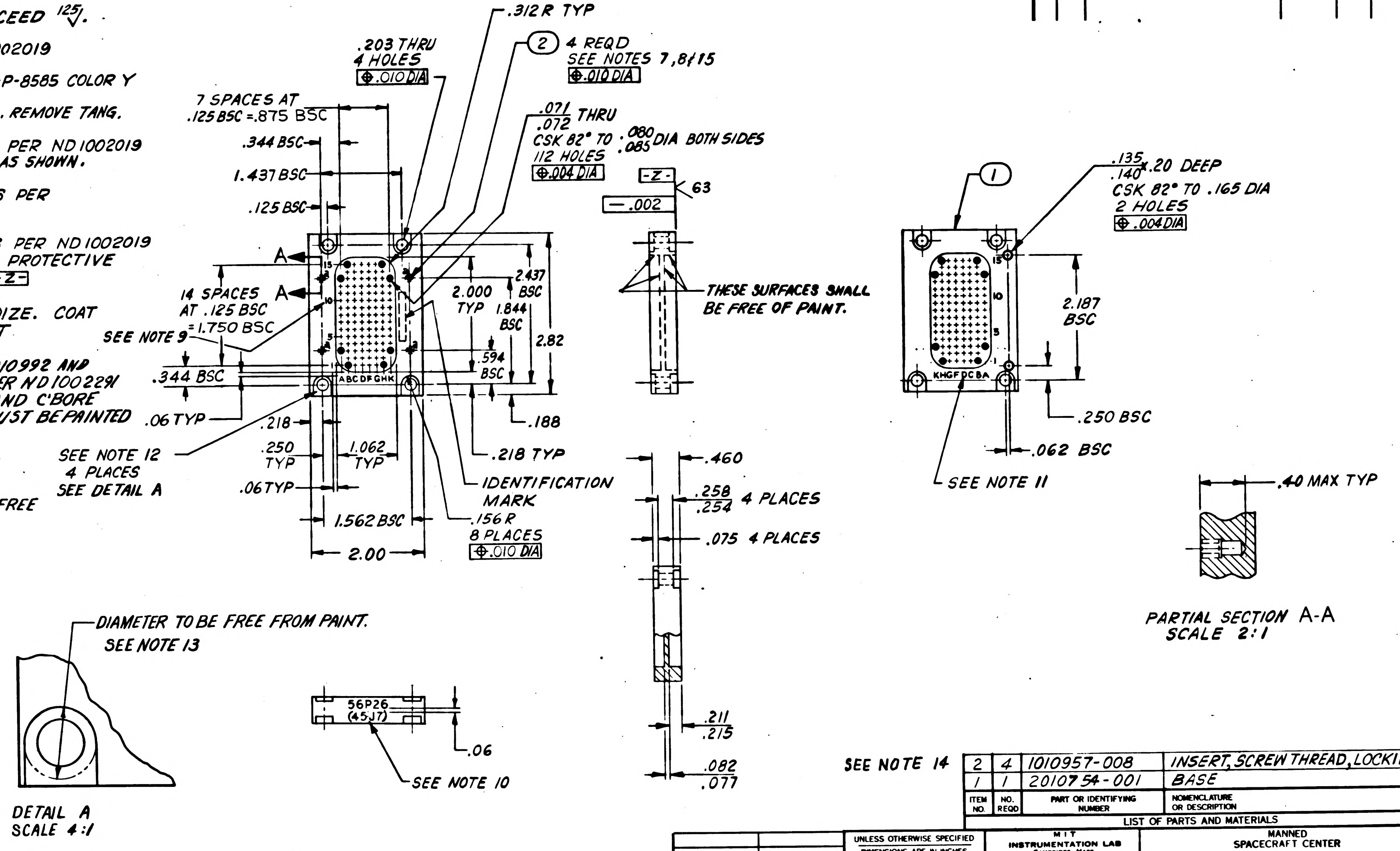
A	2010754	2	1

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	EA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
6. IDENTIFY WITH PART NUMBER PER ND 1002019
7. COAT THREAD OF ITEM (2) WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM (2) WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND C'BORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED a MUST BE FREE OF ANODIZE AND PAINT.


.312 R TYP
.203 THRU
4 HOLES
⊕ .010 DIA
(2) 4 REQD
SEE NOTES 7,8 & 15
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.071/.072 THRU
CSK 82° TO .080/.085 DIA BOTH SIDES
112 HOLES
⊕ .004 DIA
-Z-
63
— .002
A
14 SPACES
AT .125 BSC
= 1.750 BSC
SEE NOTE 9
2.000 TYP
2.437 BSC
1.844 BSC
2.82
.594 BSC
.344 BSC
.06 TYP
.218
.188
.218 TYP
.250 TYP
1.062 TYP
SEE NOTE 12
4 PLACES
SEE DETAIL A
.06 TYP
IDENTIFICATION MARK
.156 R
8 PLACES
⊕ .010 DIA
1.562 BSC
2.00
ABCDEFGHK
15
10
5
1
THESE SURFACES SHALL BE FREE OF PAINT.
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
(1)
.135/.140 x .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
2.187 BSC
KHGFEDCBA
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
PARTIAL SECTION A-A
SCALE 2:1
DIAMETER TO BE FREE FROM PAINT.
SEE NOTE 13
DETAIL A
SCALE 4:1
56P26
(45J7)
.06
SEE NOTE 10

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010754-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
Cambridge Mass
DRAWN R.W. Turner 17 JUN 66
CHECKED Ed Foster 23 Jun 66
APPROVAL D Baxter 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacot 9/23/66
CCB APPROVAL 9/12/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P26)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE D
2010754
SCALE FULL
SHEET 1 OF 1

24 JUN 66

2010754

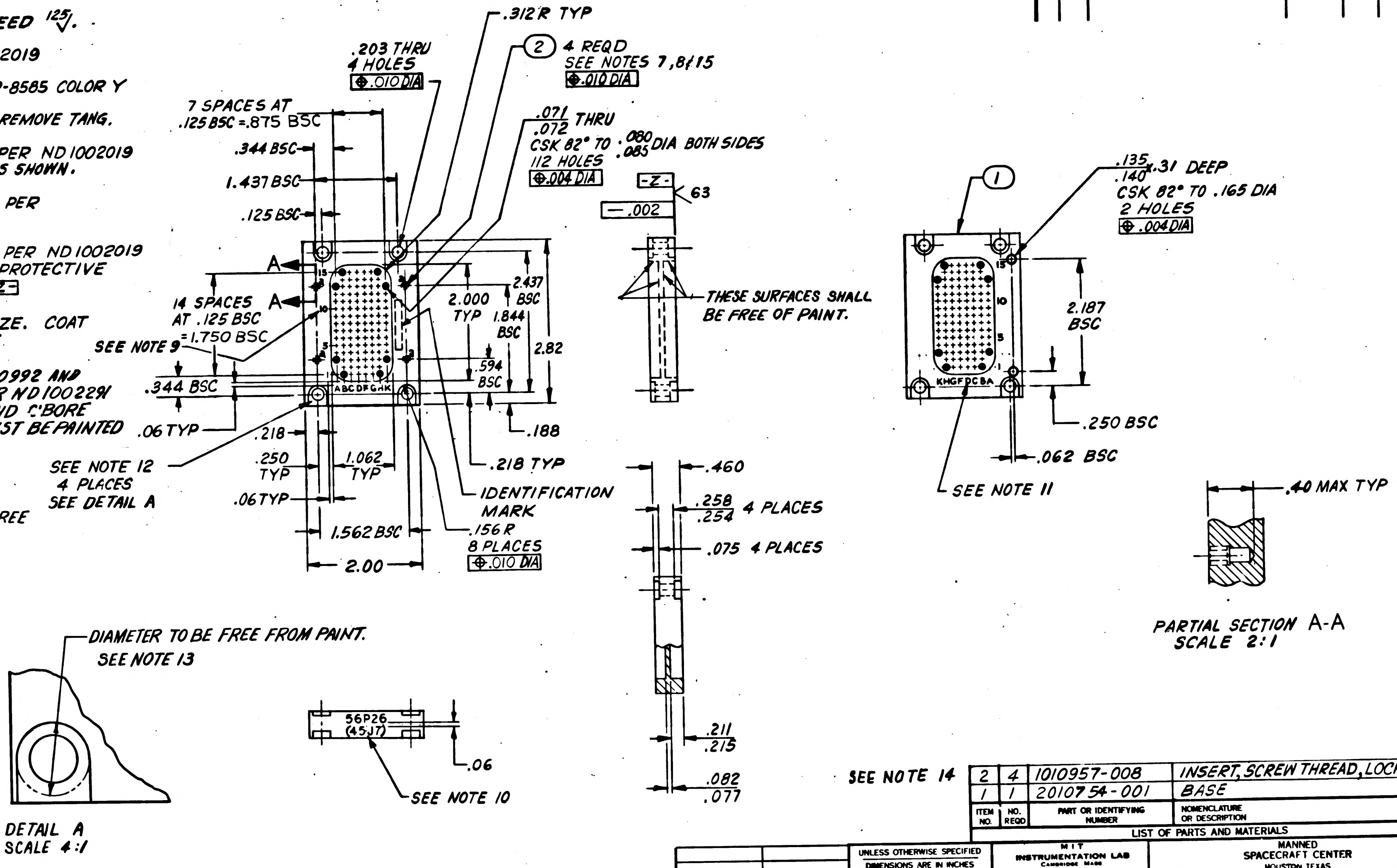
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\checkmark}$.
6. IDENTIFY WITH PART NUMBER PER ND 1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND C'BORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED & MUST BE FREE OF ANODIZE AND PAINT.

2010754 B

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10-4-66	JJB


.203 THRU
4 HOLES
⊕ .010 DIA
.312 R TYP
② 4 REQD
SEE NOTES 7, 8 & 15
⊕ .010 DIA
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.071/.072 THRU
CSK 82° TO .080/.085 DIA BOTH SIDES
112 HOLES
⊕ .004 DIA
-Z-
63
— .002
A
14 SPACES AT .125 BSC = 1.750 BSC
SEE NOTE 9
2.000 TYP
2.437 BSC
1.844 BSC
2.82
.594 BSC
.344 BSC
.06 TYP
.218
.250 TYP
1.062 TYP
.06 TYP
1.562 BSC
2.00
.188
.218 TYP
IDENTIFICATION MARK
.156 R
8 PLACES
⊕ .010 DIA
ABCDEFGHK
15
10
5
THESE SURFACES SHALL BE FREE OF PAINT.
SEE NOTE 12
4 PLACES
SEE DETAIL A
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
①
.135/.140 x .31 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
2.187 BSC
KHGFEDCBA
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
PARTIAL SECTION A-A
SCALE 2:1
DIAMETER TO BE FREE FROM PAINT.
SEE NOTE 13
DETAIL A
SCALE 4:1
56P26
(45J7)
.06
SEE NOTE 10

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010754-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.W. Turner 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D Baxter 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/22/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA(56P26)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE D
2010754
SCALE FULL
SHEET 1 OF 1

24 JUN 66

2010754

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\checkmark}$.
6. IDENTIFY WITH PART NUMBER PER ND 1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
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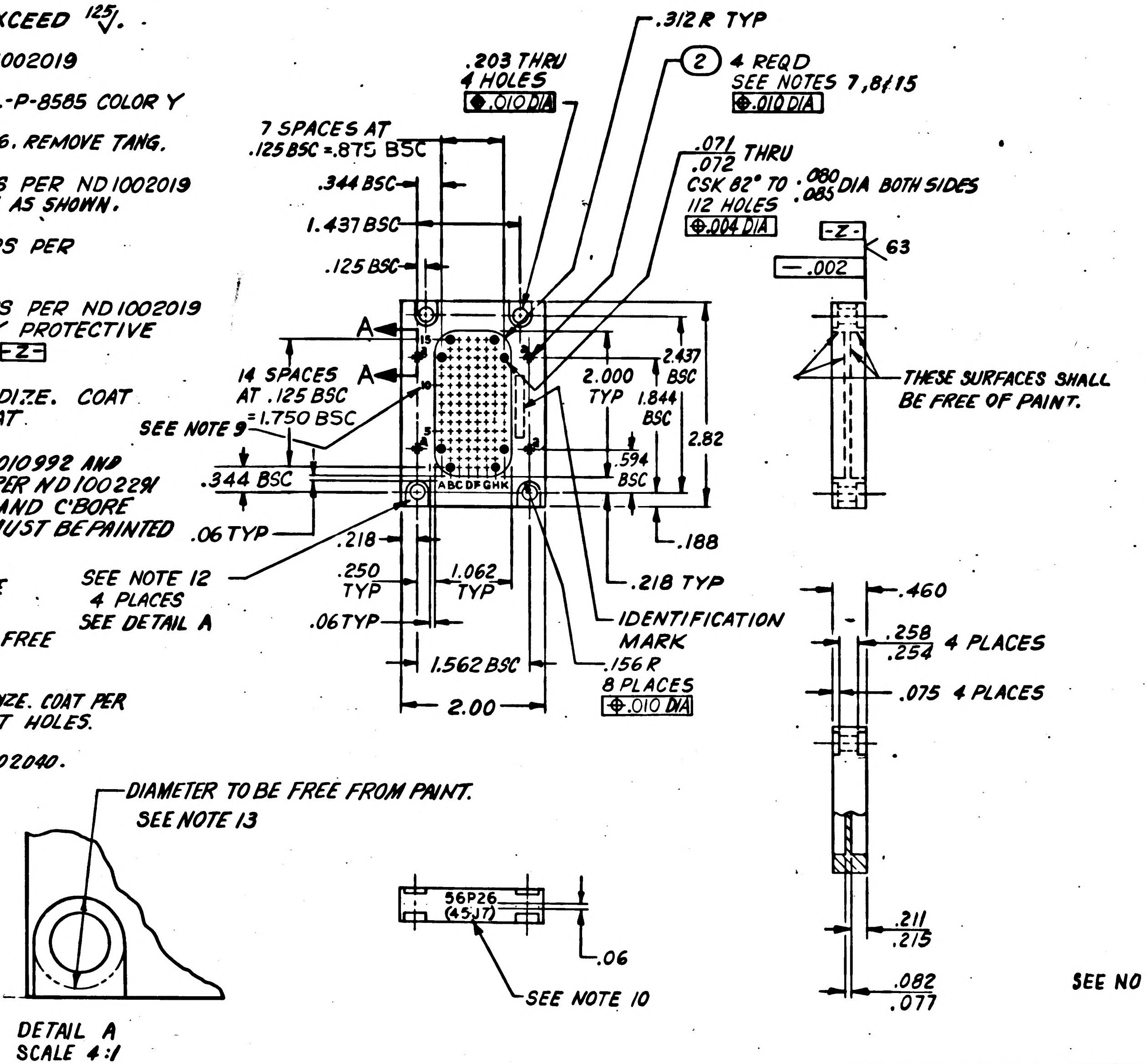
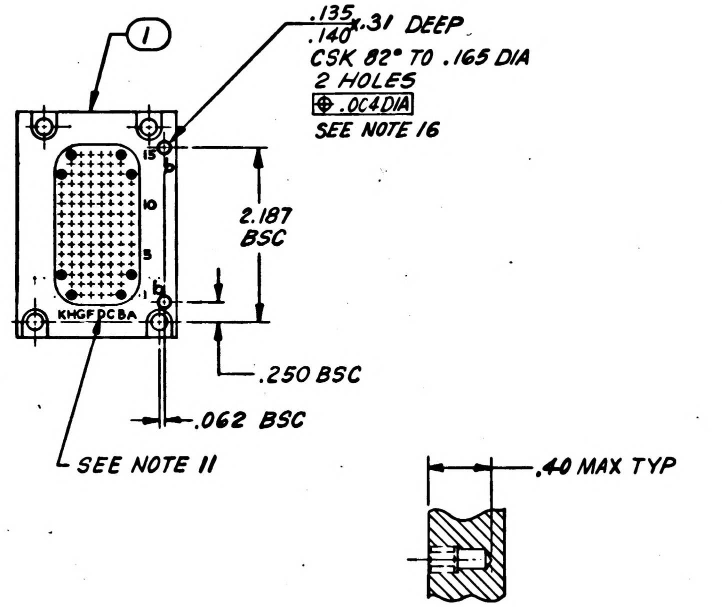
14. VENDOR ITEM- SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED a MUST BE FREE OF ANODIZE AND PAINT.
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND1002040.


.203 THRU
4 HOLES
⊕ .010 DIA
.312 R TYP
② 4 REQD
SEE NOTES 7,8 & 15
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.071/.072 THRU
CSK 82° TO .080/.085 DIA BOTH SIDES
112 HOLES
⊕ .004 DIA
-Z-
63
— .002
A
14 SPACES
AT .125 BSC
= 1.750 BSC
SEE NOTE 9
2.000 TYP
2.437 BSC
1.844 BSC
2.82
.594 BSC
.344 BSC
.06 TYP
.218
.188
.250 TYP
1.062 TYP
.218 TYP
SEE NOTE 12
4 PLACES
SEE DETAIL A
.06 TYP
IDENTIFICATION MARK
.156 R
8 PLACES
⊕ .010 DIA
1.562 BSC
2.00
THESE SURFACES SHALL BE FREE OF PAINT.
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P26
(45J7)
.06
SEE NOTE 10
DIAMETER TO BE FREE FROM PAINT.
SEE NOTE 13
DETAIL A
SCALE 4:1
ABCDEFGHK


①
.135/.140 × .31 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
SEE NOTE 16
2.187 BSC
.250 BSC
.062 BSC
SEE NOTE 11
KHGFDCBA
.40 MAX TYP

PARTIAL SECTION A-A
SCALE 2:1

2010754 C

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10-4-66	JJB
C		REVISED PER TDRR 32679		24 JAN 67	NE N.W.

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010754-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS ± .02 ± .005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN R.W. Turner 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D Barter 24 Jun 66
APPROVAL 9 Sept 66
NASA APPROVAL R. Jacob 9/22/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P26)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE D
2010754
SCALE FULL
SHEET 1 OF 1

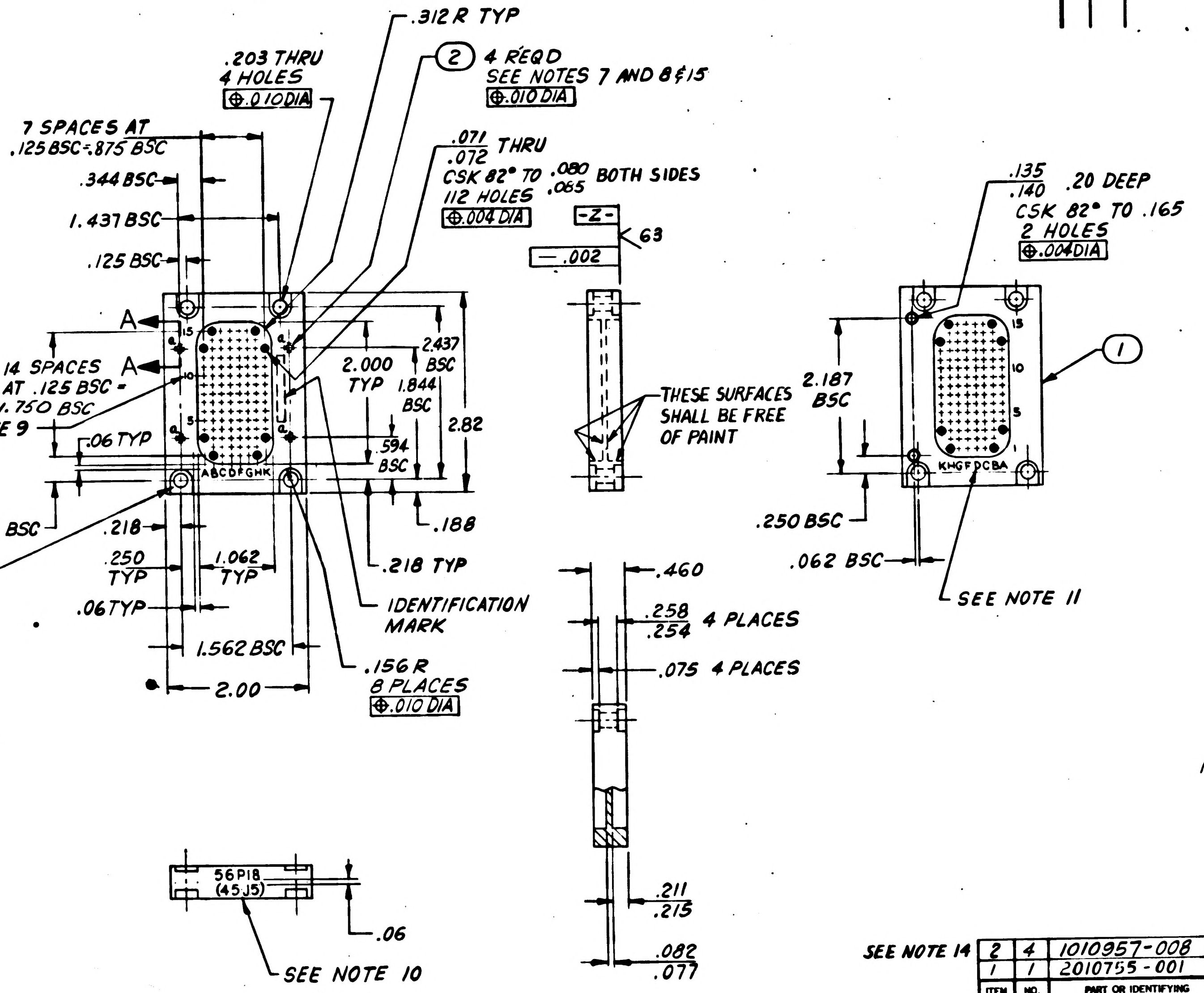
24 JUN 66

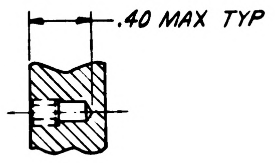
A 2010755 2

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

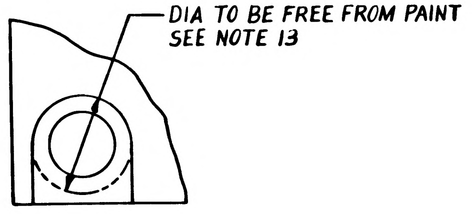
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-.
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.


.203 THRU
4 HOLES
⊕.010 DIA
.312 R TYP
② 4 REQD
SEE NOTES 7 AND 8 & 15
⊕.010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.071/.072 THRU
CSK 82° TO .080/.065 BOTH SIDES
112 HOLES
⊕.004 DIA
-Z-
63
— .002
A
14 SPACES
AT .125 BSC = 1.750 BSC
SEE NOTE 9
.06 TYP
2.000 TYP
2.437 BSC
1.844 BSC
2.82
.594 BSC
ABCDEFGHK
.344 BSC
.218
.188
.250 TYP
1.062 TYP
.218 TYP
SEE NOTE 12
4 PLACES
SEE DETAIL A
.06 TYP
IDENTIFICATION MARK
1.562 BSC
.156 R
8 PLACES
⊕.010 DIA
2.00
THESE SURFACES SHALL BE FREE OF PAINT
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P18
(45J5)
.06
SEE NOTE 10
.135/.140 .20 DEEP
CSK 82° TO .165
2 HOLES
⊕.004 DIA
①
2.187 BSC
15
10
5
1
KHGFEDCBA
.250 BSC
.062 BSC
SEE NOTE 11



PARTIAL SECTION A-A
SCALE 2:1


DIA TO BE FREE FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1

2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010755-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

SEE NOTE 14

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014742	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN L Krahs DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Boyte 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/22/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P18)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010755
SCALE FULL
SHEET 1 OF 1

2010755

B	2010755	2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	EA
B		REVISED PER TDRR 31205		10-4-66	JJB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
    A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
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6. IDENTIFY WITH PART NUMBER PER ND1002019.
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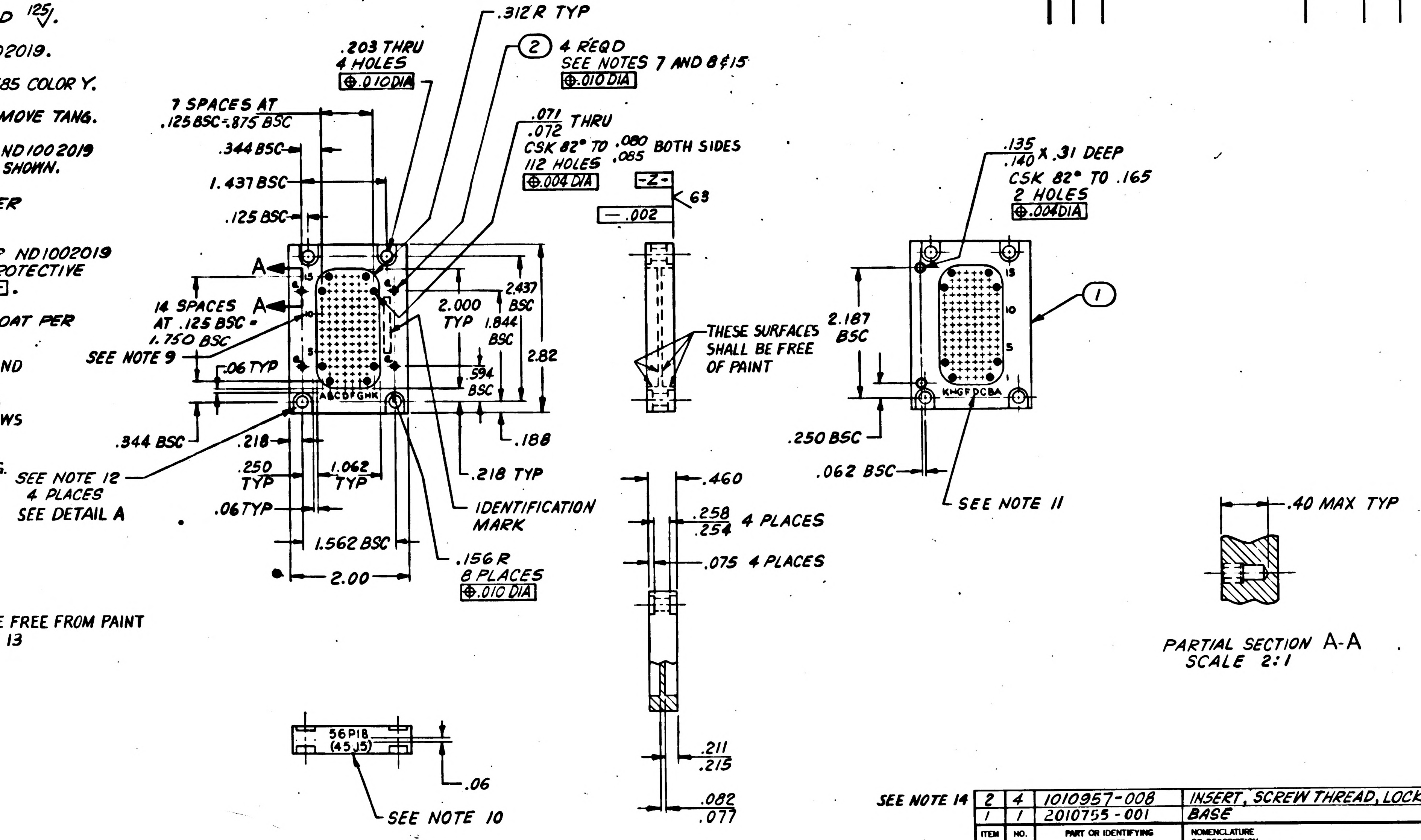
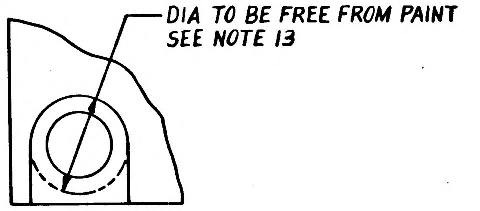
14. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.



.312R TYP
.203 THRU
4 HOLES
⊕.010DIA
② 4 REQD
SEE NOTES 7 AND 8 & 15
7 SPACES AT
.125 BSC=.875 BSC
.071/.072 THRU
CSK 82° TO .080/.085 BOTH SIDES
112 HOLES
⊕.004 DIA
-Z-
63
—.002
.344 BSC
1.437 BSC
.125 BSC
A
14 SPACES
AT .125 BSC =
1.750 BSC
SEE NOTE 9
.06 TYP
2.000 TYP
2.437 BSC
1.844 BSC
.594 BSC
2.82
.188
15
10
5
1
ABCDEFGHK
.344 BSC
.218
.250 TYP
1.062 TYP
.06 TYP
1.562 BSC
2.00
.218 TYP
IDENTIFICATION MARK
.156 R
8 PLACES
⊕.010 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
THESE SURFACES SHALL BE FREE OF PAINT
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P18
(45J5)
.06
SEE NOTE 10
.135/.140 X .31 DEEP
CSK 82° TO .165
2 HOLES
⊕.004 DIA
①
2.187 BSC
15
10
5
1
KHGFEDCBA
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
PARTIAL SECTION A-A
SCALE 2:1



DIA TO BE FREE FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010755-001	BASE

SEE NOTE 14

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014742	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ − —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9 - 497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN L Kraha DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Baxter 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P18)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010755
SCALE FULL
SHEET 1 OF 1

2010755

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
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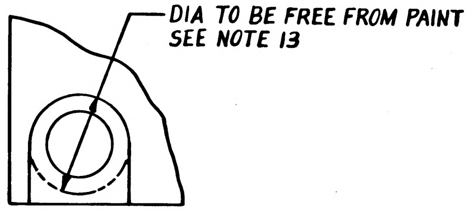
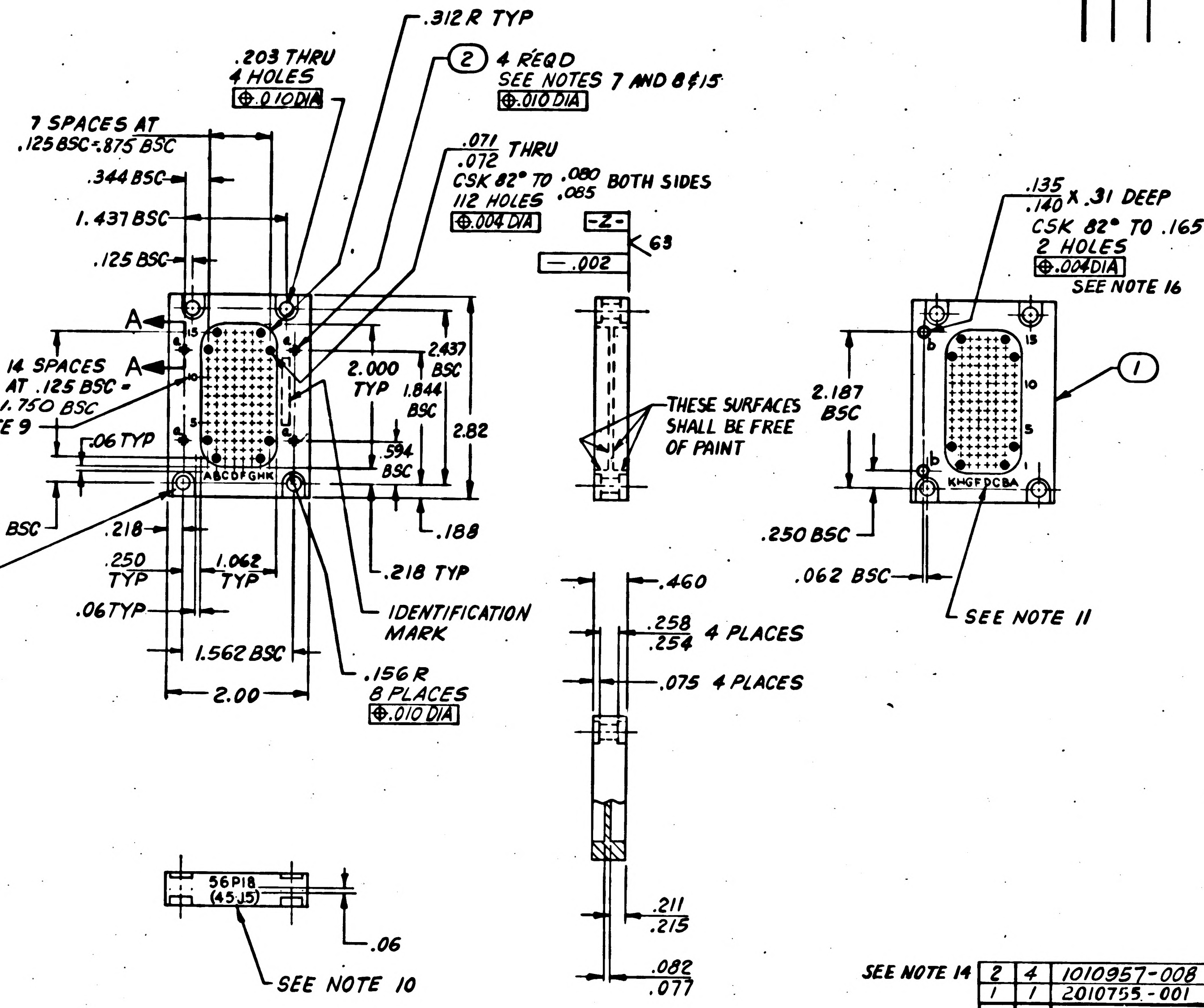
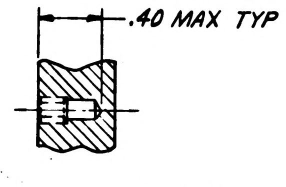
14. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.


DIA TO BE FREE FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1


SEE NOTE 12
4 PLACES
SEE DETAIL A
7 SPACES AT
.125 BSC=.875 BSC
.344 BSC
1.437 BSC
.125 BSC
.203 THRU
4 HOLES
⊕.010 DIA
.312 R TYP
② 4 REQD
SEE NOTES 7 AND 8 & 15
⊕.010 DIA
.071/.072 THRU
CSK 82° TO .080/.085 BOTH SIDES
112 HOLES
⊕.004 DIA
-Z-
63
— .002
A
A
14 SPACES
AT .125 BSC =
1.750 BSC
SEE NOTE 9
.06 TYP
15
10
5
a
ABCDFGHK
2.000
TYP
2.437
BSC
1.844
BSC
.594
BSC
2.82
.188
.218 TYP
.344 BSC
.218
.250
TYP
1.062
TYP
.06 TYP
1.562 BSC
2.00
IDENTIFICATION
MARK
.156 R
8 PLACES
⊕.010 DIA
THESE SURFACES
SHALL BE FREE
OF PAINT
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P18
(45J5)
.06
SEE NOTE 10
.135/.140 X .31 DEEP
CSK 82° TO .165
2 HOLES
⊕.004 DIA
SEE NOTE 16
b
15
10
5
1
KHGFDCBA
2.187
BSC
①
.250 BSC
.062 BSC
SEE NOTE 11



PARTIAL SECTION A-A
SCALE 2:1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
Ⓜ A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
Ⓜ B		REVISED PER TDRR 31205		10-4-66	JJB
C		REVISED PER TDRR 32679		25 JAN 67	NE M.W

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010755-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014742	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN L. Krahn DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Bayta 24 JUN 66
APPROVAL 9-22-66
NASA APPROVAL 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P18)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010755

SCALE FULL
SHEET 1 OF 1

JUN 66

2010755

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
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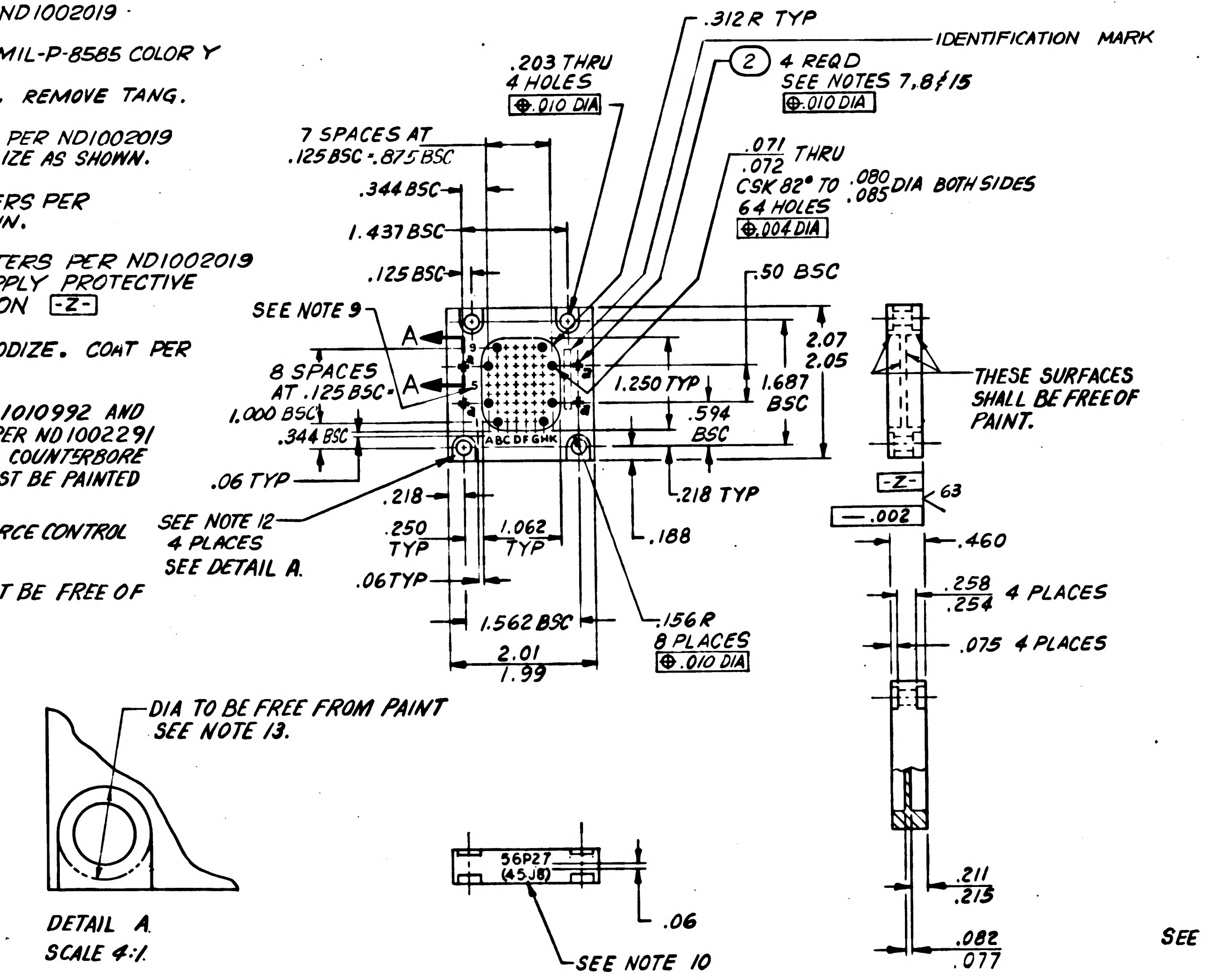
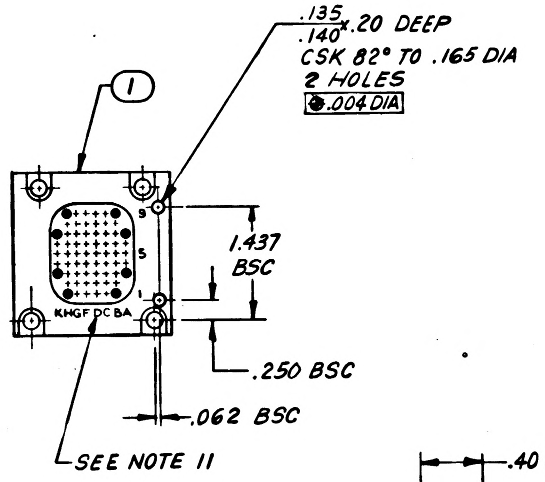
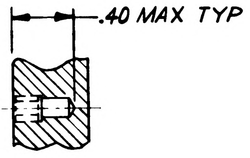
14. VENDOR ITEM - SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED a MUST BE FREE OF ANODIZE AND PAINT


.312 R TYP
IDENTIFICATION MARK
.203 THRU 4 HOLES
⊕ .010 DIA
② 4 REQD SEE NOTES 7, 8 & 15
⊕ .010 DIA
7 SPACES AT .125 BSC = .875 BSC
.071/.072 THRU CSK 82° TO .080/.085 DIA BOTH SIDES 64 HOLES
⊕ .004 DIA
.344 BSC
1.437 BSC
.125 BSC
.50 BSC
SEE NOTE 9
A
A
9
5
1
a
8 SPACES AT .125 BSC = 1.000 BSC
.344 BSC
.06 TYP
ABCDFGHK
1.250 TYP
.594 BSC
1.687 BSC
2.07
2.05
.218 TYP
.188
SEE NOTE 12 4 PLACES SEE DETAIL A.
.218
.250 TYP
1.062 TYP
.06 TYP
1.562 BSC
2.01
1.99
.156 R 8 PLACES
⊕ .010 DIA
THESE SURFACES SHALL BE FREE OF PAINT.
-Z-
63
— .002
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P27
(45J8)
.06
SEE NOTE 10
DIA TO BE FREE FROM PAINT SEE NOTE 13.
DETAIL A.
SCALE 4:1


①
.135/.140 x .20 DEEP CSK 82° TO .165 DIA 2 HOLES
⊕ .004 DIA
9
5
1
KHGFDCBA
1.437 BSC
.250 BSC
.062 BSC
SEE NOTE 11



PARTIAL SECTION A-A
SCALE 2:1

SEE NOTE 14	2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
	1	1	2010756-001	BASE
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

2014748	2014567
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R.W. Turner DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barta 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR -
PSA (56P27)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010756
SCALE FULL
SHEET 1 OF 1

24 JUN 66

B 2010756

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205			WB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
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5. UNLESS OTHERWISE SPECIFIED:
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   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\surd}$.
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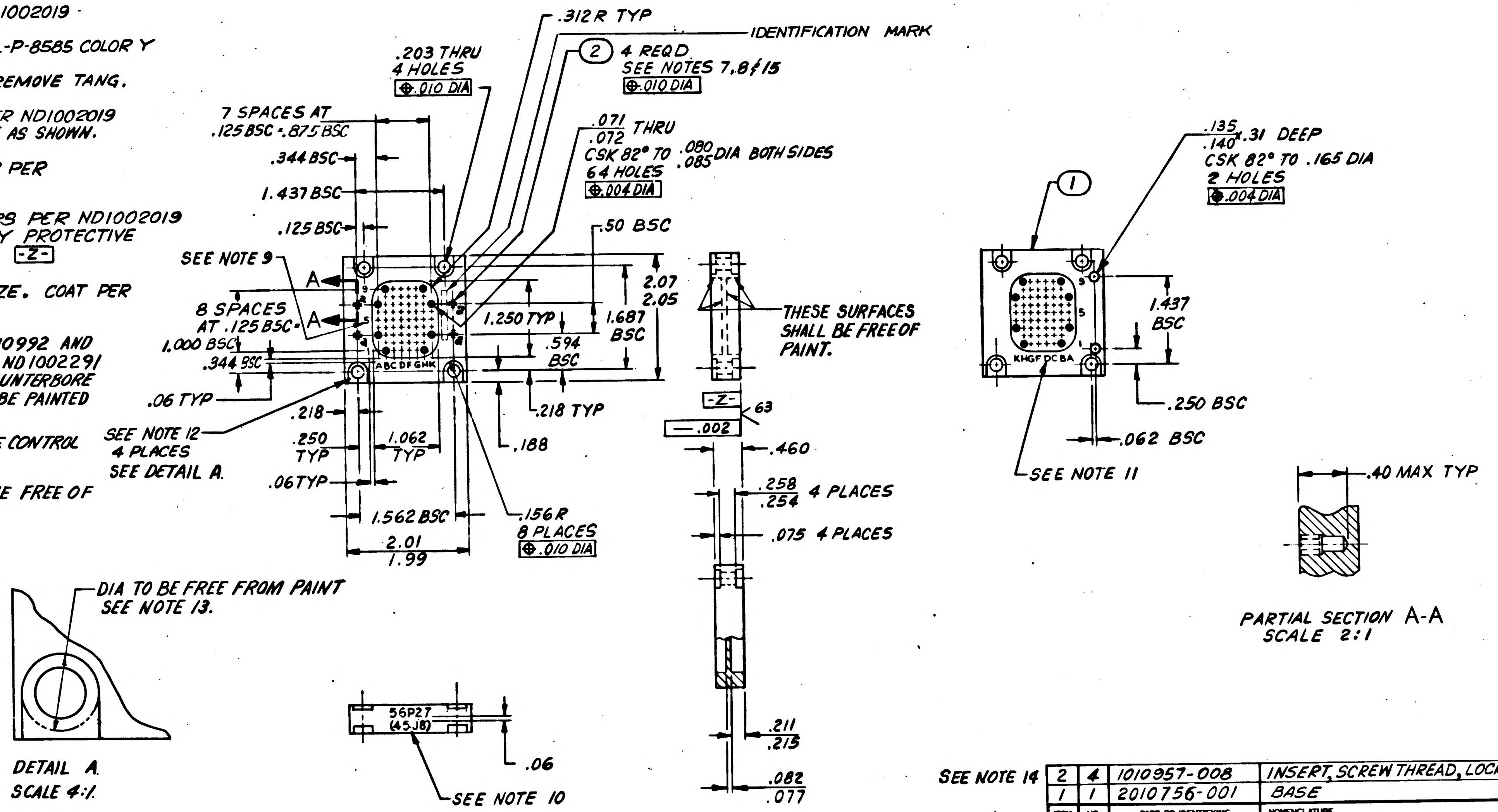
13. PAINT PER ND 1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003, ALL HOLES AND COUNTERBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED a MUST BE FREE OF ANODIZE AND PAINT


.312 R TYP
IDENTIFICATION MARK
.203 THRU 4 HOLES ⊕ .010 DIA
② 4 REQD SEE NOTES 7,8 & 15 ⊕ .010 DIA
7 SPACES AT .125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
.071/.072 THRU CSK 82° TO .080/.085 DIA BOTH SIDES 64 HOLES ⊕ .004 DIA
.50 BSC
SEE NOTE 9
A
A
8 SPACES AT .125 BSC
1.000 BSC
.344 BSC
.06 TYP
9
5
ABCDFGHK
1.250 TYP
.594 BSC
1.687 BSC
2.07 2.05
.218 TYP
.188
SEE NOTE 12 4 PLACES SEE DETAIL A.
.218
.250 TYP
1.062 TYP
.06 TYP
1.562 BSC
2.01 1.99
.156 R 8 PLACES ⊕ .010 DIA
THESE SURFACES SHALL BE FREE OF PAINT.
-Z-
63
— .002
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
①
.135/.140 x .31 DEEP CSK 82° TO .165 DIA 2 HOLES ⊕ .004 DIA
1.437 BSC
KHGFDCBA
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
DIA TO BE FREE FROM PAINT SEE NOTE 13.
56P27 (45J8)
.06
SEE NOTE 10

DETAIL A
SCALE 4:1

PARTIAL SECTION A-A
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010756-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014748	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS ±.02 ±.005 ANGLES + 2° −
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.W. Turner 17 JUL 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barta 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P27)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010756
SCALE FULL
SHEET 1 OF 1

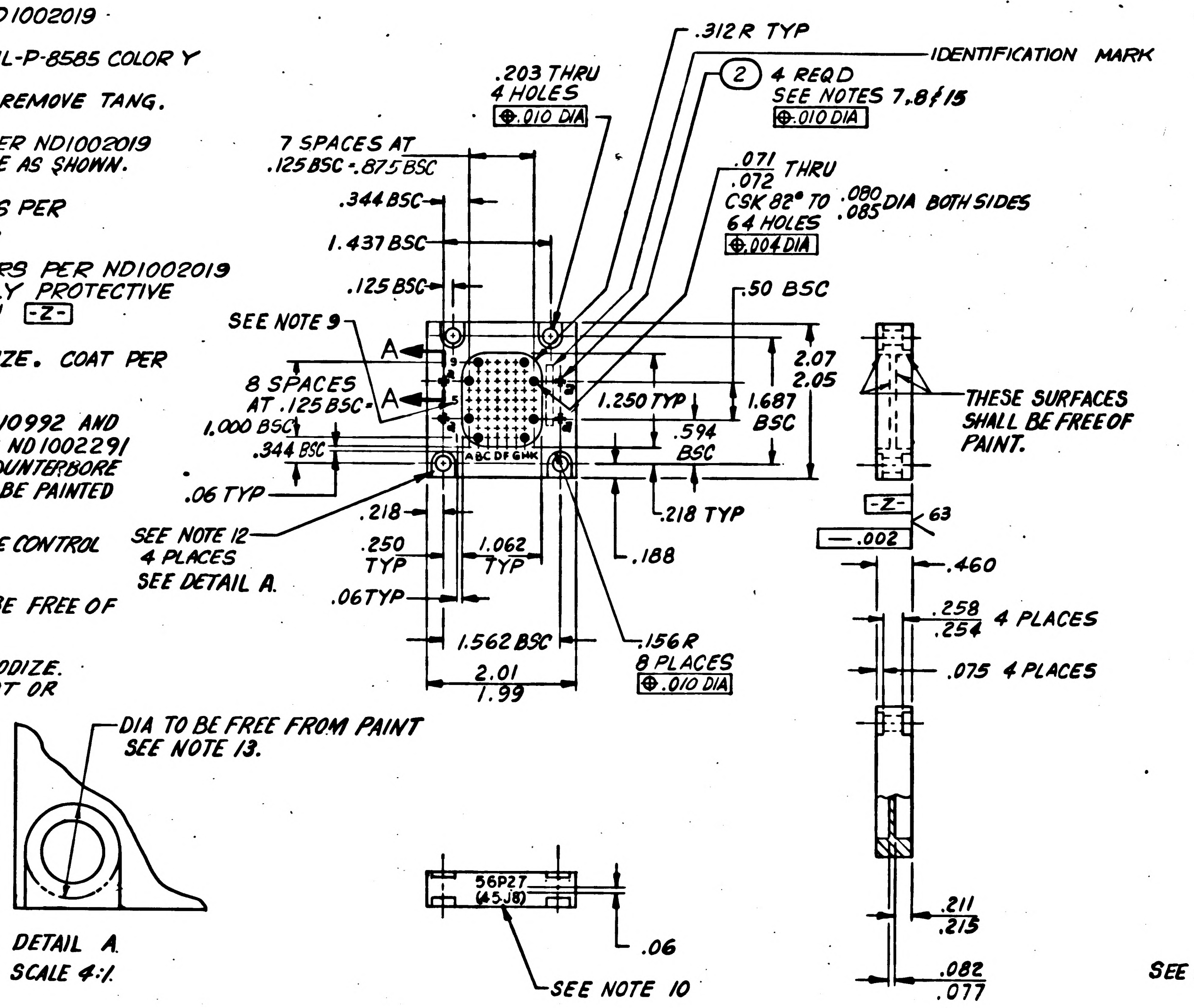
24 JUN 66

2010756

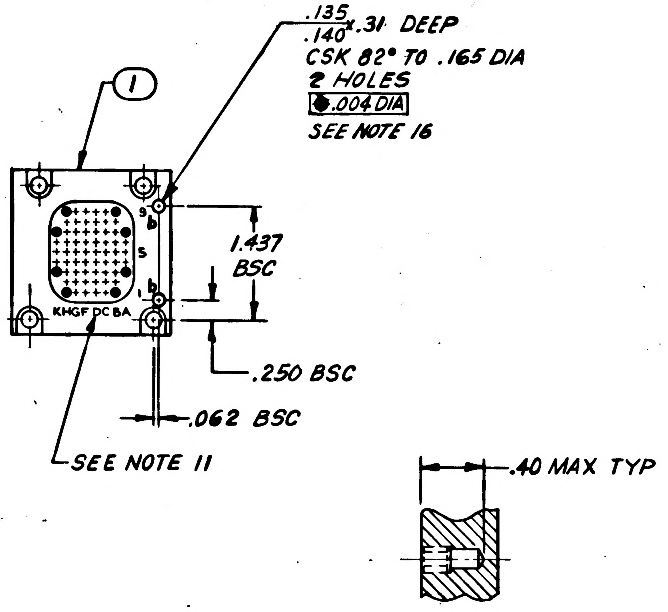
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND 1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND 1002291 TYPE III PAINT 1012543-003, ALL HOLES AND COUNTERBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION OR SOURCE CONTROL DRAWING.
15. ALL THREADED HOLES MARKED a MUST BE FREE OF ANODIZE AND PAINT
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205			WB
C		REVISED PER TDRR 32679		24 JAN 67	NE M.W.



.203 THRU
4 HOLES
⊕ .010 DIA
7 SPACES AT
.125 BSC - .875 BSC
.344 BSC
1.437 BSC
.125 BSC
SEE NOTE 9
A
8 SPACES
AT .125 BSC
A
1.000 BSC
.344 BSC
.06 TYP
.218
SEE NOTE 12
4 PLACES
SEE DETAIL A.
.250
TYP
1.062
TYP
.06 TYP
1.562 BSC
2.01
1.99
.312 R TYP
② 4 REQD
SEE NOTES 7,8 & 15
⊕ .010 DIA
.071
.072 THRU
CSK 82° TO .080/.085 DIA BOTH SIDES
64 HOLES
⊕ .004 DIA
IDENTIFICATION MARK
.50 BSC
2.07
2.05
1.250 TYP
1.687
BSC
.594
BSC
.218 TYP
.188
.156 R
8 PLACES
⊕ .010 DIA
ABC DF GMK
THESE SURFACES SHALL BE FREE OF PAINT.
-Z-
— .002
63
.460
.258
.254 4 PLACES
.075 4 PLACES
.211
.215
.082
.077
56P27
(45J8)
.06
SEE NOTE 10
DIA TO BE FREE FROM PAINT
SEE NOTE 13.
DETAIL A
SCALE 4:1



①
.135
.140 x .31 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕ .004 DIA
SEE NOTE 16
1.437
BSC
.250 BSC
.062 BSC
KHGF DC BA
SEE NOTE 11
.40 MAX TYP

PARTIAL SECTION A-A
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010756-001	BASE

LIST OF PARTS AND MATERIALS

2014748	2014567
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	+ 2°
−	±.005	−

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.W. Turner DATE 17 JUL 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barto 24 Jun 66
APPROVAL 9 Sept 66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P27)
(INSEPARABLE ASSEMBLY)

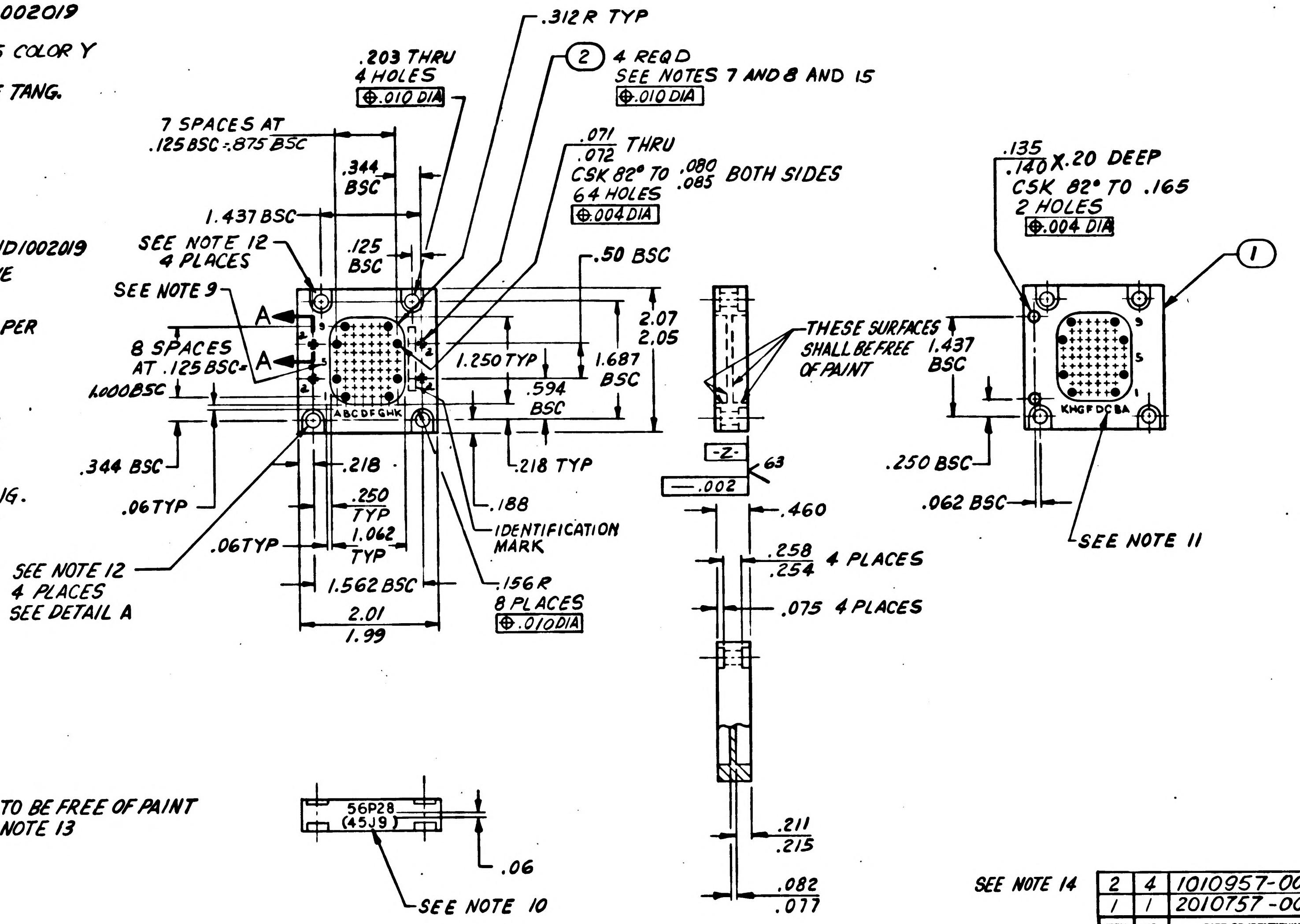
CODE IDENT NO. 80230
SIZE D
2010756
SCALE FULL
SHEET 1 OF 1

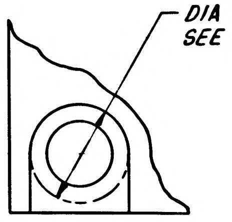
24 JUN 66

2010756 C

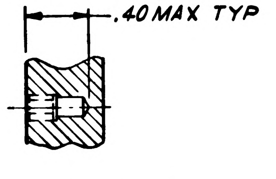
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
10. MARK .100-.140 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
11. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT
13. PAINT PER ND 1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND 1002291 TYPE III PAINT 1012543-003. ALL HOLES AND C'BORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.


.312 R TYP
.203 THRU
4 HOLES
⊕ .010 DIA
② 4 REQD
SEE NOTES 7 AND 8 AND 15
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
.071
.072 THRU
CSK 82° TO .080 .085 BOTH SIDES
64 HOLES
⊕ .004 DIA
1.437 BSC
SEE NOTE 12
4 PLACES
.125 BSC
.50 BSC
SEE NOTE 9
A
A
8 SPACES
AT .125 BSC = 1.000 BSC
2.07
2.05
1.250 TYP
1.687 BSC
.594 BSC
ABCDEFGHK
.344 BSC
.218
.218 TYP
.06 TYP
.250 TYP
.188
IDENTIFICATION MARK
.06 TYP
1.062 TYP
1.562 BSC
.156 R
8 PLACES
⊕ .010 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
2.01
1.99
THESE SURFACES SHALL BE FREE OF PAINT
-Z-
63
— .002
.460
.258
.254 4 PLACES
.075 4 PLACES
.211
.215
.082
.077
56P28
(45J9)
.06
SEE NOTE 10
.135
.140 X .20 DEEP
CSK 82° TO .165
2 HOLES
⊕ .004 DIA
①
1.437 BSC
KHGFEDCBA
.250 BSC
.062 BSC
SEE NOTE 11


DIA TO BE FREE OF PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1



PARTIAL SECTION A-A
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010757-001	BASE

LIST OF PARTS AND MATERIALS

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR [illegible]		5 JULY 66	

NEXT ASSY	USED ON
2014746	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J. Patterson DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL L. Barta 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/23/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P28)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010757
SCALE FULL
SHEET 1 OF 1

24 JUN 66

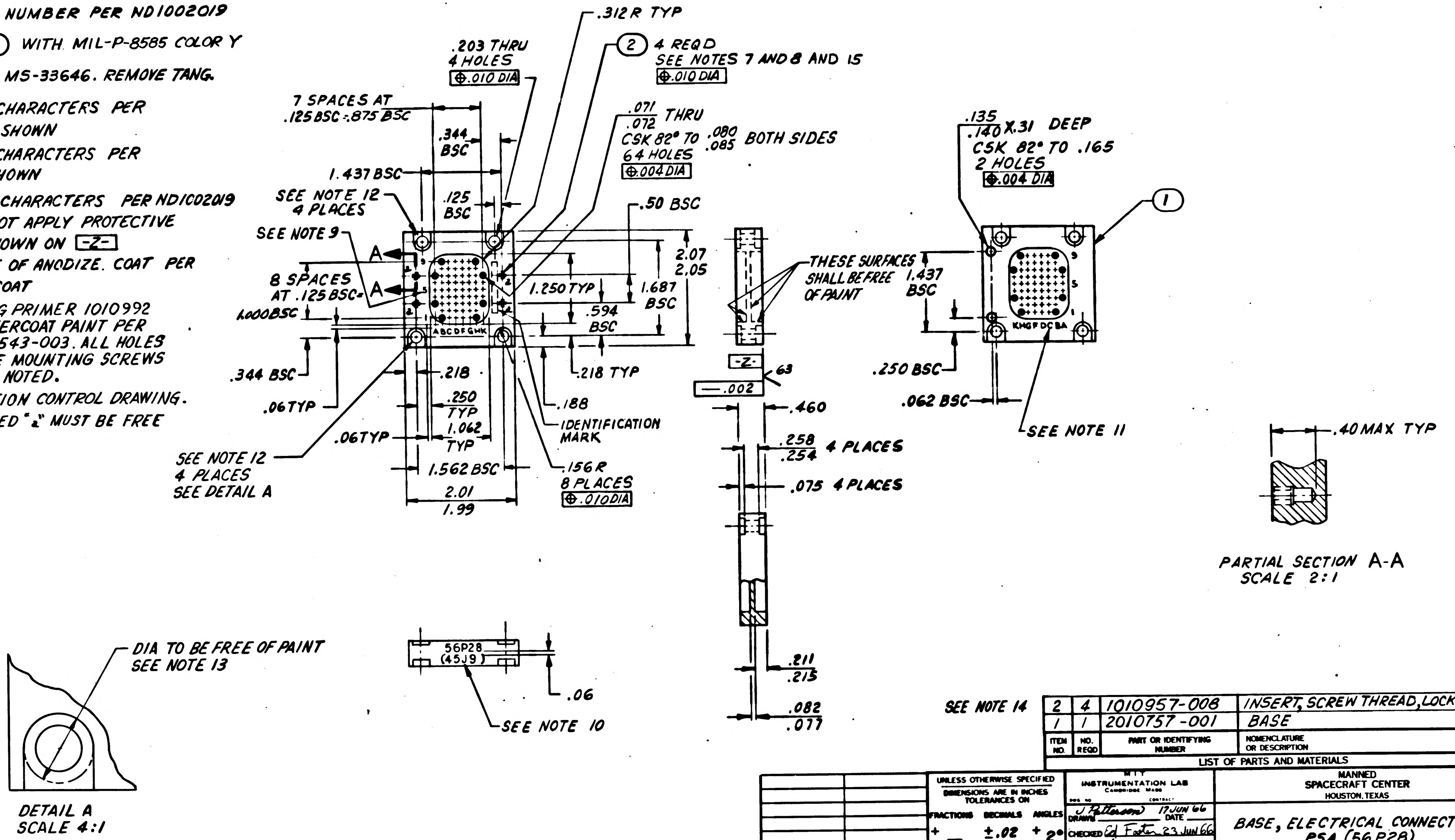
2010757

B. 2010757

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 3 1		5 JULY 66	
B		REVISED PER TDRR 31205		4 OCT 66	JB D/W

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
10. MARK .100-.140 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
11. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT
13. PAINT PER ND 1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND 1002291 TYPE III PAINT 1012543-003. ALL HOLES AND C'BORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.


.312 R TYP
.203 THRU
4 HOLES
⊕ .010 DIA
② 4 REQD
SEE NOTES 7 AND 8 AND 15
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
1.437 BSC
.125 BSC
SEE NOTE 12
4 PLACES
SEE NOTE 9
A
8 SPACES
AT .125 BSC =
1.000 BSC
.071
.072 THRU
CSK 82° TO .080
.085 BOTH SIDES
64 HOLES
⊕ .004 DIA
.50 BSC
2.07
2.05
1.250 TYP
1.687 BSC
.594 BSC
.344 BSC
.218
.218 TYP
.06 TYP
.250 TYP
.188
1.062 TYP
IDENTIFICATION MARK
.06 TYP
1.562 BSC
.156 R
8 PLACES
⊕ .010 DIA
2.01
1.99
SEE NOTE 12
4 PLACES
SEE DETAIL A
THESE SURFACES SHALL BE FREE OF PAINT
-Z-
63
— .002
.460
.258
.254 4 PLACES
.075 4 PLACES
.211
.215
.082
.077
.135
.140 X .31 DEEP
CSK 82° TO .165
2 HOLES
⊕ .004 DIA
①
1.437 BSC
.250 BSC
.062 BSC
SEE NOTE 11
.40 MAX TYP
PARTIAL SECTION A-A
SCALE 2:1
DIA TO BE FREE OF PAINT
SEE NOTE 13
DETAIL A
SCALE 4:1
56P28
(45J9)
.06
SEE NOTE 10

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010757-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014746	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ — -	± .02 ± .005	+ 2° -

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J. Patterson DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL L. Barta 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/23/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P28)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010757
SCALE FULL
SHEET 1 OF 1

24 JUN 66

2010757

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ 31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125/√.
6. IDENTIFY USING DRAWING NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .060-.100 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
10. MARK .100-.140 HIGH BLACK CHARACTERS PER ND1002019, CENTRALIZE AS SHOWN
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12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT
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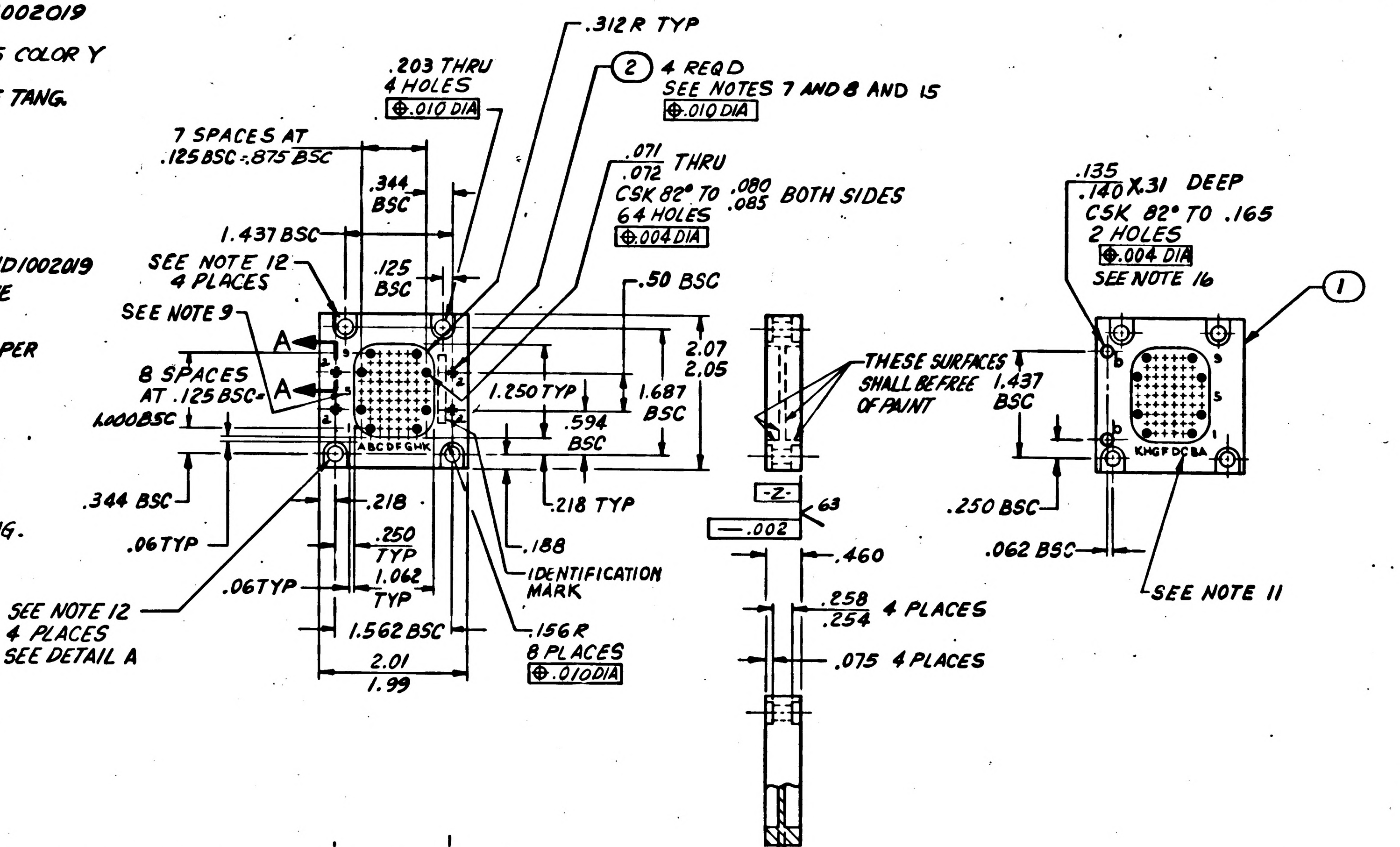
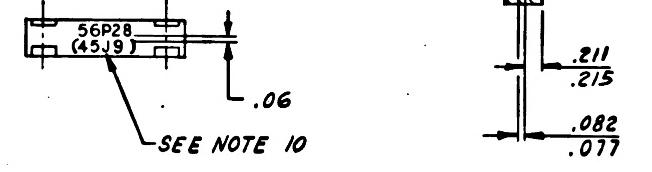
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.

REVISIONS

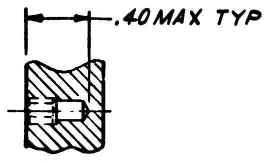
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		4 OCT 66	JJB D/W
C		REVISED PER TDRR 32679		24 JAN 67	NE D.W.



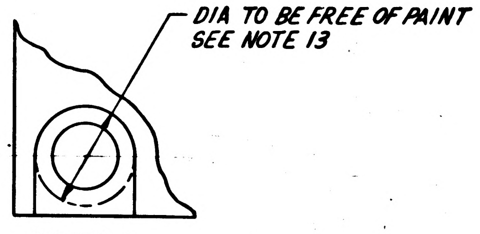
.312 R TYP
.203 THRU
4 HOLES
⊕ .010 DIA
② 4 REQD
SEE NOTES 7 AND 8 AND 15
⊕ .010 DIA
7 SPACES AT
.125 BSC = .875 BSC
.344 BSC
.071
.072 THRU
CSK 82° TO .080 .085 BOTH SIDES
64 HOLES
⊕ .004 DIA
1.437 BSC
SEE NOTE 12
4 PLACES
.125 BSC
.50 BSC
SEE NOTE 9
A
A
8 SPACES
AT .125 BSC = 1.000 BSC
1.250 TYP
1.687 BSC
2.07
2.05
.594 BSC
A B C D F G H K
.344 BSC
.06 TYP
.06 TYP
.218
.218 TYP
.250 TYP
1.062 TYP
.188
IDENTIFICATION MARK
1.562 BSC
2.01
1.99
.156 R
8 PLACES
⊕ .010 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
THESE SURFACES SHALL BE FREE OF PAINT
-Z-
63
— .002
.460
.258
.254 4 PLACES
.075 4 PLACES
.135
.140 X .31 DEEP
CSK 82° TO .165
2 HOLES
⊕ .004 DIA
SEE NOTE 16
①
1.437 BSC
.250 BSC
.062 BSC
K H G F D C B A
SEE NOTE 11



56P28
(45J9)
.06
SEE NOTE 10
.211
.215
.082
.077



PARTIAL SECTION A-A
SCALE 2:1



DIA TO BE FREE OF PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010757-001	BASE

SEE NOTE 14

LIST OF PARTS AND MATERIALS

2014746	2014567
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Patterson DATE 17 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barton 24 JUN 66
APPROVAL 9 Sep 66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/23/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P28) (INSEPARABLE ASSEMBLY)

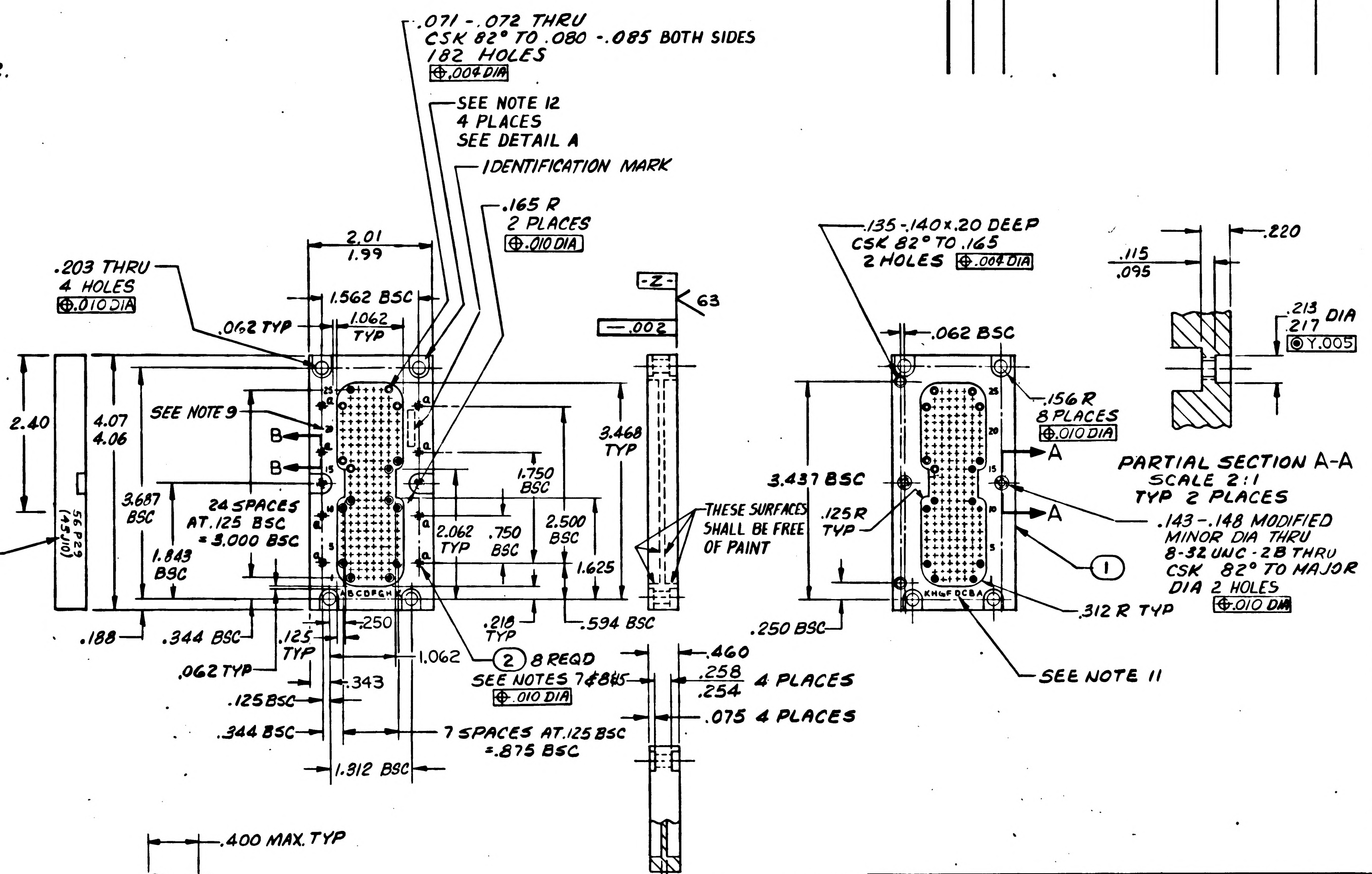
CODE IDENT NO. 80230
SIZE D
2010757
SCALE FULL
SHEET 1 OF 1

24 JUN 66

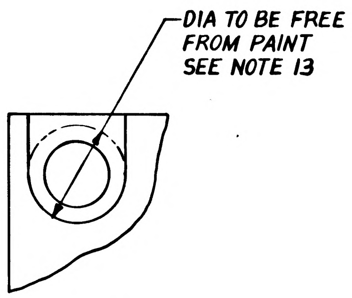
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

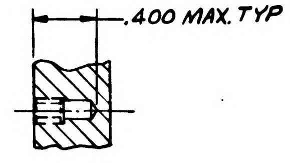
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   - A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   - B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt[125]{}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS33646 REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND 1002019. UNLESS OTHERWISE SPECIFIED, CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-.
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.


.071-.072 THRU
CSK 82° TO .080-.085 BOTH SIDES
182 HOLES
⊕.004 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
IDENTIFICATION MARK
.165 R
2 PLACES
⊕.010 DIA
.203 THRU
4 HOLES
⊕.010 DIA
2.01
1.99
1.562 BSC
.062 TYP
1.062
TYP
-Z-
63
—.002
2.40
4.07
4.06
SEE NOTE 9
B
B
3.687
BSC
24 SPACES
AT .125 BSC
=3.000 BSC
1.843
BSC
SEE NOTE 10
56 P29
(45J10)
3.468
TYP
1.750
BSC
2.062
TYP
.750
BSC
2.500
BSC
1.625
THESE SURFACES
SHALL BE FREE
OF PAINT
.188
.344 BSC
.125
TYP
.250
.062 TYP
1.062
.343
.125 BSC
.344 BSC
7 SPACES AT .125 BSC
=.875 BSC
1.312 BSC
.218
TYP
.594 BSC
② 8 REQD
SEE NOTES 7 & 8 & 15
⊕.010 DIA
.460
.258
.254
4 PLACES
.075 4 PLACES
.211
.215
.082
.077
.135-.140 x .20 DEEP
CSK 82° TO .165
2 HOLES ⊕.004 DIA
.062 BSC
3.437 BSC
.125 R
TYP
.156 R
8 PLACES
⊕.010 DIA
A
A
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B THRU
CSK 82° TO MAJOR
DIA 2 HOLES
⊕.010 DIA
①
.312 R TYP
.250 BSC
SEE NOTE 11
ABCDEFGHK
KHGFDCBA
25
20
15
10
5
a
.220
.115
.095
.213
.217
DIA
◎Y.005

PARTIAL SECTION A-A
SCALE 2:1
TYP 2 PLACES


DIA TO BE FREE
FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1



PARTIAL SECTION B-B
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THD, LOCKING
1	1	2010758-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014747	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN L Kealy 16 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barta 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P29) (INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010758
SCALE FULL
SHEET 1 OF 1

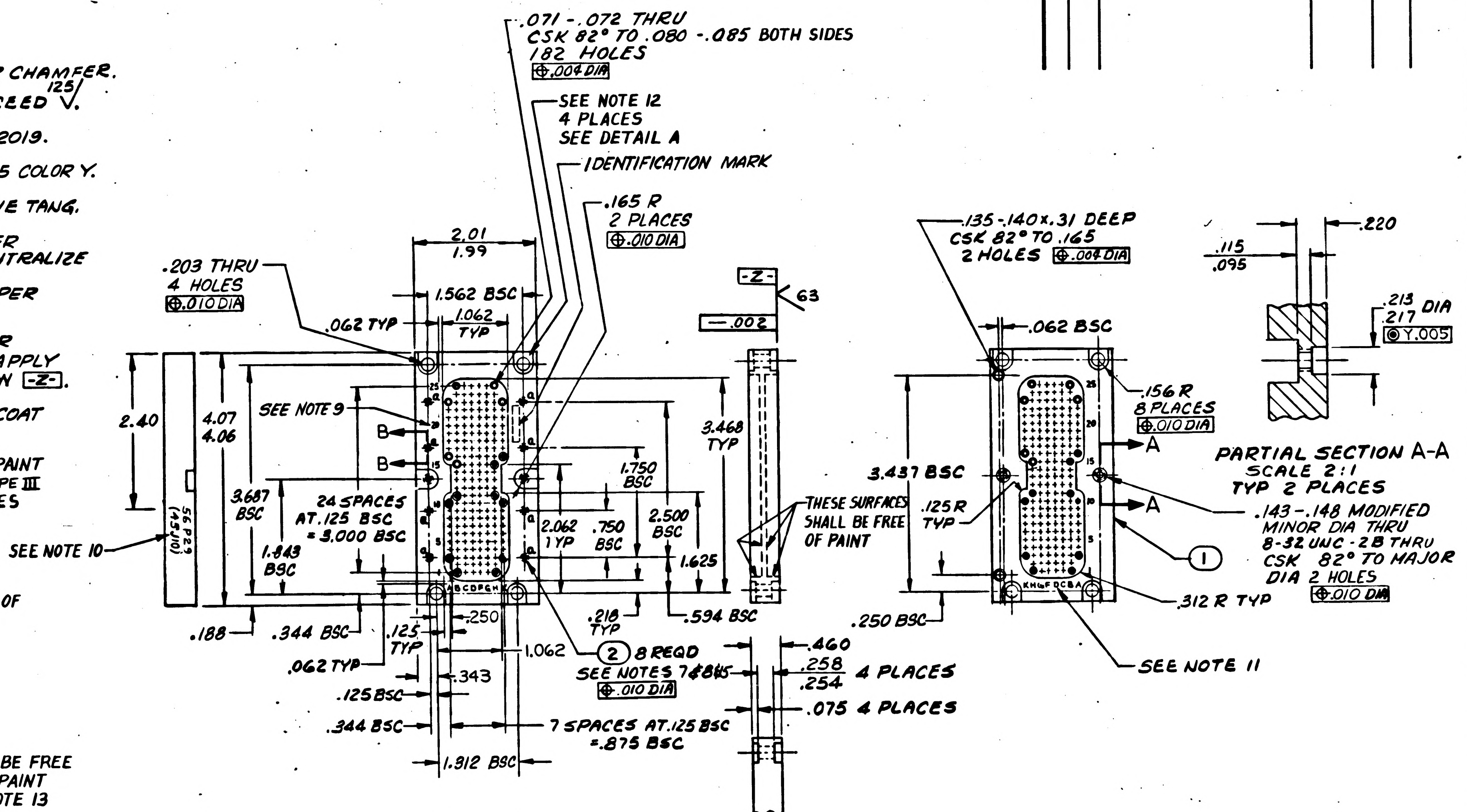
24 JUN 66

2010758

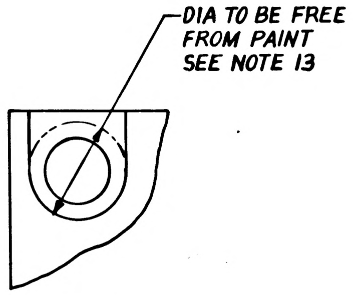
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10-4-66	JUB

NOTES:

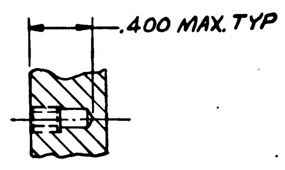
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\surd}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS33646 REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND 1002019. UNLESS OTHERWISE SPECIFIED, CENTRALIZE AS SHOWN.
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-.
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.


.071-.072 THRU
CSK 82° TO .080-.085 BOTH SIDES
182 HOLES
⊕ .004 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
IDENTIFICATION MARK
.165 R
2 PLACES
⊕ .010 DIA
2.01
1.99
1.562 BSC
1.062
TYP
.203 THRU
4 HOLES
⊕ .010 DIA
.062 TYP
-Z-
63
—.002
2.40
4.07
4.06
SEE NOTE 9
B
B
3.687
BSC
24 SPACES
AT .125 BSC
= 3.000 BSC
1.843
BSC
SEE NOTE 10
56P29
(2010758)
1.750
BSC
2.062
TYP
.750
BSC
2.500
BSC
3.468
TYP
1.625
.594 BSC
.188
.344 BSC
.125
TYP
.250
.062 TYP
.343
1.062
.125 BSC
.344 BSC
.218
TYP
② 8 REQD
SEE NOTES 7 & 8
⊕ .010 DIA
7 SPACES AT .125 BSC
= .875 BSC
1.912 BSC
.460
.258
.254
4 PLACES
.075 4 PLACES
.211
.215
.082
.077
THESE SURFACES SHALL BE FREE OF PAINT
.135-.140 x .31 DEEP
CSK 82° TO .165
2 HOLES
⊕ .004 DIA
.062 BSC
.156 R
8 PLACES
⊕ .010 DIA
3.437 BSC
.125 R
TYP
.250 BSC
A
A
①
.312 R TYP
SEE NOTE 11
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B THRU
CSK 82° TO MAJOR
DIA 2 HOLES
⊕ .010 DIA
.115
.095
.220
.213
.217
DIA
◎ Y .005

PARTIAL SECTION A-A
SCALE 2:1
TYP 2 PLACES


DIA TO BE FREE
FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1



PARTIAL SECTION B-B
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THD, LOCKING
1	1	2010758-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014747	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN L Keahy DATE 16 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Baxter 24 JUN 66
APPROVAL 9 Sept '66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/24/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P29)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO.	SIZE	
80230	D	2010758
SCALE FULL		SHEET 1 OF 1

24 JUN 66

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
REVISIONS					
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10-4-66	JUB
C		REVISED PER TDRR 32679		24 JAN 67	ME M.W.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   - A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   - B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y.
8. INSTALL ITEM ② WET PER MS33646 REMOVE TANG.
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND 1002019. UNLESS OTHERWISE SPECIFIED, CENTRALIZE AS SHOWN.
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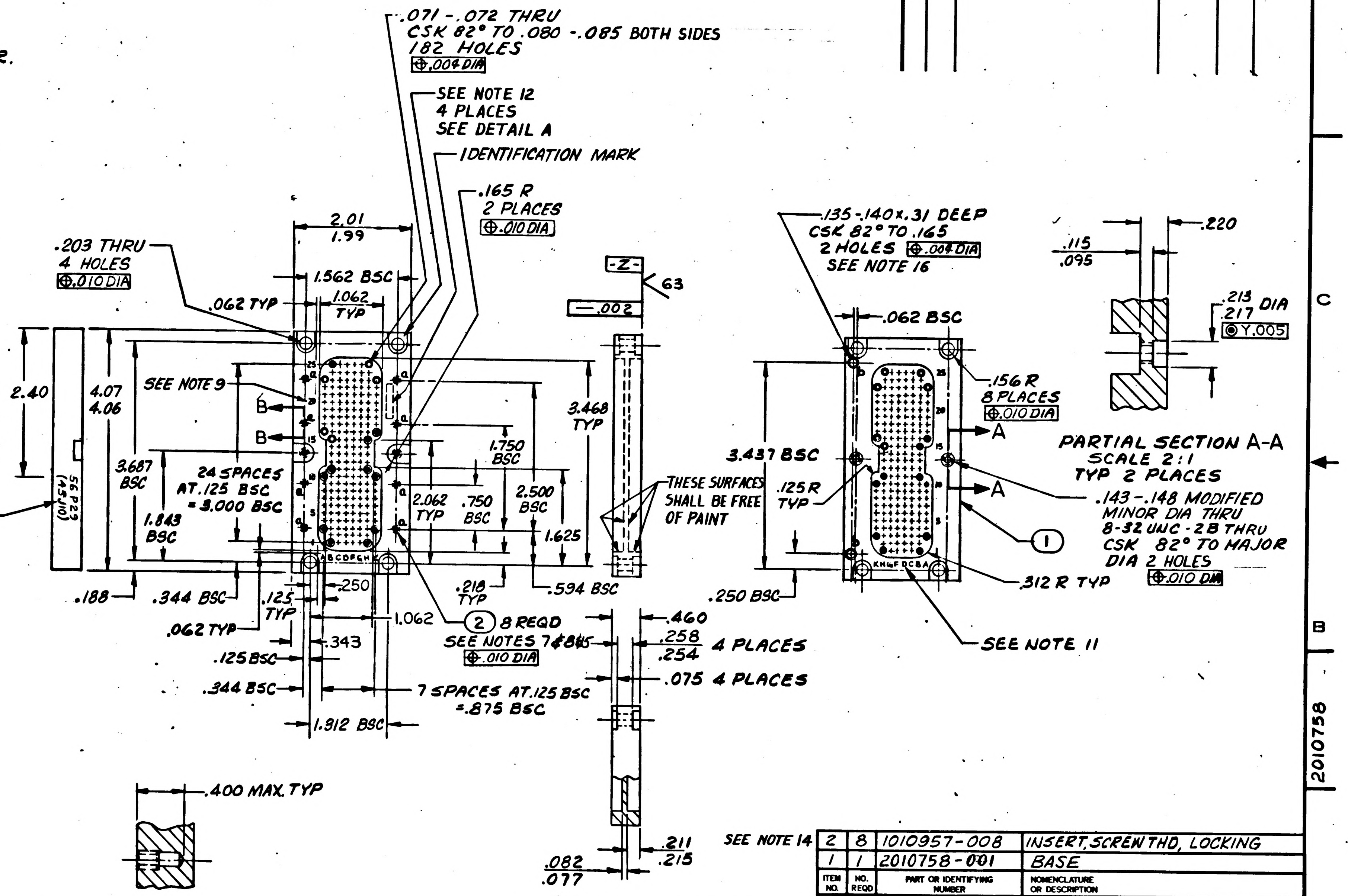
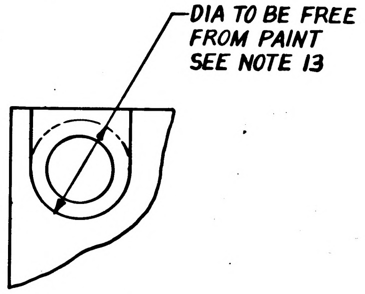
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT.
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.
16. ALL HOLES MARKED b MUST BE FREE OF ANODIZE. COAT PER ND 1002040. DO NOT EPOXY COAT OR PAINT HOLES.
17. TOUCH UP, EXCLUDING CORROSION, PER ND 1002040.


.071 - .072 THRU
CSK 82° TO .080 - .085 BOTH SIDES
182 HOLES
⊕ .004 DIA
SEE NOTE 12
4 PLACES
SEE DETAIL A
IDENTIFICATION MARK
.165 R
2 PLACES
⊕ .010 DIA
.203 THRU
4 HOLES
⊕ .010 DIA
2.01
1.99
1.562 BSC
.062 TYP
1.062
TYP
-Z-
63
— .002
2.40
4.07
4.06
SEE NOTE 9
B
B
3.687
BSC
24 SPACES
AT .125 BSC
= 3.000 BSC
1.843
BSC
56 P29
(45J10)
SEE NOTE 10
3.468
TYP
1.750
BSC
2.062
TYP
.750
BSC
2.500
BSC
1.625
THESE SURFACES SHALL BE FREE OF PAINT
.188
.344 BSC
.125
TYP
.250
.062 TYP
.343
1.062
.125 BSC
.344 BSC
1.312 BSC
7 SPACES AT .125 BSC
= .875 BSC
.218
TYP
.594 BSC
② 8 REQD
SEE NOTES 7 & 8
⊕ .010 DIA
.460
.258
.254
4 PLACES
.075 4 PLACES
.211
.215
.082
.077
.135 - .140 x .31 DEEP
CSK 82° TO .165
2 HOLES
⊕ .004 DIA
SEE NOTE 16
.062 BSC
.156 R
8 PLACES
⊕ .010 DIA
A
A
3.437 BSC
.125 R
TYP
.250 BSC
①
.143 - .148 MODIFIED
MINOR DIA THRU
8-32 UNC - 2B THRU
CSK 82° TO MAJOR
DIA 2 HOLES
⊕ .010 DIA
.312 R TYP
SEE NOTE 11
.115
.095
.220
.213
.217
DIA
◎ Y .005

PARTIAL SECTION A-A
SCALE 2:1
TYP 2 PLACES


DIA TO BE FREE
FROM PAINT
SEE NOTE 13

DETAIL A
SCALE 4:1

.400 MAX. TYP

PARTIAL SECTION B-B
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THD, LOCKING
1	1	2010758-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014747	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES +2° −
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN L Kealy DATE 16 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Baxter 24 JUN 66
APPROVAL 9 Sept '66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/24/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-
PSA (56P29)
(INSEPARABLE ASSEMBLY)

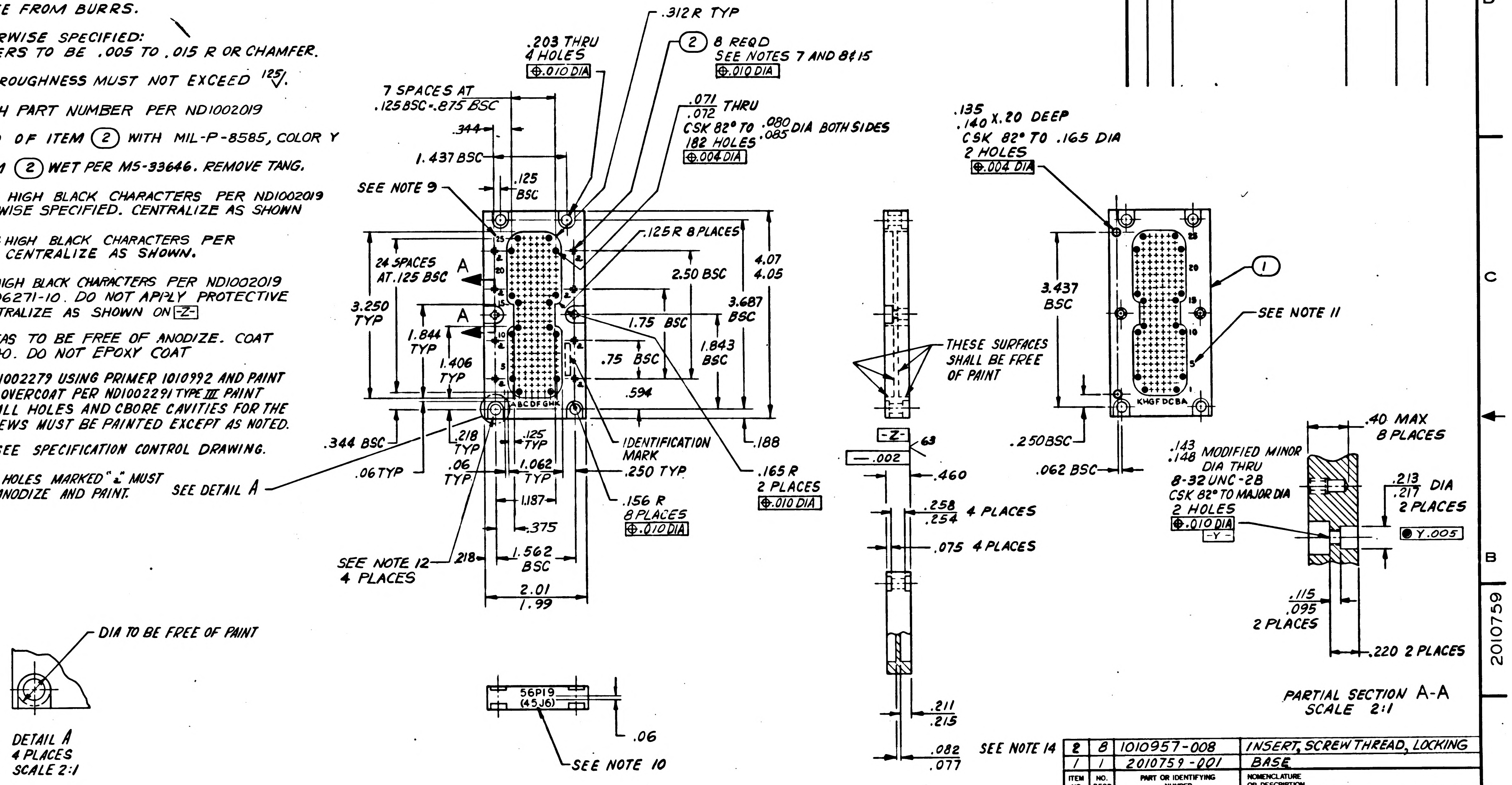
CODE IDENT NO. 80230
SIZE D
2010758
SCALE FULL
SHEET 1 OF 1

[illegible] 24 JUN 66

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ-31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $^{125}\surd$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.


SEE DETAIL A
.312R TYP
.203 THRU
4 HOLES
⊕.010 DIA
② 8 REQD
SEE NOTES 7 AND 8 & 15
⊕.010 DIA
7 SPACES AT
.125 BSC-.875 BSC
.344
1.437 BSC
.125 BSC
SEE NOTE 9
.071/.072 THRU
CSK 82° TO .080/.085 DIA BOTH SIDES
182 HOLES
⊕.004 DIA
.125R 8 PLACES
24 SPACES AT .125 BSC
A
A
3.250 TYP
1.844 TYP
1.406 TYP
2.50 BSC
4.07/4.05
3.687 BSC
1.75 BSC
1.843 BSC
.75 BSC
.594
.344 BSC
.218 TYP
.06 TYP
.06 TYP
.125 TYP
1.062 TYP
1.187
.375
1.562 BSC
2.01/1.99
.218
SEE NOTE 12
4 PLACES
IDENTIFICATION MARK
.250 TYP
.156 R
8 PLACES
⊕.010 DIA
.165 R
2 PLACES
⊕.010 DIA
.188
THESE SURFACES SHALL BE FREE OF PAINT
-Z-
.63
—.002
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P19
(45J6)
.06
SEE NOTE 10
DIA TO BE FREE OF PAINT
DETAIL A
4 PLACES
SCALE 2:1
.135/.140 X .20 DEEP
CSK 82° TO .165 DIA
2 HOLES
⊕.004 DIA
3.437 BSC
①
SEE NOTE 11
.250 BSC
.062 BSC
.143/.148 MODIFIED MINOR DIA THRU
8-32 UNC-2B
CSK 82° TO MAJOR DIA
2 HOLES
⊕.010 DIA
-Y-
.40 MAX
8 PLACES
.213/.217 DIA
2 PLACES
◉ Y .005
.115/.095
2 PLACES
.220 2 PLACES
PARTIAL SECTION A-A
SCALE 2:1
2010759

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010759-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014743	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − −
DECIMALS ±.02 ±.005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Klinger DATE 20 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Basta 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

24 JUN 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

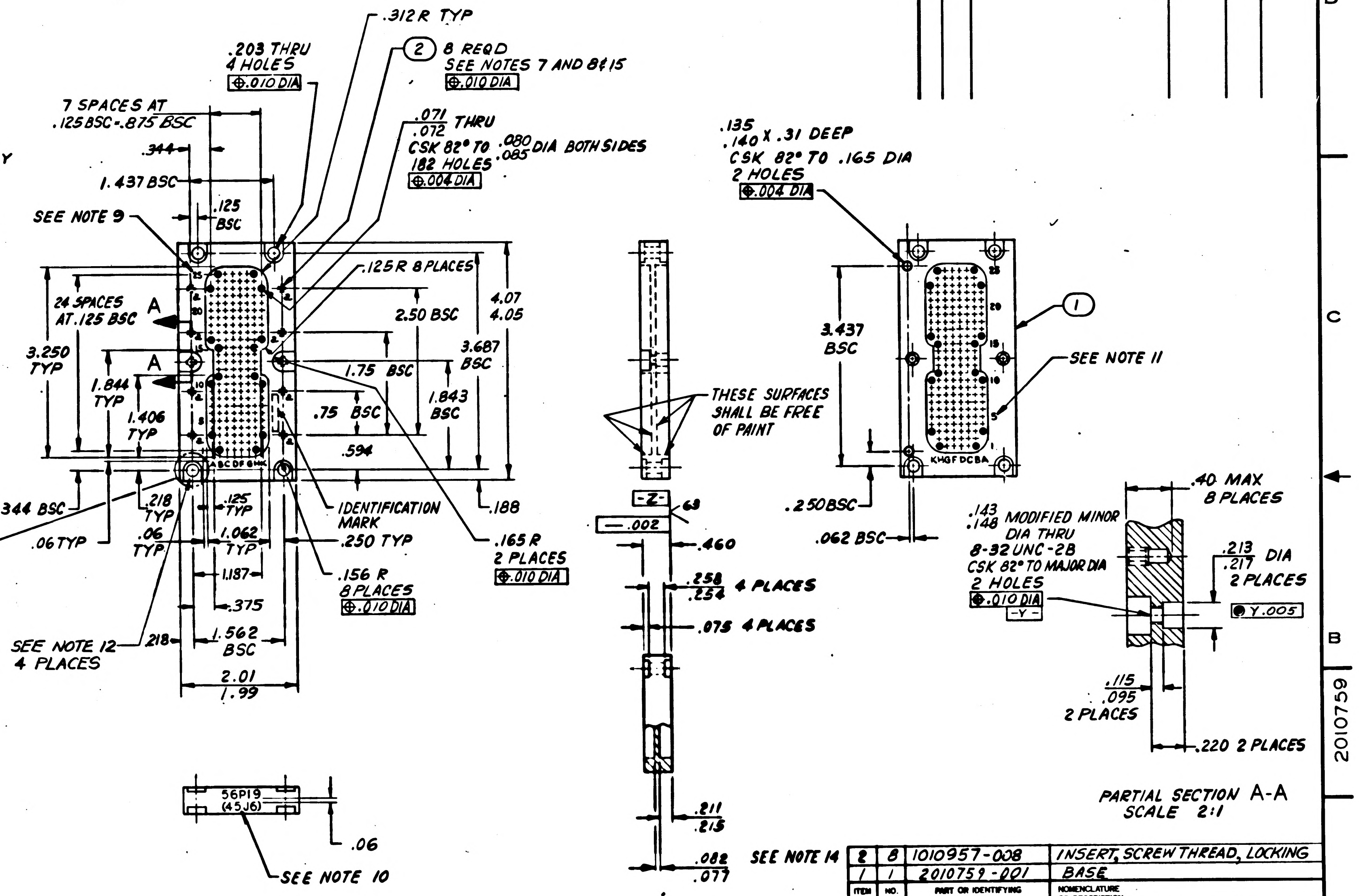
BASE, ELECTRICAL CONNECTOR-
PSA (56P19)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010759
SCALE FULL
SHEET 1 OF 1

NOTES:

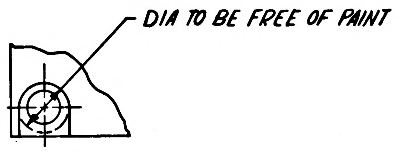
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ-31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt{}^{125}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646. REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 UNLESS OTHERWISE SPECIFIED. CENTRALIZE AS SHOWN
10. MARK .10/.14 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
11. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
12. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT
13. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT. SEE DETAIL A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31205		10-4-66	WB



.312 R TYP
.203 THRU 4 HOLES ⊕.010 DIA
② 8 REQD SEE NOTES 7 AND 8 & 15 ⊕.010 DIA
7 SPACES AT .125 BSC-.875 BSC
.344
1.437 BSC
.125 BSC
SEE NOTE 9
.071/.072 THRU CSK 82° TO .080/.085 DIA BOTH SIDES 182 HOLES ⊕.004 DIA
.125 R 8 PLACES
24 SPACES AT .125 BSC
A
3.250 TYP
A
2.50 BSC
4.07/4.05
3.687 BSC
1.844 TYP
1.406 TYP
1.75 BSC
.75 BSC
1.843 BSC
.594
.344 BSC
.06 TYP
.218 TYP
.06 TYP
.125 TYP
1.062 TYP
1.187
.375
IDENTIFICATION MARK
.250 TYP
.156 R 8 PLACES ⊕.010 DIA
.165 R 2 PLACES ⊕.010 DIA
.188
SEE NOTE 12 4 PLACES
.218
1.562 BSC
2.01/1.99
THESE SURFACES SHALL BE FREE OF PAINT
-Z-
.68
⊥ .002
.460
.258/.254 4 PLACES
.075 4 PLACES
.211/.215
.082/.077
56P19 (45J6)
.06
SEE NOTE 10
.135/.140 X .31 DEEP CSK 82° TO .165 DIA 2 HOLES ⊕.004 DIA
3.437 BSC
①
SEE NOTE 11
.250 BSC
.062 BSC
KHGFDCBA
.40 MAX 8 PLACES
.143/.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B CSK 82° TO MAJOR DIA 2 HOLES ⊕.010 DIA -Y-
.213/.217 DIA 2 PLACES
◉ Y .005
.115/.095 2 PLACES
.220 2 PLACES

PARTIAL SECTION A-A
SCALE 2:1



DIA TO BE FREE OF PAINT

DETAIL A
4 PLACES
SCALE 2:1

SEE NOTE 14

2	8	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010759-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

2014743	2014567
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J. Klinger 20 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D Basta 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR-PSA (56P19) (INSEPARABLE ASSEMBLY)

CODE IDENT NO.	SIZE	
80230	D	2010759
SCALE FULL		SHEET 1 OF 1

24 JUN 66

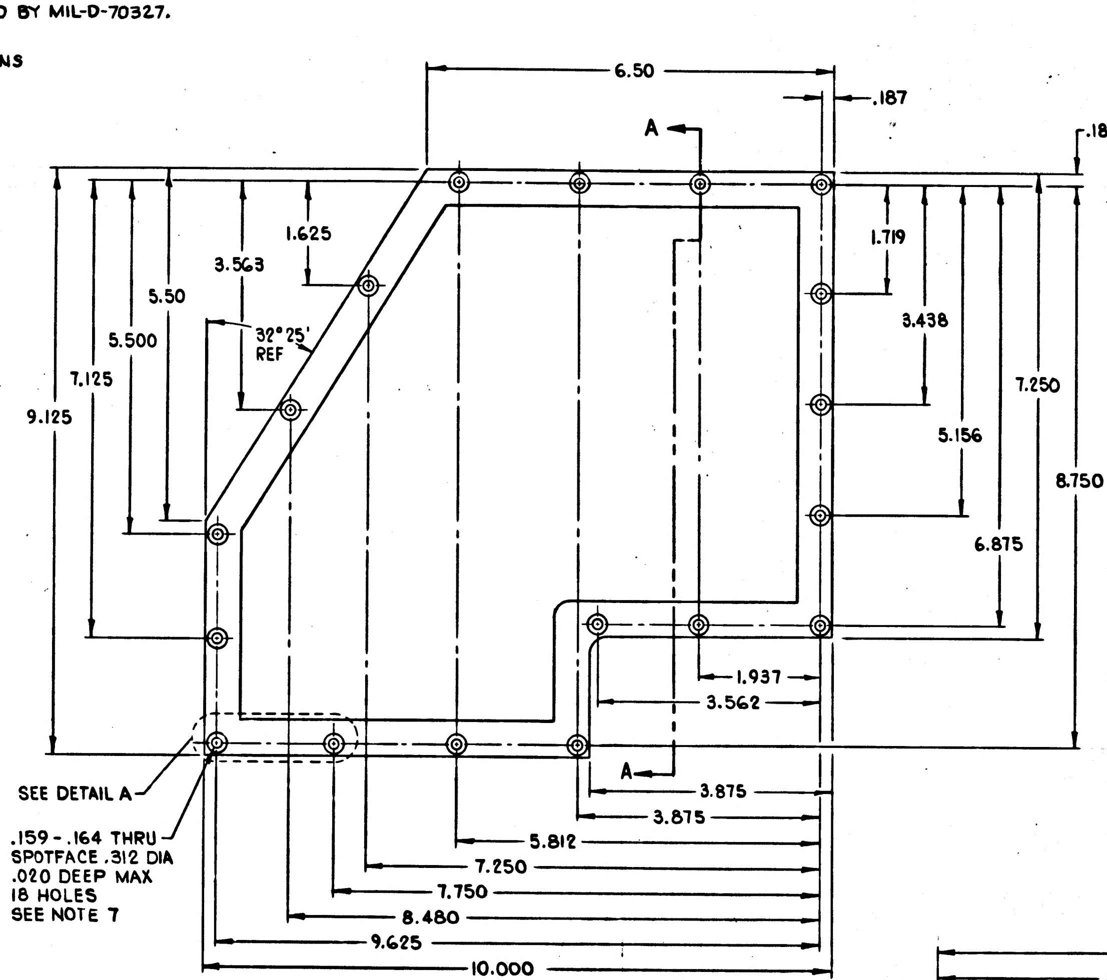
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

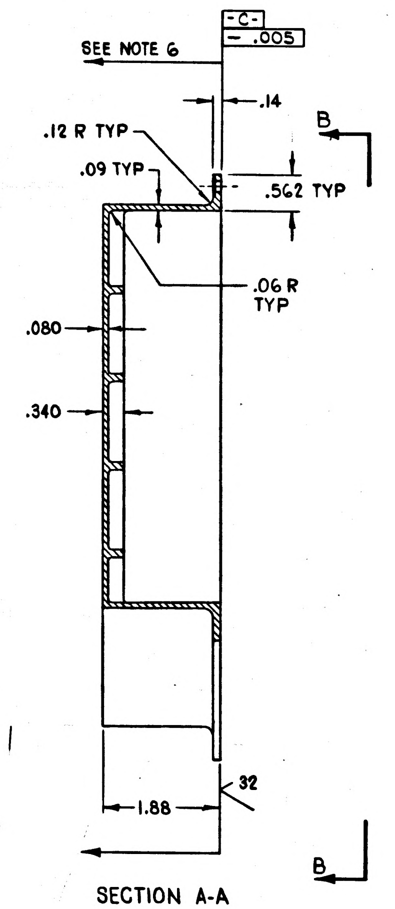
NOTES:

1 INTERPRET DRAWINGS IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY AZ-31B-H24 PER QQ-M-44 AND MEETING THE CLASS A REQUIREMENTS OF THE ALUMINIUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATE, EXTRUSIONS AND FORGINGS.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015.
4. UNLESS OTHERWISE SPECIFIED 63√ ALL OVER.
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C. TOUCH-UP, EXCLUDING CORROSION, PER ND 1002040.
6. PAINT EXTERIOR SURFACES ABOVE PLANE -C- PER ND1002279 USING PAINT 1008809-1. OVERCOAT THE 1008809-1 PAINT WITH THE 1012543-003 PAINT PER ND1002291 TYPE III, EXCEPT DO NOT USE A PRIMER. UNLESS OTHERWISE SPECIFIED ALL HOLES SHALL BE FREE OF PAINT.
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI.
8. IDENTIFY USING DRAWING NUMBER PER ND1002019.

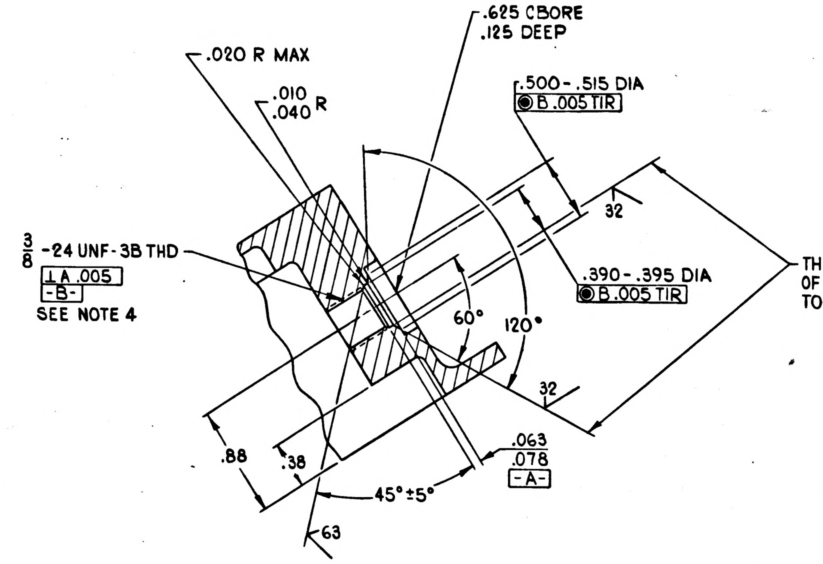
REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31182		14 JUL 66	
	B	REVISED PER TDRR 32798		3 FEB 67	ME WH


6.50
.187
.187
A
A
1.625
3.563
5.50
5.500
7.125
9.125
32°25' REF
1.719
3.438
5.156
6.875
7.250
8.750
1.937
3.562
3.875
3.875
5.812
7.250
7.750
8.480
9.625
10.000
SEE DETAIL A
.159-.164 THRU SPOTFACE .312 DIA .020 DEEP MAX 18 HOLES SEE NOTE 7

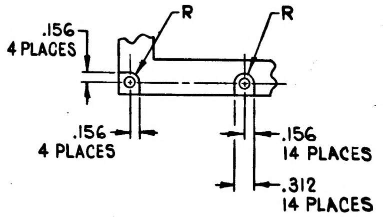

-C-
.005
SEE NOTE 6
.14
.12 R TYP
.09 TYP
.562 TYP
.06 R TYP
.080
.340
B
B
32
1.88

SECTION A-A

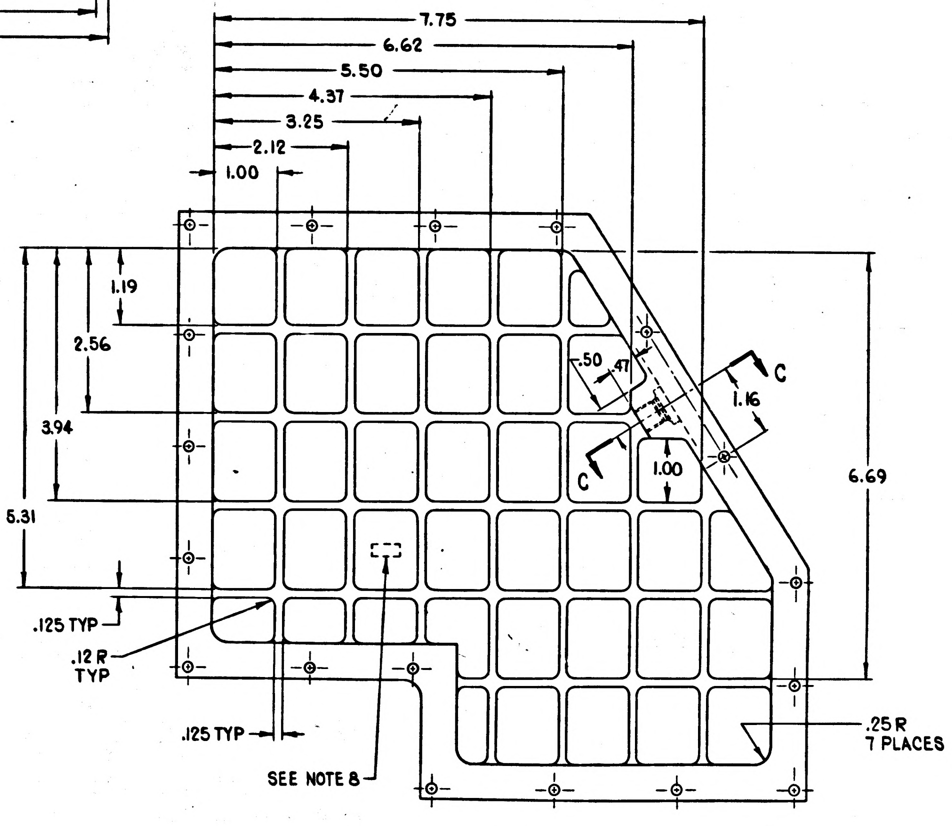

.625 CBORE .125 DEEP
.020 R MAX
.010 .040 R
.500-.515 DIA
B .005 TIR
3/8-24 UNF-3B THD
⊥ A .005
-B-
SEE NOTE 4
32
.390-.395 DIA
B .005 TIR
60°
120°
32
.063 .078
-A-
.88
.38
45°±5°
63

THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS.

SECTION C-C
SCALE: 2:1


.156 4 PLACES
R
R
.156 4 PLACES
.156 14 PLACES
.312 14 PLACES

DETAIL A
OPTIONAL


7.75
6.62
5.50
4.37
3.25
2.12
1.00
1.19
2.56
3.94
5.31
.50
.47
C
C
1.16
1.00
6.69
.125 TYP
.12 R TYP
.125 TYP
SEE NOTE 8
.25 R 7 PLACES

VIEW B-B

2007201	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .010
3 PLACE DECIMALS ± .005
ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 1
APPROVAL 20 JUN 66

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN J. Wolski DATE 20 JUN 66
CHECKED M. Manning 21 JUN 66
APPROVAL Geo. Lisedon 23 JUN 66
CONTRACT
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/24/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
PIPA ELECTRONICS

SIZE E
CODE IDENT NO. 80230
2010770
SCALE 1:1
SHEET 1 OF 1

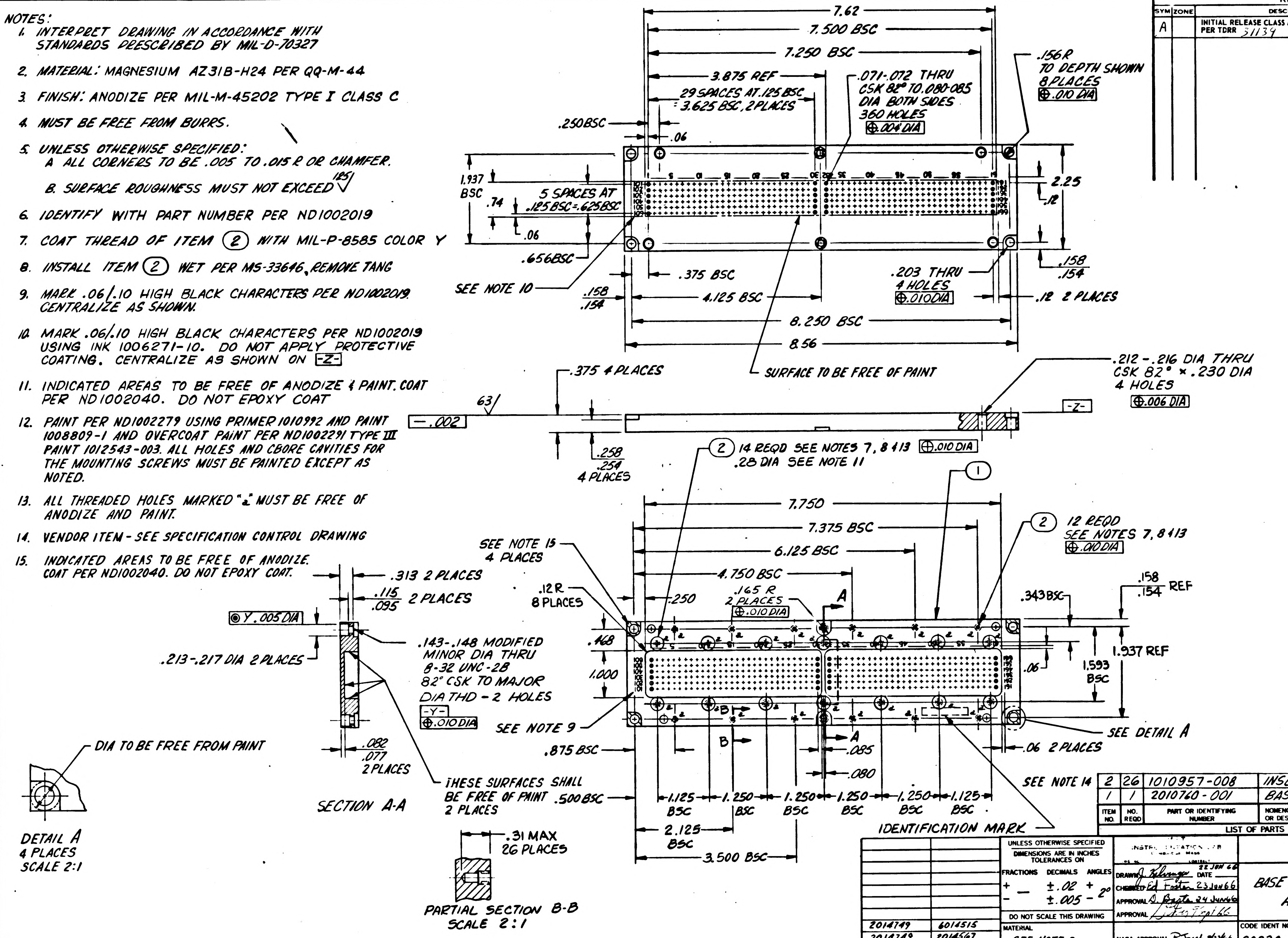
2010770

2010760

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202 TYPE I CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\surd}$
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE & PAINT. COAT PER ND1002040. DO NOT EPOXY COAT
12. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
13. ALL THREADED HOLES MARKED "a" MUST BE FREE OF ANODIZE AND PAINT.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING
15. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.



8
7
6
5
4
3
2
1
D
C
B
A
7.62
7.500 BSC
7.250 BSC
3.875 REF
29 SPACES AT .125 BSC = 3.625 BSC, 2 PLACES
.071-.072 THRU CSK 82° TO .080-.085 DIA BOTH SIDES 360 HOLES ⊕ .004 DIA
.156 R TO DEPTH SHOWN 8 PLACES ⊕ .010 DIA
.250 BSC
.06
1.937 BSC
.74
5 SPACES AT .125 BSC = .625 BSC
.06
.656 BSC
2.25
.12
SEE NOTE 10
.158 / .154
.375 BSC
4.125 BSC
.203 THRU 4 HOLES ⊕ .010 DIA
.158 / .154
.12 2 PLACES
8.250 BSC
8.56
.375 4 PLACES
SURFACE TO BE FREE OF PAINT
.212-.216 DIA THRU CSK 82° × .230 DIA 4 HOLES ⊕ .006 DIA
63
— .002
-Z-
.258 / .254 4 PLACES
② 14 REQD SEE NOTES 7, 8 & 13 ⊕ .010 DIA
.28 DIA SEE NOTE 11
①
7.750
7.375 BSC
6.125 BSC
4.750 BSC
② 12 REQD SEE NOTES 7, 8 & 13 ⊕ .010 DIA
SEE NOTE 15 4 PLACES
.12 R 8 PLACES
.250
.165 R 2 PLACES ⊕ .010 DIA
A
.343 BSC
.158 / .154 REF
.468
1.000
1.937 REF
1.593 BSC
.06
SEE NOTE 9
SEE DETAIL A
.875 BSC
B
B
A
.085
.080
.06 2 PLACES
.500 BSC
1.125 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.125 BSC
2.125 BSC
3.500 BSC
IDENTIFICATION MARK
.313 2 PLACES
.115 / .095 2 PLACES
◉ Y .005 DIA
.213-.217 DIA 2 PLACES
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B 82° CSK TO MAJOR DIA THD - 2 HOLES
-Y-
⊕ .010 DIA
.082 / .077 2 PLACES
THESE SURFACES SHALL BE FREE OF PAINT 2 PLACES
SECTION A-A
DIA TO BE FREE FROM PAINT
DETAIL A
4 PLACES
SCALE 2:1
.31 MAX 26 PLACES
PARTIAL SECTION B-B
SCALE 2:1

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	26	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010760-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014749	6014515
2014749	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES + − 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

INSTRUMENTATION LAB
DRAWN J. Kilvinger DATE 22 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Bagta 24 JUN 66
APPROVAL 66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/26/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
AGC (INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2010760
SCALE 1/1
SHEET 1 OF 1

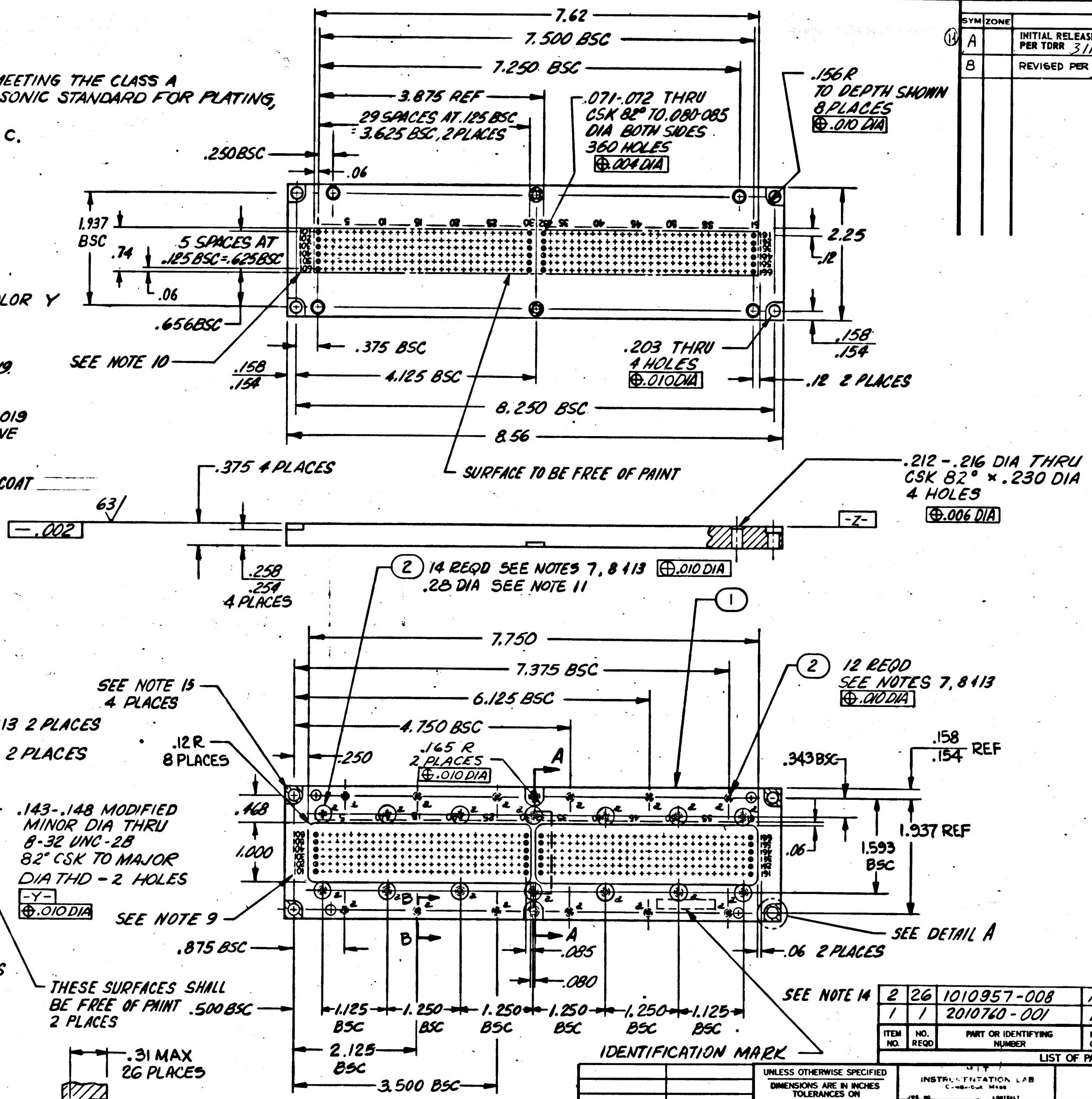
Characteristics 24 JUN 66

2010760

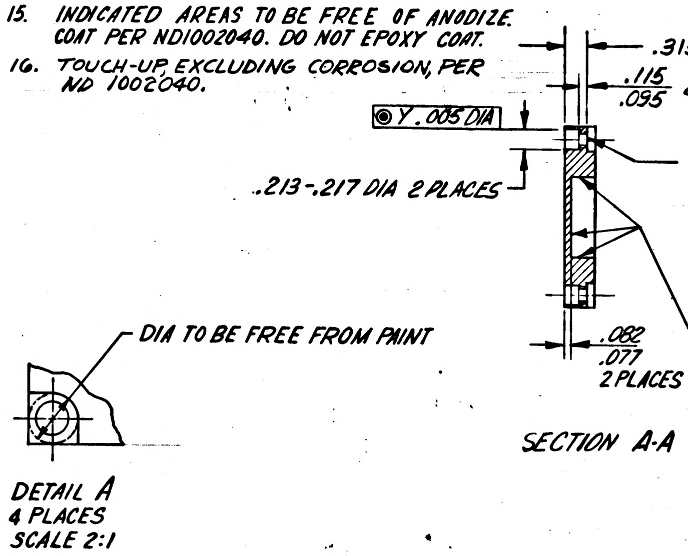
B 2010760 2

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585 COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG
9. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06/.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING. CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE & PAINT. COAT PER ND1002040. DO NOT EPOXY COAT
12. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
13. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING
15. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.
16. TOUCH-UP, EXCLUDING CORROSION, PER ND 1002040.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
⑪ A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 32680		23 JAN 67	REP



7.62
7.500 BSC
7.250 BSC
3.875 REF
29 SPACES AT .125 BSC = 3.625 BSC, 2 PLACES
.071-.072 THRU CSK 82° TO .080-.085 DIA BOTH SIDES 360 HOLES
⊕ .004 DIA
.156 R TO DEPTH SHOWN 8 PLACES
⊕ .010 DIA
.250 BSC
.06
1.937 BSC
.74
5 SPACES AT .125 BSC = .625 BSC
.06
2.25
.12
.656 BSC
SEE NOTE 10
.375 BSC
.203 THRU 4 HOLES
⊕ .010 DIA
.158
.154
.158
.154
4.125 BSC
.12 2 PLACES
8.250 BSC
8.56
.375 4 PLACES
SURFACE TO BE FREE OF PAINT
.212-.216 DIA THRU CSK 82° × .230 DIA 4 HOLES
⊕ .006 DIA
63
-.002
-Z-
.258
.254
4 PLACES
② 14 REQD SEE NOTES 7, 8 & 13 ⊕ .010 DIA
.28 DIA SEE NOTE 11
①
7.750
7.375 BSC
② 12 REQD SEE NOTES 7, 8 & 13
⊕ .010 DIA
6.125 BSC
SEE NOTE 15 4 PLACES
4.750 BSC
.12 R 8 PLACES
.250
.165 R 2 PLACES
⊕ .010 DIA
A
.343 BSC
.158
.154 REF
.468
1.000
.06
1.593 BSC
1.937 REF
SEE NOTE 9
B
B
A
.085
.080
SEE DETAIL A
.875 BSC
.06 2 PLACES
.500 BSC
1.125 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.250 BSC
1.125 BSC
2.125 BSC
3.500 BSC
IDENTIFICATION MARK
SEE NOTE 14



.313 2 PLACES
.115
.095 2 PLACES
◎ Y .005 DIA
.213-.217 DIA 2 PLACES
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B 82° CSK TO MAJOR DIA THD - 2 HOLES
-Y-
⊕ .010 DIA
.082
.077
2 PLACES
THESE SURFACES SHALL BE FREE OF PAINT 2 PLACES
DIA TO BE FREE FROM PAINT

SECTION A-A

DETAIL A
4 PLACES
SCALE 2:1

.31 MAX
26 PLACES

PARTIAL SECTION B-B
SCALE 2:1

2	26	1010957-008	INSERT, SCREW THREAD, LOCKING
1	1	2010760-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014749	6014515
2014749	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN J. Klinnger DATE 22 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Bagta 24 JUN 66
APPROVAL 9 Sept 66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/21/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
AGC (INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230 SIZE D 2010760
SCALE 1:1 SHEET 1 OF 1

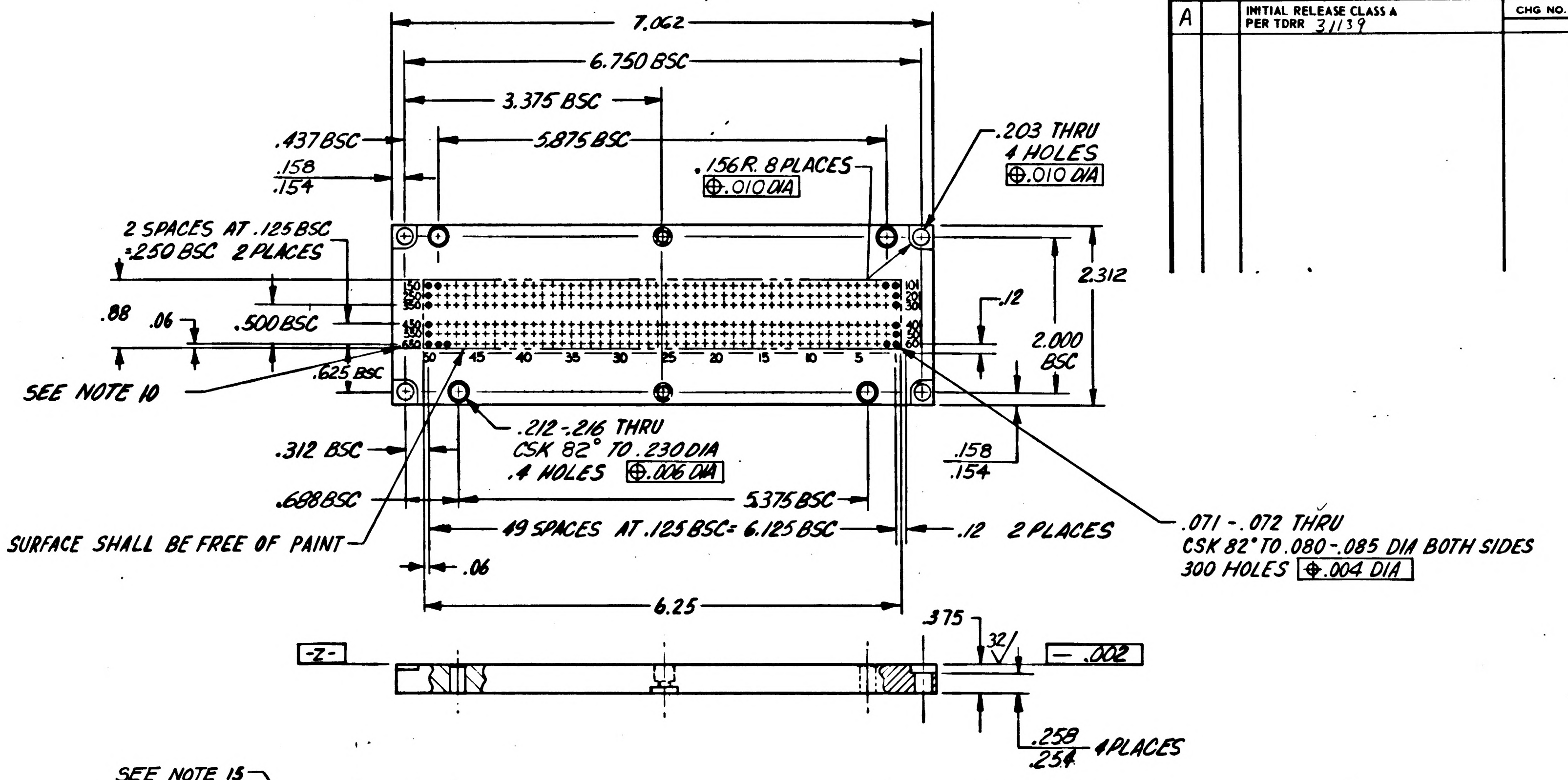
Charleston
24 JUN 66

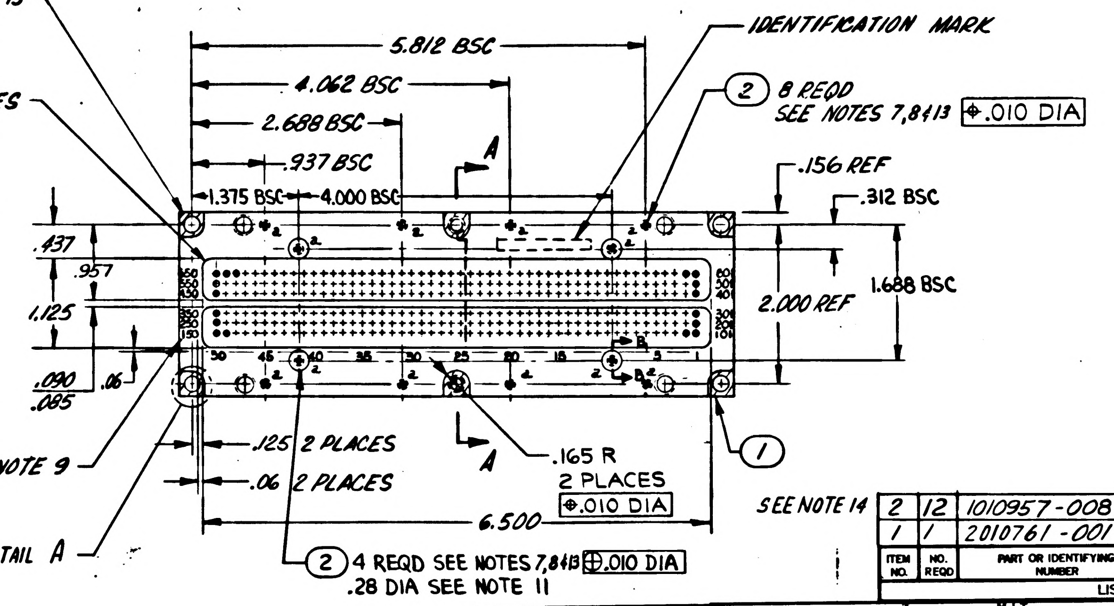
2010761 A

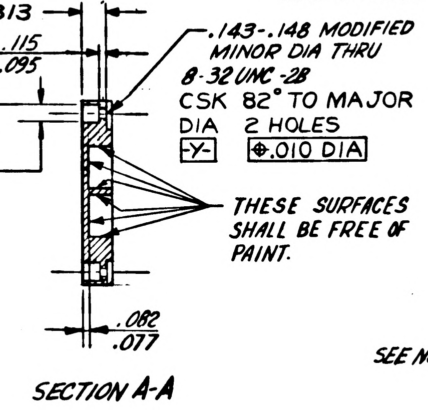
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

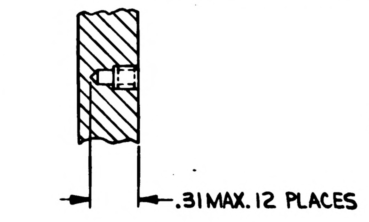
1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt[125]{}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND 1002019. CENTRALIZE AS SHOWN.
10. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING, CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE & PAINT. COAT PER ND1002040. DO NOT EPOXY COAT
12. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
13. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.


7.062
6.750 BSC
3.375 BSC
5.875 BSC
.437 BSC
.158
.154
.156R. 8 PLACES
⊕.010 DIA
.203 THRU
4 HOLES
⊕.010 DIA
2 SPACES AT .125 BSC
=.250 BSC 2 PLACES
.88
.06
.500 BSC
.625 BSC
SEE NOTE 10
150
250
350
450
550
650
101
201
301
401
501
601
50
45
40
35
30
25
20
15
10
5
1
.12
2.312
2.000 BSC
.212-.216 THRU
CSK 82° TO .230 DIA
.4 HOLES ⊕.006 DIA
.312 BSC
.688 BSC
5.375 BSC
.158
.154
49 SPACES AT .125 BSC= 6.125 BSC
.12 2 PLACES
SURFACE SHALL BE FREE OF PAINT
.06
6.25
.071 - .072 THRU
CSK 82° TO .080-.085 DIA BOTH SIDES
300 HOLES ⊕.004 DIA
-Z-
.375
32
— .002
.258
.254 4 PLACES

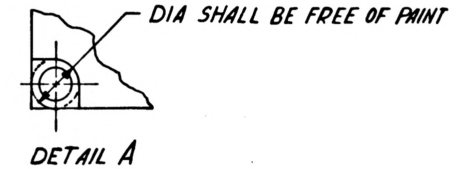

SEE NOTE 15
6 PLACES
.12R 8 PLACES
5.812 BSC
4.062 BSC
2.688 BSC
.937 BSC
1.375 BSC
4.000 BSC
A
IDENTIFICATION MARK
② 8 REQD
SEE NOTES 7,8&13 ⊕.010 DIA
.156 REF
.312 BSC
.437
.957
1.125
.090
.085
.06
2.000 REF
1.688 BSC
B
2
SEE NOTE 9
SEE DETAIL A
.125 2 PLACES
.06 2 PLACES
.165 R
2 PLACES
⊕.010 DIA
6.500
①
② 4 REQD SEE NOTES 7,8&13 ⊕.010 DIA
.28 DIA SEE NOTE 11


.313
.115
.095
⊙ Y .005
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B
CSK 82° TO MAJOR
DIA 2 HOLES
-Y- ⊕.010 DIA
.213-.217 DIA
2 PLACES
THESE SURFACES
SHALL BE FREE OF
PAINT.
.082
.077

SECTION A-A


.31 MAX. 12 PLACES

PARTIAL SECTION B-B
SCALE 2/1


DIA SHALL BE FREE OF PAINT

DETAIL A
4 PLACES
SCALE 2:1

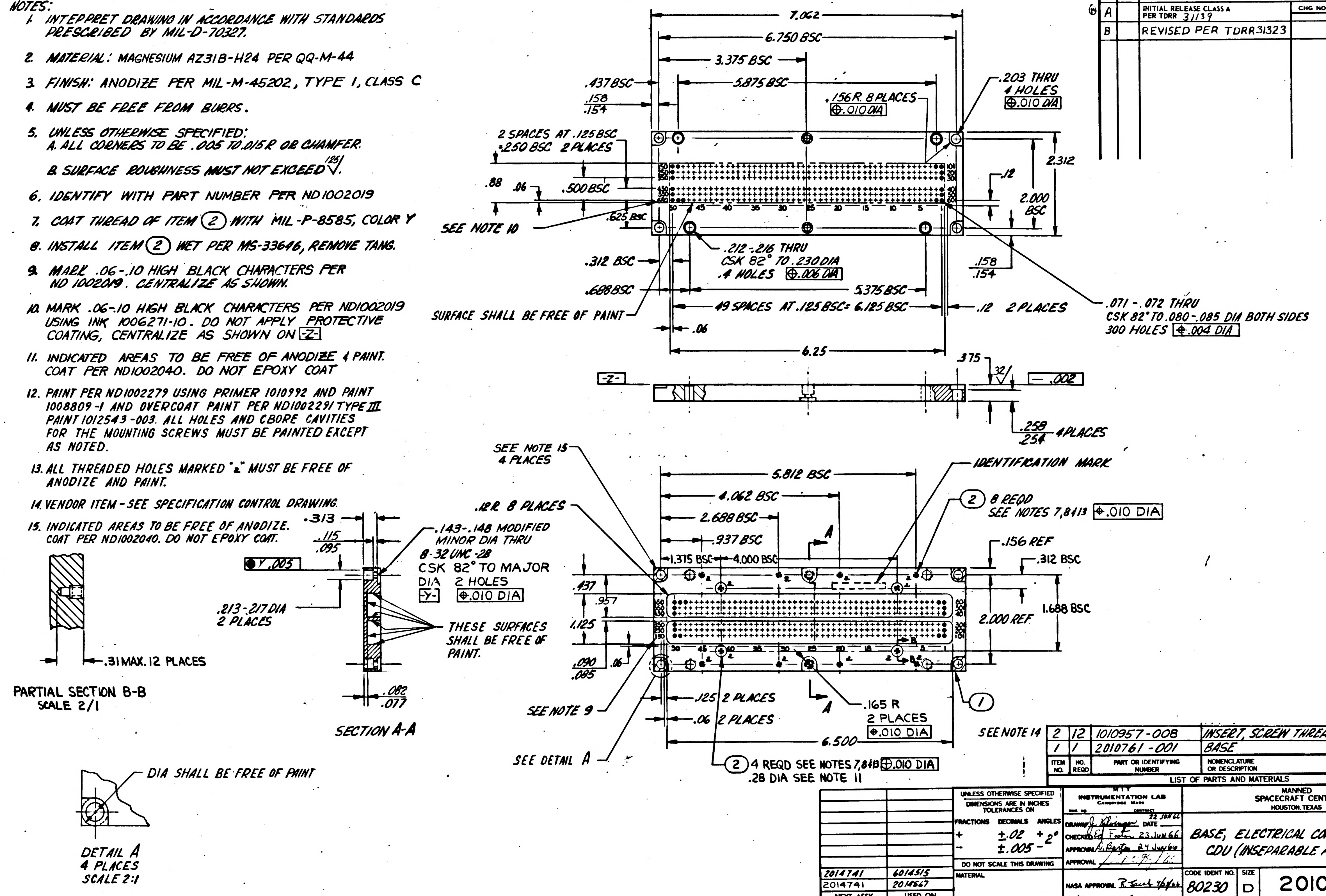
SEE NOTE 14

2	12	1010957-008	INSERT, SCREW THREAD, SELF-LKG
1	1	2010761-001	BASE
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
LIST OF PARTS AND MATERIALS			

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS DWG NO. CONTRACT	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
		FRACTIONS + -	DRAWN J. Klinger DATE 22 JUN 66	BASE, ELECTRICAL CONNECTOR CDU (INSEPARABLE ASSEMBLY)	
		DECIMALS ±.02 ±.005	CHECKED Ed Foster 23 JUN 66		
		ANGLES +2° -	APPROVAL L. Barton 24 JUN 66		
		DO NOT SCALE THIS DRAWING	APPROVAL [illegible] 7 66		
2014741	6014515	MATERIAL	NASA APPROVAL R. Jacob 9/23/66	CODE IDENT NO. 80230	SIZE D — 2010761
2014741	2014567				
NEXT ASSY	USED ON				
APPLICATION		CONTRACT NAS 9-497	CCD APPROVAL [illegible] 9/22/66	SCALE 1:1	SHEET 1 OF 1

24 JUN 66

2010761


7.062
6.750 BSC
3.375 BSC
5.875 BSC
.437 BSC
.158
.154
.156 R 8 PLACES ⊕.010 DIA
.203 THRU 4 HOLES ⊕.010 DIA
2 SPACES AT .125 BSC
.250 BSC 2 PLACES
2.312
.88
.06
.500 BSC
.12
2.000 BSC
.625 BSC
SEE NOTE 10
.212-.216 THRU CSK 82° TO .230 DIA 4 HOLES ⊕.006 DIA
.312 BSC
.688 BSC
5.375 BSC
.158
.154
SURFACE SHALL BE FREE OF PAINT
49 SPACES AT .125 BSC = 6.125 BSC
.12 2 PLACES
.071 - .072 THRU CSK 82° TO .080-.085 DIA BOTH SIDES 300 HOLES ⊕.004 DIA
.06
6.25
-Z-
.375
32
— .002
.258
.254 4 PLACES
SEE NOTE 15 4 PLACES
5.812 BSC
IDENTIFICATION MARK
4.062 BSC
2.688 BSC
.937 BSC
1.375 BSC
4.000 BSC
.12 R 8 PLACES
② 8 REQD SEE NOTES 7,8 & 13 ⊕.010 DIA
.156 REF
.312 BSC
.437
.957
1.125
.090
.085
.06
2.000 REF
1.688 BSC
SEE NOTE 9
.125 2 PLACES
.06 2 PLACES
.165 R 2 PLACES ⊕.010 DIA
6.500
SEE DETAIL A
② 4 REQD SEE NOTES 7,8 & 13 ⊕.010 DIA
.28 DIA SEE NOTE 11
①
A
.313
.115
.095
Y .005
.143-.148 MODIFIED MINOR DIA THRU 8-32 UNC-2B CSK 82° TO MAJOR DIA 2 HOLES
-Y- ⊕.010 DIA
.213-.217 DIA 2 PLACES
THESE SURFACES SHALL BE FREE OF PAINT
.082
.077
.31 MAX. 12 PLACES
PARTIAL SECTION B-B SCALE 2/1
SECTION A-A
DIA SHALL BE FREE OF PAINT
DETAIL A 4 PLACES SCALE 2:1

NOTES:

1. INTEPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
6. IDENTIFY WITH PART NUMBER PER ND1002019
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING, CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE & PAINT. COAT PER ND1002040. DO NOT EPOXY COAT
12. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
13. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31323		4 OCT '66	TD. N.W.

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	12	1010957-008	INSERT, SCREW THREAD, SELF-LKG
1	1	2010761-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014741	6014515
2014741	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + −
DECIMALS ±.02 ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. Klinger DATE 22 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL L. Barton 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 9/2/66
CCB APPROVAL 9/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
CDU (INSEPARABLE ASSEMBLY)

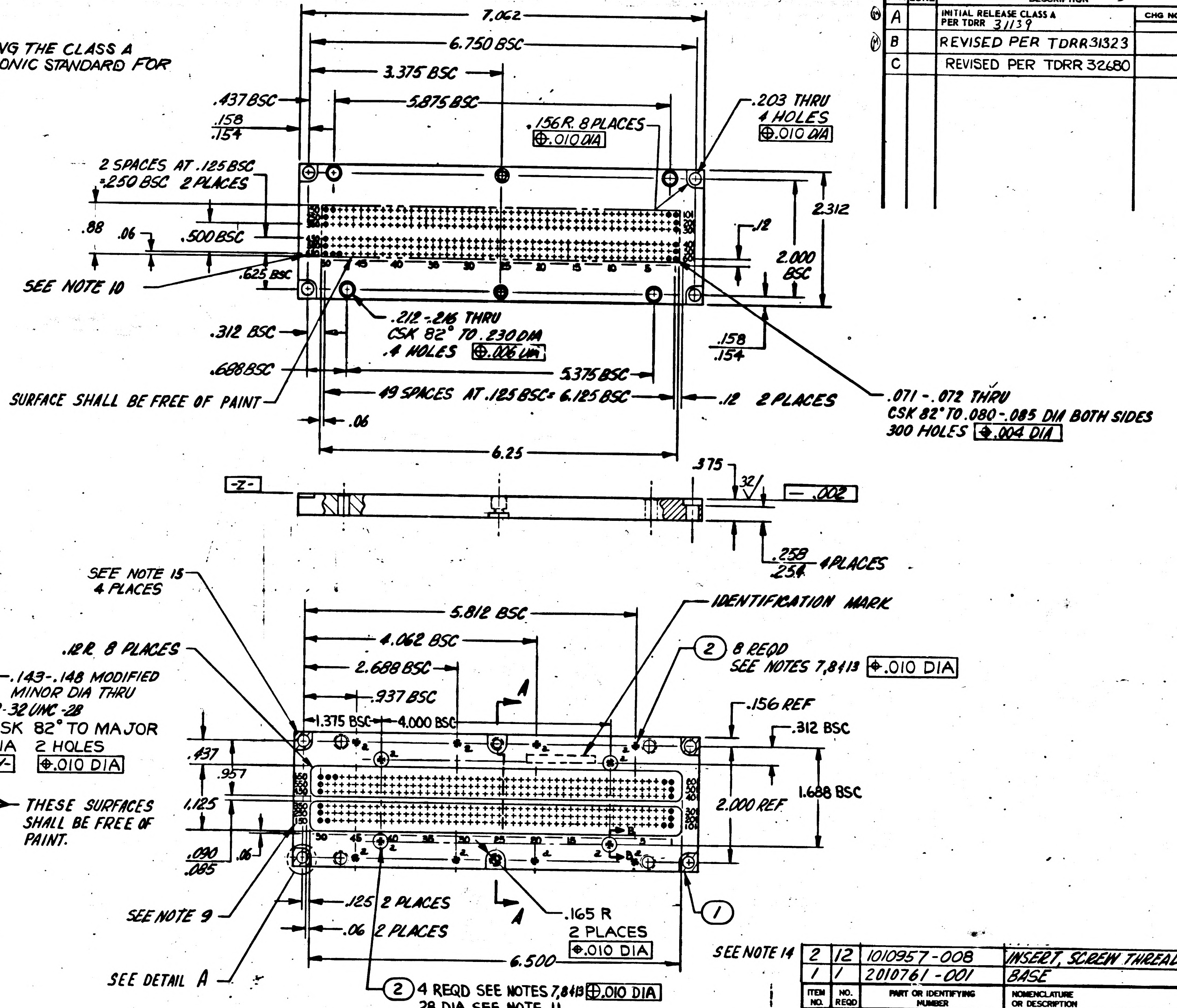
CODE IDENT NO. 80230
SIZE D
2010761
SCALE 1:1
SHEET 1 OF 1

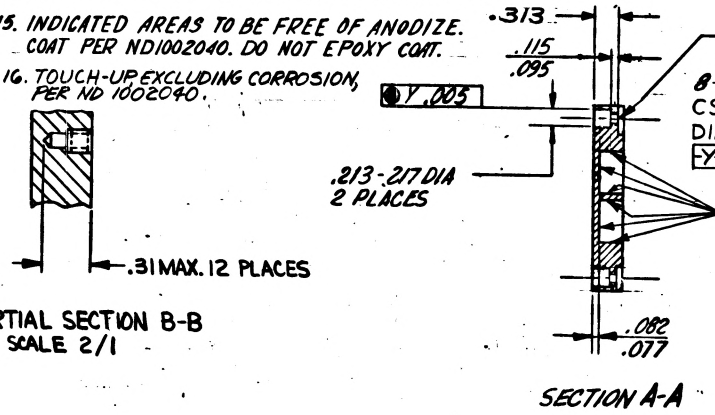
24 JUN 66

2010761 C

NOTES:

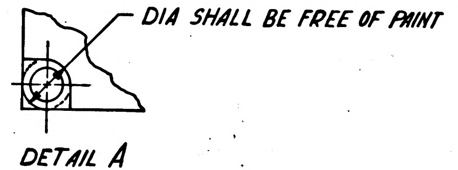
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM AZ31B-H24 PER QQ-M-44 MEETING THE CLASS A REQUIREMENTS OF THE ALUMINUM ASSOCIATIONS ULTRASONIC STANDARD FOR PLATING, EXTRUSIONS AND FORGINGS.
3. FINISH: ANODIZE PER MIL-M-45202, TYPE I, CLASS C.
4. MUST BE FREE FROM BURRS.
5. UNLESS OTHERWISE SPECIFIED:
   A. ALL CORNERS TO BE .005 TO .015R OR CHAMFER.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{125}{\checkmark}$.
6. IDENTIFY WITH PART NUMBER PER ND1002019.
7. COAT THREAD OF ITEM ② WITH MIL-P-8585, COLOR Y
8. INSTALL ITEM ② WET PER MS-33646, REMOVE TANG.
9. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019. CENTRALIZE AS SHOWN.
10. MARK .06-.10 HIGH BLACK CHARACTERS PER ND1002019 USING INK 1006271-10. DO NOT APPLY PROTECTIVE COATING, CENTRALIZE AS SHOWN ON -Z-
11. INDICATED AREAS TO BE FREE OF ANODIZE & PAINT. COAT PER ND1002040. DO NOT EPOXY COAT
12. PAINT PER ND1002279 USING PRIMER 1010992 AND PAINT 1008809-1 AND OVERCOAT PAINT PER ND1002291 TYPE III PAINT 1012543-003. ALL HOLES AND CBORE CAVITIES FOR THE MOUNTING SCREWS MUST BE PAINTED EXCEPT AS NOTED.
13. ALL THREADED HOLES MARKED "2" MUST BE FREE OF ANODIZE AND PAINT.
14. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
15. INDICATED AREAS TO BE FREE OF ANODIZE. COAT PER ND1002040. DO NOT EPOXY COAT.
16. TOUCH-UP EXCLUDING CORROSION, PER ND 1002040.


7.062
6.750 BSC
3.375 BSC
5.875 BSC
.437 BSC
.158
.154
.156R. 8 PLACES
⊕.010 DIA
.203 THRU
4 HOLES
⊕.010 DIA
2 SPACES AT .125 BSC
=.250 BSC 2 PLACES
.88
.06
.500 BSC
.625 BSC
SEE NOTE 10
2.312
.12
2.000 BSC
.312 BSC
.212-.216 THRU
CSK 82° TO .230 DIA
4 HOLES ⊕.006 DIA
.688 BSC
5.375 BSC
.158
.154
49 SPACES AT .125 BSC = 6.125 BSC
.12 2 PLACES
SURFACE SHALL BE FREE OF PAINT
.06
6.25
.071-.072 THRU
CSK 82° TO .080-.085 DIA BOTH SIDES
300 HOLES ⊕.004 DIA
-Z-
.375
32
— .002
.258
.254 4 PLACES
SEE NOTE 15
4 PLACES
5.812 BSC
4.062 BSC
2.688 BSC
.937 BSC
1.375 BSC
4.000 BSC
IDENTIFICATION MARK
.12R 8 PLACES
② 8 REQD
SEE NOTES 7,8 & 13 ⊕.010 DIA
.156 REF
.312 BSC
.437
.957
1.125
2.000 REF
1.688 BSC
.090
.085
.06
SEE NOTE 9
.125 2 PLACES
.06 2 PLACES
A
B
.165 R
2 PLACES
⊕.010 DIA
①
6.500
SEE DETAIL A
② 4 REQD SEE NOTES 7,8 & 13 ⊕.010 DIA
.28 DIA SEE NOTE 11


.313
.115
.095
⊕Y .005
.143-.148 MODIFIED
MINOR DIA THRU
8-32 UNC-2B
CSK 82° TO MAJOR
DIA 2 HOLES
-Y- ⊕.010 DIA
.213-.217 DIA
2 PLACES
THESE SURFACES
SHALL BE FREE OF
PAINT.
.31 MAX. 12 PLACES
.082
.077

PARTIAL SECTION B-B
SCALE 2/1

SECTION A-A


DIA SHALL BE FREE OF PAINT

DETAIL A
4 PLACES
SCALE 2:1

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B		REVISED PER TDRR 31323		4 OCT '66	TD. N.W.
C		REVISED PER TDRR 32680		23 JAN 67	REP N.W.

SEE NOTE 14

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	12	1010957-008	INSERT, SCREW THREAD, SELF-LKG
1	1	2010761-001	BASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014741	6614515
2014741	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	±.02	+ 2°
−	±.005	−

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO.
CONTRACT
DRAWN J. Klinger DATE 22 JUN 66
CHECKED Ed Foster 23 JUN 66
APPROVAL D. Barton 24 JUN 66
APPROVAL Sept 66
NASA APPROVAL R. Jacob 9/23/66
CCB APPROVAL 9/22/66
24 JUN 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, ELECTRICAL CONNECTOR
CDU (INSEPARABLE ASSEMBLY)

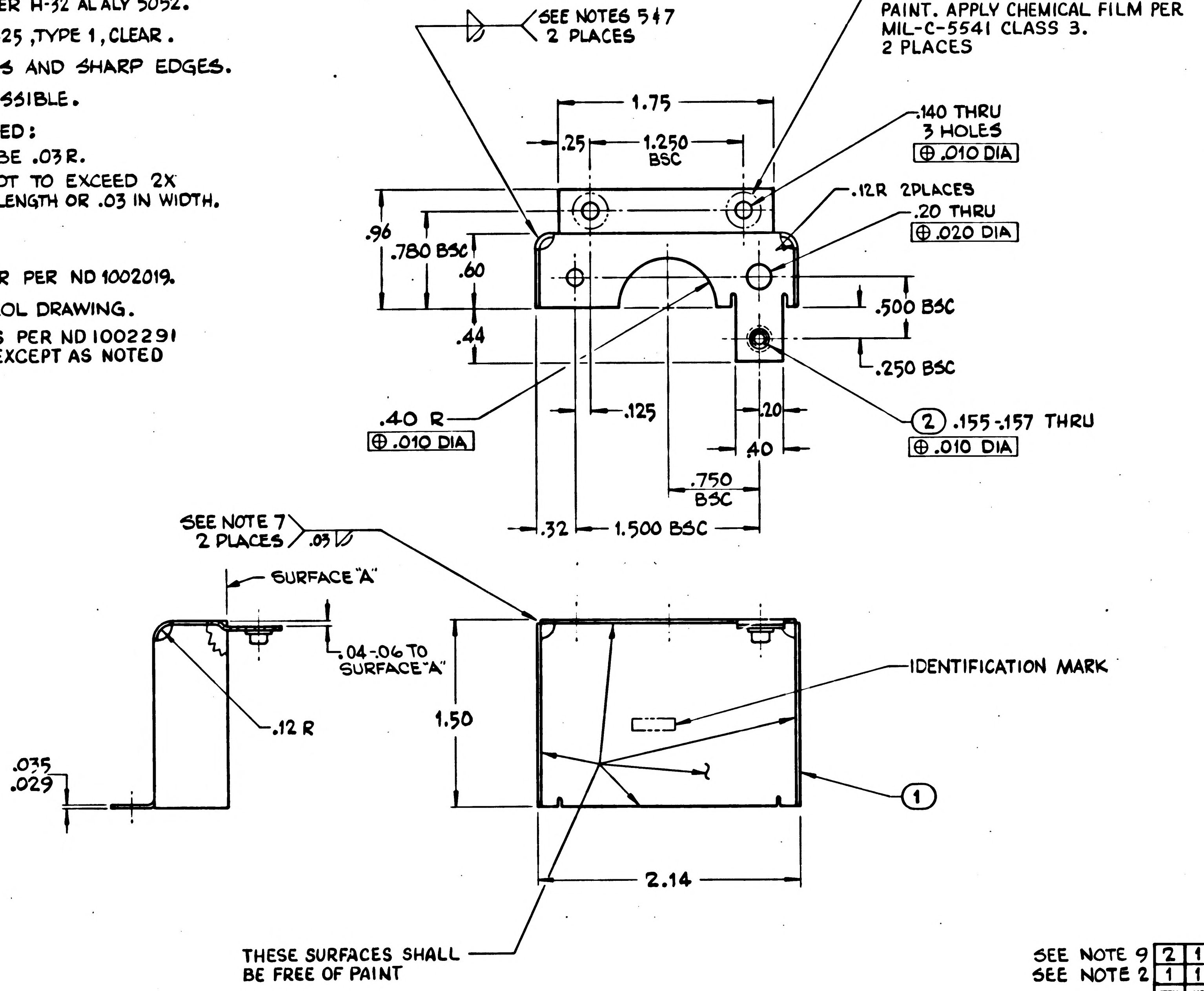
CODE IDENT NO. 80230
SIZE D
2010761
SCALE 1:1
SHEET 1 OF 1

2010761

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: QQ-A-250/8, TEMPER H-32 AL ALY 5052.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE 1, CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. MINIMUM BEND RELIEF PERMISSIBLE.
6. UNLESS OTHERWISE SPECIFIED:
   - A. INSIDE BEND RADII TO BE .03R.
   - B. BEND RELIEF SLOTS NOT TO EXCEED 2X MATERIAL THICKNESS IN LENGTH OR .03 IN WIDTH.
7. WELD PER MIL-W-8604.
8. IDENTIFY WITH PART NUMBER PER ND 1002019.
9. VENDOR ITEM-SPEC CONTROL DRAWING.
10. PAINT EDGES AND SURFACES PER ND 1002291 TYPE III PAINT 1012543-003 EXCEPT AS NOTED

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	



SEE NOTES 5 & 7
2 PLACES
.28 DIA TO BE FREE OF ANODIZE AND PAINT. APPLY CHEMICAL FILM PER MIL-C-5541 CLASS 3. 2 PLACES
1.75
.25
1.250 BSC
.140 THRU 3 HOLES
⊕ .010 DIA
.12R 2PLACES
.20 THRU
⊕ .020 DIA
.96
.780 BSC
.60
.44
.500 BSC
.250 BSC
.40 R
⊕ .010 DIA
.125
.20
.40
② .155-.157 THRU
⊕ .010 DIA
.750 BSC
.32
1.500 BSC
SEE NOTE 7
2 PLACES
.03
SURFACE "A"
.04-.06 TO SURFACE "A"
.12 R
.035
.029
1.50
IDENTIFICATION MARK
①
2.14
THESE SURFACES SHALL BE FREE OF PAINT

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 9	2	1	1000076-1	NUT, CLINCH
SEE NOTE 2	1	1	2010763-001	SHELL

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	2014567
2014742	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02	± —
	±.005	

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN J. Patterson DATE 17 JUN 66
CHECKED M. Manning 23 JUN 66
APPROVAL O. Barty 24 JUN 66
APPROVAL
NASA APPROVAL R. Jacob 1/8/66
CCB APPROVAL 9/21/66

24 JUN 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SHELL, ELECTRICAL CONNECTOR
(INSEPARABLE ASSEMBLY)
56P18 56P26

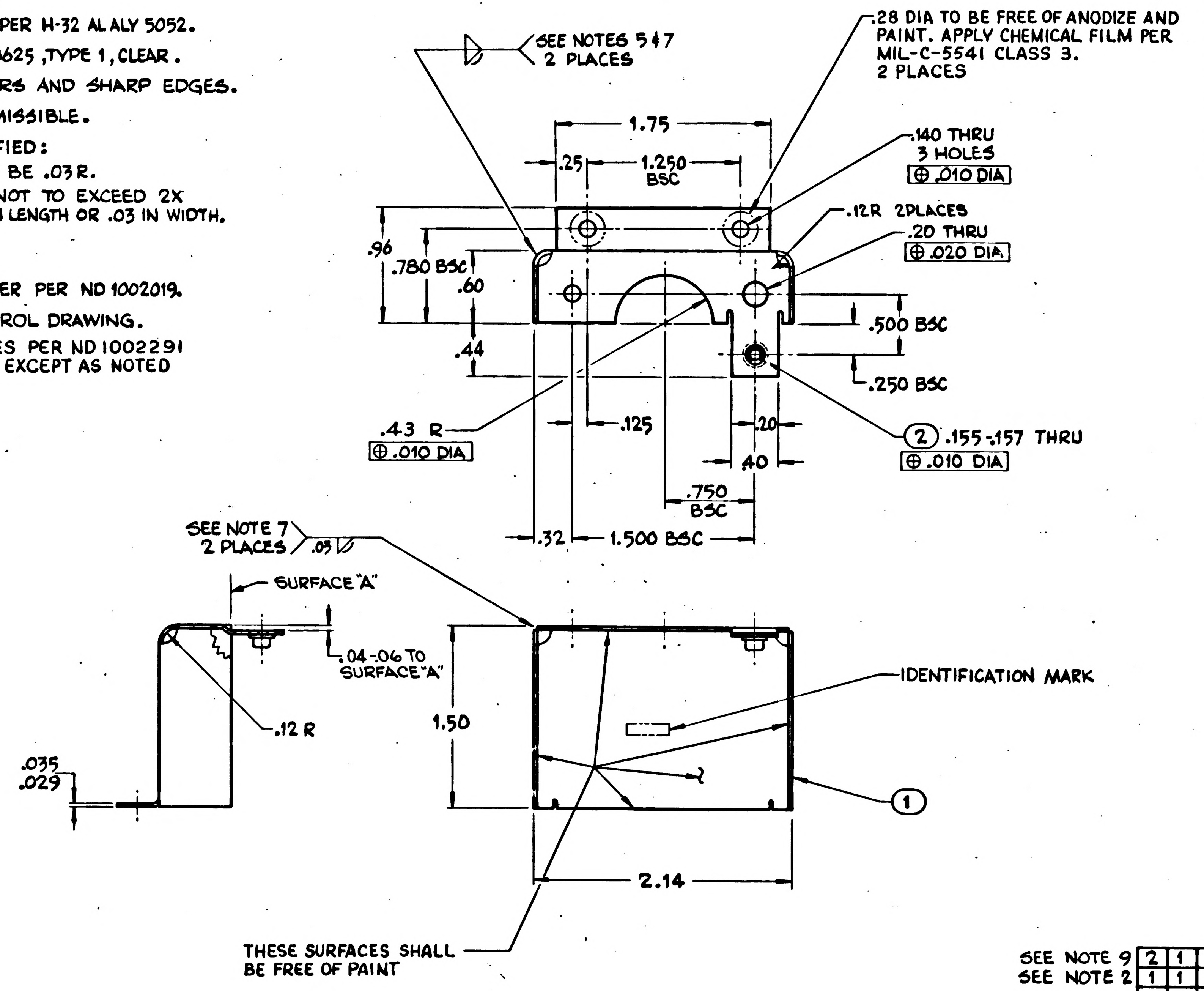
CODE IDENT NO. 80230
SIZE D
2010763
SCALE 2:1
SHEET 1 of 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: QQ-A-250/8, TEMPER H-32 AL ALY 5052.
3. FINISH: ANODIZE PER MIL-A-8625, TYPE 1, CLEAR.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. MINIMUM BEND RELIEF PERMISSIBLE.
6. UNLESS OTHERWISE SPECIFIED:
   - A. INSIDE BEND RADII TO BE .03R.
   - B. BEND RELIEF SLOTS NOT TO EXCEED 2X MATERIAL THICKNESS IN LENGTH OR .03 IN WIDTH.
7. WELD PER MIL-W-8604.
8. IDENTIFY WITH PART NUMBER PER ND 1002019.
9. VENDOR ITEM-SPEC CONTROL DRAWING.
10. PAINT EDGES AND SURFACES PER ND 1002291 TYPE III PAINT 1012543-003 EXCEPT AS NOTED

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
	B	REVISED PER TDRR 34466		14 SEP 67	



SEE NOTES 5 & 7
2 PLACES
.28 DIA TO BE FREE OF ANODIZE AND PAINT. APPLY CHEMICAL FILM PER MIL-C-5541 CLASS 3.
2 PLACES
1.75
.25
1.250 BSC
.140 THRU
3 HOLES
⊕ .010 DIA
.12R 2PLACES
.20 THRU
⊕ .020 DIA
.96
.780 BSC
.60
.44
.500 BSC
.250 BSC
.43 R
⊕ .010 DIA
.125
.20
.40
② .155-.157 THRU
⊕ .010 DIA
.750 BSC
.32
1.500 BSC
SEE NOTE 7
2 PLACES
.03
SURFACE "A"
.04-.06 TO SURFACE "A"
.12 R
.035
.029
1.50
IDENTIFICATION MARK
①
2.14
THESE SURFACES SHALL BE FREE OF PAINT

SEE NOTE 9	2	1	1000076-1	NUT, CLINCH
SEE NOTE 2	1	1	2010763-001	SHELL
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014745	2014567
2014742	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + _ −
DECIMALS ±.02 ±.005
ANGLES + _ −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Patterson 17 JUN 66
CHECKED [illegible] 23 JUN 66
APPROVAL [illegible] 24 JUN 66
APPROVAL [illegible] 9 Sept 66
NASA APPROVAL [illegible] 9/23/66
CCB APPROVAL [illegible] 9/21/66
24 JUN 66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

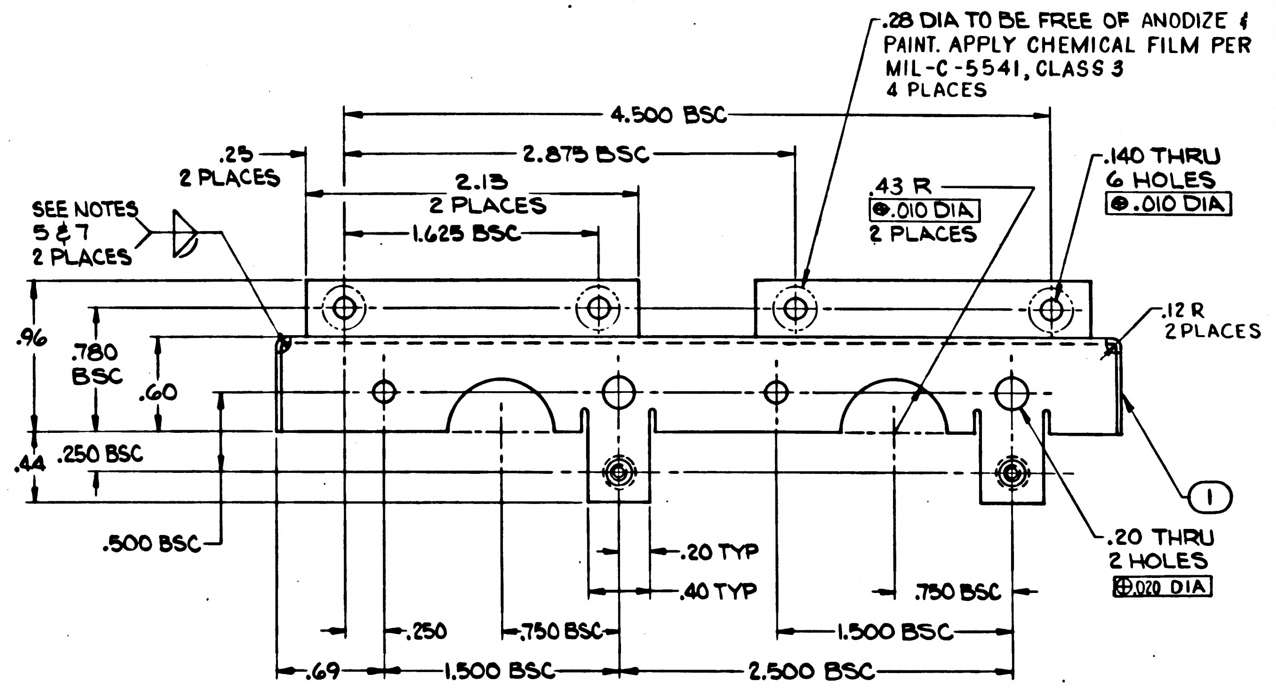
SHELL, ELECTRICAL CONNECTOR
(INSEPARABLE ASSEMBLY)
56P18 56P26

CODE IDENT NO. 80230
SIZE D
2010763
SCALE 2:1
SHEET 1 of 1

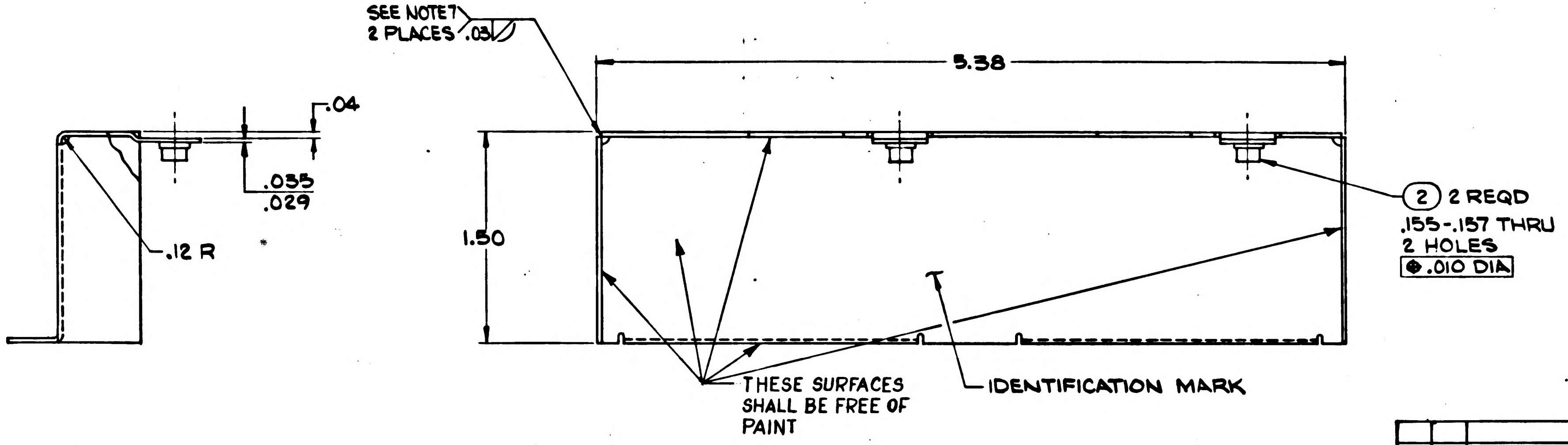
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: QQ-A-250/8, TEMPER H32 AL ALY 5052.
3. FINISH: ANODIZE PER MIL-A-8625 TYPE I, CLEAR.
4. MUST BE FREE FROM BURRS & SHARP EDGES.
5. MINIMUM BEND RELIEF PERMISSIBLE.
6. UNLESS OTHERWISE SPECIFIED:
   A. INSIDE BEND RADII TO BE .03 R.
   B. BEND RELIEF SLOTS NOT TO EXCEED 2X MATERIAL THICKNESS IN LENGTH OR .03 IN WIDTH.
7. WELD PER MIL-W-8604.
8. IDENTIFY WITH PART NUMBER PER ND1002019.
9. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
10. PAINT EDGES AND SURFACES PER ND1002291 TYPE III PAINT 1012543-003 EXCEPT AS NOTED.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	



.28 DIA TO BE FREE OF ANODIZE & PAINT. APPLY CHEMICAL FILM PER MIL-C-5541, CLASS 3
4 PLACES
4.500 BSC
2.875 BSC
.25
2 PLACES
2.13
2 PLACES
1.625 BSC
SEE NOTES 5 & 7
2 PLACES
.43 R
⊕.010 DIA
2 PLACES
.140 THRU
6 HOLES
⊕.010 DIA
.12 R
2 PLACES
.96
.780 BSC
.60
.44
.250 BSC
.500 BSC
1
.20 THRU
2 HOLES
⊕.020 DIA
.20 TYP
.40 TYP
.750 BSC
.250
.750 BSC
1.500 BSC
.69
1.500 BSC
2.500 BSC



SEE NOTE 7
2 PLACES
.03
.04
.035
.029
.12 R
5.38
1.50
2
2 REQD
.155-.157 THRU
2 HOLES
⊕.010 DIA
THESE SURFACES SHALL BE FREE OF PAINT
IDENTIFICATION MARK

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 9	2	2	1000076-1	NUT, CLINCH, FLUSH MOUNTED
SEE NOTE 2	1	1	2010765 -001	COVER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2014744	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Kilonga DATE 20 JUN 66
CHECKED M. Manning 23 JUN 66
APPROVAL D. Basta 24 Jun 66
APPROVAL
NASA APPROVAL R. Jacob 9/23/66
CCB MIT APPROVAL 9/21/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SHELL, ELECTRICAL CONNECTOR
(INSEPARABLE ASSEMBLY)
56P17

CODE IDENT NO.	SIZE	
80230	D	2010765
SCALE 2/1		SHEET 1 OF 1

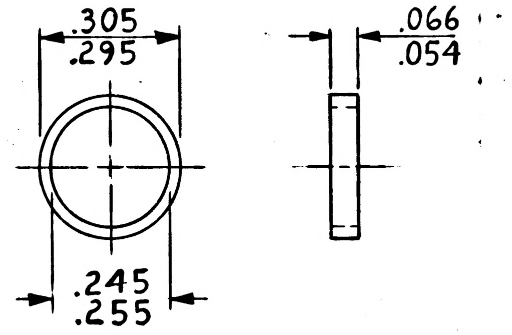
24 JUN 66

2010768 A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ZZ-R-765 CLASS III, GRADE 50, COLOR RED (SILICONE RUBBER).
3. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130.
4. EDGES MUST BE FREE FROM TEARS.

REVISIONS				
SYM	DESCRIPTION	CHG NO.	DATE	APPD.
A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	



6014535	6014515
6014532	6014515
6014531	6014515
2014741	6014515
2014749	6014515
2014741	2014567
THRU	
2014749	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO. CONTRACT

DRAWN L Krahn DATE 16 JUN 66
CHECKED 21 JUN 66
APPROVAL D. 22 JUN 66
APPROVAL 9 Sept 66
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

GASKET

CODE IDENT NO. 80230
SIZE B
2010768
SCALE 4:1
SHEET 1 OF 1

21 JUN 66

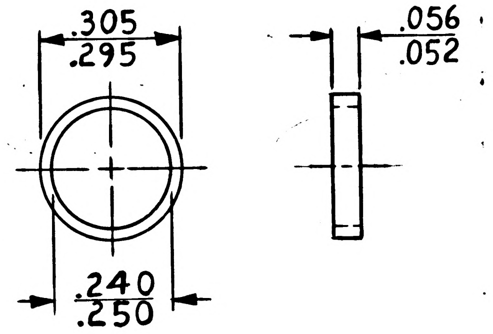
MIL 10778-D 11-16-64

2010768 B

REVISIONS				
SYM	DESCRIPTION	CHG NO:	DATE	APPD.
Ⓜ A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
B	REVISED PER TDRR 31211		3 OCT 66	JJB

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ZZ-R-765 CLASS III, GRADE 80, COLOR GRAY (SILICONE RUBBER).
3. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130.
4. EDGES MUST BE FREE FROM TEARS.



APPLICATION	
NEXT ASSY	USED ON
6014535	6014515
6014532	6014515
6014531	6014515
2014741	6014515
2014749	6014515
2014741 THRU 2014749	2014567

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN L Krahn DATE 16 JUN 66
CHECKED 21 JUN 66
APPROVAL D. Bartz 22 JUN 66
APPROVAL 9 Sept 66
NASA APPROVAL
CCB APPROVAL 9/21/66
Charleston 21 JUN 66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

GASKET

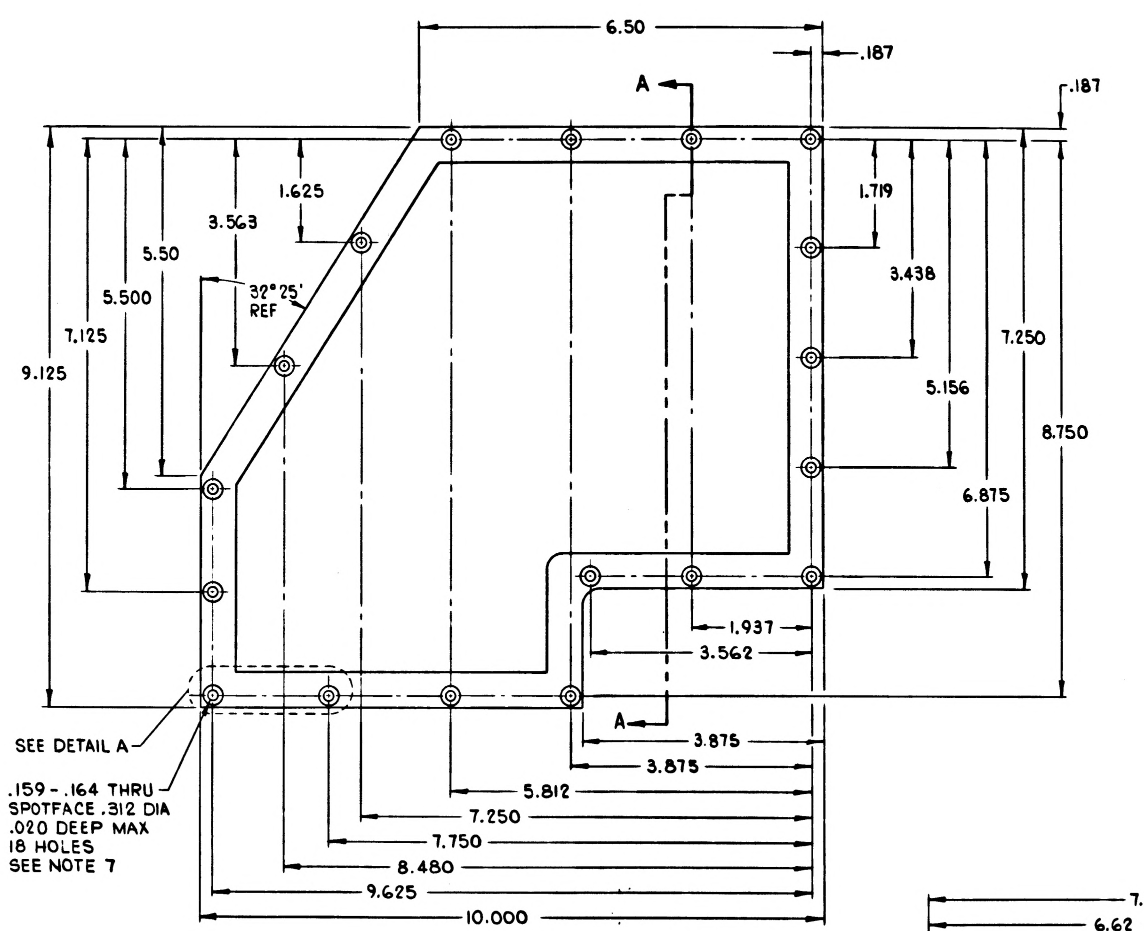
CODE IDENT NO. 80230
SIZE B
2010768
SCALE 4:1
SHEET 1 OF 1

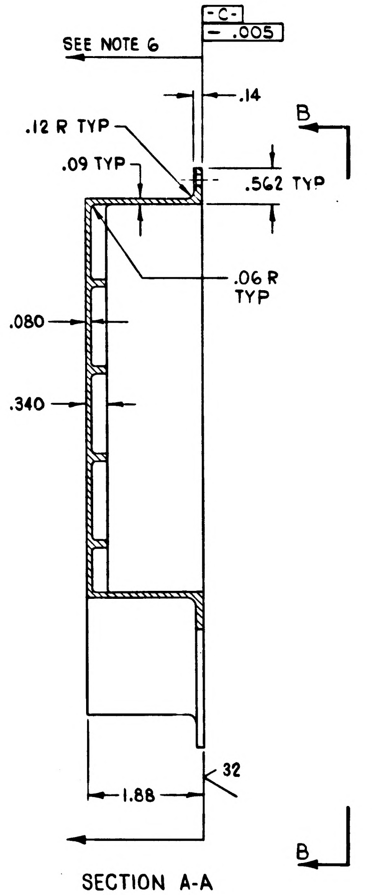
MIL 10778-D 11-16-64

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

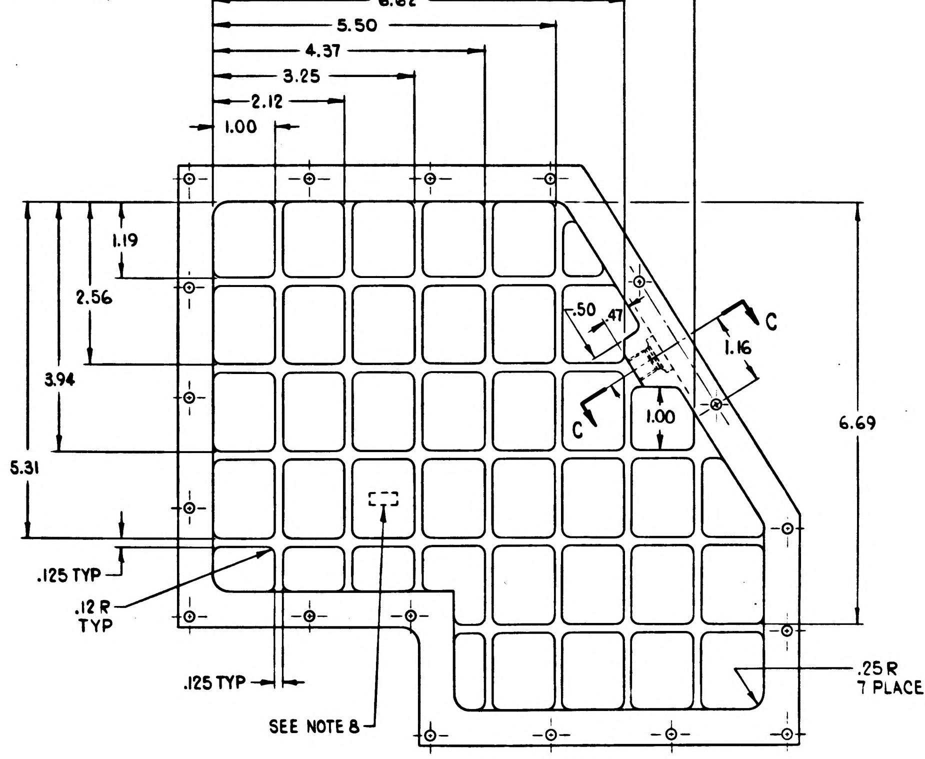
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: MAGNESIUM ALLOY AZ-31B-H24 PER QQ-M-44.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 TO .015.
4. UNLESS OTHERWISE SPECIFIED $\overset{63}{\surd}$ ALL OVER.
5. ANODIZE PER MIL-M-45202 TYPE I CLASS C.
6. PAINT EXTERIOR SURFACES ABOVE PLANE $\boxed{-C-}$ PER ND 002279 USING PAINT 1008809-1. OVERCOAT THE 008809- PAINT WITH THE 1012543-003 PAINT PER ND 00229 TYPE II, EXCEPT DO NOT USE A PRIMER. UNLESS OTHERWISE SPECIFIED ALL HOLES SHALL BE FREE OF PAINT.
7. SPOTFACE DIA SHOWN SHALL BE FREE OF FINISH MATERIALS. TREAT PER ND1002040 USING MATERIAL PER MIL-M-3171, TYPE VI.
8. IDENTIFY USING DRAWING NUMBER PER ND1002019.

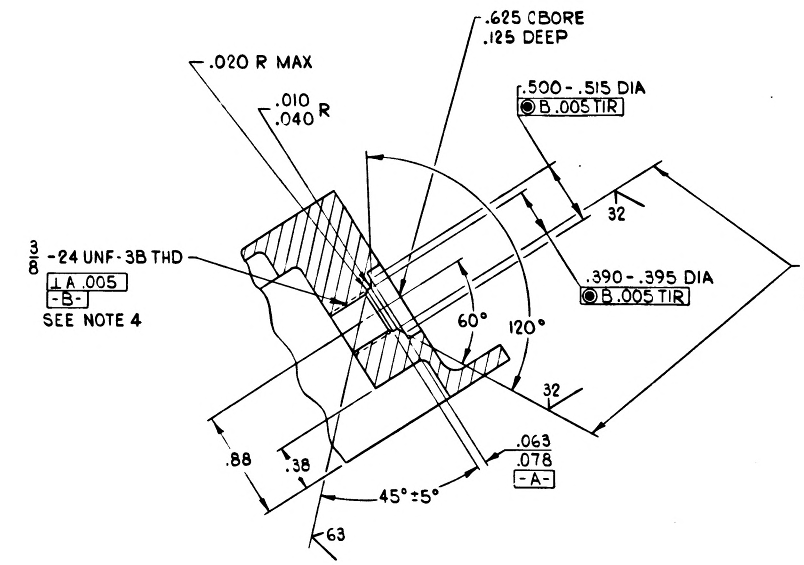

6.50
.187
.187
A
A
1.625
3.563
5.50
5.500
7.125
9.125
32°25' REF
1.719
3.438
5.156
6.875
7.250
8.750
1.937
3.562
3.875
3.875
5.812
7.250
7.750
8.480
9.625
10.000
SEE DETAIL A
.159-.164 THRU SPOTFACE .312 DIA .020 DEEP MAX 18 HOLES SEE NOTE 7


-C-
-.005
SEE NOTE 6
.14
B
B
.12 R TYP
.09 TYP
.562 TYP
.06 R TYP
.080
.340
1.88
32

SECTION A-A

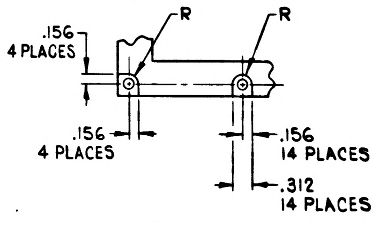

7.75
6.62
5.50
4.37
3.25
2.12
1.00
1.19
2.56
3.94
5.31
6.69
.50
.47
C
C
1.16
1.00
.125 TYP
.12 R TYP
.125 TYP
SEE NOTE 8
.25 R 7 PLACES

VIEW B-B


.020 R MAX
.010 .040 R
.625 CBORE .125 DEEP
.500-.515 DIA
◎ B .005 TIR
32
3/8-24 UNF-3B THD
⊥ A .005
-B-
SEE NOTE 4
.390-.395 DIA
◎ B .005 TIR
60°
120°
32
.063 .078
-A-
.88
.38
45°±5°
63

THESE SURFACES TO BE FREE OF LONGITUDINAL AND SPIRAL TOOL MARKS.

SECTION C-C
SCALE: 2:1


.156 4 PLACES
R
R
.156 4 PLACES
.156 14 PLACES
.312 14 PLACES

DETAIL A
OPTIONAL

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 3116		14 JUL 66	

2007201	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .010
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE I
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. Wolski DATE 20 JUN 66
CHECKED 21 JUN 66
APPROVAL
CONTRACT
NASA APPROVAL 9/23/66
CCA APPROVAL 9/2/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER
PIPA ELECTRONICS

SIZE E
CODE IDENT NO. 80230
2010770
SCALE 1:1
SHEET 1 OF 1

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	WA WA

REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SHEET	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45

REV STATUS OF SHEETS																							
REV					A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SHEET					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN 29 JUN 66 (DAY MO YR)
CHECKER W. Diehl 1 JUL 66
NEA ENGINEER L. Barta 5 Jul 66
APPROVAL 8/1/66
CONTR NO. NAS 9-497
NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "A"
(C/M, BLOCK II)

SIZE A | CODE IDENT. NO 80230 | 2010774

SCALE NONE | SHEET 1 OF 67

MIL 1377A6 12-65

REVISION STATUS OF SHEETS

SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV
46	A																
47	A																
48	A																
49	A																
50	A																
51	A																
52	A																
53	A																
54	A																
55	A																
56	A																
57	A																
58	A																
59	A																
60	A																
61	A																
62	A																
63	A																
64	A																
65	A																
66	A																
67	A																

SIZE A | CODE IDENT. NO. 80230 | 2010774

SCALE NONE | REV LTR A | SHEET 2 OF 67

MIL 1377A3 8-65

NOTE NUMBER — GENERAL NOTES DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6A AND 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014671.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
  A - FROM END OF SHIELD
  B - TO END OF SHIELD
  G - GREEN
  K - BLACK
  L - BLUE
  N - BROWN
  R - RED
  W - WHITE
  Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 3 OF 67

NOTE NUMBER — GENERAL NOTES DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
  CONNECTOR 56P2, USE ITEM NUMBERS 23 AND 32.
  CONNECTOR 56P1,3,4,5,6,7, AND 8 USE ITEM NUMBERS 22 AND 32.
  CONNECTOR 56P9, AND P10 USE ITEM NUMBER 24.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 38.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 41 AND 42 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 4 OF 67

NOTE NUMBER — GENERAL NOTES DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
  A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
  B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT LIMITED TO 15 MILLIAMPS.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 39 AND 40.

24 CONDUCTORS WITH AN A,B,C,D,E,F OR G IN THE REMARKS COLUMN ARE TO BE GROUP SHIELDED PER DETAIL A AND/OR B OF THE CONF. DRAWING.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 35, THROUGH CENTER OF EMI/RFI SHIELDING TAPE. ITEM 34. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 36. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.

27 ASSEMBLE INSULATION TUBING, ITEM 45, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 5 OF 67

NOTE NUMBER — GENERAL NOTES DESCRIPTION

28 ASSEMBLE A LENGTH OF WIRE BRAID ITEM 53 OVER CONDUCTORS A333 AND A337. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 36, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071, FIG. 6B.

29 CONDUCTORS SHALL ENTER CONNECTORS 56P9 AND 56P10 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE REMARKS COLUMN.

31 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 GRMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICROSECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

~~32 MARK CHARACTERS .10-.14 HIGH, BLACK, PER ND 1002019. CENTRALIZE AS SHOWN~~

33 LACE HARNESS BRANCHES TOGETHER USING A CONTINUOUS CLOVE HITCH AT LOCATIONS SHOWN.

34 ASSEMBLE SHRINK SLEEVE, ITEM 59, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTORS P9 AND P10. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

35 SOLDER PER ND1002071 USING ITEMS 60 OR 61 AND 62.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 6 OF 67

NOTE NUMBER	GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 7 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010774-001	WIRE PER 1010789-006, 22 AWG, YEL, 25 FT TOT LG
	2	1	2010774-002	WIRE PER 1010789-016, 26 AWG, YEL, 50 FT TOT LG
	3	1	2010774-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 15 FT TOT LG
	4	1	2010774-004	WIRE PER 1010789-017, 26 AWG, YEL, RED, 220 FT TOT LG
	5	1	2010774-005	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 20 FT TOT LG
	6	1	2010774-006	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN 90 FT TOT LG
	7	1	2010774-007	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 25 FT TOT LG
	8	1	2010774-008	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT, 10 FT TOT LG
	9	1	2010774-009	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 150 FT TOT LG
	10	1	2010774-010	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	11	1	2010774-011	WIRE PER 1010789-002, 24 AWG, BLK, 80 FT TOT LG
	12	1	2014741-021	CONNECTOR, PLUG, ELECTRICAL (56P9)
	13	1	2014749-021	CONNECTOR, PLUG, ELECTRICAL (56P10)
9	14	1	1010929-109	CONNECTOR, PLUG, ELECTRICAL (56P1)

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 8 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-005	CONNECTOR, PLUG, ELECTRICAL (56P2)
9	16	1	1010929-102	CONNECTOR, PLUG, ELECTRICAL (56P3)
9	17	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P4)
9	18	1	1010929-103	CONNECTOR, PLUG, ELECTRICAL (56P5)
9	19	1	1010929-104	CONNECTOR, PLUG, ELECTRICAL (56P6)
9	20	1	1010929-108	CONNECTOR, PLUG, ELECTRICAL (56P7)
9	21	1	1010929-105	CONNECTOR, PLUG, ELECTRICAL (56P8)
9	22	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	23	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	24	311	1010955- 1	CONTACT, MALE
9	25	349	1010955- 2	CONTACT, MALE
	26	1	2014670- 4	ADAPTER, CONNECTOR
	28	1	2014670- 7	ADAPTER, CONNECTOR
9	29	14	1012534- 36	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	30	2	1012534- 38	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	31	93	1010402- 2	SLEEVE, SOLDER
9	32	115	1010958- 1	PLUG, PROTECTIVE SEALING
9	34	AR	1010989	TAPE, SHIELDING, EMI/RFI

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 9 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35	1	2010774-012	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED, SILVER PLATED, 22AWG, 100 FT TOT LG
	36	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	37	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	38	AR	1012507-004	TAPE, LACING AND TYING
9	39	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	40	AR	1012504	PRIMER, METAL PARTS
9	41	AR	1010661	EPOXY RESIN
9	42	AR	1010679	ADHESIVE ACTIVATOR
9	45	AR	1006776- 19	INSULATION SLEEVING, 6 FEET TOTAL LENGTH
	47	8	2021203	TERMINAL LUG, SOLDER
	48	8	MS35333-69	WASHER, LOCK
9	49	8	1006783- 93	SCREW, BUTTON HD
9	51	5	1006783- 18	SCREW, BUTTON HD
	52	4	MS25036-52	TERMINAL LUG
28	53	1	2010774-013	WIRE BRAID,QQ-B-575,.12DIA. 36AWG, 5 FT TOT LG
	54	2	2014670- 11	ADAPTER, CONNECTOR
	55	2	2014670- 12	ADAPTER, CONNECTOR
	56	1	2014670- 13	ADAPTER,CONNECTOR

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 10 OF 67

SEE NOTE LIST OF MATERIALS

NUMBER ITEM	QTY	PART NO.	DESCRIPTION
57	1	2014670- 15	ADAPTER,CONNECTOR
58	1	MS25036-48	TERMINAL LUG
59	445	1010490-114	SLEEVE, INSULATION (HEAT SHRINKABLE)
60	AR	SN60WRAP	SOLDER QQ-S-571
61	AR	SN60WS	SOLDER QQ-S-571
62	AR	MIL-F-14256 TYPE A OR W	FLUX
63	4	1010402- 1	SLEEVE, SOLDER

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	21	9			1.00 1.00	.75 .75				68 68	31 31	
A	21A	11		SHLD A21 P9-111				.20 .18	NO NO		 24	 BRANCH 1
A	21B	11		E3 SHLD A21				.19 .20	NO NO			
A	21R			P9-311 P10-515				.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	21Y			P9-211 P10-615				.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	22	10			1.00 1.00	.75 .75				7 68	29 31	
A	22B	11		E3 SHLD A22				.19 .20	NO NO			
A	22G			P9-511 P10-536				.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A	22R			P9-611 P10-622				.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	22Y			P9-411 P10-534				.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A	23	9			1.00 1.00	.75 .75				7 68	29 31	
A	23B	11		E4 SHLD A23				.19 .20	NO NO			

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	23R		P9-212 P10-112					.18 .18	NO NO		25 25	BRANCH 1
A	23Y		P9-112 P10-412					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	24	9			1.00 1.00	.75 .75				7 68	29 31	
A	24B	11	E4 SHLD A24					.19 .20	NO NO			
A	24R		P9-412 P10-614					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	24Y		P9-312 P10-313					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	25	10			1.00 1.00	.75 .75				7 68	29 31	
A	25B	11	E4 SHLD A25					.19 .20	NO NO		52	
A	25G		P9-113 P10-514					.18 .18	NO NO		25 24	BRANCH 1 BRANCH 4
A	25R		P9-612 P10-314					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	25Y		P9-512 P10-414					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	26	9			1.00 1.00	.75 .75				7 68	29 31	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	26B	11	E3 SHLD A26					.19 .20	NO NO		52	
A	26R		P9-313 P10-525					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	26Y		P9-213 P10-624					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	27	9			1.75 1.00	1.50 .75				68 68	31 31	
A	27A	11	SHLD A27 P7-12					.20 .13	NO NO		 22	
A	27B	11	P9-637 SHLD A27					.18 .20	NO NO		24	BRANCH 3
A	27R		P7-27 P9-437					.13 .18	NO NO		22 25	 BRANCH 3
A	27Y		P7-13 P9-537					.13 .18	NO NO		22 25	 BRANCH 3
A	28	9			1.75 1.00	1.50 .75				68 68	31 31	
A	28A	11	SHLD A28 P7-26					.20 .13	NO NO		 22	
A	28B	11	P9-137 SHLD A28					.18 .20	NO NO		24	BRANCH 3
A	28R		P7-47 P9-237					.13 .18	NO NO		22 25	 BRANCH 3

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 28Y			P7-46 P9-337					.13 .18	NO NO		22 25	 BRANCH 3
A 29	9				1.75 1.00	1.50 .75				68 68	31 31	
A 29A	11		SHLD A29 P7-24					.20 .13	NO NO		 22	
A 29B	11		P9-634 SHLD A29					.18 .20	NO NO		24	BRANCH 2
A 29R			P7-44 P9-434					.13 .18	NO NO		22 25	 BRANCH 2
A 29Y			P7-25 P9-534					.13 .18	NO NO		22 25	 BRANCH 2
A 30	9				1.75 1.00	1.50 .75				68 68	31 31	
A 30A	11		SHLD A30 P7-5					.20 .13	NO NO		 22	
A 30B	11		P9-335 SHLD A30					.18 .20	NO NO		24	BRANCH 2
A 30R			P7-4 P9-135					.13 .18	NO NO		22 25	 BRANCH 2
A 30Y			P7-1 P9-235					.13 .18	NO NO		22 25	 BRANCH 2
A 31	9				1.75 1.00	1.50 .75				68 68	31 31	

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 31A	11		SHLD A31 P7-3					.20 .13	NO NO		 22	
A 31B	11		P9-635 SHLD A31					.18 .20	NO NO		24	BRANCH 2
A 31R			P7-11 P9-435					.13 .18	NO NO		22 25	 BRANCH 2
A 31Y			P7-10 P9-535					.13 .18	NO NO		22 25	 BRANCH 2
A 32	4											
A 32R			P7-53 P9-536					.13 .18	NO NO		22 25	 BRANCH 3
A 32Y			P7-54 P9-636					.13 .18	NO NO		22 25	 BRANCH 3
A 33	9				1.75 1.00	1.50 .75				68 68	31 31	
A 33A	11		SHLD A33 P1-13					.20 .13	NO NO		 22	
A 33B	11		P9-332 SHLD A33					.18 .20	NO NO		24	BRANCH 2
A 33R			P1-28 P9-132					.13 .18	NO NO		22 25	 BRANCH 2
A 33Y			P1-27 P9-232					.13 .18	NO NO		22 25	 BRANCH 2

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CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 34	9				1.75 1.00	1.50 .75				68 68	31 31	
A 34A	11		SHLD A34 P1-1					.20 .13	NO NO		 22	
A 34B	11		P9-632 SHLD A34					.18 .20	NO NO		24	BRANCH 2
A 34R			P1-4 P9-432					.13 .18	NO NO		22 25	 BRANCH 2
A 34Y			P1-3 P9-532					.13 .18	NO NO		22 25	 BRANCH 2
A 35	9				1.75 1.00	1.50 .75				68 68	31 31	
A 35A	11		SHLD A35 P1-16					.20 .13	NO NO		 22	
A 35B	11		P9-333 SHLD A35					.18 .20	NO NO		24	BRANCH 2
A 35R			P1-6 P9-133					.13 .18	NO NO		22 25	 BRANCH 2
A 35Y			P1-5 P9-233					.13 .18	NO NO		22 25	 BRANCH 2
A 36	9				1.75 1.00	1.50 .75				68 68	31 31	
A 36A	11		SHLD A36 P1-17					.20 .13	NO NO		 22	

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 36B	11		P9-346 SHLD A36					.18 .20	NO NO		24	BRANCH 3
A 36R			P1-34 P9-146					.13 .18	NO NO		22 25	 BRANCH 3
A 36Y			P1-33 P9-246					.13 .18	NO NO		22 25	 BRANCH 3
A 37	9				1.75 1.00	1.50 .75				68 68	31 31	
A 37A	11		SHLD A37 P1-18					.20 .13	NO NO		 22	
A 37B	11		P9-646 SHLD A37					.18 .20	NO NO		24	BRANCH 3
A 37R			P1-35 P9-446					.13 .18	NO NO		22 25	 BRANCH 3
A 37Y			P1-36 P9-546					.13 .18	NO NO		22 25	 BRANCH 3
A 38	9				1.75 1.00	1.50 .75				68 68	31 31	
A 38A	11		SHLD A38 P1-14					.20 .13	NO NO		 22	
A 38B	11		P9-348 SHLD A38					.18 .20	NO NO		24	BRANCH 3
A 38R			P1-30 P9-248					.13 .18	NO NO		22 25	 BRANCH 3

SIZE A
CODE IDENT NO. 80230
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SCALE-NONE
REV LTR A
SHEET 18 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 38Y			P1-29 P9-148					.13 .18	NO NO		22 25	BRANCH 3
A 39	9				1.75 1.00	1.50 .75				68 68	31 31	
A 39A	11		SHLD A39 P1-15					.20 .13	NO NO		22	
A 39B	11		P9-648 SHLD A39					.18 .20	NO NO		24	BRANCH 3
A 39R			P1-31 P9-448					.13 .18	NO NO		22 25	BRANCH 3
A 39Y			P1-32 P9-548					.13 .18	NO NO		22 25	BRANCH 3
A 40	9				1.75 1.00	1.50 .75				68 68	31 31	
A 40A	11		SHLD A40 P1-20					.20 .13	NO NO		22	
A 40B	11		P9-633 SHLD A40					.18 .20	NO NO		24	BRANCH 2
A 40R			P1-19 P9-533					.13 .18	NO NO		22 25	BRANCH 2
A 40Y			P1-37 P9-433					.13 .18	NO NO		22 25	BRANCH 2
A 41	9				1.75 1.00	1.50 .75				68 68	31 31	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 19 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 41A	11		SHLD A41 P1-21					.20 .13	NO NO		22	
A 41B	11		P9-334 SHLD A41					.18 .20	NO NO		24	BRANCH 2
A 41R			P1-38 P9-234					.13 .18	NO NO		22 25	BRANCH 2
A 41Y			P1-39 P9-134					.13 .18	NO NO		22 25	BRANCH 2
A 42	6											
A 42G			P1-26 P9-421					.13 .18	NO NO		22 25	BRANCH 2
A 42R			P1-43 P9-620					.13 .18	NO NO		22 25	BRANCH 2
A 42Y			P1-44 P9-221					.13 .18	NO NO		22 25	BRANCH 2
A 43	6											
A 43G			P1-8 P9-222					.13 .18	NO NO		22 25	BRANCH 2
A 43R			P1-7 P9-621					.13 .18	NO NO		22 25	BRANCH 2
A 43Y			P1-2 P9-119					.13 .18	NO NO		22 25	BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 20 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 46	2		P1-25 P9-422					.13 .18	NO NO		22 25	BRANCH 2
A 47	3											
A 47R			P1-40 P9-228					.13 .18	NO NO		22 24	BRANCH 2
A 47Y			P1-23 P9-328					.13 .18	NO NO		22 24	BRANCH 2
A 48	3											
A 48R			P1-41 P9-428					.13 .18	NO NO		22 24	BRANCH 2
A 48Y			P1-42 P9-528					.13 .18	NO NO		22 24	BRANCH 2
A 49	9				1.75 1.00	1.50 .75				68 68	31 31	
A 49A	11		SHLD A49 P4-30					.20 .13	NO NO		22	
A 49B	11		P9-340 SHLD A49					.18 .20	NO NO		24	BRANCH 3
A 49R			P4-52 P9-140					.13 .18	NO NO		22 25	BRANCH 3
A 49Y			P4-51 P9-240					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 21 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 50	9				1.75 1.00	1.50 .75				68 68	31 31	
A 50A	11		SHLD A50 P4-31					.20 .13	NO NO		22	
A 50B	11		P9-640 SHLD A50					.18 .20	NO NO		24	BRANCH 3
A 50R			P4-54 P9-440					.13 .18	NO NO		22 25	BRANCH 3
A 50Y			P4-53 P9-540					.13 .18	NO NO		22 25	BRANCH 3
A 51	9				1.75 1.00	1.50 .75				68 68	31 31	
A 51A	11		SHLD A51 P4-29					.20 .13	NO NO		22	
A 51B	11		P9-341 SHLD A51					.18 .20	NO NO		24	BRANCH 3
A 51R			P4-13 P9-141					.13 .18	NO NO		22 25	BRANCH 3
A 51Y			P4-14 P9-241					.13 .18	NO NO		22 25	BRANCH 3
A 52	9				1.75 1.00	1.50 .75				68 68	31 31	
A 52A	11		SHLD A52 P4-32					.20 .13	NO NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 22 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 52B	11		P9-641					.18	NO		24	BRANCH 3
			SHLD A52					.20	NO			
A 52R			P4-16					.13	NO		22	
			P9-441					.18	NO		25	BRANCH 3
A 52Y			P4-15					.13	NO		22	
			P9-541					.18	NO		25	BRANCH 3
A 53	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 53A	11		SHLD A53					.20	NO			
			P4-36					.13	NO		22	
A 53B	11		P9-342					.18	NO		24	BRANCH 3
			SHLD A53					.20	NO			
A 53R			P4-59					.13	NO		22	
			P9-142					.18	NO		25	BRANCH 3
A 53Y			P4-60					.13	NO		22	
			P9-242					.18	NO		25	BRANCH 3
A 54	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 54A	11		SHLD A54					.20	NO			
			P4-37					.13	NO		22	
A 54B	11		P9-642					.18	NO		24	BRANCH 3
			SHLD A54					.20	NO			
A 54R			P4-61					.13	NO		22	
			P9-442					.18	NO		25	BRANCH 3

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 23 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 54Y			P4-38					.13	NO		22	
			P9-542					.18	NO		25	BRANCH 3
A 55	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 55A	11		SHLD A55					.20	NO			
			P4-33					.13	NO		22	
A 55B	11		P9-343					.18	NO		24	BRANCH 3
			SHLD A55					.20	NO			
A 55R			P4-56					.13	NO		22	
			P9-143					.18	NO		25	BRANCH 3
A 55Y			P4-55					.13	NO		22	
			P9-243					.18	NO		25	BRANCH 3
A 56	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 56A	11		SHLD A56					.20	NO			
			P4-34					.13	NO		22	
A 56B	11		P9-643					.18	NO		24	BRANCH 3
			SHLD A56					.20	NO			
A 56R			P4-57					.13	NO		22	
			P9-443					.18	NO		25	BRANCH 3
A 56Y			P4-58					.13	NO		22	
			P9-543					.18	NO		25	BRANCH 3
A 57	9				1.75	1.50				68	31	
					1.00	.75				68	31	

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 24 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 57A	11		SHLD A57					.20	NO			
			P4-27					.13	NO		22	
A 57B	11		P9-344					.18	NO		24	BRANCH 3
			SHLD A57					.20	NO			
A 57R			P4-48					.13	NO		22	
			P9-144					.18	NO		25	BRANCH 3
A 57Y			P4-47					.13	NO		22	
			P9-244					.18	NO		25	BRANCH 3
A 58	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 58A	11		SHLD A58					.20	NO			
			P4-28					.13	NO		22	
A 58B	11		P9-644					.18	NO		24	BRANCH 3
			SHLD A58					.20	NO			
A 58R			P4-49					.13	NO		22	
			P9-444					.18	NO		25	BRANCH 3
A 58Y			P4-50					.13	NO		22	
			P9-544					.18	NO		25	BRANCH 3
A 59	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 59A	11		SHLD A59					.20	NO			
			P4-35					.13	NO		22	
A 59B	11		P9-345					.18	NO		24	BRANCH 3
			SHLD A59					.20	NO			

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 25 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 59R			P4-17					.13	NO		22	
			P9-145					.18	NO		25	BRANCH 3
A 59Y			P4-18					.13	NO		22	
			P9-245					.18	NO		25	BRANCH 3
A 60	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 60A	11		SHLD A60					.20	NO			
			P4-20					.13	NO		22	
A 60B	11		P9-645					.18	NO		24	BRANCH 3
			SHLD A60					.20	NO			
A 60R			P4-19					.13	NO		22	
			P9-445					.18	NO		25	BRANCH 3
A 60Y			P4-8					.13	NO		22	
			P9-545					.18	NO		25	BRANCH 3
A 61	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 61A	11		SHLD A61					.20	NO			
			P4-22					.13	NO		22	
A 61B	11		P9-329					.18	NO		24	BRANCH 2
			SHLD A61					.20	NO			
A 61R			P4-41					.13	NO		22	
			P9-129					.18	NO		25	BRANCH 2
A 61Y			P4-42					.13	NO		22	
			P9-229					.18	NO		25	BRANCH 2

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 26 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 62	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 62A	11		SHLD A62 P4-24					.20 .13	NO NO		 22	
A 62B	11		P9-629 SHLD A62					.18 .20	NO NO		24	BRANCH 2
A 62R			P4-43 P9-429					.13 .18	NO NO		22 25	 BRANCH 2
A 62Y			P4-44 P9-529					.13 .18	NO NO		22 25	 BRANCH 2
A 63	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 63A	11		SHLD A63 P4-25					.20 .13	NO NO		 22	
A 63B	11		P9-330 SHLD A63					.18 .20	NO NO		24	BRANCH 2
A 63R			P4-45 P9-130					.13 .18	NO NO		22 25	 BRANCH 2
A 63Y			P4-46 P9-230					.13 .18	NO NO		22 25	 BRANCH 2
A 64	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 64A	11		SHLD A64 P4-21					.20 .13	NO NO		 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 64B	11		P9-630 SHLD A64					.18 .20	NO NO		24	BRANCH 2
A 64R			P4-39 P9-430					.13 .18	NO NO		22 25	 BRANCH 2
A 64Y			P4-40 P9-530					.13 .18	NO NO		22 25	 BRANCH 2
A 65	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 65A	11		SHLD A65 P4-10					.20 .13	NO NO		 22	
A 65B	11		P9-331 SHLD A65					.18 .20	NO NO		24	BRANCH 2
A 65R			P4-9 P9-131					.13 .18	NO NO		22 25	 BRANCH 2
A 65Y			P4-23 P9-231					.13 .18	NO NO		22 25	 BRANCH 2
A 66	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 66A	11		SHLD A66 P4-11					.20 .13	NO NO		 22	
A 66B	11		P9-631 SHLD A66					.18 .20	NO NO		24	BRANCH 2
A 66R			P4-26 P9-431					.13 .18	NO NO		22 25	 BRANCH 2

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 66Y			P4-12 P9-531					.13 .18	NO NO		22 25	 BRANCH 2
A 67	9				1.75 1.00	1.50 .75				6B 7	31 29	
A 67A	11		SHLD A67 P4-1					.20 .13	NO NO		 22	
A 67R			P4-6 P9-338					.13 .18	NO NO		22 25	 BRANCH 3
A 67Y			P4-7 P9-238					.13 .18	NO NO		22 25	 BRANCH 3
A 68	8				1.75 1.00	1.50 .75				6B 7	63 29	
A 68A	11		SHLD A68 P4-2					.20 .13	NO NO		 22	
A 68Y			P4-3 P9-138					.13 .18	NO NO		22 24	 BRANCH 3
A 69	1		P4-5 P9-336					.13 .18	NO NO		22 24	 BRANCH 3
A 70	1		P4-4 P9-136					.13 .18	NO NO		22 24	 BRANCH 3
A 71	1		P5-84 P9-236					.13 .18	NO NO		22 24	 BRANCH 3
A 72	1		P5-60 P9-436					.13 .18	NO NO		22 24	 BRANCH 3

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 74	4											F
A 74R			P2-55 P10-121					.13 .18	NO NO		23 25	F BRANCH 5
A 74Y			P2-56 P10-221					.13 .18	NO NO		23 25	F BRANCH 5
A 75	4											F
A 75R			P2-54 P10-120					.13 .18	NO NO		23 25	F BRANCH 5
A 75Y			P2-32 P10-220					.13 .18	NO NO		23 25	F BRANCH 5
A 76	4											F
A 76R			P2-17 P10-119					.13 .18	NO NO		23 25	F BRANCH 5
A 76Y			P2-33 P10-219					.13 .18	NO NO		23 25	F BRANCH 5
A 77	4											F
A 77R			P2-16 P10-118					.13 .18	NO NO		23 25	F BRANCH 5
A 77Y			P2-5 P10-218					.13 .18	NO NO		23 25	F BRANCH 5

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 78	4											F
A 78R			P2-57 P10-321					.13 .18	NO NO		23 25	F BRANCH 5
A 78Y			P2-34 P10-421					.13 .18	NO NO		23 25	F BRANCH 5
A 79	4											F
A 79R			P2-18 P10-320					.13 .18	NO NO		23 25	F BRANCH 5
A 79Y			P2-35 P10-420					.13 .18	NO NO		23 25	F BRANCH 5
A 80	4											F
A 80R			P2-52 P10-319					.13 .18	NO NO		23 25	F BRANCH 5
A 80Y			P2-53 P10-419					.13 .18	NO NO		23 25	F BRANCH 5
A 81	4											F
A 81R			P2-15 P10-318					.13 .18	NO NO		23 25	F BRANCH 5
A 81Y			P2-30 P10-418					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A	SHEET 31 OF 67	

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 82	4											F
A 82R			P2-50 P10-317					.13 .18	NO NO		23 25	F BRANCH 5
A 82Y			P2-51 P10-417					.13 .18	NO NO		23 25	F BRANCH 5
A 83	4											F
A 83R			P2-13 P10-323					.13 .18	NO NO		23 25	F BRANCH 5
A 83Y			P2-29 P10-423					.13 .18	NO NO		23 25	F BRANCH 5
A 84	4											F
A 84R			P2-12 P10-322					.13 .18	NO NO		23 25	F BRANCH 5
A 84Y			P2-27 P10-422					.13 .18	NO NO		23 25	F BRANCH 5
A 85	4											F
A 85R			P2-48 P10-316					.13 .18	NO NO		23 25	F BRANCH 5
A 85Y			P2-49 P10-416					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A	SHEET 32 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 86	4											F
A 86R			P2-1 P10-315					.13 .18	NO NO		23 25	F BRANCH 5
A 86Y			P2-4 P10-415					.13 .18	NO NO		23 25	F BRANCH 5
A 87	4											F
A 87R			P2-11 P10-324					.13 .18	NO NO		23 25	F BRANCH 5
A 87Y			P2-24 P10-424					13 .18	NO NO		23 25	F BRANCH 5
A 88	4											F
A 88R			P2-10 P10-117					.13 .18	NO NO		23 24	F BRANCH 5
A 88Y			P2-2 P10-217					.13 .18	NO NO		23 25	F BRANCH 5
A 89	4											F
A 89R			P2-59 P10-139					.13 .18	NO NO		23 25	F BRANCH 5
A 89Y			P2-58 P10-239					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A	SHEET 33 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 90	4											F
A 90R			P2-7 P10-138					.13 .18	NO NO		23 25	F BRANCH 5
A 90Y			P2-6 P10-238					.13 .18	NO NO		23 25	F BRANCH 5
A 91	4											F
A 91R			P2-36 P10-137					.13 .18	NO NO		23 25	F BRANCH 5
A 91Y			P2-60 P10-237					.13 .18	NO NO		23 25	F BRANCH 5
A 92	4											F
A 92R			P2-8 P10-136					.13 .18	NO NO		23 25	F BRANCH 5
A 92Y			P2-19 P10-236					.13 .18	NO NO		23 25	F BRANCH 5
A 93	4											F
A 93R			P2-61 P10-135					.13 .18	NO NO		23 25	F BRANCH 5
A 93Y			P2-38 P10-235					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A	SHEET 34 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 94	4											F
A 94R			P2-39 P10-134					.13 .18	NO NO		23 25	F BRANCH 5
A 94Y			P2-20 P10-234					.13 .18	NO NO		23 25	F BRANCH 5
A 95	4											F
A 95R			P2-43 P10-327					.13 .18	NO NO		23 25	F BRANCH 5
A 95Y			P2-42 P10-427					.13 .18	NO NO		23 25	F BRANCH 5
A 96	4											F
A 96R			P2-22 P10-326					.13 .18	NO NO		23 25	F BRANCH 5
A 96Y			P2-9 P10-426					.13 .18	NO NO		23 25	F BRANCH 5
A 97	4											F
A 97R			P2-41 P10-325					.13 .18	NO NO		23 25	F BRANCH 5
A 97Y			P2-40 P10-425					.13 .18	NO NO		23 25	F BRANCH 5

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 35 OF 67

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 98	10				1.75 1.00	1.50 .75				68 7	31 29	
A 98A	11		SHLD A98 P2-44					.20 .13	NO NO		23	
A 98G			P2-25 P10-212					.13 .18	NO NO		23 24	BRANCH 4
A 98R			P2-46 P10-113					.13 .18	NO NO		23 24	BRANCH 4
A 98Y			P2-45 P10-312					.13 .18	NO NO		23 24	BRANCH 4
A 99	8				1.75 1.00	1.50 .75				68 7	63 29	
A 99A	11		SHLD A99 P2-26					.20 .13	NO NO		23	
A 99Y			P2-47 P10-114					.13 .18	NO NO		23 24	BRANCH 4
A 104	2		P3-1 P10-538					.13 .18	NO NO		22 25	E BRANCH 5
A 105	2		P3-7 P10-556					.13 .18	NO NO		22 25	E BRANCH 5
A 106	2		P3-2 P10-625					.13 .18	NO NO		22 25	E BRANCH 5
A 113	2		P3-8 P10-547					.13 .18	NO NO		22 25	E BRANCH 5

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 36 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 116	1		P5-66 P10-602					.13 .18	NO NO		22 24	D BRANCH 4
A 118	1		P5-45 P10-504					.13 .18	NO NO		22 24	D BRANCH 4
A 125	2		P5-26 P10-409					.13 .22	NO NO		22	D BRANCH 4
A 127	5											A
A 127G			P5-53 P10-161					.13 .18	NO NO		22 24	A BRANCH 6
A 127R			P5-78 P10-159					.13 .18	NO NO		22 24	A BRANCH 6
A 127Y			P5-54 P10-160					.13 .18	NO NO		22 24	A BRANCH 6
A 128	5											A
A 128G			P5-55 P10-260					.13 .18	NO NO		22 24	A BRANCH 6
A 128R			P5-79 P10-261					.13 .18	NO NO		22 24	A BRANCH 6
A 128Y			P5-80 P10-259					.13 .18	NO NO		22 24	A BRANCH 6
A 129	5											A

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 37 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 129G			P5-16 P10-360					.13 .18	NO NO		22 24	A BRANCH 6
A 129R			P5-33 P10-361					.13 .18	NO NO		22 24	A BRANCH 6
A 129Y			P5-32 P10-359					.13 .18	NO NO		22 24	A BRANCH 6
A 130	5											A
A 130G			P5-56 P10-460					.13 .18	NO NO		22 24	A BRANCH 6
A 130R			P5-81 P10-461					.13 .18	NO NO		22 24	A BRANCH 6
A 130Y			P5-57 P10-459					.13 .18	NO NO		22 24	A BRANCH 6
A 131	5											A
A 131G			P5-35 P10-560					.13 .18	NO NO		22 24	A BRANCH 6
A 131R			P5-58 P10-561					.13 .18	NO NO		22 24	A BRANCH 6
A 131Y			P5-34 P10-559					.13 .18	NO NO		22 24	A BRANCH 6
A 139	2		P6-77 P10-636					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 38 OF 67

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 148	2		P6-20 P10-613					.13 .18	NO NO		22 25	C BRANCH 6
A 149	4											C
A 149R			P6-85 P10-133					.13 .18	NO NO		22 25	C BRANCH 6
A 149Y			P6-84 P10-233					.13 .18	NO NO		22 25	C BRANCH 6
A 150	4											C
A 150R			P6-82 P10-516					.13 .18	NO NO		22 25	C BRANCH 6
A 150Y			P6-57 P10-616					.13 .18	NO NO		22 25	C BRANCH 6
A 151	4											C
A 151R			P6-8 P10-158					.13 .18	NO NO		22 25	C BRANCH 6
A 151Y			P6-2 P10-258					.13 .18	NO NO		22 25	C BRANCH 6
A 152	4											C
A 152R			P6-19 P10-157					.13 .18	NO NO		22 25	C BRANCH 6

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 39 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 152Y			P6-7 P10-257					.13 .18	NO NO		22 25	C BRANCH 6
A 153	4											C
A 153R			P6-6 P10-156					.13 .18	NO NO		22 25	C BRANCH 6
A 153Y			P6-1 P10-256					.13 .18	NO NO		22 25	C BRANCH 6
A 154	4											C
A 154R			P6-5 P10-155					.13 .18	NO NO		22 25	C BRANCH 6
A 154Y			P6-4 P10-255					.13 .18	NO NO		22 25	C BRANCH 6
A 155	4											C
A 155R			P6-15 P10-154					.13 .18	NO NO		22 25	C BRANCH 6
A 155Y			P6-16 P10-254					.13 .18	NO NO		22 25	C BRANCH 6
A 156	4											C
A 156R			P6-17 P10-153					.13 .18	NO NO		22 25	C BRANCH 6

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 40 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 156Y			P6-33 P10-253					.13 .18	NO NO		22 25	C BRANCH 6
A 157	4											C
A 157R			P6-61 P10-132					.13 .18	NO NO		22 25	C BRANCH 6
A 157Y			P6-60 P10-232					.13 .18	NO NO		22 25	C BRANCH 6
A 158	4											
A 158R			P6-37 P10-130					.13 .18	NO NO		22 25	C BRANCH 6
A 158Y			P6-36 P10-230					.13 .18	NO NO		22 25	C BRANCH 6
A 159	4											C
A 159R			P6-83 P10-352					.13 .18	NO NO		22 25	C BRANCH 6
A 159Y			P6-59 P10-452					.13 .18	NO NO		22 25	C BRANCH 6
A 160	4											C
A 160R			P6-35 P10-129					.13 .18	NO NO		22 25	C BRANCH 6

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 41 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 160Y			P6-18 P10-229					.13 .18	NO NO		22 25	C BRANCH 6
A 161	4											C
A 161R			P6-58 P10-128					.13 .18	NO NO		22 25	C BRANCH 6
A 161Y			P6-34 P10-228					.13 .18	NO NO		22 25	C BRANCH 6
A 164	1		P8-9 P10-302					.13 .18	NO NO		22 24	B BRANCH 4
A 170	2		P8-5 P10-509					.13 .18	NO NO		22 25	B BRANCH 4
A 177	2		P8-8 P10-108					.13 .22	NO NO		22	B BRANCH 4
A 178	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 178A	11		SHLD A178 P3-52					.20 .13	NO NO		 22	
A 178B	11		P7-21 SHLD A178					.13 .20	NO NO		22	
A 178R			P3-77 P7-40					.13 .13	NO NO		22 22	
A 178Y			P3-53 P7-22					.13 .13	NO NO		22 22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 42 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 179	9				1.75	1.50				68	31	
					1.75	1.50				68	31	
A 179A	11		SHLD A179					.20	NO			
			P3-30					.13	NO		22	
A 179B	11		P7-23					.13	NO		22	
			SHLD A179					.20	NO			
A 179R			P3-31					.13	NO		22	
			P7-42					.13	NO		22	
A 179Y			P3-15					.13	NO		22	
			P7-43					.13	NO		22	
A 180	9				1.75	1.50				68	31	
					1.75	1.50				68	31	
A 180A	11		SHLD A180					.20	NO			
			P3-51					.13	NO		22	
A 180B	11		P7-2					.13	NO		22	
			SHLD A180					.20	NO			
A 180R			P3-75					.13	NO		22	
			P7-8					.13	NO		22	
A 180Y			P3-76					.13	NO		22	
			P7-9					.13	NO		22	
A 181	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 181A	11		SHLD A181					.20	NO			
			P3-46					.13	NO		22	

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR A	SHEET 43 OF 67	

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 181R			P3-71					.13	NO		22	
			P7-38					.13	NO		22	
A 181Y			P3-70					.13	NO		22	
			P7-39					.13	NO		22	
A 182	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 182A	11		SHLD A182					.20	NO			
			P3-69					.13	NO		22	
A 182R			P3-45					.13	NO		22	
			P7-19					.13	NO		22	
A 182Y			P3-44					.13	NO		22	
			P7-20					.13	NO		22	
A 183	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 183A	11		SHLD A183					.20	NO			
			P3-28					.13	NO		22	
A 183R			P3-13					.13	NO		22	
			P7-60					.13	NO		22	
A 183Y			P3-29					.13	NO		22	
			P7-61					.13	NO		22	
A 184	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 184A	11		SHLD A184					.20	NO			
			P3-74					.13	NO		22	

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR A	SHEET 44 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 184R			P3-49					.13	NO		22	
			P7-36					.13	NO		22	
A 184Y			P3-50					.13	NO		22	
			P7-37					.13	NO		22	
A 185	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 185A	11		SHLD A185					.20	NO			
			P3-27					.13	NO		22	
A 185R			P3-26					.13	NO		22	
			P7-58					.13	NO		22	
A 185Y			P3-47					.13	NO		22	
			P7-59					.13	NO		22	
A 186	9				1.75	1.50				68	31	
					1.75	1.50				7	29	
A 186A	11		SHLD A186					.20	NO			
			P3-48					.13	NO		22	
A 186R			P3-72					.13	NO		22	
			P7-35					.13	NO		22	
A 186Y			P3-73					.13	NO		22	
			P7-18					.13	NO		22	
A 187	3											
A 187R			P3-67					.13	NO		22	
			P7-57					.13	NO		22	

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR A	SHEET 45 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 187Y			P3-68					.13	NO		22	
			P7-34					.13	NO		22	
A 188	7											
A 188G			P3-24					.13	NO		22	
			P7-51					.13	NO		22	
A 188N			P3-43					.13	NO		22	
			P7-29					.13	NO		22	
A 188R			P3-25					.13	NO		22	
			P7-50					.13	NO		22	
A 188Y			P3-23					.13	NO		22	
			P7-28					.13	NO		22	
A 189	4											
A 189R			P3-5					.13	NO		22	
			P7-49					.13	NO		22	
A 189Y			P3-14					.13	NO		22	
			P7-48					.13	NO		22	
A 195	2		P5-23					.13	NO		22	D
			P10-608					.22	NO			BRANCH 4
A 196	2		P5-22					.13	NO		22	D
			P10-609					.22	NO			BRANCH 4
A 198	6											

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR A	SHEET 46 OF 67	

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 179	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 179A	11		SHLD A179 P3-30					.20 .13	NO NO		 22	
A 179B	11		P7-23 SHLD A179					.13 .20	NO NO		22	
A 179R			P3-31 P7-42					.13 .13	NO NO		22 22	
A 179Y			P3-15 P7-43					.13 .13	NO NO		22 22	
A 180	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 180A	11		SHLD A180 P3-51					.20 .13	NO NO		 22	
A 180B	11		P7-2 SHLD A180					.13 .20	NO NO		22	
A 180R			P3-75 P7-8					.13 .13	NO NO		22 22	
A 180Y			P3-76 P7-9					.13 .13	NO NO		22 22	
A 181	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 181A	11		SHLD A181 P3-46					.20 .13	NO NO		 22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 43 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 181R			P3-71 P7-38					.13 .13	NO NO		22 22	
A 181Y			P3-70 P7-39					.13 .13	NO NO		22 22	
A 182	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 182A	11		SHLD A182 P3-69					.20 .13	NO NO		 22	
A 182R			P3-45 P7-19					.13 .13	NO NO		22 22	
A 182Y			P3-44 P7-20					.13 .13	NO NO		22 22	
A 183	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 183A	11		SHLD A183 P3-28					.20 .13	NO NO		 22	
A 183R			P3-13 P7-60					.13 .13	NO NO		22 22	
A 183Y			P3-29 P7-61					.13 .13	NO NO		22 22	
A 184	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 184A	11		SHLD A184 P3-74					.20 .13	NO NO		 22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 44 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 184R			P3-49 P7-36					.13 .13	NO NO		22 22	
A 184Y			P3-50 P7-37					.13 .13	NO NO		22 22	
A 185	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 185A	11		SHLD A185 P3-27					.20 .13	NO NO		 22	
A 185R			P3-26 P7-58					.13 .13	NO NO		22 22	
A 185Y			P3-47 P7-59					.13 .13	NO NO		22 22	
A 186	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 186A	11		SHLD A186 P3-48					.20 .13	NO NO		 22	
A 186R			P3-72 P7-35					.13 .13	NO NO		22 22	
A 186Y			P3-73 P7-18					.13 .13	NO NO		22 22	
A 187	3											
A 187R			P3-67 P7-57					.13 .13	NO NO		22 22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 45 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 187Y			P3-68 P7-34					.13 .13	NO NO		22 22	
A 188	7											
A 188G			P3-24 P7-51					.13 .13	NO NO		22 22	
A 188N			P3-43 P7-29					.13 .13	NO NO		22 22	
A 188R			P3-25 P7-50					.13 .13	NO NO		22 22	
A 188Y			P3-23 P7-28					.13 .13	NO NO		22 22	
A 189	4											
A 189R			P3-5 P7-49					.13 .13	NO NO		22 22	
A 189Y			P3-14 P7-48					.13 .13	NO NO		22 22	
A 195	2		P5-23 P10-608					.13 .22	NO NO		22	D BRANCH 4
A 196	2		P5-22 P10-609					.13 .22	NO NO		22	D BRANCH 4
A 198	6											

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 46 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 198G			P1-11 P9-521					.13 .18	NO NO		22 25	BRANCH 2
A 198K			P1-10 P9-121					.13 .18	NO NO		22 25	BRANCH 2
A 198Y			P1-9 P9-321					.13 .18	NO NO		22 25	BRANCH 2
A 199	5											A
A 199G			P5-5 P10-660					.13 .18	NO NO		22 24	A BRANCH 6
A 199K			P5-31 P10-661					.13 .18	NO NO		22 24	A BRANCH 6
A 199Y			P5-15 P10-659					.13 .18	NO NO		22 24	A BRANCH 6
A 200	2		P3-39 P10-202					.13 .18	NO NO		22 25	E BRANCH 5
A 201	2		P3-64 P10-102					.13 .18	NO NO		22 24	E BRANCH 5
A 202	2		P3-42 P10-652					.13 .18	NO NO		22 25	E BRANCH 5
A 203	2		P3-66 P10-551					.13 .18	NO NO		22 25	E BRANCH 5
A 204	2		P3-21 P10-552					.13 .18	NO NO		22 25	E BRANCH 5

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR	A	SHEET 47 OF 67	

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 205	2		P3-22 P10-651					.13 .18	NO NO		22 25	E BRANCH 5
A 206	2		P3-18 P10-548					.13 .18	NO NO		22 25	E BRANCH 5
A 207	2		P3-36 P10-549					.13 .18	NO NO		22 25	E BRANCH 5
A 208	2		P3-19 P10-550					.13 .18	NO NO		22 25	E BRANCH 5
A 209	2		P3-41 P10-214					.13 .18	NO NO		22 25	E BRANCH 5
A 210	2		P3-65 P10-216					.13 .18	NO NO		22 25	E BRANCH 5
A 211	2		P3-40 P10-215					.13 .18	NO NO		22 25	E BRANCH 5
A 212	2		P3-33 P10-646					.13 .18	NO NO		22 25	E BRANCH 5
A 213	2		P3-17 P10-546					.13 .18	NO NO		22 25	E BRANCH 5
A 214	2		P3-57 P10-645					.13 .18	NO NO		22 25	E BRANCH 5
A 215	2		P3-82 P10-545					.13 .18	NO NO		22 25	E BRANCH 5
A 216	2		P3-81 P10-542					.13 .18	NO NO		22 25	E BRANCH 5

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR	A	SHEET 48 OF 67	

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 217	2		P3-80 P10-644					.13 .18	NO NO		22 25	E BRANCH 5
A 218	2		P3-56 P10-544					.13 .18	NO NO		22 25	E BRANCH 5
A 219	2		P3-84 P10-623					.13 .18	NO NO		22 25	E BRANCH 5
A 220	2		P3-60 P10-524					.13 .18	NO NO		22 25	E BRANCH 5
A 221	2		P3-59 P10-522					.13 .18	NO NO		22 25	E BRANCH 5
A 222	2		P3-62 P10-648					.13 .18	NO NO		22 25	E BRANCH 5
A 223	2		P3-63 P10-649					.13 .18	NO NO		22 25	E BRANCH 5
A 224	2		P3-38 P10-650					.13 .18	NO NO		22 25	E BRANCH 5
A 225	2		P5-38 P10-401					.13 .18	NO NO		22 25	D BRANCH 4
A 226	2		P5-62 P10-601					.13 .18	NO NO		22 25	D BRANCH 4
A 227	2		P5-63 P10-501					.13 .18	NO NO		22 25	D BRANCH 4
A 228	2		P5-64 P10-101					.13 .18	NO NO		22 24	D BRANCH 4

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR	A	SHEET 49 OF 67	

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 229	2		P5-40 P10-301					.13 .18	NO NO		22 25	D BRANCH 4
A 230	2		P5-39 P10-201					.13 .18	NO NO		22 25	D BRANCH 4
A 231	2		P5-41 P10-502					.13 .22	NO NO		22 25	D BRANCH 4
A 232	2		P5-42 P10-402					.13 .22	NO NO		22	D BRANCH 4
A 233	2		P5-30 P10-204					.13 .22	NO NO		22	D BRANCH 4
A 234	2		P5-14 P10-505					.13 .22	NO NO		22	D BRANCH 4
A 235	2		P5-29 P10-605					.13 .22	NO NO		22	D BRANCH 4
A 236	2		P5-77 P10-506					.13 .22	NO NO		22	D BRANCH 4
A 237	2		P5-52 P10-404					.13 .22	NO NO		22	D BRANCH 4
A 238	2		P5-76 P10-304					.13 .22	NO NO		22	D BRANCH 4
A 239	2		P5-50 P10-405					.13 .22	NO NO		22	D BRANCH 4
A 240	2		P5-51 P10-606					.13 .22	NO NO		22	D BRANCH 4

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR	A	SHEET 50 OF 67	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 241	2		P5-75 P10-205					.13 .22	NO NO		22	D BRANCH 4
A 242	2		P5-73 P10-607					.13 .22	NO NO		22	D BRANCH 4
A 243	2		P5-74 P10-305					.13 .22	NO NO		22	D BRANCH 4
A 244	2		P5-49 P10-507					.13 .22	NO NO		22	D BRANCH 4
A 245	2		P5-13 P10-306					.13 .22	NO NO		22	D BRANCH 4
A 246	2		P5-28 P10-206					.13 .22	NO NO		22	D BRANCH 4
A 247	2		P5-27 P10-406					.13 .22	NO NO		22	D BRANCH 4
A 248	2		P5-47 P10-307					.13 .22	NO NO		22	D BRANCH 4
A 249	2		P5-46 P10-208					.13 .22	NO NO		22	D BRANCH 4
A 250	2		P5-4 P10-308					.13 .22	NO NO		22	D BRANCH 4
A 251	2		P5-12 P10-309					.13 .22	NO NO		22	D BRANCH 4
A 252	2		P5-71 P10-207					.13 .22	NO NO		22	D BRANCH 4

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 51 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 253	2		P5-72 P10-407					.13 .22	NO NO		22	D BRANCH 4
A 254	2		P5-48 P10-604					.13 .22	NO NO		22	D BRANCH 4
A 255	3											A
A 255R			P5-44 P10-107					.13 .18	NO NO		22 24	A BRANCH 6
A 255Y			P5-68 P10-105					.13 .18	NO NO		22 24	A BRANCH 6
A 256	2		P6-14 P10-540					.13 .18	NO NO		22 25	C BRANCH 6
A 257	2		P6-30 P10-639					.13 .18	NO NO		22 25	C BRANCH 6
A 258	2		P6-48 P10-658					.13 .18	NO NO		22 25	C BRANCH 6
A 259	2		P6-72 P10-557					.13 .18	NO NO		22 25	C BRANCH 6
A 260	2		P6-73 P10-558					.13 .18	NO NO		22 25	C BRANCH 6
A 261	2		P6-49 P10-657					.13 .18	NO NO		22 25	C BRANCH 6
A 262	2		P6-28 P10-640					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 52 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 263	2		P6-29 P10-520					.13 .18	NO NO		22 25	C BRANCH 6
A 264	2		P6-76 P10-523					.13 .18	NO NO		22 25	C BRANCH 6
A 265	2		P6-75 P10-647					.13 .18	NO NO		22 25	C BRANCH 6
A 266	2		P6-50 P10-641					.13 .18	NO NO		22 25	C BRANCH 6
A 267	2		P6-74 P10-541					.13 .18	NO NO		22 25	C BRANCH 6
A 268	2		P6-40 P10-109					.13 .18	NO NO		22 25	C BRANCH 6
A 269	2		P6-21 P10-410					.13 .18	NO NO		22 25	C BRANCH 6
A 270	2		P6-65 P10-209					.13 .18	NO NO		22 25	C BRANCH 6
A 271	2		P6-22 P10-310					.13 .18	NO NO		22 25	C BRANCH 6
A 272	2		P6-66 P10-510					.13 .18	NO NO		22 25	C BRANCH 6
A 273	2		P6-42 P10-210					.13 .18	NO NO		22 25	C BRANCH 6
A 274	2		P6-41 P10-610					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 53 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 275	2		P6-67 P10-110					.13 .18	NO NO		22 25	C BRANCH 6
A 276	2		P6-10 P10-111					.13 .18	NO NO		22 25	C BRANCH 6
A 277	2		P6-24 P10-612					.13 .18	NO NO		22 25	C BRANCH 6
A 278	2		P6-9 P10-211					.13 .18	NO NO		22 25	C BRANCH 6
A 279	2		P6-23 P10-512					.13 .18	NO NO		22 25	C BRANCH 6
A 280	2		P6-68 P10-511					.13 .18	NO NO		22 25	C BRANCH 6
A 281	2		P6-69 P10-411					.13 .18	NO NO		22 25	C BRANCH 6
A 282	2		P6-43 P10-611					.13 .18	NO NO		22 25	C BRANCH 6
A 283	2		P6-44 P10-311					.13 .18	NO NO		22 25	C BRANCH 6
A 284	2		P6-46 P10-627					.13 .18	NO NO		22 25	C BRANCH 6
A 285	2		P6-25 P10-628					.13 .18	NO NO		22 25	C BRANCH 6
A 286	2		P6-45 P10-528					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 54 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 287	2		P6-71 P10-526					.13 .18	NO NO		22 25	C BRANCH 6
A 288	2		P6-70 P10-527					.13 .18	NO NO		22 25	C BRANCH 6
A 289	2		P6-47 P10-626					.13 .18	NO NO		22 25	C BRANCH 6
A 290	2		P6-12 P10-654					.13 .18	NO NO		22 25	C BRANCH 6
A 291	2		P6-3 P10-655					.13 .18	NO NO		22 25	C BRANCH 6
A 292	2		P6-11 P10-555					.13 .18	NO NO		22 25	C BRANCH 6
A 293	2		P6-27 P10-553					.13 .18	NO NO		22 25	C BRANCH 6
A 294	2		P6-26 P10-554					.13 .18	NO NO		22 25	C BRANCH 6
A 295	2		P6-13 P10-653					.13 .18	NO NO		22 25	C BRANCH 6
A 296	2		P8-24 P10-403					.13 .18	NO NO		22 25	B BRANCH 4
A 297	2		P8-44 P10-603					.13 .18	NO NO		22 25	B BRANCH 4
A 298	2		P8-43 P10-503					.13 .18	NO NO		22 25	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 55 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 299	2		P8-41 P10-103					.13 .18	NO NO		22 24	B BRANCH 4
A 300	2		P8-42 P10-303					.13 .18	NO NO		22 25	B BRANCH 4
A 301	2		P8-23 P10-203					.13 .18	NO NO		22 25	B BRANCH 4
A 302	2		P8-22 P10-502					.13 .22	NO NO		22 24	B BRANCH 4
A 303	2		P8-10 P10-402					.13 .22	NO NO		22 24	B BRANCH 4
A 304	2		P8-52 P10-207					.13 .22	NO NO		22 24	B BRANCH 4
A 305	2		P8-50 P10-407					.13 .22	NO NO		22 24	B BRANCH 4
A 306	2		P8-51 P10-307					.13 .22	NO NO		22 24	B BRANCH 4
A 307	2		P8-31 P10-408					.13 .22	NO NO		22	B BRANCH 4
A 308	2		P8-53 P10-608					.13 .22	NO NO		22 24	B BRANCH 4
A 309	2		P8-54 P10-508					.13 .22	NO NO		22	B BRANCH 4
A 310	2		P8-32 P10-208					.13 .22	NO NO		22 24	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 56 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 311	2		P8-30 P10-309					.13 .22	NO NO		22 24	B BRANCH 4
A 312	2		P8-29 P10-308					.13 .22	NO NO		22 24	B BRANCH 4
A 313	2		P8-16 P10-409					.13 .22	NO NO		22 24	B BRANCH 4
A 314	2		P8-14 P10-604					.13 .22	NO NO		22 24	B BRANCH 4
A 315	2		P8-15 P10-609					.13 .22	NO NO		22 24	B BRANCH 4
A 316	1		P8-7 P10-106					.13 .18	NO NO		22 24	B BRANCH 4
A 317	1		P8-2 P10-104					.13 .18	NO NO		22 24	B BRANCH 4
A 318	2		P8-3 P10-607					.13 .22	NO NO		22 24	B BRANCH 4
A 319	2		P8-25 P10-606					.13 .22	NO NO		22 24	B BRANCH 4
A 320	2		P8-1 P10-507					.13 .22	NO NO		22 24	B BRANCH 4
A 321	2		P8-12 P10-406					.13 .22	NO NO		22 24	B BRANCH 4
A 322	2		P8-11 P10-506					.13 .22	NO NO		22 24	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 57 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 323	2		P8-28 P10-405					.13 .22	NO NO		22 24	B BRANCH 4
A 324	2		P8-4 P10-206					.13 .22	NO NO		22 24	B BRANCH 4
A 325	2		P8-13 P10-306					.13 .22	NO NO		22 24	B BRANCH 4
A 326	2		P8-26 P10-205					.13 .22	NO NO		22 24	B BRANCH 4
A 327	2		P8-27 P10-305					.13 .22	NO NO		22 24	B BRANCH 4
A 328	2		P8-47 P10-204					.13 .22	NO NO		22 24	B BRANCH 4
A 329	2		P8-45 P10-404					.13 .22	NO NO		22 24	B BRANCH 4
A 330	2		P8-46 P10-304					.13 .22	NO NO		22 24	B BRANCH 4
A 331	2		P8-48 P10-605					.13 .22	NO NO		22 24	B BRANCH 4
A 332	2		P8-49 P10-505					.13 .22	NO NO		22 24	B BRANCH 4
A 333	3									6A 6A	31 31	
A 333A	11		SHLD A333 E8					.20 .19	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 58 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 333B	11		E12 SHLD A333					.19 .20	NO NO			
A 333R			P3-3 P7-52					.13 .13	NO NO		22 22	
A 333Y			P3-11 P7-31					.13 .13	NO NO		22 22	
A 334	8				1.75 1.75	1.50 1.50				6A 6A	63 63	
A 334A	11		SHLD A334 E8					.20 .19	NO NO		 47	
A 334B	11		E11 SHLD A334					.19 .20	NO NO		47	
A 334Y			P3-4 P6-51					.13 .13	NO NO		22 22	
A 335	9				1.75 1.75	1.50 1.50				6A 6A	31 31	
A 335A	11		SHLD A335 E10					.20 .19	NO NO			
A 335B	11		E12 SHLD A335					.19 .20	NO NO		47	
A 335R			P5-19 P7-15					.13 .13	NO NO		22 22	
A 335Y			P5-18 P7-16					.13 .13	NO NO		22 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 336	9				1.75 1.75	1.50 1.50				6A 6A	31 31	
A 336A	11		SHLD A336 E10					.20 .19	NO NO			
A 336B	11		E13 SHLD A336					.19 .20	NO NO			
A 336R			P5-7 P7-30					.13 .13	NO NO		22 22	
A 336Y			P5-8 P7-14					.13 .13	NO NO		22 22	
A 337	3									6A 6A	31 31	
A 337A	11		SHLD A337 E10					.20 .19	NO NO		 47	
A 337B	11		E13 SHLD A337					.19 .20	NO NO		47	
A 337R			P5-9 P7-6					.13 .13	NO NO		22 22	
A 337Y			P5-2 P7-7					.13 .13	NO NO		22 22	
A 338	2		P5-10 P10-508					.13 .22	NO NO		22 24	D BRANCH 4
A 339	2		P5-24 P10-408					.13 .22	NO NO		22 24	D BRANCH 4

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 340	35		E7 E5					.19 .19	NO NO		47	F
A 341	35		E8 E5					.19 .19	NO NO			E
A 342	35		E9 E5					.19 .19	NO NO		 52	D
A 343	35		E9 E6					.19 .19	NO NO		47	A
A 344	35		E11 E6					.19 .19	NO NO			C
A 345	35		E14 E6					.19 .19	NO NO		47 52	B
A 346	2		P5-43 P10-108					.13 .22	NO NO		22 24	A BRANCH 6
A 347	35		E3 E36					.19 .19	NO NO		 58	G
A 348	4											G
A 348R			P9-610 P10-332					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 348Y			P9-510 P10-432					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 349	4											G

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 349R			P9-310 P10-330					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 349Y			P9-210 P10-430					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 350	4											G
A 350R			P9-609 P10-329					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 350Y			P9-509 P10-429					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 351	4											G
A 351R			P9-309 P10-328					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 351Y			P9-209 P10-428					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 352	4											G
A 352R			P9-608 P10-334					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 352Y			P9-508 P10-434					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 353	4											G

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 353R			P9-308 P10-333					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 353Y			P9-208 P10-433					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354	4											G
A 354R			P9-607 P10-338					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354Y			P9-507 P10-438					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355	4											G
A 355R			P9-307 P10-337					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355Y			P9-207 P10-437					.18 .18	NO NO		25 25	B, BRANCH 1 BRANCH 5
A 356	4											G
A 356R			P9-606 P10-336					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 356Y			P9-506 P10-436					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357	4											G

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	A	SHEET 63 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 357R			P9-306 P10-335					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357Y			P9-206 P10-435					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358	4											G
A 358R			P9-605 P10-146					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358Y			P9-505 P10-246					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359	4											G
A 359R			P9-305 P10-145					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359Y			P9-205 P10-245					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360	4											G
A 360R			P9-604 P10-144					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360Y			P9-504 P10-244					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361	4											G

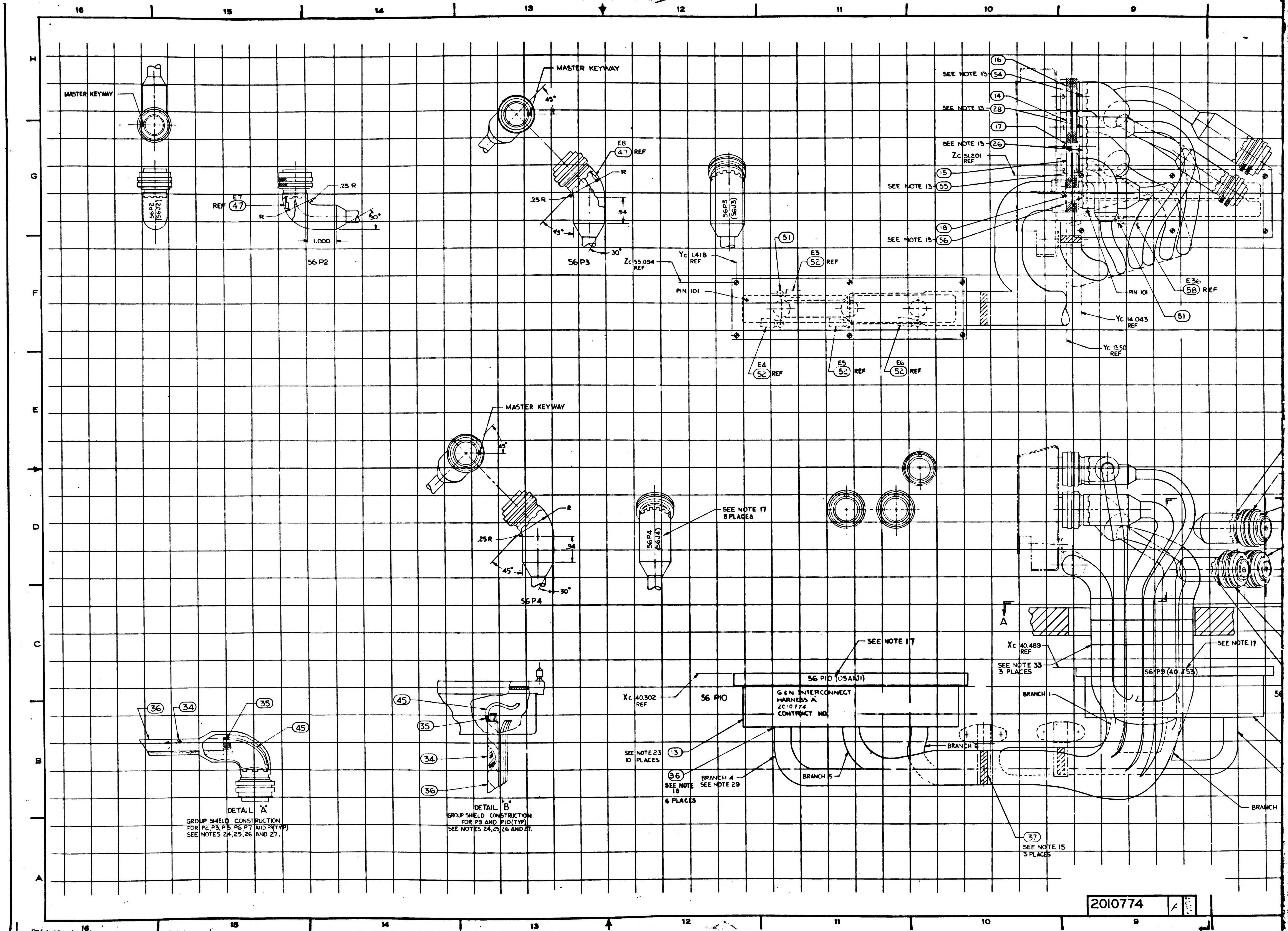
SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	A	SHEET 64 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 361R			P9-304 P10-143					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361Y			P9-204 P10-243					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362	4											G
A 362R			P9-603 P10-148					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362Y			P9-503 P10-248					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363	4											G
A 363R			P9-303 P10-147					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363Y			P9-203 P10-247					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364	4											G
A 364R			P9-602 P10-152					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364Y			P9-502 P10-252					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365	4											G

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	A	SHEET 65 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 365R			P9-302 P10-151					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365Y			P9-202 P10-251					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366	4											G
A 366R			P9-601 P10-150					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366Y			P9-501 P10-250					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367	4											G
A 367R			P9-301 P10-149					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367Y			P9-201 P10-249					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	A	SHEET 66 OF 67

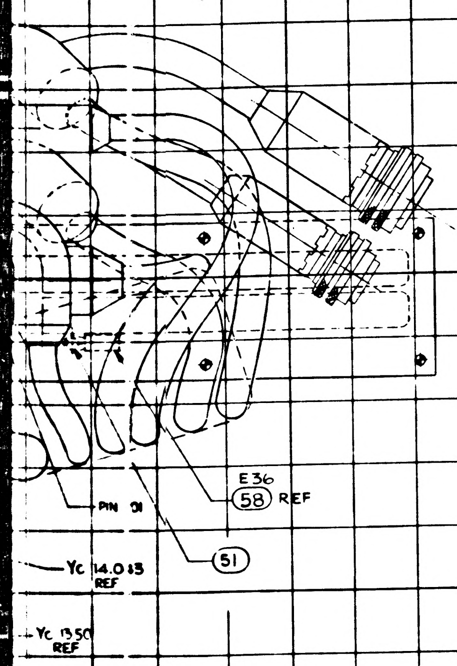

16
15
14
13
12
11
10
9
H
G
F
E
D
C
B
A
MASTER KEYWAY
56P2 (56J2)
E7
REF 47
R
.25 R
30°
1.000
56 P2
MASTER KEYWAY
45°
E8
47 REF
R
.25 R
.94
45°
30°
56 P3
56P3 (56J3)
Zc 55.034 REF
Yc 1.418 REF
51
E3
52 REF
PIN 101
E4
52 REF
E5
52 REF
E6
52 REF
16
SEE NOTE 13 54
14
SEE NOTE 13 28
17
SEE NOTE 13 26
Zc 51.201 REF
15
SEE NOTE 13 55
18
SEE NOTE 13 56
PIN 101
E36
58 REF
51
Yc 14.043 REF
Yc 13.50 REF
MASTER KEYWAY
45°
R
.25 R
.94
45°
30°
56 P4
56P4 (56J4)
SEE NOTE 17 8 PLACES
A
Xc 40.489 REF
SEE NOTE 33 3 PLACES
SEE NOTE 17
56 P9 (40 J53)
BRANCH 1
SEE NOTE 17
56 P10 (05ANJ1)
Xc 40.302 REF
56 P10
G&N INTERCONNECT HARNESS A 2010774 CONTRACT NO.
SEE NOTE 23 10 PLACES
13
36
SEE NOTE 16
6 PLACES
BRANCH 4 SEE NOTE 29
BRANCH 5
BRANCH 6
37
SEE NOTE 15 3 PLACES
BRANCH
36
34
35
45
DETAIL "A"
GROUP SHIELD CONSTRUCTION FOR P2, P3, P5, P6, P7 AND P8 (TYP)
SEE NOTES 24, 25, 26 AND 27.
45
35
34
36
DETAIL "B"
GROUP SHIELD CONSTRUCTION FOR P9 AND P10 (TYP)
SEE NOTES 24, 25, 26 AND 27.
2010774
F

1/2010774

REVISIONS 3/30

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

SEE SHEET 1 FOR REVISION RECORD



PIN 31
E36
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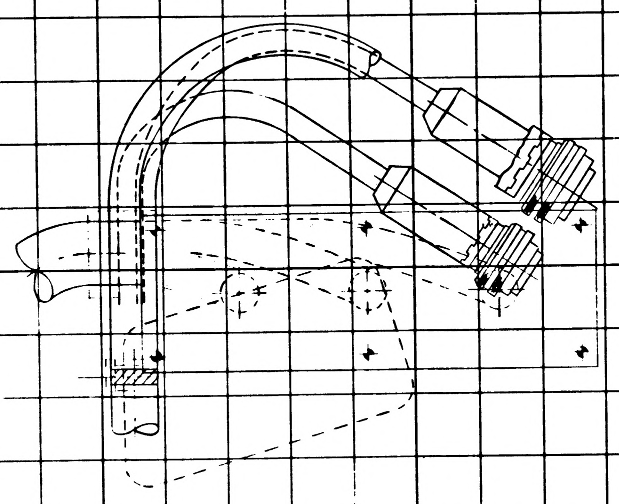
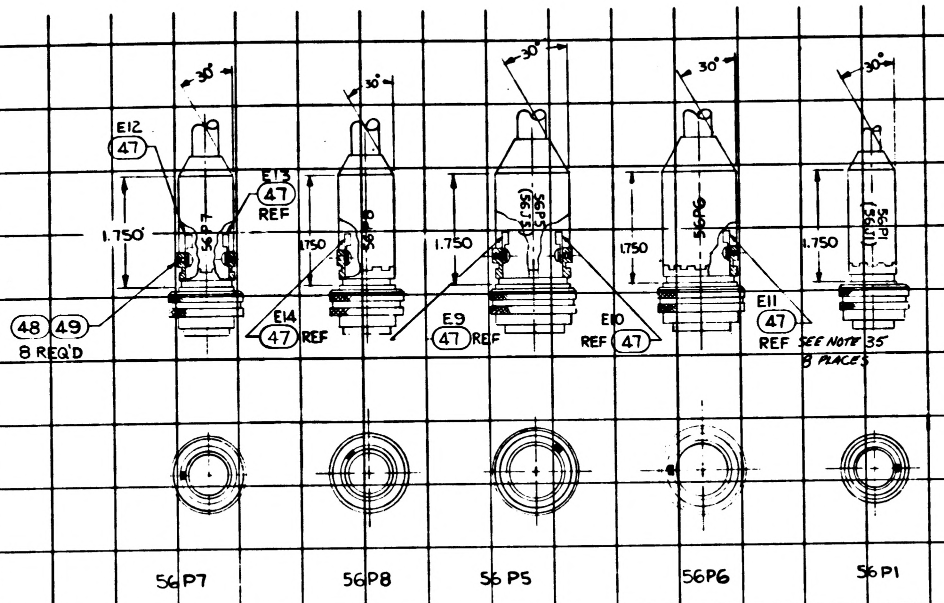
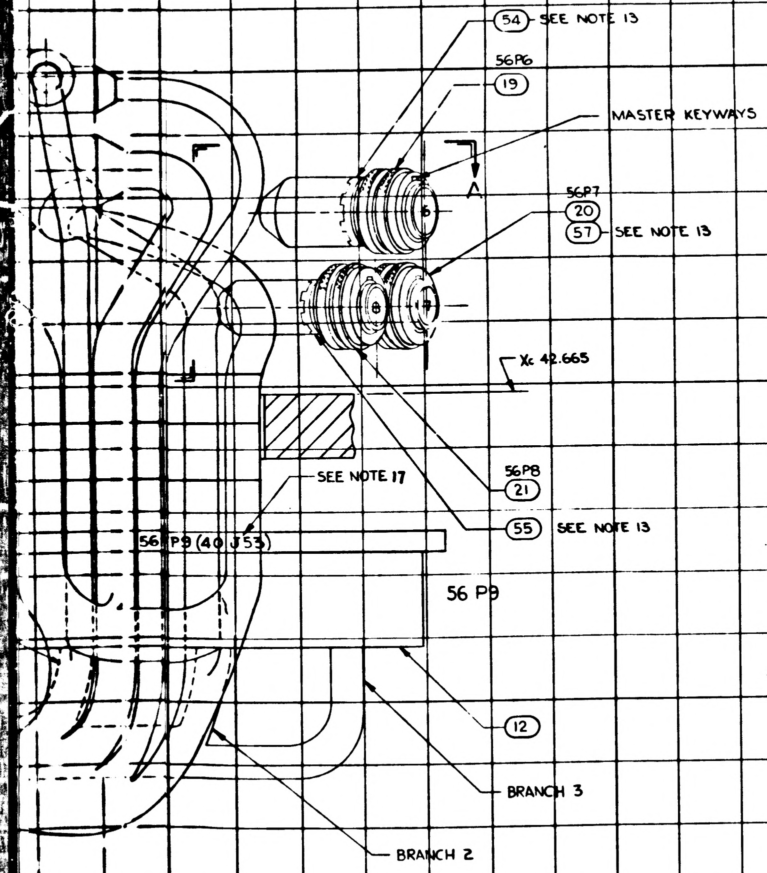
(51)
Yc 14.083 REF
Yc 13.50 REF



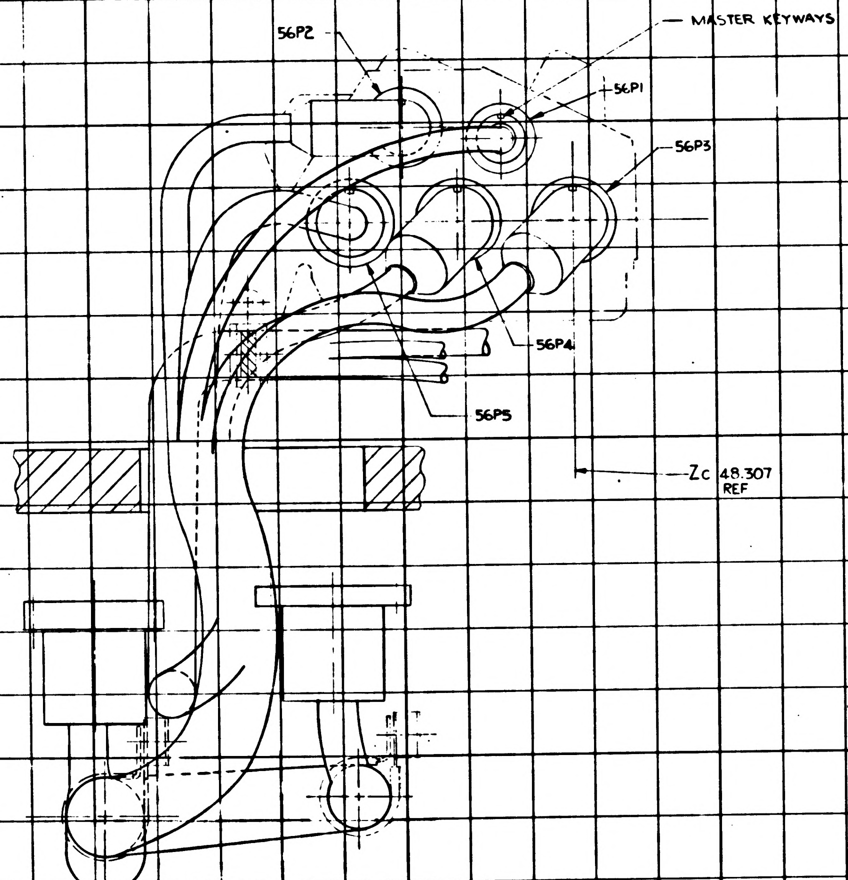
PARTIAL VIEW A-A



30°
E12
(47)
E13
(47)
REF
1.750
(48) (49)
8 REQ'D
E14
(47) REF
E9
(47) REF
E10
REF (47)
E11
(47)
REF SEE NOTE 35
8 PLACES
56P7
56P8
56P5
(56J5)
56P6
56P1
(56J1)
56P7
56P8
56 P5
56P6
56 P1



(54) SEE NOTE 13
56P6
(19)
MASTER KEYWAYS
A
56P7
(20)
(57) SEE NOTE 13
Xc 42.665
56P8
(21)
(55) SEE NOTE 13
SEE NOTE 17
56 P9 (40 J53)
56 P9
(12)
BRANCH 3
BRANCH 2



56P2
MASTER KEYWAYS
56P1
56P3
56P4
56P5
Zc 48.307 REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + − − −	M I T INSTRUMENTATION LAB CAMBRIDGE MASS DRAWN Grunewald DATE 28 JUN 66 CHECKED W Diehl 1 JUL '66 APPROVAL Paul Nelson AUG 15, 66 APPROVAL [illegible] 6/1/66	MANNED SPACECRAFT CENTER HOUSTON, TEXAS G & N INTERCONNECT HARNESS "A" (C/M BLOCK II)
DO NOT SCALE THIS DRAWING MATERIAL	NASA APPROVAL R. Jacob 9/23/66	CODE IDENT NO 80230 · SIZE J2 · 2010774
CONTRACT NAS9-497	CCA APPROVAL [illegible] 9/12/66	SCALE FULL · SHEET 6 OF 6

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	wA
B	REVISED PER TDRR 31197	4 Oct. 66	DW

REV		A	A	A	A	A	A	A	A	A	B	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A
SHEET		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
REV STATUS OF SHEETS	REV					B	B	A	B	A	B	A	A	B	A	B	A	B	A	A	A	A	A	A	A		
	SHEET					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN	29 JUN 66	DAY MO YR
CHECKER	W. Diehl	1 JUL 66
NEA ENGINEER	L. Bustin	5 Jul 66
APPROVAL		
CONTR NO.	NAS 9-497	
NASA APPROVAL	R. Jacob	
CCB APPROVAL		

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "A"
(C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010774
SCALE NONE		SHEET 1 OF 67

MIL 1377A6 12-63

REVISION STATUS OF SHEETS

SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV
46	A																
47	B																
48	A																
49	B																
50	B																
51	A																
52	A																
53	A																
54	A																
55	A																
56	B																
57	A																
58	A																
59	A																
60	A																
61	A																
62	A																
63	A																
64	A																
65	A																
66	A																
67	B																

SIZE	CODE IDENT. NO.	
A	80230	2010774
SCALE NONE	REV LTR B	SHEET 2 OF 67

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6A AND 6B AND ND1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014671.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A - FROM END OF SHIELD B - TO END OF SHIELD G - GREEN K - BLACK L - BLUE N - BROWN R - RED W - WHITE Y - YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION
8	UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 3 OF 67

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
11	ALL UNUSED CONTACT CAVITIES ON CONNECTORS 56P1, 2, 3, 4, 5, 6, 7, AND 8 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 32.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 38.
13	APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 41 AND 42 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 4 OF 67

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT LIMITED TO 15 MILLIAMPS.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 39 AND 40.
24	CONDUCTORS WITH AN A,B,C,D,E,F OR G IN THE REMARKS COLUMN ARE TO BE GROUP SHIELDED PER DETAIL A AND/OR B OF THE CONF. DRAWING.
25	GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 35, THROUGH CENTER OF EMI/RFI SHIELDING TAPE. ITEM 34. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.
26	COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 36. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.
27	ASSEMBLE INSULATION TUBING, ITEM 45, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 5 OF 67

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
28	ASSEMBLE A LENGTH OF WIRE BRAID ITEM 53 OVER CONDUCTORS A333 AND A337. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE. ITEM 36. PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071, FIG. 6B.
29	CONDUCTORS SHALL ENTER CONNECTORS 56P9 AND 56P10 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE REMARKS COLUMN.
31	PERFORM WORKMANSHIP VIBRATION A. SINUSOIDAL SWEEP AT 3.5 GRMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICROSECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
33	LACE HARNESS BRANCHES TOGETHER USING A CONTINUOUS CLOVE HITCH AT LOCATIONS SHOWN.
34	ASSEMBLE SHRINK SLEEVE, ITEM 59, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTORS P9 AND P10. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.
35	SOLDER PER ND1002071 USING ITEMS 60 OR 61 AND 62.
36	BOND TERMINAL LUG AND SCREW TO THE ADAPTER PER ND1002187, TYPE III, USING ITEMS 41, 42, 64 AND 65.

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 6 OF 67

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 7 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010774-001	WIRE PER 1010789-006, 22 AWG, YEL, 25 FT TOT LG
	2	1	2010774-002	WIRE PER 1010789-016, 26 AWG, YEL, 50 FT TOT LG
	3	1	2010774-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 15 FT TOT LG
	4	1	2010774-004	WIRE PER 1010789-017, 26 AWG, YEL, RED, 220 FT TOT LG
	5	1	2010774-005	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 20 FT TOT LG
	6	1	2010774-006	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN 90 FT TOT LG
	7	1	2010774-007	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 25 FT TOT LG
	8	1	2010774-008	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT, 10 FT TOT LG
	9	1	2010774-009	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 150 FT TOT LG
	10	1	2010774-010	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	11	1	2010774-011	WIRE PER 1010789-002, 24 AWG, BLK, 80 FT TOT LG
	12	1	2014741-021	CONNECTOR, PLUG, ELECTRICAL (56P9)
	13	1	2014749-021	CONNECTOR, PLUG, ELECTRICAL (56P10)
9	14	1	1010929-109	CONNECTOR, PLUG, ELECTRICAL (56P1)

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 8 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-005	CONNECTOR, PLUG, ELECTRICAL (56P2)
9.	16	1	1010929-102	CONNECTOR, PLUG, ELECTRICAL (56P3)
9	17	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P4)
9	18	1	1010929-103	CONNECTOR, PLUG, ELECTRICAL (56P5)
9	19	1	1010929-104	CONNECTOR, PLUG, ELECTRICAL (56P6)
9	20	1	1010929-108	CONNECTOR, PLUG, ELECTRICAL (56P7)
9	21	1	1010929-105	CONNECTOR, PLUG, ELECTRICAL (56P8)
9	22	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	23	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	24	113	1010955- 1	CONTACT, MALE
9	25	332	1010955- 2	CONTACT, MALE
	26	1	2014670- 4	ADAPTER, CONNECTOR
	28	1	2014670- 7	ADAPTER, CONNECTOR
9	29	14	1012534- 36	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	30	2	1012534- 38	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	31	93	1010402- 2	SLEEVE, SOLDER
9	32	115	1010958- 1	PLUG, PROTECTIVE SEALING
9	34	AR	1010989	TAPE, SHIELDING, EMI/RFI

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 9 OF 67

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35	1	2010774-012	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED, SILVER PLATED, 22AWG, 100 FT TOT LG
	36	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	37	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	38	AR	1012507-004	TAPE, LACING AND TYING
9	39	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	40	AR	1012504	PRIMER, METAL PARTS
9	41	AR	1010661	EPOXY RESIN
9	42	AR	1010679	ADHESIVE ACTIVATOR
9	45	AR	1006776- 19	INSULATION SLEEVING, 6 FEET TOTAL LENGTH
	47	8	2021203	TERMINAL LUG, SOLDER
	48	8	MS35333-69	WASHER, LOCK
9	49	8	1006783- 93	SCREW, BUTTON HD
9	51	5	1006783- 18	SCREW, BUTTON HD
	52	4	MS25036-52	TERMINAL LUG
28	53	1	2010774-013	WIRE BRAID,QQ-B-575,.12DIA. 36AWG, 5 FT TOT LG
	54	2	2014670- 11	ADAPTER, CONNECTOR
	55	2	2014670- 12	ADAPTER, CONNECTOR
	56	1	2014670- 13	ADAPTER,CONNECTOR

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 10 OF 67

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	57	1	2014670- 15	ADAPTER,CONNECTOR
	58	1	MS25036-48	TERMINAL LUG
	59	445	1010490-114	SLEEVE, INSULATION (HEAT SHRINKABLE)
	60	AR	SN60WRAP	SOLDER QQ-S-571
	61	AR	SN60WS	SOLDER QQ-S-571
	62	AR	MIL-F-14256 TYPE A OR W	FLUX
	63	4	1010402- 1	SLEEVE, SOLDER
9	64	AR	1008822	COLORANT, EPOXY BASE
9	65	AR	1006277	SILICA, PULVERIZED PYROGENIC

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR B | SHEET 11 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 21	9				1.00 1.00	.75 .75				68 68	31 31	
A 21A	11		SHLD A21 P9-111					.20 .18	NO NO		 24	 BRANCH 1
A 21B	11		E3 SHLD A21					.19 .20	NO NO			
A 21R			P9-311 P10-515					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 21Y			P9-211 P10-615					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 22	10				1.00 1.00	.75 .75				7 68	29 31	
A 22B	11		E3 SHLD A22					.19 .20	NO NO			
A 22G			P9-511 P10-536					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A 22R			P9-611 P10-622					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A 22Y			P9-411 P10-534					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A 23	9				1.00 1.00	.75 .75				7 68	29 31	
A 23B	11		E4 SHLD A23					.19 .20	NO NO			

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 12 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 23R			P9-212 P10-112					.18 .18	NO NO		25 25	BRANCH 1
A 23Y			P9-112 P10-412					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 24	9				1.00 1.00	.75 .75				7 68	29 31	
A 24B	11		E4 SHLD A24					.19 .20	NO NO			
A 24R			P9-412 P10-614					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 24Y			P9-312 P10-313					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 25	10				1.00 1.00	.75 .75				7 68	29 31	
A 25B	11		E4 SHLD A25					.19 .20	NO NO		52	
A 25G			P9-113 P10-514					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A 25R			P9-612 P10-314					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A 25Y			P9-512 P10-414					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A 26	9				1.00 1.00	.75 .75				7 68	29 31	

SIZE A | CODE IDENT NO. 60230 | 2010774
SCALE-NONE | REV LTR B | SHEET 13 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 26B	11		E3 SHLD A26					.19 .20	NO NO		52	
A 26R			P9-313 P10-525					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 26Y			P9-213 P10-624					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A 27	9				1.75 1.00	1.50 .75				68 68	31 31	
A 27A	11		SHLD A27 P7-12					.20 .13	NO NO		 22	
A 27B	11		P9-637 SHLD A27					.18 .20	NO NO		24	BRANCH 3
A 27R			P7-27 P9-437					.13 .18	NO NO		22 25	 BRANCH 3
A 27Y			P7-13 P9-537					.13 .18	NO NO		22 25	 BRANCH 3
A 28	9				1.75 1.00	1.50 .75				68 68	31 31	
A 28A	11		SHLD A28 P7-26					.20 .13	NO NO		 22	
A 28B	11		P9-137 SHLD A28					.18 .20	NO NO		24	BRANCH 3
A 28R			P7-47 P9-237					.13 .18	NO NO		22 25	 BRANCH 3

SIZE A | CODE IDENT NO. 80230 | 2010774
SCALE-NONE | REV LTR A | SHEET 14 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 28Y			P7-46 P9-337					.13 .18	NO NO		22 25	BRANCH 3
A 29	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 29A	11		SHLD A29 P7-24					.20 .13	NO NO		22	
A 29B	11		P9-634 SHLD A29					.18 .20	NO NO		24	BRANCH 2
A 29R			P7-44 P9-434					.13 .18	NO NO		22 25	BRANCH 2
A 29Y			P7-25 P9-534					.13 .18	NO NO		22 25	BRANCH 2
A 30	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 30A	11		SHLD A30 P7-5					.20 .13	NO NO		22	
A 30B	11		P9-335 SHLD A30					.18 .20	NO NO		24	BRANCH 2
A 30R			P7-4 P9-135					.13 .18	NO NO		22 25	BRANCH 2
A 30Y			P7-1 P9-235					.13 .18	NO NO		22 25	BRANCH 2
A 31	9				1.75 1.00	1.50 .75				6B 6B	31 31	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A		SHEET 15 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 31A	11		SHLD A31 P7-3					.20 .13	NO NO		22	
A 31B	11		P9-635 SHLD A31					.18 .20	NO NO		24	BRANCH 2
A 31R			P7-11 P9-435					.13 .18	NO NO		22 25	BRANCH 2
A 31Y			P7-10 P9-535					.13 .18	NO NO		22 25	BRANCH 2
A 32	4											
A 32R			P7-53 P9-536					.13 .18	NO NO		22 25	BRANCH 3
A 32Y			P7-54 P9-636					.13 .18	NO NO		22 25	BRANCH 3
A 33	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 33A	11		SHLD A33 P1-13					.20 .13	NO NO		22	
A 33B	11		P9-332 SHLD A33					.18 .20	NO NO		24	BRANCH 2
A 33R			P1-28 P9-132					.13 .18	NO NO		22 25	BRANCH 2
A 33Y			P1-27 P9-232					.13 .18	NO NO		22 25	BRANCH 2

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A		SHEET 16 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 34	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 34A	11		SHLD A34 P1-1					.20 .13	NO NO		22	
A 34B	11		P9-632 SHLD A34					.18 .20	NO NO		24	BRANCH 2
A 34R			P1-4 P9-432					.13 .18	NO NO		22 25	BRANCH 2
A 34Y			P1-3 P9-532					.13 .18	NO NO		22 25	BRANCH 2
A 35	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 35A	11		SHLD A35 P1-16					.20 .13	NO NO		22	
A 35B	11		P9-333 SHLD A35					.18 .20	NO NO		24	BRANCH 2
A 35R			P1-6 P9-133					.13 .18	NO NO		22 25	BRANCH 2
A 35Y			P1-5 P9-233					.13 .18	NO NO		22 25	BRANCH 2
A 36	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 36A	11		SHLD A36 P1-17					.20 .13	NO NO		22	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A		SHEET 17 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 36B	11		P9-346 SHLD A36					.18 .20	NO NO		24	BRANCH 3
A 36R			P1-34 P9-146					.13 .18	NO NO		22 25	BRANCH 3
A 36Y			P1-33 P9-246					.13 .18	NO NO		22 25	BRANCH 3
A 37	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 37A	11		SHLD A37 P1-18					.20 .13	NO NO		22	
A 37B	11		P9-646 SHLD A37					.18 .20	NO NO		24	BRANCH 3
A 37R			P1-35 P9-446					.13 .18	NO NO		22 25	BRANCH 3
A 37Y			P1-36 P9-546					.13 .18	NO NO		22 25	BRANCH 3
A 38	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 38A	11		SHLD A38 P1-14					.20 .13	NO NO		22	
A 38B	11		P9-348 SHLD A38					.18 .20	NO NO		24	BRANCH 3
A 38R			P1-30 P9-248					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR A		SHEET 18 OF 67

HARNESS A 2010774

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	38Y			P1-29 P9-148					.13 .18	NO NO		22 25	BRANCH 3
A	39	9				1.75 1.00	1.50 .75				68 68	31 31	
A	39A	11		SHLD A39 P1-15					.20 .13	NO NO		22	
A	39B	11		P9-648 SHLD A39					.18 .20	NO NO		24	BRANCH 3
A	39R			P1-31 P9-448					.13 .18	NO NO		22 25	BRANCH 3
A	39Y			P1-32 P9-548					.13 .18	NO NO		22 25	BRANCH 3
A	40	9				1.75 1.00	1.50 .75				68 68	31 31	
A	40A	11		SHLD A40 P1-20					.20 .13	NO NO		22	
A	40B	11		P9-633 SHLD A40					.18 .20	NO NO		24	BRANCH 2
A	40R			P1-19 P9-533					.13 .18	NO NO		22 25	BRANCH 2
A	40Y			P1-37 P9-433					.13 .18	NO NO		22 25	BRANCH 2
A	41	9				1.75 1.00	1.50 .75				68 68	31 31	

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 19 OF 67

HARNESS A 2010774

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	41A	11		SHLD A41 P1-21					.20 .13	NO NO		22	
A	41B	11		P9-334 SHLD A41					.18 .20	NO NO		24	BRANCH 2
A	41R			P1-38 P9-234					.13 .18	NO NO		22 25	BRANCH 2
A	41Y			P1-39 P9-134					.13 .18	NO NO		22 25	BRANCH 2
A	42	6											
A	42G			P1-26 P9-421					.13 .18	NO NO		22 25	BRANCH 2
A	42R			P1-43 P9-620					.13 .18	NO NO		22 25	BRANCH 2
A	42Y			P1-44 P9-221					.13 .18	NO NO		22 25	BRANCH 2
A	43	6											
A	43G			P1-8 P9-222					.13 .18	NO NO		22 25	BRANCH 2
A	43R			P1-7 P9-621					.13 .18	NO NO		22 25	BRANCH 2
A	43Y			P1-2 P9-119					.13 .18	NO NO		22 25	BRANCH 2

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 20 OF 67

HARNESS A 2010774

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	46	2		P1-25 P9-422					.13 .18	NO NO		22 25	BRANCH 2
A	47	3											
A	47R			P1-40 P9-228					.13 .18	NO NO		22 24	BRANCH 2
A	47Y			P1-23 P9-328					.13 .18	NO NO		22 24	BRANCH 2
A	48	3											
A	48R			P1-41 P9-428					.13 .18	NO NO		22 24	BRANCH 2
A	48Y			P1-42 P9-528					.13 .18	NO NO		22 24	BRANCH 2
A	49	9				1.75 1.00	1.50 .75				68 68	31 31	
A	49A	11		SHLD A49 P4-30					.20 .13	NO NO		22	
A	49B	11		P9-340 SHLD A49					.18 .20	NO NO		24	BRANCH 3
A	49R			P4-52 P9-140					.13 .18	NO NO		22 25	BRANCH 3
A	49Y			P4-51 P9-240					.13 .18	NO NO		22 25	BRANCH 3

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 21 OF 67

HARNESS A 2010774

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	50	9				1.75 1.00	1.50 .75				68 68	31 31	
A	50A	11		SHLD A50 P4-31					.20 .13	NO NO		22	
A	50B	11		P9-640 SHLD A50					.18 .20	NO NO		24	BRANCH 3
A	50R			P4-54 P9-440					.13 .18	NO NO		22 25	BRANCH 3
A	50Y			P4-53 P9-540					.13 .18	NO NO		22 25	BRANCH 3
A	51	9				1.75 1.00	1.50 .75				68 68	31 31	
A	51A	11		SHLD A51 P4-29					.20 .13	NO NO		22	
A	51B	11		P9-341 SHLD A51					.18 .20	NO NO		24	BRANCH 3
A	51R			P4-13 P9-141					.13 .18	NO NO		22 25	BRANCH 3
A	51Y			P4-14 P9-241					.13 .18	NO NO		22 25	BRANCH 3
A	52	9				1.75 1.00	1.50 .75				68 68	31 31	
A	52A	11		SHLD A52 P4-32					.20 .13	NO NO		22	

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR A | SHEET 22 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 52B	11		P9-641 SHLD A52					.18 .20	NO NO		24	BRANCH 3
A 52R			P4-16 P9-441					.13 .18	NO NO		22 25	 BRANCH 3
A 52Y			P4-15 P9-541					.13 .18	NO NO		22 25	 BRANCH 3
A 53	9				1.75 1.00	1.50 .75				68 68	31 31	
A 53A	11		SHLD A53 P4-36					.20 .13	NO NO		 22	
A 53B	11		P9-342 SHLD A53					.18 .20	NO NO		24	BRANCH 3
A 53R			P4-59 P9-142					.13 .18	NO NO		22 25	 BRANCH 3
A 53Y			P4-60 P9-242					.13 .18	NO NO		22 25	 BRANCH 3
A 54	9				1.75 1.00	1.50 .75				68 68	31 31	
A 54A	11		SHLD A54 P4-37					.20 .13	NO NO		 22	
A 54B	11		P9-642 SHLD A54					.18 .20	NO NO		24	BRANCH 3
A 54R			P4-61 P9-442					.13 .18	NO NO		22 25	 BRANCH 3

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR A	SHEET 23 OF 67		

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 54Y			P4-38 P9-542					.13 .18	NO NO		22 25	 BRANCH 3
A 55	9				1.75 1.00	1.50 .75				68 68	31 31	
A 55A	11		SHLD A55 P4-33					.20 .13	NO NO		 22	
A 55B	11		P9-343 SHLD A55					.18 .20	NO NO		24	BRANCH 3
A 55R			P4-56 P9-143					.13 .18	NO NO		22 25	 BRANCH 3
A 55Y			P4-55 P9-243					.13 .18	NO NO		22 25	 BRANCH 3
A 56	9				1.75 1.00	1.50 .75				68 68	31 31	
A 56A	11		SHLD A56 P4-34					.20 .13	NO NO		 22	
A 56B	11		P9-643 SHLD A56					.18 .20	NO NO		24	BRANCH 3
A 56R			P4-57 P9-443					.13 .18	NO NO		22 25	 BRANCH 3
A 56Y			P4-58 P9-543					.13 .18	NO NO		22 25	 BRANCH 3
A 57	9				1.75 1.00	1.50 .75				68 68	31 31	

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR A	SHEET 24 OF 67		

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 57A	11		SHLD A57 P4-27					.20 .13	NO NO		 22	
A 57B	11		P9-344 SHLD A57					.18 .20	NO NO		24	BRANCH 3
A 57R			P4-48 P9-144					.13 .18	NO NO		22 25	 BRANCH 3
A 57Y			P4-47 P9-244					.13 .18	NO NO		22 25	 BRANCH 3
A 58	9				1.75 1.00	1.50 .75				68 68	31 31	
A 58A	11		SHLD A58 P4-28					.20 .13	NO NO		 22	
A 58B	11		P9-644 SHLD A58					.18 .20	NO NO		24	BRANCH 3
A 58R			P4-49 P9-444					.13 .18	NO NO		22 25	 BRANCH 3
A 58Y			P4-50 P9-544					.13 .18	NO NO		22 25	 BRANCH 3
A 59	9				1.75 1.00	1.50 .75				68 68	31 31	
A 59A	11		SHLD A59 P4-35					.20 .13	NO NO		 22	
A 59B	11		P9-345 SHLD A59					.18 .20	NO NO		24	BRANCH 3

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR A	SHEET 25 OF 67		

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 59R			P4-17 P9-145					.13 .18	NO NO		22 25	 BRANCH 3
A 59Y			P4-18 P9-245					.13 .18	NO NO		22 25	 BRANCH 3
A 60	9				1.75 1.00	1.50 .75				68 68	31 31	
A 60A	11		SHLD A60 P4-20					.20 .13	NO NO		 22	
A 60B	11		P9-645 SHLD A60					.18 .20	NO NO		24	BRANCH 3
A 60R			P4-19 P9-445					.13 .18	NO NO		22 25	 BRANCH 3
A 60Y			P4-8 P9-545					.13 .18	NO NO		22 25	 BRANCH 3
A 61	9				1.75 1.00	1.50 .75				68 68	31 31	
A 61A	11		SHLD A61 P4-22					.20 .13	NO NO		 22	
A 61B	11		P9-329 SHLD A61					.18 .20	NO NO		24	BRANCH 2
A 61R			P4-41 P9-129					.13 .18	NO NO		22 25	 BRANCH 2
A 61Y			P4-42 P9-229					.13 .18	NO NO		22 25	 BRANCH 2

SIZE	CODE IDENT NO.			
A	80230	2010774		
SCALE-NONE	REV LTR A	SHEET 26 OF 67		

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 62	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 62A	11		SHLD A62					.20	NO			
			P4-24					.13	NO		22	
A 62B	11		P9-629					.18	NO		24	BRANCH 2
			SHLD A62					.20	NO			
A 62R			P4-43					.13	NO		22	
			P9-429					.18	NO		25	BRANCH 2
A 62Y			P4-44					.13	NO		22	
			P9-529					.18	NO		25	BRANCH 2
A 63	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 63A	11		SHLD A63					.20	NO			
			P4-25					.13	NO		22	
A 63B	11		P9-330					.18	NO		24	BRANCH 2
			SHLD A63					.20	NO			
A 63R			P4-45					.13	NO		22	
			P9-130					.18	NO		25	BRANCH 2
A 63Y			P4-46					.13	NO		22	
			P9-230					.18	NO		25	BRANCH 2
A 64	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 64A	11		SHLD A64					.20	NO			
			P4-21					.13	NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 27 OF 67

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HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 64B	11		P9-630					.18	NO		24	BRANCH 2
			SHLD A64					.20	NO			
A 64R			P4-39					.13	NO		22	
			P9-430					.18	NO		25	BRANCH 2
A 64Y			P4-40					.13	NO		22	
			P9-530					.18	NO		25	BRANCH 2
A 65	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 65A	11		SHLD A65					.20	NO			
			P4-10					.13	NO		22	
A 65B	11		P9-331					.18	NO		24	BRANCH 2
			SHLD A65					.20	NO			
A 65R			P4-9					.13	NO		22	
			P9-131					.18	NO		25	BRANCH 2
A 65Y			P4-23					.13	NO		22	
			P9-231					.18	NO		25	BRANCH 2
A 66	9				1.75	1.50				68	31	
					1.00	.75				68	31	
A 66A	11		SHLD A66					.20	NO			
			P4-11					.13	NO		22	
A 66B	11		P9-631					.18	NO		24	BRANCH 2
			SHLD A66					.20	NO			
A 66R			P4-26					.13	NO		22	
			P9-431					.18	NO		25	BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 28 OF 67

MIL 2084 9-65

LIMA 101266 HARNESS A 2010774 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 66Y			P4-12					.13	NO		22	
			P9-531					.18	NO		25	BRANCH 2
A 67	9				1.75	1.50				68	31	
					1.00	.75				7	29	
A 67A	11		SHLD A67					.20	NO			
			P4-1					.13	NO		22	
A 67R			P4-6					.13	NO		22	
			P9-338					.18	NO		25	BRANCH 3
A 67Y			P4-7					.13	NO		22	
			P9-238					.18	NO		25	BRANCH 3
A 68	8				1.75	1.50				68	63	
					1.00	.75				7	30	
A 68A	11		SHLD A68					.20	NO			
			P4-2					.13	NO		22	
A 68Y			P4-3					.13	NO		22	
			P9-138					.18	NO		24	BRANCH 3
A 69	1		P4-5					.13	NO		22	
			P9-336					.18	NO		24	BRANCH 3
A 70	1		P4-4					.13	NO		22	
			P9-136					.18	NO		24	BRANCH 3
A 71	1		P5-84					.13	NO		22	
			P9-236					.18	NO		24	BRANCH 3
A 72	1		P5-60					.13	NO		22	
			P9-436					.18	NO		24	BRANCH 3

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 29 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 74	4											F
A 74R			P2-55					.13	NO		23	F
			P10-121					.18	NO		25	BRANCH 5
A 74Y			P2-56					.13	NO		23	F
			P10-221					.18	NO		25	BRANCH 5
A 75	4											F
A 75R			P2-54					.13	NO		23	F
			P10-120					.18	NO		25	BRANCH 5
A 75Y			P2-32					.13	NO		23	F
			P10-220					.18	NO		25	BRANCH 5
A 76	4											F
A 76R			P2-17					.13	NO		23	F
			P10-119					.18	NO		25	BRANCH 5
A 76Y			P2-33					.13	NO		23	F
			P10-219					.18	NO		25	BRANCH 5
A 77	4											F
A 77R			P2-16					.13	NO		23	F
			P10-118					.18	NO		25	BRANCH 5
A 77Y			P2-5					.13	NO		23	F
			P10-218					.18	NO		25	BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 30 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 78	4											F
A 78R			P2-57 P10-321					.13 .18	NO NO		23 25	F BRANCH 5
A 78Y			P2-34 P10-421					.13 .18	NO NO		23 25	F BRANCH 5
A 79	4											F
A 79R			P2-18 P10-320					.13 .18	NO NO		23 25	F BRANCH 5
A 79Y			P2-35 P10-420					.13 .18	NO NO		23 25	F BRANCH 5
A 80	4											F
A 80R			P2-52 P10-319					.13 .18	NO NO		23 25	F BRANCH 5
A 80Y			P2-53 P10-419					.13 .18	NO NO		23 25	F BRANCH 5
A 81	4											F
A 81R			P2-15 P10-318					.13 .18	NO NO		23 25	F BRANCH 5
A 81Y			P2-30 P10-418					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 31 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 82	4											F
A 82R			P2-50 P10-317					.13 .18	NO NO		23 25	F BRANCH 5
A 82Y			P2-51 P10-417					.13 .18	NO NO		23 25	F BRANCH 5
A 83	4											F
A 83R			P2-13 P10-323					.13 .18	NO NO		23 25	F BRANCH 5
A 83Y			P2-29 P10-423					.13 .18	NO NO		23 25	F BRANCH 5
A 84	4											F
A 84R			P2-12 P10-322					.13 .18	NO NO		23 25	F BRANCH 5
A 84Y			P2-27 P10-422					.13 .18	NO NO		23 25	F BRANCH 5
A 85	4											F
A 85R			P2-48 P10-316					.13 .18	NO NO		23 25	F BRANCH 5
A 85Y			P2-49 P10-416					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 32 OF 67

MIL 2084 9-65

LIMA 101266 HARNESS A 2010774 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 86	4											F
A 86R			P2-1 P10-315					.13 .18	NO NO		23 25	F BRANCH 5
A 86Y			P2-4 P10-415					.13 .18	NO NO		23 25	F BRANCH 5
A 87	4											F
A 87R			P2-11 P10-324					.13 .18	NO NO		23 25	F BRANCH 5
A 87Y			P2-24 P10-424					.13 .18	NO NO		23 25	F BRANCH 5
A 88	4											F
A 88R			P2-10 P10-117					.13 .18	NO NO		23 25	F BRANCH 5
A 88Y			P2-2 P10-217					.13 .18	NO NO		23 25	F BRANCH 5
A 89	4											F
A 89R			P2-59 P10-139					.13 .18	NO NO		23 25	F BRANCH 5
A 89Y			P2-58 P10-239					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 33 OF 67

MIL 2084 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 90	4											F
A 90R			P2-7 P10-138					.13 .18	NO NO		23 25	F BRANCH 5
A 90Y			P2-6 P10-238					.13 .18	NO NO		23 25	F BRANCH 5
A 91	4											F
A 91R			P2-36 P10-137					.13 .18	NO NO		23 25	F BRANCH 5
A 91Y			P2-60 P10-237					.13 .18	NO NO		23 25	F BRANCH 5
A 92	4											F
A 92R			P2-8 P10-136					.13 .18	NO NO		23 25	F BRANCH 5
A 92Y			P2-19 P10-236					.13 .18	NO NO		23 25	F BRANCH 5
A 93	4											F
A 93R			P2-61 P10-135					.13 .18	NO NO		23 25	F BRANCH 5
A 93Y			P2-38 P10-235					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 34 OF 67

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 94	4											F
A 94R			P2-39 P10-134					.13 .18	NO NO		23 25	F BRANCH 5
A 94Y			P2-20 P10-234					.13 .18	NO NO		23 25	F BRANCH 5
A 95	4											F
A 95R			P2-43 P10-327					.13 .18	NO NO		23 25	F BRANCH 5
A 95Y			P2-42 P10-427					.13 .18	NO NO		23 25	F BRANCH 5
A 96	4											F
A 96R			P2-22 P10-326					.13 .18	NO NO		23 25	F BRANCH 5
A 96Y			P2-9 P10-426					.13 .18	NO NO		23 25	F BRANCH 5
A 97	4											F
A 97R			P2-41 P10-325					.13 .18	NO NO		23 25	F BRANCH 5
A 97Y			P2-40 P10-425					.13 .18	NO NO		23 25	F BRANCH 5

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 98	10				1.75 1.00	1.50 .75				68 7	31 29	
A 98A	11		SHLD A98 P2-44					.20 .13	NO NO		23	
A 98G			P2-25 P10-212					.13 .18	NO NO		23 24	BRANCH 4
A 98R			P2-46 P10-113					.13 .18	NO NO		23 24	BRANCH 4
A 98Y			P2-45 P10-312					.13 .18	NO NO		23 24	BRANCH 4
A 99	8				1.75 1.00	1.50 .75				68 7	63 29	
A 99A	11		SHLD A99 P2-26					.20 .13	NO NO		23	
A 99Y			P2-47 P10-114					.13 .18	NO NO		23 24	BRANCH 4
A 104	2		P3-1 P10-538					.13 .18	NO NO		22 25	E BRANCH 5
A 105	2		P3-7 P10-556					.13 .18	NO NO		22 25	E BRANCH 5
A 106	2		P3-2 P10-625					.13 .18	NO NO		22 25	E BRANCH 5
A 113	2		P3-8 P10-547					.13 .18	NO NO		22 25	E BRANCH 5

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 116	1		P5-66 P10-602					.13 .18	NO NO		22 24	D BRANCH 4
A 118	1		P5-45 P10-504					.13 .18	NO NO		22 24	D BRANCH 4
A 125	2		P5-26 P10-409					.13 .22	NO NO		22	D BRANCH 4
A 127	5											A
A 127G			P5-53 P10-161					.13 .18	NO NO		22 24	A BRANCH 6
A 127R			P5-78 P10-159					.13 .18	NO NO		22 24	A BRANCH 6
A 127Y			P5-54 P10-160					.13 .18	NO NO		22 24	A BRANCH 6
A 128	5											A
A 128G			P5-55 P10-260					.13 .18	NO NO		22 24	A BRANCH 6
A 128R			P5-79 P10-261					.13 .18	NO NO		22 24	A BRANCH 6
A 128Y			P5-80 P10-259					.13 .18	NO NO		22 24	A BRANCH 6
A 129	5											A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 129G			P5-16 P10-360					.13 .18	NO NO		22 24	A BRANCH 6
A 129R			P5-33 P10-361					.13 .18	NO NO		22 24	A BRANCH 6
A 129Y			P5-32 P10-359					.13 .18	NO NO		22 24	A BRANCH 6
A 130	5											A
A 130G			P5-56 P10-460					.13 .18	NO NO		22 24	A BRANCH 6
A 130R			P5-81 P10-461					.13 .18	NO NO		22 24	A BRANCH 6
A 130Y			P5-57 P10-459					.13 .18	NO NO		22 24	A BRANCH 6
A 131	5											A
A 131G			P5-35 P10-560					.13 .18	NO NO		22 24	A BRANCH 6
A 131R			P5-58 P10-561					.13 .18	NO NO		22 24	A BRANCH 6
A 131Y			P5-34 P10-559					.13 .18	NO NO		22 24	A BRANCH 6
A 139	2		P6-77 P10-636					.13 .18	NO NO		22 25	C BRANCH 6

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 148	2		P6-20 P10-613					.13 .18	NO NO		22 25	C BRANCH 6
A 149	4											C
A 149R			P6-85 P10-133					.13 .18	NO NO		22 25	C BRANCH 6
A 149Y			P6-84 P10-233					.13 .18	NO NO		22 25	C BRANCH 6
A 150	4											C
A 150R			P6-82 P10-516					.13 .18	NO NO		22 25	C BRANCH 6
A 150Y			P6-57 P10-616					.13 .18	NO NO		22 25	C BRANCH 6
A 151	4											C
A 151R			P6-8 P10-158					.13 .18	NO NO		22 25	C BRANCH 6
A 151Y			P6-2 P10-258					.13 .18	NO NO		22 25	C BRANCH 6
A 152	4											C
A 152R			P6-19 P10-157					.13 .18	NO NO		22 25	C BRANCH 6

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 152Y			P6-7 P10-257					.13 .18	NO NO		22 25	C BRANCH 6
A 153	4											C
A 153R			P6-6 P10-156					.13 .18	NO NO		22 25	C BRANCH 6
A 153Y			P6-1 P10-256					.13 .18	NO NO		22 25	C BRANCH 6
A 154	4											C
A 154R			P6-5 P10-155					.13 .18	NO NO		22 25	C BRANCH 6
A 154Y			P6-4 P10-255					.13 .18	NO NO		22 25	C BRANCH 6
A 155	4											C
A 155R			P6-15 P10-154					.13 .18	NO NO		22 25	C BRANCH 6
A 155Y			P6-16 P10-254					.13 .18	NO NO		22 25	C BRANCH 6
A 156	4											C
A 156R			P6-17 P10-153					.13 .18	NO NO		22 25	C BRANCH 6

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 156Y			P6-33 P10-253					.13 .18	NO NO		22 25	C BRANCH 6
A 157	4											C
A 157R			P6-61 P10-132					.13 .18	NO NO		22 25	C BRANCH 6
A 157Y			P6-60 P10-232					.13 .18	NO NO		22 25	C BRANCH 6
A 158	4											
A 158R			P6-37 P10-130					.13 .18	NO NO		22 25	C BRANCH 6
A 158Y			P6-36 P10-230					.13 .18	NO NO		22 25	C BRANCH 6
A 159	4											C
A 159R			P6-83 P10-352					.13 .18	NO NO		22 25	C BRANCH 6
A 159Y			P6-59 P10-452					.13 .18	NO NO		22 25	C BRANCH 6
A 160	4											C
A 160R			P6-35 P10-129					.13 .18	NO NO		22 25	C BRANCH 6

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 160Y			P6-18 P10-229					.13 .18	NO NO		22 25	C BRANCH 6
A 161	4											C
A 161R			P6-58 P10-128					.13 .18	NO NO		22 25	C BRANCH 6
A 161Y			P6-34 P10-228					.13 .18	NO NO		22 25	C BRANCH 6
A 164	1		P8-9 P10-302					.13 .18	NO NO		22 24	B BRANCH 4
A 170	2		P8-5 P10-509					.13 .18	NO NO		22 25	B BRANCH 4
A 177	2		P8-8 P10-108					.13 .22	NO NO		22	B BRANCH 4
A 178	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 178A	11		SHLD A178 P3-52					.20 .13	NO NO		22	
A 178B	11		P7-21 SHLD A178					.13 .20	NO NO		22	
A 178R			P3-77 P7-40					.13 .13	NO NO		22 22	
A 178Y			P3-53 P7-22					.13 .13	NO NO		22 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 179	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 179A	11		SHLD A179 P3-30					.20 .13	NO NO		 22	
A 179B	11		P7-23 SHLD A179					.13 .20	NO NO		22	
A 179R			P3-31 P7-42					.13 .13	NO NO		22 22	
A 179Y			P3-15 P7-43					.13 .13	NO NO		22 22	
A 180	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 180A	11		SHLD A180 P3-51					.20 .13	NO NO		 22	
A 180B	11		P7-2 SHLD A180					.13 .20	NO NO		22	
A 180R			P3-75 P7-8					.13 .13	NO NO		22 22	
A 180Y			P3-76 P7-9					.13 .13	NO NO		22 22	
A 181	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 181A	11		SHLD A181 P3-46					.20 .13	NO NO		 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 181R			P3-71 P7-38					.13 .13	NO NO		22 22	
A 181Y			P3-70 P7-39					.13 .13	NO NO		22 22	
A 182	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 182A	11		SHLD A182 P3-69					.20 .13	NO NO		 22	
A 182R			P3-45 P7-19					.13 .13	NO NO		22 22	
A 182Y			P3-44 P7-20					.13 .13	NO NO		22 22	
A 183	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 183A	11		SHLD A183 P3-28					.20 .13	NO NO		 22	
A 183R			P3-13 P7-60					.13 .13	NO NO		22 22	
A 183Y			P3-29 P7-61					.13 .13	NO NO		22 22	
A 184	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 184A	11		SHLD A184 P3-74					.20 .13	NO NO		 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 184R			P3-49 P7-36					.13 .13	NO NO		22 22	
A 184Y			P3-50 P7-37					.13 .13	NO NO		22 22	
A 185	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 185A	11		SHLD A185 P3-27					.20 .13	NO NO		 22	
A 185R			P3-26 P7-58					.13 .13	NO NO		22 22	
A 185Y			P3-47 P7-59					.13 .13	NO NO		22 22	
A 186	9				1.75 1.75	1.50 1.50				68 7	31 29	
A 186A	11		SHLD A186 P3-48					.20 .13	NO NO		 22	
A 186R			P3-72 P7-35					.13 .13	NO NO		22 22	
A 186Y			P3-73 P7-18					.13 .13	NO NO		22 22	
A 187	3											
A 187R			P3-67 P7-57					.13 .13	NO NO		22 22	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 187Y			P3-68 P7-34					.13 .13	NO NO		22 22	
A 188	7											
A 188G			P3-24 P7-51					.13 .13	NO NO		22 22	
A 188N			P3-43 P7-29					.13 .13	NO NO		22 22	
A 188R			P3-25 P7-50					.13 .13	NO NO		22 22	
A 188Y			P3-23 P7-28					.13 .13	NO NO		22 22	
A 189	4											
A 189R			P3-5 P7-49					.13 .13	NO NO		22 22	
A 189Y			P3-14 P7-48					.13 .13	NO NO		22 22	
A 195	2		P5-23 P10-608					.13 .22	NO NO		22	D BRANCH 4
A 196	2		P5-22 P10-609					.13 .22	NO NO		22	D BRANCH 4
A 198	6											

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
A	198G			P1-11 P9-521					.13 .18	NO NO		22 25	BRANCH 2
A	198R			P1-10 P9-121					.13 .18	NO NO		22 25	BRANCH 2
A	198Y			P1-9 P9-321					.13 .18	NO NO		22 25	BRANCH 2
A	199	5											A
A	199G			P5-5 P10-660					.13 .18	NO NO		22 24	A BRANCH 6
A	199R			P5-31 P10-661					.13 .18	NO NO		22 24	A BRANCH 6
A	199Y			P5-15 P10-659					.13 .18	NO NO		22 24	A BRANCH 6
A	200	2		P3-39 P10-202					.13 .18	NO NO		22 25	E BRANCH 5
A	201	2		P3-64 P10-102					.13 .18	NO NO		22 25	E BRANCH 5
A	202	2		P3-42 P10-652					.13 .18	NO NO		22 25	E BRANCH 5
A	203	2		P3-66 P10-551					.13 .18	NO NO		22 25	E BRANCH 5
A	204	2		P3-21 P10-552					.13 .18	NO NO		22 25	E BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 47 OF 67

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
A	205	2		P3-22 P10-651					.13 .18	NO NO		22 25	E BRANCH 5
A	206	2		P3-18 P10-548					.13 .18	NO NO		22 25	E BRANCH 5
A	207	2		P3-36 P10-549					.13 .18	NO NO		22 25	E BRANCH 5
A	208	2		P3-19 P10-550					.13 .18	NO NO		22 25	E BRANCH 5
A	209	2		P3-41 P10-214					.13 .18	NO NO		22 25	E BRANCH 5
A	210	2		P3-65 P10-216					.13 .18	NO NO		22 25	E BRANCH 5
A	211	2		P3-40 P10-215					.13 .18	NO NO		22 25	E BRANCH 5
A	212	2		P3-33 P10-646					.13 .18	NO NO		22 25	E BRANCH 5
A	213	2		P3-17 P10-546					.13 .18	NO NO		22 25	E BRANCH 5
A	214	2		P3-57 P10-645					.13 .18	NO NO		22 25	E BRANCH 5
A	215	2		P3-82 P10-545					.13 .18	NO NO		22 25	E BRANCH 5
A	216	2		P3-81 P10-542					.13 .18	NO NO		22 25	E BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 48 OF 67

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
A	217	2		P3-80 P10-644					.13 .18	NO NO		22 25	E BRANCH 5
A	218	2		P3-56 P10-544					.13 .18	NO NO		22 25	E BRANCH 5
A	219	2		P3-84 P10-623					.13 .18	NO NO		22 25	E BRANCH 5
A	220	2		P3-60 P10-524					.13 .18	NO NO		22 25	E BRANCH 5
A	221	2		P3-59 P10-522					.13 .18	NO NO		22 25	E BRANCH 5
A	222	2		P3-62 P10-648					.13 .18	NO NO		22 25	E BRANCH 5
A	223	2		P3-63 P10-649					.13 .18	NO NO		22 25	E BRANCH 5
A	224	2		P3-38 P10-650					.13 .18	NO NO		22 25	E BRANCH 5
A	225	2		P5-38 P10-401					.13 .18	NO NO		22 25	D BRANCH 4
A	226	2		P5-62 P10-601					.13 .18	NO NO		22 25	D BRANCH 4
A	227	2		P5-63 P10-501					.13 .18	NO NO		22 25	D BRANCH 4
A	228	2		P5-64 P10-101					.13 .18	NO NO		22 25	D BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 49 OF 67

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
A	229	2		P5-40 P10-301					.13 .18	NO NO		22 25	D BRANCH 4
A	230	2		P5-39 P10-201					.13 .18	NO NO		22 25	D BRANCH 4
A	231	2		P5-41 P10-502					.13 .22	NO NO		22	D BRANCH 4
A	232	2		P5-42 P10-402					.13 .22	NO NO		22	D BRANCH 4
A	233	2		P5-30 P10-204					.13 .22	NO NO		22	D BRANCH 4
A	234	2		P5-14 P10-505					.13 .22	NO NO		22	D BRANCH 4
A	235	2		P5-29 P10-605					.13 .22	NO NO		22	D BRANCH 4
A	236	2		P5-77 P10-506					.13 .22	NO NO		22	D BRANCH 4
A	237	2		P5-52 P10-404					.13 .22	NO NO		22	D BRANCH 4
A	238	2		P5-76 P10-304					.13 .22	NO NO		22	D BRANCH 4
A	239	2		P5-50 P10-405					.13 .22	NO NO		22	D BRANCH 4
A	240	2		P5-51 P10-606					.13 .22	NO NO		22	D BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 50 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 241	2		P5-75 P10-205					.13 .22	NO NO		22	D BRANCH 4
A 242	2		P5-73 P10-607					.13 .22	NO NO		22	D BRANCH 4
A 243	2		P5-74 P10-305					.13 .22	NO NO		22	D BRANCH 4
A 244	2		P5-49 P10-507					.13 .22	NO NO		22	D BRANCH 4
A 245	2		P5-13 P10-306					.13 .22	NO NO		22	D BRANCH 4
A 246	2		P5-28 P10-206					.13 .22	NO NO		22	D BRANCH 4
A 247	2		P5-27 P10-406					.13 .22	NO NO		22	D BRANCH 4
A 248	2		P5-47 P10-307					.13 .22	NO NO		22	D BRANCH 4
A 249	2		P5-46 P10-208					.13 .22	NO NO		22	D BRANCH 4
A 250	2		P5-4 P10-308					.13 .22	NO NO		22	D BRANCH 4
A 251	2		P5-12 P10-309					.13 .22	NO NO		22	D BRANCH 4
A 252	2		P5-71 P10-207					.13 .22	NO NO		22	D BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR A	SHEET 51 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 253	2		P5-72 P10-407					.13 .22	NO NO		22	D BRANCH 4
A 254	2		P5-48 P10-604					.13 .22	NO NO		22	D BRANCH 4
A 255	3											A
A 255R			P5-44 P10-107					.13 .18	NO NO		22 24	A BRANCH 6
A 255Y			P5-68 P10-105					.13 .18	NO NO		22 24	A BRANCH 6
A 256	2		P6-14 P10-540					.13 .18	NO NO		22 25	C BRANCH 6
A 257	2		P6-30 P10-639					.13 .18	NO NO		22 25	C BRANCH 6
A 258	2		P6-48 P10-658					.13 .18	NO NO		22 25	C BRANCH 6
A 259	2		P6-72 P10-557					.13 .18	NO NO		22 25	C BRANCH 6
A 260	2		P6-73 P10-558					.13 .18	NO NO		22 25	C BRANCH 6
A 261	2		P6-49 P10-657					.13 .18	NO NO		22 25	C BRANCH 6
A 262	2		P6-28 P10-640					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR A	SHEET 52 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 263	2		P6-29 P10-520					.13 .18	NO NO		22 25	C BRANCH 6
A 264	2		P6-76 P10-523					.13 .18	NO NO		22 25	C BRANCH 6
A 265	2		P6-75 P10-647					.13 .18	NO NO		22 25	C BRANCH 6
A 266	2		P6-50 P10-641					.13 .18	NO NO		22 25	C BRANCH 6
A 267	2		P6-74 P10-541					.13 .18	NO NO		22 25	C BRANCH 6
A 268	2		P6-40 P10-109					.13 .18	NO NO		22 25	C BRANCH 6
A 269	2		P6-21 P10-410					.13 .18	NO NO		22 25	C BRANCH 6
A 270	2		P6-65 P10-209					.13 .18	NO NO		22 25	C BRANCH 6
A 271	2		P6-22 P10-310					.13 .18	NO NO		22 25	C BRANCH 6
A 272	2		P6-66 P10-510					.13 .18	NO NO		22 25	C BRANCH 6
A 273	2		P6-42 P10-210					.13 .18	NO NO		22 25	C BRANCH 6
A 274	2		P6-41 P10-610					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR A	SHEET 53 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 275	2		P6-67 P10-110					.13 .18	NO NO		22 25	C BRANCH 6
A 276	2		P6-10 P10-111					.13 .18	NO NO		22 25	C BRANCH 6
A 277	2		P6-24 P10-612					.13 .18	NO NO		22 25	C BRANCH 6
A 278	2		P6-9 P10-211					.13 .18	NO NO		22 25	C BRANCH 6
A 279	2		P6-23 P10-512					.13 .18	NO NO		22 25	C BRANCH 6
A 280	2		P6-68 P10-511					.13 .18	NO NO		22 25	C BRANCH 6
A 281	2		P6-69 P10-411					.13 .18	NO NO		22 25	C BRANCH 6
A 282	2		P6-43 P10-611					.13 .18	NO NO		22 25	C BRANCH 6
A 283	2		P6-44 P10-311					.13 .18	NO NO		22 25	C BRANCH 6
A 284	2		P6-46 P10-627					.13 .18	NO NO		22 25	C BRANCH 6
A 285	2		P6-25 P10-628					.13 .18	NO NO		22 25	C BRANCH 6
A 286	2		P6-45 P10-528					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR A	SHEET 54 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 287	2		P6-71 P10-526					.13 .18	NO NO		22 25	C BRANCH 6
A 288	2		P6-70 P10-527					.13 .18	NO NO		22 25	C BRANCH 6
A 289	2		P6-47 P10-626					.13 .18	NO NO		22 25	C BRANCH 6
A 290	2		P6-12 P10-654					.13 .18	NO NO		22 25	C BRANCH 6
A 291	2		P6-3 P10-655					.13 .18	NO NO		22 25	C BRANCH 6
A 292	2		P6-11 P10-555					.13 .18	NO NO		22 25	C BRANCH 6
A 293	2		P6-27 P10-553					.13 .18	NO NO		22 25	C BRANCH 6
A 294	2		P6-26 P10-554					.13 .18	NO NO		22 25	C BRANCH 6
A 295	2		P6-13 P10-653					.13 .18	NO NO		22 25	C BRANCH 6
A 296	2		P8-24 P10-403					.13 .18	NO NO		22 25	B BRANCH 4
A 297	2		P8-44 P10-603					.13 .18	NO NO		22 25	B BRANCH 4
A 298	2		P8-43 P10-503					.13 .18	NO NO		22 25	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 55 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 299	2		P8-41 P10-103					.13 .18	NO NO		22 25	B BRANCH 4
A 300	2		P8-42 P10-303					.13 .18	NO NO		22 25	B BRANCH 4
A 301	2		P8-23 P10-203					.13 .18	NO NO		22 25	B BRANCH 4
A 302	2		P8-22 P10-502					.13 .22	NO NO		22 24	B BRANCH 4
A 303	2		P8-10 P10-402					.13 .22	NO NO		22 24	B BRANCH 4
A 304	2		P8-52 P10-207					.13 .22	NO NO		22 24	B BRANCH 4
A 305	2		P8-50 P10-407					.13 .22	NO NO		22 24	B BRANCH 4
A 306	2		P8-51 P10-307					.13 .22	NO NO		22 24	B BRANCH 4
A 307	2		P8-31 P10-408					.13 .22	NO NO		22	B BRANCH 4
A 308	2		P8-53 P10-608					.13 .22	NO NO		22 24	B BRANCH 4
A 309	2		P8-54 P10-508					.13 .22	NO NO		22	B BRANCH 4
A 310	2		P8-32 P10-208					.13 .22	NO NO		22 24	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR B	SHEET 56 OF 67

MIL 2 84 9 65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 311	2		P8-30 P10-309					.13 .22	NO NO		22 24	B BRANCH 4
A 312	2		P8-29 P10-308					.13 .22	NO NO		22 24	B BRANCH 4
A 313	2		P8-16 P10-409					.13 .22	NO NO		22 24	B BRANCH 4
A 314	2		P8-14 P10-604					.13 .22	NO NO		22 24	B BRANCH 4
A 315	2		P8-15 P10-609					.13 .22	NO NO		22 24	B BRANCH 4
A 316	1		P8-7 P10-106					.13 .18	NO NO		22 24	B BRANCH 4
A 317	1		P8-2 P10-104					.13 .18	NO NO		22 24	B BRANCH 4
A 318	2		P8-3 P10-607					.13 .22	NO NO		22 24	B BRANCH 4
A 319	2		P8-25 P10-606					.13 .22	NO NO		22 24	B BRANCH 4
A 320	2		P8-1 P10-507					.13 .22	NO NO		22 24	B BRANCH 4
A 321	2		P8-12 P10-406					.13 .22	NO NO		22 24	B BRANCH 4
A 322	2		P8-11 P10-506					.13 .22	NO NO		22 24	B BRANCH 4

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 57 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 323	2		P8-28 P10-405					.13 .22	NO NO		22 24	B BRANCH 4
A 324	2		P8-4 P10-206					.13 .22	NO NO		22 24	B BRANCH 4
A 325	2		P8-13 P10-306					.13 .22	NO NO		22 24	B BRANCH 4
A 326	2		P8-26 P10-205					.13 .22	NO NO		22 24	B BRANCH 4
A 327	2		P8-27 P10-305					.13 .22	NO NO		22 24	B BRANCH 4
A 328	2		P8-47 P10-204					.13 .22	NO NO		22 24	B BRANCH 4
A 329	2		P8-45 P10-404					.13 .22	NO NO		22 24	B BRANCH 4
A 330	2		P8-46 P10-304					.13 .22	NO NO		22 24	B BRANCH 4
A 331	2		P8-48 P10-605					.13 .22	NO NO		22 24	B BRANCH 4
A 332	2		P8-49 P10-505					.13 .22	NO NO		22 24	B BRANCH 4
A 333	3									6A 6A	31 31	
A 333A	11		SHLD A333 E8					.20 .19	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR A	SHEET 58 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 333B	11		E12 SHLD A333					.19 .20	NO NO			
A 333R			P3-3 P7-52					.13 .13	NO NO		22 22	
A 333Y			P3-11 P7-31					.13 .13	NO NO		22 22	
A 334	8				1.75 1.75	1.50 1.50				6A 6A	63 63	
A 334A	11		SHLD A334 E8					.20 .19	NO NO		 47	
A 334B	11		E11 SHLD A334					.19 .20	NO NO		47	
A 334Y			P3-4 P6-51					.13 .13	NO NO		22 22	
A 335	9				1.75 1.75	1.50 1.50				6A 6A	31 31	
A 335A	11		SHLD A335 E10					.20 .19	NO NO			
A 335B	11		E12 SHLD A335					.19 .20	NO NO		47	
A 335R			P5-19 P7-15					.13 .13	NO NO		22 22	
A 335Y			P5-18 P7-16					.13 .13	NO NO		22 22	

SIZE A CODE IDENT NO. 80230 2010774
SCALE-NONE REV LTR A SHEET 59 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 336	9				1.75 1.75	1.50 1.50				6A 6A	31 31	
A 336A	11		SHLD A336 E10					.20 .19	NO NO			
A 336B	11		E13 SHLD A336					.19 .20	NO NO			
A 336R			P5-7 P7-30					.13 .13	NO NO		22 22	
A 336Y			P5-8 P7-14					.13 .13	NO NO		22 22	
A 337	3									6A 6A	31 31	
A 337A	11		SHLD A337 E10					.20 .19	NO NO		 47	
A 337B	11		E13 SHLD A337					.19 .20	NO NO		47	
A 337R			P5-9 P7-6					.13 .13	NO NO		22 22	
A 337Y			P5-2 P7-7					.13 .13	NO NO		22 22	
A 338	2		P5-10 P10-508					.13 .22	NO NO		22 24	D BRANCH 4
A 339	2		P5-24 P10-408					.13 .22	NO NO		22 24	D BRANCH 4

SIZE A CODE IDENT NO. 80230 2010774
SCALE-NONE REV LTR A SHEET 60 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 340	35		E7 E5					.19 .19	NO NO		47	F
A 341	35		E8 E5					.19 .19	NO NO			E
A 342	35		E9 E5					.19 .19	NO NO		 52	D
A 343	35		E9 E6					.19 .19	NO NO		47	A
A 344	35		E11 E6					.19 .19	NO NO			C
A 345	35		E14 E6					.19 .19	NO NO		47 52	B
A 346	2		P5-43 P10-108					.13 .22	NO NO		22 24	A BRANCH 6
A 347	35		E3 E36					.19 .19	NO NO		 58	G
A 348	4											G
A 348R			P9-610 P10-332					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 348Y			P9-510 P10-432					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 349	4											G

SIZE A CODE IDENT NO. 80230 2010774
SCALE-NONE REV LTR A SHEET 61 OF 67

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 349R			P9-310 P10-330					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 349Y			P9-210 P10-430					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 350	4											G
A 350R			P9-609 P10-329					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 350Y			P9-509 P10-429					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 351	4											G
A 351R			P9-309 P10-328					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 351Y			P9-209 P10-428					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 352	4											G
A 352R			P9-608 P10-334					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 352Y			P9-508 P10-434					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 353	4											G

SIZE A CODE IDENT NO. 80230 2010774
SCALE-NONE REV LTR A SHEET 62 OF 67

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 353R			P9-308 P10-333					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 353Y			P9-208 P10-433					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354	4											G
A 354R			P9-607 P10-338					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354Y			P9-507 P10-438					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355	4											G
A 355R			P9-307 P10-337					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355Y			P9-207 P10-437					.18 .18	NO NO		25 25	B, BRANCH 1 BRANCH 5
A 356	4											G
A 356R			P9-606 P10-336					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 356Y			P9-506 P10-436					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357	4											G

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 63 OF 67

MIL 2004 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 357R			P9-306 P10-335					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357Y			P9-206 P10-435					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358	4											G
A 358R			P9-605 P10-146					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358Y			P9-505 P10-246					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359	4											G
A 359R			P9-305 P10-145					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359Y			P9-205 P10-245					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360	4											G
A 360R			P9-604 P10-144					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360Y			P9-504 P10-244					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361	4											G

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 64 OF 67

MIL 2004 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 361R			P9-304 P10-143					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361Y			P9-204 P10-243					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362	4											G
A 362R			P9-603 P10-148					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362Y			P9-503 P10-248					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363	4											G
A 363R			P9-303 P10-147					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363Y			P9-203 P10-247					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364	4											G
A 364R			P9-602 P10-152					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364Y			P9-502 P10-252					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365	4											G

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 65 OF 67

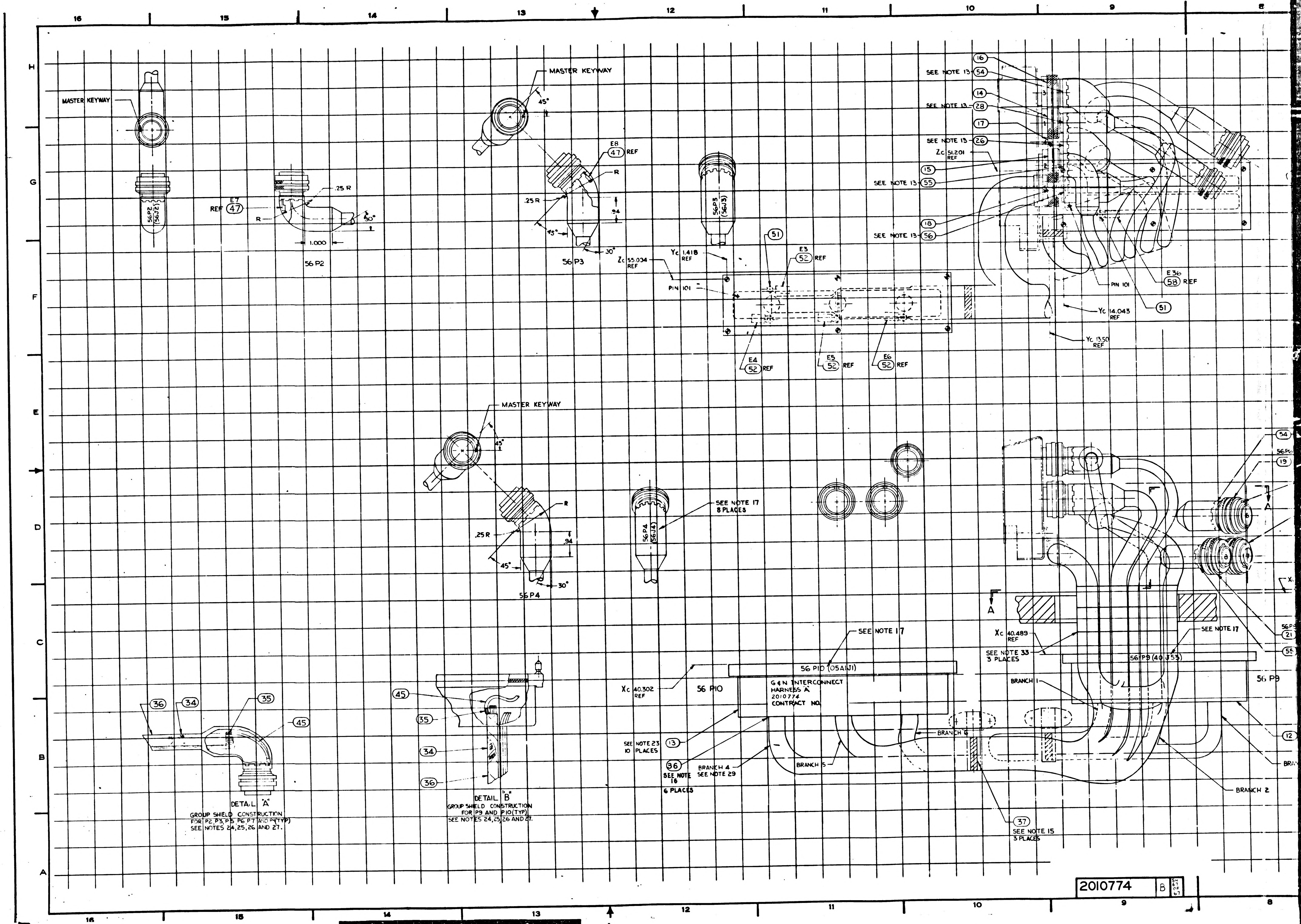
MIL 2004 9-65

HARNESS A 2010774

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 365R			P9-302 P10-151					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365Y			P9-202 P10-251					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366	4											G
A 366R			P9-601 P10-150					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366Y			P9-501 P10-250					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367	4											G
A 367R			P9-301 P10-149					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367Y			P9-201 P10-249					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR A
SHEET 66 OF 67

MIL 2004 9-65


MASTER KEYWAY
56P2 (56J2)
E7
REF 47
R
.25 R
30°
1.000
56 P2
MASTER KEYWAY
45°
E8
47 REF
R
.25 R
.94
45°
30°
56 P3
56P3 (56J3)
Yc 1.418 REF
Zc 55.034 REF
PIN 101
51
E3
52 REF
E4
52 REF
E5
52 REF
E6
52 REF
16
SEE NOTE 13 54
14
SEE NOTE 13 28
17
SEE NOTE 13 26
Zc 51.201 REF
15
SEE NOTE 13 55
18
SEE NOTE 13 56
PIN 101
E36
58 REF
51
Yc 14.043 REF
Yc 13.50 REF
MASTER KEYWAY
45°
R
.25 R
.94
45°
30°
56 P4
SEE NOTE 17
8 PLACES
56P4 (56J4)
54
56P6
19
A
A
Xc
56P5
21
55
SEE NOTE 17
Xc 40.489 REF
SEE NOTE 33
3 PLACES
56 P9 (40 J53)
56 P9
SEE NOTE 17
56 P10 (05A1J1)
Xc 40.302 REF
56 P10
G & N INTERCONNECT
HARNESS "A"
2010774
CONTRACT NO.
SEE NOTE 23
10 PLACES
13
36
SEE NOTE 16
6 PLACES
BRANCH 4
SEE NOTE 29
BRANCH 5
BRANCH 6
BRANCH 1
12
BRANCH 2
37
SEE NOTE 15
3 PLACES
36
34
35
45
45
35
34
36
2010774
B
SH 67 OF 67

DETAIL "A"
GROUP SHIELD CONSTRUCTION
FOR P2, P3, P5, P6, P7 AND P8 (TYP)
SEE NOTES 24, 25, 26 AND 27.

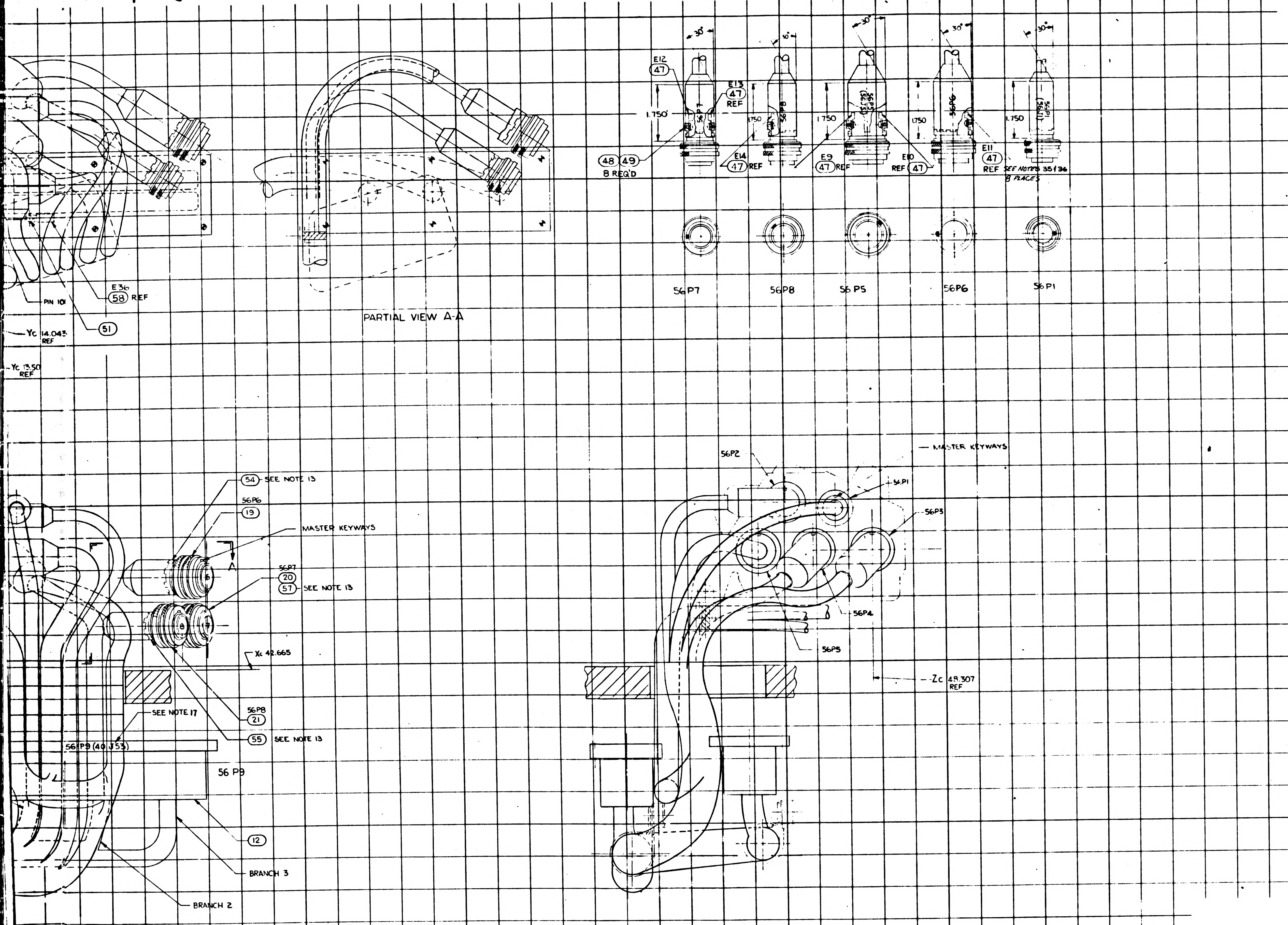
DETAIL "B"
GROUP SHIELD CONSTRUCTION
FOR P9 AND P10 (TYP)
SEE NOTES 24, 25, 26 AND 27.

1/2010774

REVISIONS 3/139

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

SEE SHEET I FOR REVISION RECORD



30°
E12
(47)
E13
(47)
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1.750
(48) (49)
8 REQ'D
E14
(47) REF
E9
(47) REF
E10
REF (47)
E11
(47)
REF SEE NOTES 35 & 36
8 PLACES
56P7
56P8
56P5
56P6
56P1
E36
(58) REF
PIN 101
(51)
Yc 14.043
REF
Yc 13.50
REF
PARTIAL VIEW A-A
(54) SEE NOTE 13
56P6
(19)
MASTER KEYWAYS
A
56P7
(20)
(57) SEE NOTE 13
Xc 42.665
SEE NOTE 17
56P9 (40 J53)
56 P9
56P8
(21)
(55) SEE NOTE 13
(12)
BRANCH 3
BRANCH 2
56P2
MASTER KEYWAYS
56P1
56P3
56P4
56P5
Zc 49.307
REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + − − −	M I T INSTRUMENTATION LAB	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN 28 JUN 66 DATE CHECKED APPROVAL APPROVAL	G&N INTERCONNECT HARNESS "A" (C/M BLOCK II)
MATERIAL	NASA APPROVAL R. Jacob	CODE IDENT NO 80230 · SIZE J2 · 2010774
CONTRACT NAS9-497	CCA APPROVAL	SCALE FULL · SHEET 67 OF 67

2010774 B

2/2010774

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	WA
B	REVISED PER TDRR 31197	4 Oct 66	DJW
C	REVISED PER TDRR 31212	22 OCT 66	

REV		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
SHEET		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
REV STATUS OF SHEETS	REV								C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	SHEET								1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN 29 JUN 66
DAY MO YR
CHECKER W. Diehl 1 JUL 66
NEA ENGINEER L. Barta 5 Jul 66
APPROVAL
CONTR NO. NAS 9-497
NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "A"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010774
SCALE NONE
SHEET 1 OF 68

MIL 1377A6 12-65

REVISION STATUS OF SHEETS

SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV	SH	REV
46	C																
47	C																
48	C																
49	C																
50	C																
51	C																
52	C																
53	C																
54	C																
55	C																
56	C																
57	C																
58	C																
59	C																
60	C																
61	C																
62	C																
63	C																
64	C																
65	C																
66	C																
67	C																
68	C																

SIZE A
CODE IDENT. NO. 80230
2010774
SCALE NONE
REV LTR C
SHEET 2

MIL 1377A3 8-65

NOTE NUMBER	GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR C		SHEET 7 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010774-001	WIRE PER 1010789-006, 22 AWG, YEL, 25 FT TOT LG
	2	1	2010774-002	WIRE PER 1010789-016, 26 AWG, YEL, 50 FT TOT LG
	3	1	2010774-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 15 FT TOT LG
	4	1	2010774-004	WIRE PER 1010789-017, 26 AWG, YEL, RED, 220 FT TOT LG
	5	1	2010774-005	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 20 FT TOT LG
	6	1	2010774-006	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN 90 FT TOT LG
	7	1	2010774-007	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 25 FT TOT LG
	8	1	2010774-008	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT, 10 FT TOT LG
	9	1	2010774-009	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 150 FT TOT LG
	10	1	2010774-010	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	11	1	2010774-011	WIRE PER 1010789-002, 24 AWG, BLK, 80 FT TOT LG
	12	1	2014741-021	CONNECTOR, PLUG, ELECTRICAL (56P9)
	13	1	2014749-021	CONNECTOR, PLUG, ELECTRICAL (56P10)
9	14	1	1010929-109	CONNECTOR, PLUG, ELECTRICAL (56P1)

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR C		SHEET 8 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-005	CONNECTOR, PLUG, ELECTRICAL (56P2)
9	16	1	1010929-102	CONNECTOR, PLUG, ELECTRICAL (56P3)
9	17	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P4)
9	18	1	1010929-103	CONNECTOR, PLUG, ELECTRICAL (56P5)
9	19	1	1010929-104	CONNECTOR, PLUG, ELECTRICAL (56P6)
9	20	1	1010929-108	CONNECTOR, PLUG, ELECTRICAL (56P7)
9	21	1	1010929-105	CONNECTOR, PLUG, ELECTRICAL (56P8)
9	22	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	23	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	24	113	1010955- 1	CONTACT, MALE
9	25	332	1010955- 2	CONTACT, MALE
	26	1	2014670- 4	ADAPTER, CONNECTOR
	28	1	2014670- 7	ADAPTER, CONNECTOR
9	29	14	1012534- 36	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	30	2	1012534- 38	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	31	93	1010402- 2	SLEEVE, SOLDER
9	32	115	1010958- 1	PLUG, PROTECTIVE SEALING
9	34	AR	1010989	TAPE, SHIELDING, EMI/RFI

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR C		SHEET 9 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35		2010774-012	DELETED
	36	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	37	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	38	AR	1012507-004	TAPE, LACING AND TYING
9	39	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	40	AR	1012504	PRIMER, METAL PARTS
9	41	AR	1010661	EPOXY RESIN
9	42	AR	1010679	ADHESIVE ACTIVATOR
	45		1006776- 19	DELETED
	47	8	2021203	TERMINAL LUG, SOLDER
	48	8	MS35333-69	WASHER, LOCK
9	49	8	1006783- 93	SCREW, BUTTON HD
9	51	5	1006783- 18	SCREW, BUTTON HD
	52	4	MS25036-52	TERMINAL LUG
28	53	1	2010774-013	WIRE BRAID,QQ-B-575,.120IA. 36AWG, 5 FT TOT LG
	54	2	2014670- 11	ADAPTER, CONNECTOR
	55	2	2014670- 12	ADAPTER, CONNECTOR
	56	1	2014670- 13	ADAPTER,CONNECTOR

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR C		SHEET 10 OF

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 7 OF	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010774-001	WIRE PER 1010789-006, 22 AWG, YEL, 25 FT TOT LG
	2	1	2010774-C02	WIRE PER 1010789-016, 26 AWG, YEL, 50 FT TOT LG
	3	1	2010774-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 15 FT TOT LG
	4	1	2010774-C04	WIRE PER 1010789-017, 26 AWG, YEL, RED, 220 FT TOT LG
	5	1	2010774-C05	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 20 FT TOT LG
	6	1	2010774-C06	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN 90 FT TOT LG
	7	1	2010774-C07	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 25 FT TOT LG
	8	1	2010774-C08	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT, 10 FT TOT LG
	9	1	2010774-C09	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 150 FT TOT LG
	10	1	2010774-C10	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	11	1	2010774-C11	WIRE PER 1010789-002, 24 AWG, BLK, 80 FT TOT LG
	12	1	2014741-C21	CONNECTOR, PLUG, ELECTRICAL (56P9)
	13	1	2014749-C21	CONNECTOR, PLUG, ELECTRICAL (56P10)
9	14	1	1010929-109	CONNECTOR, PLUG, ELECTRICAL (56P1)

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 8 OF	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-005	CONNECTOR, PLUG, ELECTRICAL (56P2)
9	16	1	1010929-102	CONNECTOR, PLUG, ELECTRICAL (56P3)
9	17	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P4)
9	18	1	1010929-103	CONNECTOR, PLUG, ELECTRICAL (56P5)
9	19	1	1010929-104	CONNECTOR, PLUG, ELECTRICAL (56P6)
9	20	1	1010929-108	CONNECTOR, PLUG, ELECTRICAL (56P7)
9	21	1	1010929-105	CONNECTOR, PLUG, ELECTRICAL (56P8)
9	22	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	23	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	24	113	1010955- 1	CONTACT, MALE
9	25	332	1010955- 2	CONTACT, MALE
	26	1	2014670- 4	ADAPTER, CONNECTOR
	28	1	2014670- 7	ADAPTER, CONNECTOR
9	29	14	1012534- 36	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	30	2	1012534- 38	SLEEVE, INSULATION (HEAT SHRINKABLE)
9	31	93	1010402- 2	SLEEVE, SOLDER
9	32	115	1010958- 1	PLUG, PROTECTIVE SEALING
9	34	AR	1010989	TAPE, SHIELDING, EMI/RFI

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 9 OF	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35		2010774-012	DELETED
	36	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	37	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	38	AR	1012507-004	TAPE, LACING AND TYING
9	39	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	40	AR	1012504	PRIMER, METAL PARTS
9	41	AR	1010661	EPOXY RESIN
9	42	AR	1010679	ADHESIVE ACTIVATOR
	45		1006776- 19	DELETED
	47	8	2021203	TERMINAL LUG, SOLDER
	48	8	MS35333-69	WASHER, LOCK
9	49	8	1006783- 93	SCREW, BUTTON HD
9	51	5	1006783- 18	SCREW, BUTTON HD
	52	4	MS25036-52	TERMINAL LUG
28	53	1	2010774-013	WIRE BRAID,QQ-B-575,.12DIA. 36AWG, 5 FT TOT LG
	54	2	2014670- 11	ADAPTER, CONNECTOR
	55	2	2014670- 12	ADAPTER, CONNECTOR
	56	1	2014670- 13	ADAPTER,CONNECTOR

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 10 OF	

CYZMOURE 110366 HARNESS A 2010774 C

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	57	1	2014670- 15	ADAPTER,CONNECTOR
	58	1	MS25036-48	TERMINAL LUG
	59	445	1010490-114	SLEEVE, INSULATION (HEAT SHRINKABLE)
	60	AR	SN60WRAP	SCLDER QQ-S-571
	61	AR	SN60WS	SOLDER QQ-S-571
	62	AR	MIL-F-14256 TYPE A OR W	FLUX
	63	4	1010402- 1	SLEEVE, SCLDER
9	64	AR	1008822	COLORANT, EPCXY BASE
9	65	AR	1006277	SILICA, PULVERIZED PYROGENIC
9	66	14	1010811-002	BAND, CABLE

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 11 OF

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CYZMOURE 110366 HARNESS A 2010774 C

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	21	9				1.00 1.00	.75 .75				68 68	31 31	
A	21A	11		SHLD A21 P9-111					.20 .18	NO NO		24	BRANCH 1
A	21B	11		E3 SHLD A21					.19 .20	NO NO			
A	21R			P9-311 P10-515					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	21Y			P9-211 P10-615					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	22	10				1.00 1.00	.75 .75				7 68	29 31	
A	22B	11		E3 SHLD A22					.19 .20	NO NO			
A	22G			P9-511 P10-536					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A	22R			P9-611 P10-622					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	22Y			P9-411 P10-534					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 5
A	23	9				1.00 1.00	.75 .75				7 68	29 31	
A	23B	11		E4 SHLD A23					.19 .20	NO NO			

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 12 OF

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CYZMOURE 110366 HARNESS A 2010774 C

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	23R			P9-212 P10-112					.18 .18	NO NO		25 25	BRANCH 1
A	23Y			P9-112 P10-412					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	24	9				1.00 1.00	.75 .75				7 68	29 31	
A	24B	11		E4 SHLD A24					.19 .20	NO NO			
A	24R			P9-412 P10-614					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	24Y			P9-312 P10-313					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	25	10				1.00 1.00	.75 .75				7 68	29 31	
A	25B	11		E4 SHLD A25					.19 .20	NO NC		52	
A	25G			P9-113 P10-514					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	25R			P9-612 P10-314					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	25Y			P9-512 P10-414					.18 .18	NO NO		24 24	BRANCH 1 BRANCH 4
A	26	9				1.00 1.00	.75 .75				7 68	29 31	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 13 OF

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CYZMOURE 110366 HARNESS A 2010774 C

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	26B	11		E3 SHLD A26					.19 .20	NO NO		52	
A	26R			P9-313 P10-525					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	26Y			P9-213 P10-624					.18 .18	NO NO		25 25	BRANCH 1 BRANCH 4
A	27	9				1.75 1.00	1.50 .75				68 68	31 31	
A	27A	11		SHLD A27 P7-12					.20 .13	NO NO		22	
A	27B	11		P9-637 SHLD A27					.18 .20	NO NO		24	BRANCH 3
A	27R			P7-27 P9-437					.13 .18	NO NO		22 25	BRANCH 3
A	27Y			P7-13 P9-537					.13 .18	NO NO		22 25	BRANCH 3
A	28	9				1.75 1.00	1.50 .75				68 68	31 31	
A	28A	11		SHLD A28 P7-26					.20 .13	NO NO		22	
A	28B	11		P9-137 SHLD A28					.18 .20	NO NO		24	BRANCH 3
A	28R			P7-47 P9-237					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 14 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 28Y			P7-46 P9-337					.13 .18	NO NO		22 25	BRANCH 3
A 29	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 29A	11		SHLD A29 P7-24					.20 .13	NO NO		22	
A 29B	11		P9-634 SHLD A29					.18 .20	NO NO		24	BRANCH 2
A 29R			P7-44 P9-434					.13 .18	NO NO		22 25	BRANCH 2
A 29Y			P7-25 P9-534					.13 .18	NO NO		22 25	BRANCH 2
A 30	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 30A	11		SHLD A30 P7-5					.20 .13	NO NO		22	
A 30B	11		P9-335 SHLD A30					.18 .20	NO NO		24	BRANCH 2
A 30R			P7-4 P9-135					.13 .18	NO NO		22 25	BRANCH 2
A 30Y			P7-1 P9-235					.13 .18	NO NO		22 25	BRANCH 2
A 31	9				1.75 1.00	1.50 .75				6B 6B	31 31	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 15 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 31A	11		SHLD A31 P7-3					.20 .13	NO NO		22	
A 31B	11		P9-635 SHLD A31					.18 .20	NO NO		24	BRANCH 2
A 31R			P7-11 P9-435					.13 .18	NO NO		22 25	BRANCH 2
A 31Y			P7-10 P9-535					.13 .18	NO NO		22 25	BRANCH 2
A 32	4											
A 32R			P7-53 P9-536					.13 .18	NO NO		22 25	BRANCH 3
A 32Y			P7-54 P9-636					.13 .18	NO NO		22 25	BRANCH 3
A 33	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 33A	11		SHLD A33 P1-13					.20 .13	NO NO		22	
A 33B	11		P9-332 SHLD A33					.18 .20	NO NO		24	BRANCH 2
A 33R			P1-28 P9-132					.13 .18	NO NO		22 25	BRANCH 2
A 33Y			P1-27 P9-232					.13 .18	NO NO		22 25	BRANCH 2

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 16 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 34	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 34A	11		SHLD A34 P1-1					.20 .13	NO NO		22	
A 34B	11		P9-632 SHLD A34					.18 .20	NO NO		24	BRANCH 2
A 34R			P1-4 P9-432					.13 .18	NO NO		22 25	BRANCH 2
A 34Y			P1-3 P9-532					.13 .18	NO NO		22 25	BRANCH 2
A 35	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 35A	11		SHLD A35 P1-16					.20 .13	NO NO		22	
A 35B	11		P9-333 SHLD A35					.18 .20	NO NO		24	BRANCH 2
A 35R			P1-6 P9-133					.13 .18	NO NO		22 25	BRANCH 2
A 35Y			P1-5 P9-233					.13 .18	NO NO		22 25	BRANCH 2
A 36	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 36A	11		SHLD A36 P1-17					.20 .13	NO NO		22	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 17 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 36B	11		P9-346 SHLD A36					.18 .20	NO NO		24	BRANCH 3
A 36R			P1-34 P9-146					.13 .18	NO NO		22 25	BRANCH 3
A 36Y			P1-33 P9-246					.13 .18	NO NO		22 25	BRANCH 3
A 37	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 37A	11		SHLD A37 P1-18					.20 .13	NO NO		22	
A 37B	11		P9-646 SHLD A37					.18 .20	NO NO		24	BRANCH 3
A 37R			P1-35 P9-446					.13 .18	NO NO		22 25	BRANCH 3
A 37Y			P1-36 P9-546					.13 .18	NO NO		22 25	BRANCH 3
A 38	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 38A	11		SHLD A38 P1-14					.20 .13	NO NO		22	
A 38B	11		P9-348 SHLD A38					.18 .20	NO NO		24	BRANCH 3
A 38R			P1-30 P9-248					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 18 OF

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CYZMOURE 110366 HARNESS A ▼ 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 38Y			P1-29 P9-148					.13 .18	NO NO		22 25	BRANCH 3
A 39	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 39A	11		SHLD A39 P1-15					.20 .13	NO NO		22	
A 39B	11		P9-648 SHLD A39					.18 .20	NO NO		24	BRANCH 3
A 39R			P1-31 P9-448					.13 .18	NO NO		22 25	BRANCH 3
A 39Y			P1-32 P9-548					.13 .18	NO NO		22 25	BRANCH 3
A 40	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 40A	11		SHLD A40 P1-20					.20 .13	NO NO		22	
A 40B	11		P9-633 SHLD A40					.18 .20	NO NO		24	BRANCH 2
A 40R			P1-19 P9-533					.13 .18	NO NO		22 25	BRANCH 2
A 40Y			P1-37 P9-433					.13 .18	NO NO		22 25	BRANCH 2
A 41	9				1.75 1.00	1.50 .75				6B 6B	31 31	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 19 OF

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CYZMOURE 110366 HARNESS A ▼ 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 41A	11		SHLD A41 P1-21					.20 .13	NO NO		22	
A 41B	11		P9-334 SHLD A41					.18 .20	NO NO		24	BRANCH 2
A 41R			P1-38 P9-234					.13 .18	NO NO		22 25	BRANCH 2
A 41Y			P1-39 P9-134					.13 .18	NO NO		22 25	BRANCH 2
A 42	6											
A 42G			P1-26 P9-421					.13 .18	NO NO		22 25	BRANCH 2
A 42R			P1-43 P9-620					.13 .18	NO NO		22 25	BRANCH 2
A 42Y			P1-44 P9-221					.13 .18	NO NO		22 25	BRANCH 2
A 43	6											
A 43G			P1-8 P9-222					.13 .18	NO NO		22 25	BRANCH 2
A 43R			P1-7 P9-621					.13 .18	NO NO		22 25	BRANCH 2
A 43Y			P1-2 P9-119					.13 .18	NO NO		22 25	BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 20 OF

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CYZMOURE 110366 HARNESS A ▼ 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 46	2		P1-25 P9-422					.13 .18	NO NO		22 25	BRANCH 2
A 47	3											
A 47R			P1-40 P9-228					.13 .18	NO NO		22 24	BRANCH 2
A 47Y			P1-23 P9-328					.13 .18	NO NO		22 24	BRANCH 2
A 48	3											
A 48R			P1-41 P9-428					.13 .18	NO NO		22 24	BRANCH 2
A 48Y			P1-42 P9-528					.13 .18	NO NO		22 24	BRANCH 2
A 49	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 49A	11		SHLD A49 P4-30					.20 .13	NO NO		22	
A 49B	11		P9-340 SHLD A49					.18 .20	NO NO		24	BRANCH 3
A 49R			P4-52 P9-140					.13 .18	NO NO		22 25	BRANCH 3
A 49Y			P4-51 P9-240					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 21 OF

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CYZMOURE 110366 HARNESS A ▼ 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 50	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 50A	11		SHLD A50 P4-31					.20 .13	NO NO		22	
A 50B	11		P9-640 SHLD A50					.18 .20	NO NO		24	BRANCH 3
A 50R			P4-54 P9-440					.13 .18	NO NO		22 25	BRANCH 3
A 50Y			P4-53 P9-540					.13 .18	NO NO		22 25	BRANCH 3
A 51	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 51A	11		SHLD A51 P4-29					.20 .13	NO NO		22	
A 51B	11		P9-341 SHLD A51					.18 .20	NO NO		24	BRANCH 3
A 51R			P4-13 P9-141					.13 .18	NO NO		22 25	BRANCH 3
A 51Y			P4-14 P9-241					.13 .18	NO NO		22 25	BRANCH 3
A 52	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 52A	11		SHLD A52 P4-32					.20 .13	NO NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 22 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 52B	11		P9-641 SHLD A52					.18 .20	NO NO		24	BRANCH 3
A 52R			P4-16 P9-441					.13 .18	NO NO		22 25	BRANCH 3
A 52Y			P4-15 P9-541					.13 .18	NO NO		22 25	BRANCH 3
A 53	9				1.75 1.00	1.50 .75				68 68	31 31	
A 53A	11		SHLD A53 P4-36					.20 .13	NO NO		22	
A 53B	11		P9-342 SHLD A53					.18 .20	NO NO		24	BRANCH 3
A 53R			P4-59 P9-142					.13 .18	NO NO		22 25	BRANCH 3
A 53Y			P4-60 P9-242					.13 .18	NO NO		22 25	BRANCH 3
A 54	9				1.75 1.00	1.50 .75				68 68	31 31	
A 54A	11		SHLD A54 P4-37					.20 .13	NO NO		22	
A 54B	11		P9-642 SHLD A54					.18 .20	NO NO		24	BRANCH 3
A 54R			P4-61 P9-442					.13 .18	NO NO		22 25	BRANCH 3

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 23 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 54Y			P4-38 P9-542					.13 .18	NO NO		22 25	BRANCH 3
A 55	9				1.75 1.00	1.50 .75				68 68	31 31	
A 55A	11		SHLD A55 P4-33					.20 .13	NO NO		22	
A 55B	11		P9-343 SHLD A55					.18 .20	NO NO		24	BRANCH 3
A 55R			P4-56 P9-143					.13 .18	NO NO		22 25	BRANCH 3
A 55Y			P4-55 P9-243					.13 .18	NO NO		22 25	BRANCH 3
A 56	9				1.75 1.00	1.50 .75				68 68	31 31	
A 56A	11		SHLD A56 P4-34					.20 .13	NO NO		22	
A 56B	11		P9-643 SHLD A56					.18 .20	NO NO		24	BRANCH 3
A 56R			P4-57 P9-443					.13 .18	NO NO		22 25	BRANCH 3
A 56Y			P4-58 P9-543					.13 .18	NO NO		22 25	BRANCH 3
A 57	9				1.75 1.00	1.50 .75				68 68	31 31	

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 24 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 57A	11		SHLD A57 P4-27					.20 .13	NO NO		22	
A 57B	11		P9-344 SHLD A57					.18 .20	NO NO		24	BRANCH 3
A 57R			P4-48 P9-144					.13 .18	NO NO		22 25	BRANCH 3
A 57Y			P4-47 P9-244					.13 .18	NO NO		22 25	BRANCH 3
A 58	9				1.75 1.00	1.50 .75				68 68	31 31	
A 58A	11		SHLD A58 P4-28					.20 .13	NO NO		22	
A 58B	11		P9-644 SHLD A58					.18 .20	NO NO		24	BRANCH 3
A 58R			P4-49 P9-444					.13 .18	NO NO		22 25	BRANCH 3
A 58Y			P4-50 P9-544					.13 .18	NO NO		22 25	BRANCH 3
A 59	9				1.75 1.00	1.50 .75				68 68	31 31	
A 59A	11		SHLD A59 P4-35					.20 .13	NO NO		22	
A 59B	11		P9-345 SHLD A59					.18 .20	NO NO		24	BRANCH 3

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 25 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 59R			P4-17 P9-145					.13 .18	NO NO		22 25	BRANCH 3
A 59Y			P4-18 P9-245					.13 .18	NO NO		22 25	BRANCH 3
A 60	9				1.75 1.00	1.50 .75				68 68	31 31	
A 60A	11		SHLD A60 P4-20					.20 .13	NO NO		22	
A 60B	11		P9-645 SHLD A60					.18 .20	NO NO		24	BRANCH 3
A 60R			P4-19 P9-445					.13 .18	NO NO		22 25	BRANCH 3
A 60Y			P4-8 P9-545					.13 .18	NO NO		22 25	BRANCH 3
A 61	9				1.75 1.00	1.50 .75				68 68	31 31	
A 61A	11		SHLD A61 P4-22					.20 .13	NO NO		22	
A 61B	11		P9-329 SHLD A61					.18 .20	NO NO		24	BRANCH 2
A 61R			P4-41 P9-129					.13 .18	NO NO		22 25	BRANCH 2
A 61Y			P4-42 P9-229					.13 .18	NO NO		22 25	BRANCH 2

SIZE	CODE IDENT NO.		
A	80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 26 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 62	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 62A	11		SHLD A62 P4-24					.20 .13	NO NO		22	
A 62B	11		P9-629 SHLD A62					.18 .20	NO NO		24	BRANCH 2
A 62R			P4-43 P9-429					.13 .18	NO NO		22 25	BRANCH 2
A 62Y			P4-44 P9-529					.13 .18	NO NO		22 25	BRANCH 2
A 63	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 63A	11		SHLD A63 P4-25					.20 .13	NO NO		22	
A 63B	11		P9-330 SHLD A63					.18 .20	NO NO		24	BRANCH 2
A 63R			P4-45 P9-130					.13 .18	NO NO		22 25	BRANCH 2
A 63Y			P4-46 P9-230					.13 .18	NO NO		22 25	BRANCH 2
A 64	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 64A	11		SHLD A64 P4-21					.20 .13	NO NO		22	

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR C	SHEET 27 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 64B	11		P9-630 SHLD A64					.18 .20	NO NO		24	BRANCH 2
A 64R			P4-39 P9-430					.13 .18	NO NO		22 25	BRANCH 2
A 64Y			P4-40 P9-530					.13 .18	NO NO		22 25	BRANCH 2
A 65	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 65A	11		SHLD A65 P4-10					.20 .13	NO NO		22	
A 65B	11		P9-331 SHLD A65					.18 .20	NO NO		24	BRANCH 2
A 65R			P4-9 P9-131					.13 .18	NO NO		22 25	BRANCH 2
A 65Y			P4-23 P9-231					.13 .18	NO NO		22 25	BRANCH 2
A 66	9				1.75 1.00	1.50 .75				6B 6B	31 31	
A 66A	11		SHLD A66 P4-11					.20 .13	NO NO		22	
A 66B	11		P9-631 SHLD A66					.18 .20	NO NO		24	BRANCH 2
A 66R			P4-26 P9-431					.13 .18	NO NO		22 25	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR C	SHEET 28 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 66Y			P4-12 P9-531					.13 .18	NO NO		22 25	BRANCH 2
A 67	9				1.75 1.00	1.50 .75				6B 7	31 29	
A 67A	11		SHLD A67 P4-1					.20 .13	NO NO		22	
A 67R			P4-6 P9-338					.13 .18	NO NO		22 25	BRANCH 3
A 67Y			P4-7 P9-238					.13 .18	NO NO		22 25	BRANCH 3
A 68	8				1.75 1.00	1.50 .75				6B 7	63 30	
A 68A	11		SHLD A68 P4-2					.20 .13	NO NO		22	
A 68Y			P4-3 P9-138					.13 .18	NO NO		22 24	BRANCH 3
A 69	1		P4-5 P9-336					.13 .18	NO NO		22 24	BRANCH 3
A 70	1		P4-4 P9-136					.13 .18	NO NO		22 24	BRANCH 3
A 71	1		P5-84 P9-236					.13 .18	NO NO		22 24	BRANCH 3
A 72	1		P5-60 P9-436					.13 .18	NO NO		22 24	BRANCH 3

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR C	SHEET 29 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 74	4											F
A 74R			P2-55 P10-121					.13 .18	NO NO		23 25	F BRANCH 5
A 74Y			P2-56 P10-221					.13 .18	NO NO		23 25	F BRANCH 5
A 75	4											F
A 75R			P2-54 P10-120					.13 .18	NO NO		23 25	F BRANCH 5
A 75Y			P2-32 P10-220					.13 .18	NO NO		23 25	F BRANCH 5
A 76	4											F
A 76R			P2-17 P10-119					.13 .18	NO NO		23 25	F BRANCH 5
A 76Y			P2-33 P10-219					.13 .18	NO NO		23 25	F BRANCH 5
A 77	4											F
A 77R			P2-16 P10-118					.13 .18	NO NO		23 25	F BRANCH 5
A 77Y			P2-5 P10-218					.13 .18	NO NO		23 25	F BRANCH 5

SIZE A	CODE IDENT NO. 80230	2010774
SCALE-NONE	REV LTR C	SHEET 30 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 78	4											F
A 78R			P2-57 P10-321					.13 .18	NO NO		23 25	F BRANCH 5
A 78Y			P2-34 P10-421					.13 .18	NO NO		23 25	F BRANCH 5
A 79	4											F
A 79R			P2-18 P10-320					.13 .18	NO NO		23 25	F BRANCH 5
A 79Y			P2-35 P10-420					.13 .18	NO NO		23 25	F BRANCH 5
A 80	4											F
A 80R			P2-52 P10-319					.13 .18	NO NO		23 25	F BRANCH 5
A 80Y			P2-53 P10-419					.13 .18	NO NO		23 25	F BRANCH 5
A 81	4											F
A 81R			P2-15 P10-318					.13 .18	NO NO		23 25	F BRANCH 5
A 81Y			P2-30 P10-418					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 31 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 82	4											F
A 82R			P2-50 P10-317					.13 .18	NO NO		23 25	F BRANCH 5
A 82Y			P2-51 P10-417					.13 .18	NO NO		23 25	F BRANCH 5
A 83	4											F
A 83R			P2-13 P10-323					.13 .18	NO NO		23 25	F BRANCH 5
A 83Y			P2-29 P10-423					.13 .18	NO NO		23 25	F BRANCH 5
A 84	4											F
A 84R			P2-12 P10-322					.13 .18	NO NO		23 25	F BRANCH 5
A 84Y			P2-27 P10-422					.13 .18	NO NO		23 25	F BRANCH 5
A 85	4											F
A 85R			P2-48 P10-316					.13 .18	NO NO		23 25	F BRANCH 5
A 85Y			P2-49 P10-416					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 32 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 86	4											F
A 86R			P2-1 P10-315					.13 .18	NO NO		23 25	F BRANCH 5
A 86Y			P2-4 P10-415					.13 .18	NO NO		23 25	F BRANCH 5
A 87	4											F
A 87R			P2-11 P10-324					.13 .18	NO NO		23 25	F BRANCH 5
A 87Y			P2-24 P10-424					.13 .18	NO NO		23 25	F BRANCH 5
A 88	4											F
A 88R			P2-10 P10-117					.13 .18	NO NO		23 25	F BRANCH 5
A 88Y			P2-2 P10-217					.13 .18	NO NO		23 25	F BRANCH 5
A 89	4											F
A 89R			P2-59 P10-139					.13 .18	NO NO		23 25	F BRANCH 5
A 89Y			P2-58 P10-239					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 33 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 90	4											F
A 90R			P2-7 P10-138					.13 .18	NO NO		23 25	F BRANCH 5
A 90Y			P2-6 P10-238					.13 .18	NO NO		23 25	F BRANCH 5
A 91	4											F
A 91R			P2-36 P10-137					.13 .18	NO NO		23 25	F BRANCH 5
A 91Y			P2-60 P10-237					.13 .18	NO NO		23 25	F BRANCH 5
A 92	4											F
A 92R			P2-8 P10-136					.13 .18	NO NO		23 25	F BRANCH 5
A 92Y			P2-19 P10-236					.13 .18	NO NO		23 25	F BRANCH 5
A 93	4											F
A 93R			P2-61 P10-135					.13 .18	NO NO		23 25	F BRANCH 5
A 93Y			P2-38 P10-235					.13 .18	NO NO		23 25	F BRANCH 5

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 34 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 94	4											F
A 94R			P2-39 P10-134					.13 .18	NO NO		23 25	F BRANCH 5
A 94Y			P2-20 P10-234					.13 .18	NO NO		23 25	F BRANCH 5
A 95	4											F
A 95R			P2-43 P10-327					.13 .18	NO NO		23 25	F BRANCH 5
A 95Y			P2-42 P10-427					.13 .18	NO NO		23 25	F BRANCH 5
A 96	4											F
A 96R			P2-22 P10-326					.13 .18	NO NO		23 25	F BRANCH 5
A 96Y			P2-9 P10-426					.13 .18	NO NO		23 25	F BRANCH 5
A 97	4											F
A 97R			P2-41 P10-325					.13 .18	NO NO		23 25	F BRANCH 5
A 97Y			P2-40 P10-425					.13 .18	NO NO		23 25	F BRANCH 5

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C | SHEET 35 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 98	10				1.75 1.00	1.50 .75				68 7	31 29	
A 98A	11		SHLD A98 P2-44					.20 .13	NO NO		23	
A 98G			P2-25 P10-212					.13 .18	NO NO		23 24	BRANCH 4
A 98R			P2-46 P10-113					.13 .18	NO NO		23 24	BRANCH 4
A 98Y			P2-45 P10-312					.13 .18	NO NO		23 24	BRANCH 4
A 99	8				1.75 1.00	1.50 .75				68 7	63 29	
A 99A	11		SHLD A99 P2-26					.20 .13	NO NO		23	
A 99Y			P2-47 P10-114					.13 .18	NO NO		23 24	BRANCH 4
A 104	2		P3-1 P10-538					.13 .18	NO NO		22 25	E BRANCH 5
A 105	2		P3-7 P10-556					.13 .18	NO NO		22 25	E BRANCH 5
A 106	2		P3-2 P10-625					.13 .18	NO NO		22 25	E BRANCH 5
A 113	2		P3-8 P10-547					.13 .18	NO NO		22 25	E BRANCH 5

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C | SHEET 36 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 116	1		P5-66 P10-602					.13 .18	NO NO		22 24	D BRANCH 4
A 118	1		P5-45 P10-504					.13 .18	NO NO		22 24	D BRANCH 4
A 125	2		P5-26 P10-409					.13 .22	NO NO		22	D BRANCH 4
A 127	5											A
A 127G			P5-53 P10-161					.13 .18	NO NO		22 24	A BRANCH 6
A 127R			P5-78 P10-159					.13 .18	NO NO		22 24	A BRANCH 6
A 127Y			P5-54 P10-160					.13 .18	NO NO		22 24	A BRANCH 6
A 128	5											A
A 128G			P5-55 P10-260					.13 .18	NO NO		22 24	A BRANCH 6
A 128R			P5-79 P10-261					.13 .18	NO NO		22 24	A BRANCH 6
A 128Y			P5-80 P10-259					.13 .18	NO NO		22 24	A BRANCH 6
A 129	5											A

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C | SHEET 37 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 129G			P5-16 P10-360					.13 .18	NO NO		22 24	A BRANCH 6
A 129R			P5-33 P10-361					.13 .18	NO NO		22 24	A BRANCH 6
A 129Y			P5-32 P10-359					.13 .18	NO NO		22 24	A BRANCH 6
A 130	5											A
A 130G			P5-56 P10-460					.13 .18	NO NO		22 24	A BRANCH 6
A 130R			P5-81 P10-461					.13 .18	NO NO		22 24	A BRANCH 6
A 130Y			P5-57 P10-459					.13 .18	NO NO		22 24	A BRANCH 6
A 131	5											A
A 131G			P5-35 P10-560					.13 .18	NO NO		22 24	A BRANCH 6
A 131R			P5-58 P10-561					.13 .18	NO NO		22 24	A BRANCH 6
A 131Y			P5-34 P10-559					.13 .18	NO NO		22 24	A BRANCH 6
A 139	2		P6-77 P10-636					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C | SHEET 38 OF

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 148	2		P6-20 P10-613					.13 .18	NO NO		22 25	C BRANCH 6
A 149	4											C
A 149R			P6-85 P10-133					.13 .18	NO NO		22 25	C BRANCH 6
A 149Y			P6-84 P10-233					.13 .18	NO NO		22 25	C BRANCH 6
A 150	4											C
A 150R			P6-82 P10-516					.13 .18	NO NO		22 25	C BRANCH 6
A 150Y			P6-57 P10-616					.13 .18	NO NO		22 25	C BRANCH 6
A 151	4											C
A 151R			P6-8 P10-158					.13 .18	NO NO		22 25	C BRANCH 6
A 151Y			P6-2 P10-258					.13 .18	NO NO		22 25	C BRANCH 6
A 152	4											C
A 152R			P6-19 P10-157					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C |

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 152Y			P6-7 P10-257					.13 .18	NO NO		22 25	C BRANCH 6
A 153	4											C
A 153R			P6-6 P10-156					.13 .18	NO NO		22 25	C BRANCH 6
A 153Y			P6-1 P10-256					.13 .18	NO NO		22 25	C BRANCH 6
A 154	4											C
A 154R			P6-5 P10-155					.13 .18	NO NO		22 25	C BRANCH 6
A 154Y			P6-4 P10-255					.13 .18	NO NO		22 25	C BRANCH 6
A 155	4											C
A 155R			P6-15 P10-154					.13 .18	NO NO		22 25	C BRANCH 6
A 155Y			P6-16 P10-254					.13 .18	NO NO		22 25	C BRANCH 6
A 156	4											C
A 156R			P6-17 P10-153					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C |

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 156Y			P6-33 P10-253					.13 .18	NO NO		22 25	C BRANCH 6
A 157	4											C
A 157R			P6-61 P10-132					.13 .18	NO NO		22 25	C BRANCH 6
A 157Y			P6-60 P10-232					.13 .18	NO NO		22 25	C BRANCH 6
A 158	4											
A 158R			P6-37 P10-130					.13 .18	NO NO		22 25	C BRANCH 6
A 158Y			P6-36 P10-230					.13 .18	NO NO		22 25	C BRANCH 6
A 159	4											C
A 159R			P6-83 P10-352					.13 .18	NO NO		22 25	C BRANCH 6
A 159Y			P6-59 P10-452					.13 .18	NO NO		22 25	C BRANCH 6
A 160	4											C
A 160R			P6-35 P10-129					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C |

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 160Y			P6-18 P10-229					.13 .18	NO NO		22 25	C BRANCH 6
A 161	4											C
A 161R			P6-58 P10-128					.13 .18	NO NO		22 25	C BRANCH 6
A 161Y			P6-34 P10-228					.13 .18	NO NO		22 25	C BRANCH 6
A 164	1		P8-9 P10-302					.13 .18	NO NO		22 24	B BRANCH 4
A 170	2		P8-5 P10-509					.13 .18	NO NO		22 25	B BRANCH 4
A 177	2		P8-8 P10-108					.13 .22	NO NO		22	B BRANCH 4
A 178	9				1.75 1.75	1.50 1.50				68 68	31 31	
A 178A	11		SHLD A178 P3-52					.20 .13	NO NO		 22	
A 178B	11		P7-21 SHLD A178					.13 .20	NO NO		22	
A 178R			P3-77 P7-40					.13 .13	NO NO		22 22	
A 178Y			P3-53 P7-22					.13 .13	NO NO		22 22	

SIZE A | CODE IDENT NO. 80230 | 2010774

SCALE-NONE | REV LTR C |

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 179	9				1.75	1.50				6B	31	
					1.75	1.50				6B	31	
A 179A	11		SHLD A179					.20	NO			
			P3-30					.13	NO		22	
A 179B	11		P7-23					.13	NO		22	
			SHLD A179					.20	NO			
A 179R			P3-31					.13	NO		22	
			P7-42					.13	NO		22	
A 179Y			P3-15					.13	NO		22	
			P7-43					.13	NO		22	
A 180	9				1.75	1.50				6B	31	
					1.75	1.50				6B	31	
A 180A	11		SHLD A180					.20	NO			
			P3-51					.13	NO		22	
A 180B	11		P7-2					.13	NO		22	
			SHLD A180					.20	NO			
A 180R			P3-75					.13	NO		22	
			P7-8					.13	NO		22	
A 180Y			P3-76					.13	NO		22	
			P7-9					.13	NO		22	
A 181	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 181A	11		SHLD A181					.20	NO			
			P3-46					.13	NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 43 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 181R			P3-71					.13	NO		22	
			P7-38					.13	NO		22	
A 181Y			P3-70					.13	NO		22	
			P7-39					.13	NO		22	
A 182	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 182A	11		SHLD A182					.20	NO			
			P3-69					.13	NO		22	
A 182R			P3-45					.13	NO		22	
			P7-19					.13	NO		22	
A 182Y			P3-44					.13	NO		22	
			P7-20					.13	NO		22	
A 183	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 183A	11		SHLD A183					.20	NO			
			P3-28					.13	NO		22	
A 183R			P3-13					.13	NO		22	
			P7-60					.13	NO		22	
A 183Y			P3-29					.13	NO		22	
			P7-61					.13	NO		22	
A 184	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 184A	11		SHLD A184					.20	NO			
			P3-74					.13	NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 44 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 184R			P3-49					.13	NO		22	
			P7-36					.13	NO		22	
A 184Y			P3-50					.13	NO		22	
			P7-37					.13	NO		22	
A 185	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 185A	11		SHLD A185					.20	NO			
			P3-27					.13	NO		22	
A 185R			P3-26					.13	NO		22	
			P7-58					.13	NO		22	
A 185Y			P3-47					.13	NO		22	
			P7-59					.13	NO		22	
A 186	9				1.75	1.50				6B	31	
					1.75	1.50				7	29	
A 186A	11		SHLD A186					.20	NC			
			P3-48					.13	NO		22	
A 186R			P3-72					.13	NO		22	
			P7-35					.13	NO		22	
A 186Y			P3-73					.13	NO		22	
			P7-18					.13	NO		22	
A 187	3											
A 187R			P3-67					.13	NO		22	
			P7-57					.13	NO		22	

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 45 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 187Y			P3-68					.13	NO		22	
			P7-34					.13	NO		22	
A 188	7											
A 188G			P3-24					.13	NO		22	
			P7-51					.13	NO		22	
A 188N			P3-43					.13	NO		22	
			P7-29					.13	NO		22	
A 188R			P3-25					.13	NO		22	
			P7-50					.13	NO		22	
A 188Y			P3-23					.13	NO		22	
			P7-28					.13	NO		22	
A 189	4											
A 189R			P3-5					.13	NO		22	
			P7-49					.13	NO		22	
A 189Y			P3-14					.13	NO		22	
			P7-48					.13	NO		22	
A 195	2		P5-23					.13	NO		22	D
			P10-608					.22	NO			BRANCH 4
A 196	2		P5-22					.13	NO		22	D
			P10-609					.22	NO			BRANCH 4
A 198	6											

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 46 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 198G			P1-11 P9-521					.13 .18	NO NO		22 25	BRANCH 2
A 198R			P1-10 P9-121					.13 .18	NO NO		22 25	BRANCH 2
A 198Y			P1-9 P9-321					.13 .18	NO NO		22 25	BRANCH 2
A 199	5											A
A 199G			P5-5 P10-660					.13 .18	NO NO		22 24	A BRANCH 6
A 199R			P5-31 P10-661					.13 .18	NO NO		22 24	A BRANCH 6
A 199Y			P5-15 P10-659					.13 .18	NO NO		22 24	A BRANCH 6
A 200	2		P3-39 P10-202					.13 .18	NO NO		22 25	E BRANCH 5
A 201	2		P3-64 P10-102					.13 .18	NO NO		22 25	E BRANCH 5
A 202	2		P3-42 P10-652					.13 .18	NO NO		22 25	E BRANCH 5
A 203	2		P3-66 P10-551					.13 .18	NO NO		22 25	E BRANCH 5
A 204	2		P3-21 P10-552					.13 .18	NO NO		22 25	E BRANCH 5

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR C
SHEET 47 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 205	2		P3-22 P10-651					.13 .18	NO NO		22 25	E BRANCH 5
A 206	2		P3-18 P10-548					.13 .18	NO NO		22 25	E BRANCH 5
A 207	2		P3-36 P10-549					.13 .18	NO NO		22 25	E BRANCH 5
A 208	2		P3-19 P10-550					.13 .18	NO NO		22 25	E BRANCH 5
A 209	2		P3-41 P10-214					.13 .18	NO NO		22 25	E BRANCH 5
A 210	2		P3-65 P10-216					.13 .18	NO NO		22 25	E BRANCH 5
A 211	2		P3-40 P10-215					.13 .18	NO NO		22 25	E BRANCH 5
A 212	2		P3-33 P10-646					.13 .18	NO NO		22 25	E BRANCH 5
A 213	2		P3-17 P10-546					.13 .18	NO NO		22 25	E BRANCH 5
A 214	2		P3-57 P10-645					.13 .18	NO NO		22 25	E BRANCH 5
A 215	2		P3-82 P10-545					.13 .18	NO NO		22 25	E BRANCH 5
A 216	2		P3-81 P10-542					.13 .18	NO NO		22 25	E BRANCH 5

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR C
SHEET 48 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 217	2		P3-80 P10-644					.13 .18	NO NO		22 25	E BRANCH 5
A 218	2		P3-56 P10-544					.13 .18	NO NO		22 25	E BRANCH 5
A 219	2		P3-84 P10-623					.13 .18	NO NO		22 25	E BRANCH 5
A 220	2		P3-60 P10-524					.13 .18	NO NO		22 25	E BRANCH 5
A 221	2		P3-59 P10-522					.13 .18	NO NO		22 25	E BRANCH 5
A 222	2		P3-62 P10-648					.13 .18	NO NO		22 25	E BRANCH 5
A 223	2		P3-63 P10-649					.13 .18	NO NO		22 25	E BRANCH 5
A 224	2		P3-38 P10-650					.13 .18	NO NO		22 25	E BRANCH 5
A 225	2		P5-38 P10-401					.13 .18	NO NO		22 25	D BRANCH 4
A 226	2		P5-62 P10-601					.13 .18	NO NO		22 25	D BRANCH 4
A 227	2		P5-63 P10-501					.13 .18	NO NO		22 25	D BRANCH 4
A 228	2		P5-64 P10-101					.13 .18	NO NO		22 25	D BRANCH 4

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR C
SHEET 49 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 229	2		P5-40 P10-301					.13 .18	NO NO		22 25	D BRANCH 4
A 230	2		P5-39 P10-201					.13 .18	NO NO		22 25	D BRANCH 4
A 231	2		P5-41 P10-502					.13 .22	NO NO		22	D BRANCH 4
A 232	2		P5-42 P10-402					.13 .22	NO NO		22	D BRANCH 4
A 233	2		P5-30 P10-204					.13 .22	NO NO		22	D BRANCH 4
A 234	2		P5-14 P10-505					.13 .22	NO NO		22	D BRANCH 4
A 235	2		P5-29 P10-605					.13 .22	NO NO		22	D BRANCH 4
A 236	2		P5-77 P10-506					.13 .22	NO NO		22	D BRANCH 4
A 237	2		P5-52 P10-404					.13 .22	NO NO		22	D BRANCH 4
A 238	2		P5-76 P10-304					.13 .22	NO NO		22	D BRANCH 4
A 239	2		P5-50 P10-405					.13 .22	NO NO		22	D BRANCH 4
A 240	2		P5-51 P10-606					.13 .22	NO NO		22	D BRANCH 4

SIZE A
CODE IDENT NO. 80230
2010774
SCALE-NONE
REV LTR C
SHEET 50 OF

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 241	2		P5-75 P10-205					.13 .22	NO NO		22	D BRANCH 4
A 242	2		P5-73 P10-607					.13 .22	NO NO		22	D BRANCH 4
A 243	2		P5-74 P10-305					.13 .22	NO NO		22	D BRANCH 4
A 244	2		P5-49 P10-507					.13 .22	NO NO		22	D BRANCH 4
A 245	2		P5-13 P10-306					.13 .22	NO NO		22	D BRANCH 4
A 246	2		P5-28 P10-206					.13 .22	NO NO		22	D BRANCH 4
A 247	2		P5-27 P10-406					.13 .22	NO NO		22	D BRANCH 4
A 248	2		P5-47 P10-307					.13 .22	NO NO		22	D BRANCH 4
A 249	2		P5-46 P10-208					.13 .22	NO NO		22	D BRANCH 4
A 250	2		P5-4 P10-308					.13 .22	NO NO		22	D BRANCH 4
A 251	2		P5-12 P10-309					.13 .22	NO NO		22	D BRANCH 4
A 252	2		P5-71 P10-207					.13 .22	NO NO		22	D BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 51 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 253	2		P5-72 P10-407					.13 .22	NO NO		22	D BRANCH 4
A 254	2		P5-48 P10-604					.13 .22	NO NO		22	D BRANCH 4
A 255	3											A
A 255R			P5-44 P10-107					.13 .18	NO NO		22 24	A BRANCH 6
A 255Y			P5-68 P10-105					.13 .18	NO NO		22 24	A BRANCH 6
A 256	2		P6-14 P10-540					.13 .18	NO NO		22 25	C BRANCH 6
A 257	2		P6-30 P10-639					.13 .18	NO NO		22 25	C BRANCH 6
A 258	2		P6-48 P10-658					.13 .18	NO NO		22 25	C BRANCH 6
A 259	2		P6-72 P10-557					.13 .18	NO NO		22 25	C BRANCH 6
A 260	2		P6-73 P10-558					.13 .18	NO NO		22 25	C BRANCH 6
A 261	2		P6-49 P10-657					.13 .18	NO NO		22 25	C BRANCH 6
A 262	2		P6-28 P10-640					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 52 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 263	2		P6-29 P10-520					.13 .18	NO NO		22 25	C BRANCH 6
A 264	2		P6-76 P10-523					.13 .18	NO NO		22 25	C BRANCH 6
A 265	2		P6-75 P10-647					.13 .18	NO NO		22 25	C BRANCH 6
A 266	2		P6-50 P10-641					.13 .18	NO NO		22 25	C BRANCH 6
A 267	2		P6-74 P10-541					.13 .18	NO NO		22 25	C BRANCH 6
A 268	2		P6-40 P10-109					.13 .18	NO NO		22 25	C BRANCH 6
A 269	2		P6-21 P10-410					.13 .18	NO NO		22 25	C BRANCH 6
A 270	2		P6-65 P10-209					.13 .18	NO NO		22 25	C BRANCH 6
A 271	2		P6-22 P10-310					.13 .18	NO NO		22 25	C BRANCH 6
A 272	2		P6-66 P10-510					.13 .18	NO NO		22 25	C BRANCH 6
A 273	2		P6-42 P10-210					.13 .18	NO NO		22 25	C BRANCH 6
A 274	2		P6-41 P10-610					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 53 OF

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CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 275	2		P6-67 P10-110					.13 .18	NO NO		22 25	C BRANCH 6
A 276	2		P6-10 P10-111					.13 .18	NO NO		22 25	C BRANCH 6
A 277	2		P6-24 P10-612					.13 .18	NO NO		22 25	C BRANCH 6
A 278	2		P6-9 P10-211					.13 .18	NO NO		22 25	C BRANCH 6
A 279	2		P6-23 P10-512					.13 .18	NO NO		22 25	C BRANCH 6
A 280	2		P6-68 P10-511					.13 .18	NO NO		22 25	C BRANCH 6
A 281	2		P6-69 P10-411					.13 .18	NO NO		22 25	C BRANCH 6
A 282	2		P6-43 P10-611					.13 .18	NO NO		22 25	C BRANCH 6
A 283	2		P6-44 P10-311					.13 .18	NO NO		22 25	C BRANCH 6
A 284	2		P6-46 P10-627					.13 .18	NO NO		22 25	C BRANCH 6
A 285	2		P6-25 P10-628					.13 .18	NO NO		22 25	C BRANCH 6
A 286	2		P6-45 P10-528					.13 .18	NO NO		22 25	C BRANCH 6

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR	C	SHEET 54 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 287	2		P6-71 P1C-526					.13 .18	NO NO		22 25	C BRANCH 6
A 288	2		P6-70 P10-527					.13 .18	NO NC		22 25	C BRANCH 6
A 289	2		P6-47 P10-626					.13 .18	NO NO		22 25	C BRANCH 6
A 290	2		P6-12 P1C-654					.13 .18	NO NO		22 25	C BRANCH 6
A 291	2		P6-3 P10-655					.13 .18	NO NO		22 25	C BRANCH 6
A 292	2		P6-11 P10-555					.13 .18	NO NO		22 25	C BRANCH 6
A 293	2		P6-27 P10-553					.13 .18	NO NO		22 25	C BRANCH 6
A 294	2		P6-26 P10-554					.13 .18	NO NO		22 25	C BRANCH 6
A 295	2		P6-13 P1C-653					.13 .18	NO NO		22 25	C BRANCH 6
A 296	2		P8-24 P1C-403					.13 .18	NO NC		22 25	B BRANCH 4
A 297	2		P8-44 P10-603					.13 .18	NO NO		22 25	B BRANCH 4
A 298	2		P8-43 P10-503					.13 .18	NO NO		22 25	B BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C		SHEET 55 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 299	2		P8-41 P10-103					.13 .18	NO NO		22 25	B BRANCH 4
A 3C0	2		P8-42 P10-303					.13 .18	NO NO		22 25	B BRANCH 4
A 301	2		P8-23 P1C-203					.13 .18	NO NO		22 25	B BRANCH 4
A 302	2		P8-22 P10-502					.13 .22	NO NO		22 24	B BRANCH 4
A 303	2		P8-10 P10-402					.13 .22	NO NO		22 24	B BRANCH 4
A 304	2		P8-52 P10-207					.13 .22	NO NO		22 24	B BRANCH 4
A 3C5	2		P8-50 P10-407					.13 .22	NO NO		22 24	B BRANCH 4
A 306	2		P8-51 P10-307					.13 .22	NO NO		22 24	B BRANCH 4
A 3C7	2		P8-31 P10-408					.13 .22	NO NO		22	B BRANCH 4
A 3C8	2		P8-53 P1C-608					.13 .22	NO NO		22 24	B BRANCH 4
A 309	2		P8-54 P1C-508					.13 .22	NO NO		22	B BRANCH 4
A 310	2		P8-32 P1C-208					.13 .22	NO NO		22 24	B BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C		SHEET 56 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 201C774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 311	2		P8-30 P10-309					.13 .22	NO NO		22 24	B BRANCH 4
A 312	2		P8-29 P10-308					.13 .22	NO NO		22 24	B BRANCH 4
A 313	2		P8-16 P10-409					.13 .22	NO NO		22 24	B BRANCH 4
A 314	2		P8-14 P10-604					.13 .22	NO NO		22 24	B BRANCH 4
A 315	2		P8-15 P1C-609					.13 .22	NO NO		22 24	B BRANCH 4
A 316	1		P8-7 P10-106					.13 .18	NO NO		22 24	B BRANCH 4
A 317	1		P8-2 P10-104					.13 .18	NO NO		22 24	B BRANCH 4
A 318	2		P8-3 P10-607					.13 .22	NO NO		22 24	B BRANCH 4
A 319	2		P8-25 P10-606					.13 .22	NO NO		22 24	B BRANCH 4
A 320	2		P8-1 P1C-507					.13 .22	NO NO		22 24	B BRANCH 4
A 321	2		P8-12 P10-406					.13 .22	NO NO		22 24	B BRANCH 4
A 322	2		P8-11 P1C-506					.13 .22	NO NO		22 24	B BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C		SHEET 57 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 323	2		P8-28 P1C-405					.13 .22	NO NO		22 24	B BRANCH 4
A 324	2		P8-4 P10-206					.13 .22	NO NO		22 24	B BRANCH 4
A 325	2		P8-13 P10-306					.13 .22	NO NO		22 24	B BRANCH 4
A 326	2		P8-26 P10-205					.13 .22	NO NO		22 24	B BRANCH 4
A 327	2		P8-27 P10-305					.13 .22	NO NC		22 24	B BRANCH 4
A 328	2		P8-47 P10-204					.13 .22	NO NO		22 24	B BRANCH 4
A 329	2		P8-45 P10-404					.13 .22	NO NO		22 24	B BRANCH 4
A 330	2		P8-46 P10-304					.13 .22	NO NO		22 24	B BRANCH 4
A 331	2		P8-48 P1C-605					.13 .22	NO NO		22 24	B BRANCH 4
A 332	2		P8-49 P10-505					.13 .22	NO NO		22 24	B BRANCH 4
A 333	3									6A 6A	31 31	
A 333A	11		SHLD A333 E8					.20 .19	NO NO			

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C		SHEET 58 OF

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 333B	11		E12					.19	NO			
			SHLD A333					.20	NO			
A 333R			P3-3					.13	NO		22	
			P7-52					.13	NO		22	
A 333Y			P3-11					.13	NO		22	
			P7-31					.13	NO		22	
A 334	8				1.75	1.50				6A	63	
					1.75	1.50				6A	63	
A 334A	11		SHLD A334					.20	NO			
			E8					.19	NO		47	
A 334B	11		E11					.19	NO		47	
			SHLD A334					.20	NO			
A 334Y			P3-4					.13	NO		22	
			P6-51					.13	NO		22	
A 335	9				1.75	1.50				6A	31	
					1.75	1.50				6A	31	
A 335A	11		SHLD A335					.20	NO			
			E10					.19	NO			
A 335B	11		E12					.19	NO		47	
			SHLD A335					.20	NO			
A 335R			P5-19					.13	NO		22	
			P7-15					.13	NO		22	
A 335Y			P5-18					.13	NO		22	
			P7-16					.13	NO		22	

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 59 OF	

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 336	9				1.75	1.50				6A	31	
					1.75	1.50				6A	31	
A 336A	11		SHLD A336					.20	NO			
			E10					.19	NO			
A 336B	11		E13					.19	NO			
			SHLD A336					.20	NO			
A 336R			P5-7					.13	NO		22	
			P7-30					.13	NO		22	
A 336Y			P5-8					.13	NO		22	
			P7-14					.13	NO		22	
A 337	3									6A	31	
										6A	31	
A 337A	11		SHLD A337					.20	NO			
			E10					.19	NO		47	
A 337B	11		E13					.19	NO		47	
			SHLD A337					.20	NO			
A 337R			P5-9					.13	NO		22	
			P7-6					.13	NO		22	
A 337Y			P5-2					.13	NO		22	
			P7-7					.13	NO		22	
A 338	2		P5-10					.13	NO		22	D
			P10-508					.22	NO		24	BRANCH 4
A 339	2		P5-24					.13	NO		22	D
			P10-408					.22	NO		24	BRANCH 4

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 60 OF	

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 340			DELETED									
A 341			DELETED									
A 342			DELETED									
A 343			DELETED									
A 344			DELETED									
A 345			DELETED									
A 346	2		P5-43					.13	NO		22	A
			P10-108					.22	NO		24	BRANCH 6
A 347			DELETED									
A 348	4											G
A 348R			P9-610					.18	NO		25	G, BRANCH 1
			P10-332					.18	NO		25	BRANCH 5
A 348Y			P9-510					.18	NO		25	G, BRANCH 1
			P10-432					.18	NO		25	BRANCH 5
A 349	4											G

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 61 OF	

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 349R			P9-310					.18	NO		25	G, BRANCH 1
			P10-330					.18	NO		25	BRANCH 5
A 349Y			P9-210					.18	NO		25	G, BRANCH 1
			P10-430					.18	NO		25	BRANCH 5
A 350	4											G
A 350R			P9-609					.18	NO		25	G, BRANCH 1
			P10-329					.18	NO		25	BRANCH 5
A 350Y			P9-509					.18	NO		25	G, BRANCH 1
			P10-429					.18	NO		25	BRANCH 5
A 351	4											G
A 351R			P9-309					.18	NO		25	G, BRANCH 1
			P10-328					.18	NO		25	BRANCH 5
A 351Y			P9-209					.18	NO		25	G, BRANCH 1
			P10-428					.18	NO		25	BRANCH 5
A 352	4											G
A 352R			P9-608					.18	NO		25	G, BRANCH 1
			P10-334					.18	NO		25	BRANCH 5
A 352Y			P9-508					.18	NO		25	G, BRANCH 1
			P10-434					.18	NO		25	BRANCH 5
A 353	4											G

SIZE A	CODE IDENT NO. 80230	2010774	
SCALE-NONE	REV LTR C	SHEET 62 OF	

FORM 2084 9-65

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 353R			P9-308 P10-333					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 353Y			P9-208 P10-433					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354	4											G
A 354R			P9-607 P10-338					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 354Y			P9-507 P10-438					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355	4											G
A 355R			P9-307 P10-337					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 355Y			P9-207 P10-437					.18 .18	NO NO		25 25	B, BRANCH 1 BRANCH 5
A 356	4											G
A 356R			P9-606 P10-336					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 356Y			P9-506 P10-436					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357	4											G

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 63 OF

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 357R			P9-306 P10-335					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 357Y			P9-206 P10-435					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358	4											G
A 358R			P9-605 P10-146					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 358Y			P9-505 P10-246					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359	4											G
A 359R			P9-305 P10-145					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 359Y			P9-205 P10-245					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360	4											G
A 360R			P9-604 P10-144					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 360Y			P9-504 P10-244					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361	4											G

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 64 OF

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 361R			P9-304 P10-143					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 361Y			P9-204 P10-243					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362	4											G
A 362R			P9-603 P10-148					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 362Y			P9-503 P10-248					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363	4											G
A 363R			P9-303 P10-147					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 363Y			P9-203 P10-247					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364	4											G
A 364R			P9-602 P10-152					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 364Y			P9-502 P10-252					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365	4											G

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 65 OF

CYZMOURE 110366 HARNESS A 2010774 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 365R			P9-302 P10-151					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 365Y			P9-202 P10-251					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366	4											G
A 366R			P9-601 P10-150					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 366Y			P9-501 P10-250					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367	4											G
A 367R			P9-301 P10-149					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 367Y			P9-201 P10-249					.18 .18	NO NO		25 25	G, BRANCH 1 BRANCH 5
A 368	1		E3 SHLD G					.19 .25	NO YES			G
A 369	1		SHLD G E36					.25 .19	YES NO		58	G
A 370	1		E7 SHLD F					.19 .25	YES YES		47	F
A 371	1		SHLD F E5					.25 .19	YES NO			F

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 66 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE CNE, FIG	ACCESSORY ITEMS	REMARKS
A 372	1		E8					.19	YES			E
			SHLD E					.25	YES			
A 373	1		SHLD E					.25	YES			
			E5					.19	NO			E
A 374	1		E9					.19	YES			D
			SHLD D					.25	YES			
A 375	1		SHLD D					.25	YES			
			E5					.19	NO		52	D
A 376	1		E9					.19	YES		47	A
			SHLD A					.25	YES			
A 377	1		SHLD A					.25	YES			
			E6					.19	NO			A
A 378	1		E11					.19	YES			C
			SHLD C					.25	YES			
A 379	1		SHLD C					.25	YES			
			E6					.19	NO			C
A 380	1		E14					.19	YES		47	B
			SHLD B					.25	YES			
A 381	1		SHLD B					.25	YES			
			E6					.19	NO		52	B

SIZE	CODE IDENT NO.	
A	80230	2010774
SCALE-NONE	REV LTR C	SHEET 67 OF

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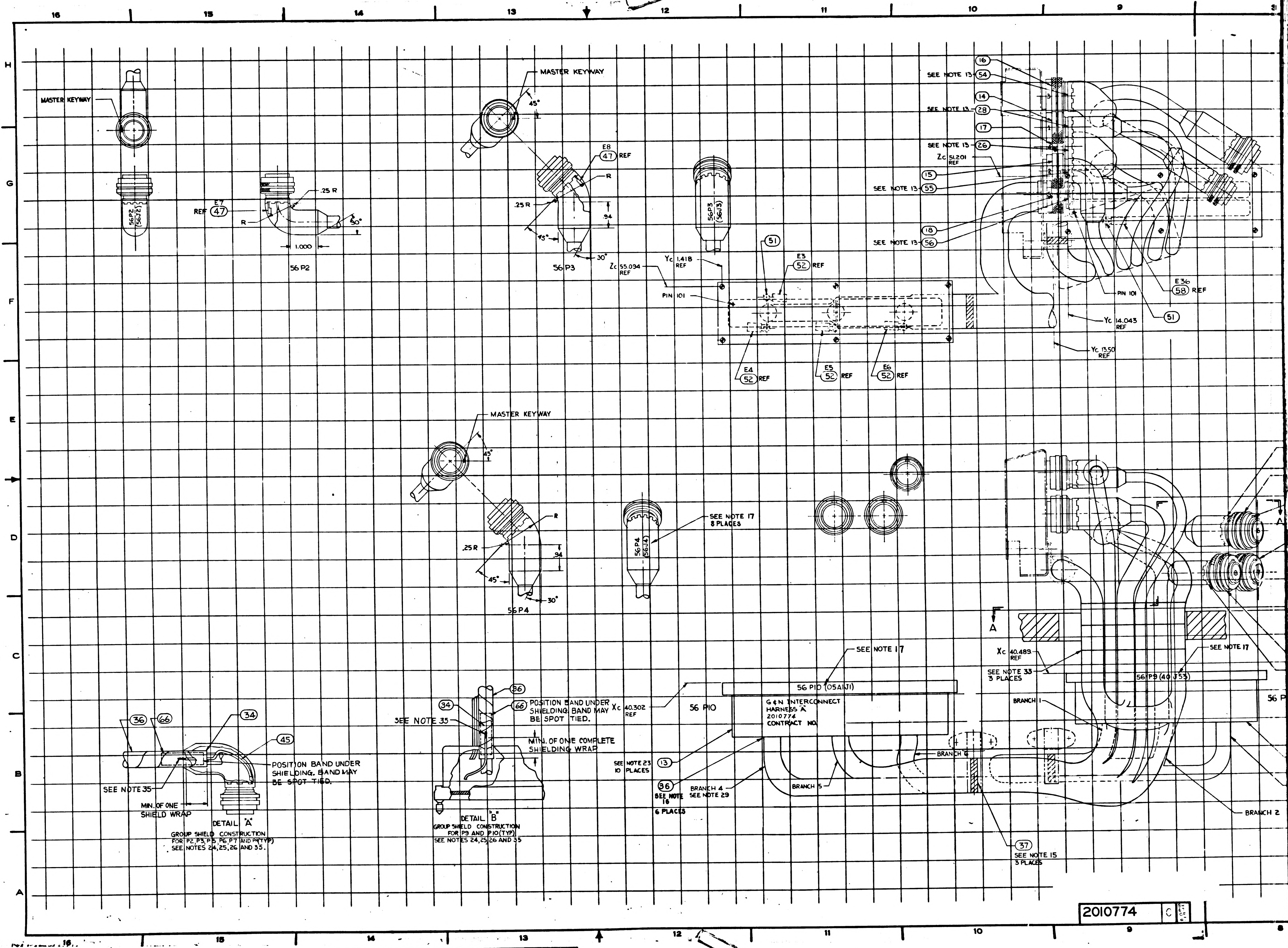
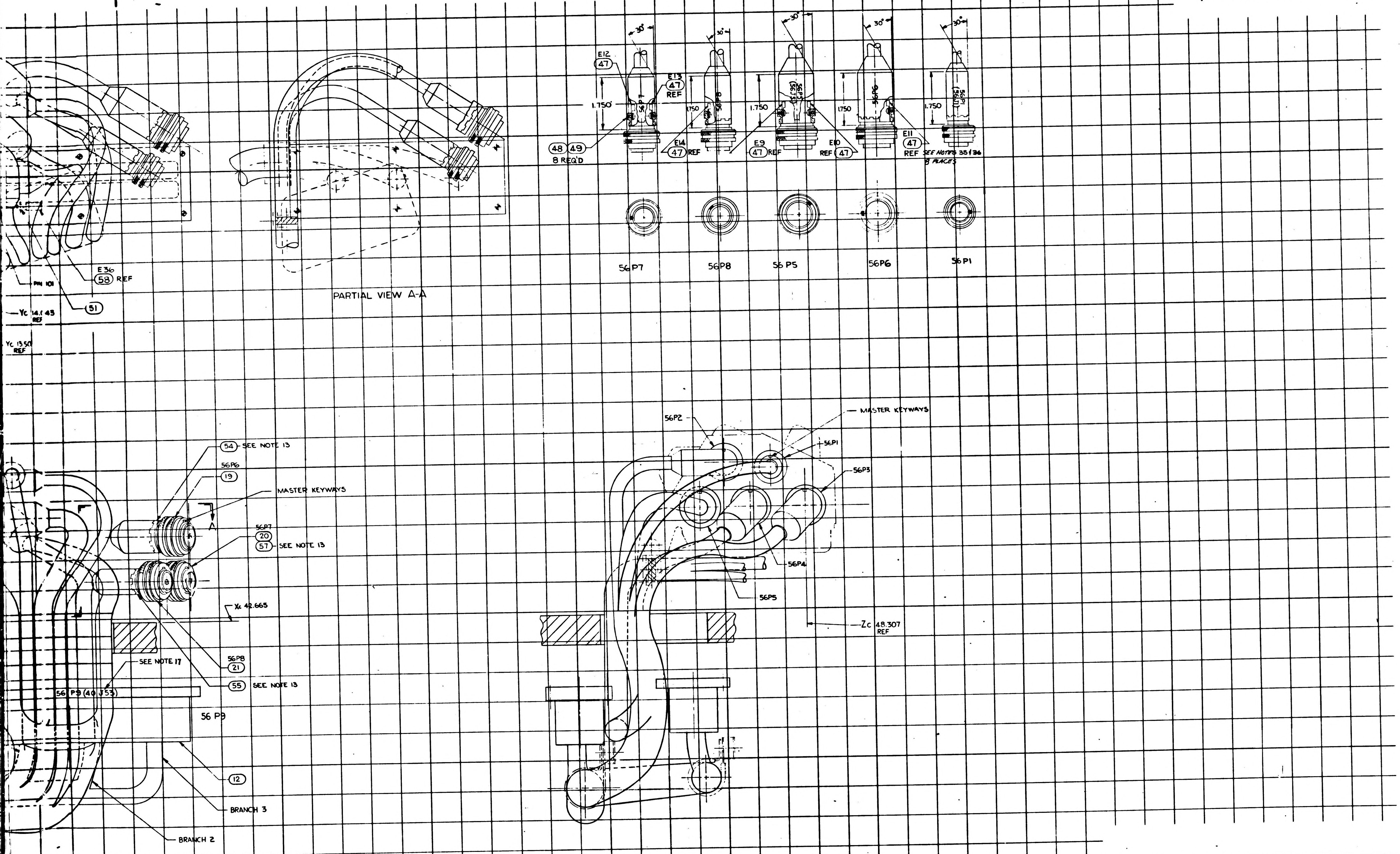

16
15
14
13
12
11
10
9
H
G
F
E
D
C
B
A
MASTER KEYWAY
56P2 (56J2)
REF 47 E7
.25 R
R
30°
1.000
56 P2
MASTER KEYWAY
45°
E8
47 REF
R
.25 R
.94
45°
30°
56 P3
56P3 (56J3)
Yc 1.418 REF
Zc 55.094 REF
PIN 101
51
E3
52 REF
E4
52 REF
E5
52 REF
E6
52 REF
16
SEE NOTE 13 54
14
SEE NOTE 13 28
17
SEE NOTE 13 26
Zc 51.201 REF
15
SEE NOTE 13 55
18
SEE NOTE 13 56
PIN 101
E36
58 REF
51
Yc 14.043 REF
Yc 13.50 REF
MASTER KEYWAY
45°
R
.25 R
.94
45°
30°
56P4
56P4 (56J4)
SEE NOTE 17
8 PLACES
A
A
Xc 40.489 REF
SEE NOTE 33
3 PLACES
SEE NOTE 17
56 P9 (40 J53)
56 P
BRANCH 1
BRANCH 2
SEE NOTE 17
56 P10 (05A1J1)
Xc 40.302 REF
56 P10
G & N INTERCONNECT
HARNESS "A"
2010774
CONTRACT NO.
SEE NOTE 23
10 PLACES
13
36
SEE NOTE 16
6 PLACES
BRANCH 4
SEE NOTE 29
BRANCH 5
BRANCH 6
37
SEE NOTE 15
3 PLACES
36
66
34
45
POSITION BAND UNDER
SHIELDING. BAND MAY
BE SPOT TIED.
SEE NOTE 35
MIN. OF ONE
SHIELD WRAP
DETAIL "A"
GROUP SHIELD CONSTRUCTION
FOR P2, P3, P5, P6, P7 AND P9 (TYP)
SEE NOTES 24, 25, 26 AND 35.
36
34
66
SEE NOTE 35
POSITION BAND UNDER
SHIELDING. BAND MAY
BE SPOT TIED.
MIN. OF ONE COMPLETE
SHIELDING WRAP
DETAIL "B"
GROUP SHIELD CONSTRUCTION
FOR P9 AND P10 (TYP)
SEE NOTES 24, 25, 26 AND 35
2010774
C

1/2010774

REVISIONS 37-39				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		

SEE SHEET I FOR REVISION RECORD



E12
47
E13
47
REF
1.750
30°
48 49
8 REQ'D
56P7
56P8
56P5
(56J5)
56P6
56P1
(56J1)
1.750
E14
47 REF
E9
47 REF
E10
REF 47
E11
47
REF
SEE NOTES 35 & 36
8 PLACES
56P7
56P8
56 P5
56P6
56P1
PARTIAL VIEW A-A
PIN 101
E36
58 REF
51
Yc 14.143
REF
Yc 13.50
REF
54 - SEE NOTE 13
56P6
19
MASTER KEYWAYS
A
56P7
20
57 - SEE NOTE 13
Xc 42.665
SEE NOTE 17
56P8
21
55 SEE NOTE 13
56 P9 (40 J53)
56 P9
12
BRANCH 3
BRANCH 2
56P2
MASTER KEYWAYS
56P1
56P3
56P4
56P5
Zc 48.307
REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	M I T INSTRUMENTATION LAB CAMBRIDGE MASS DRAWN Gruenewald DATE 28 JUN 66 CHECKED W Diehl 1 JUL 66 APPROVAL Paul Watson AUG 15, 66 APPROVAL J E Kane	MANNED SPACECRAFT CENTER HOUSTON, TEXAS G & N INTERCONNECT HARNESS "A" (C/M BLOCK II)
DO NOT SCALE THIS DRAWING MATERIAL	NASA APPROVAL R. Jacob 9/23/66	CODE IDENT NO. 80230 · SIZE J2 · 2010774
CONTRACT NAS9-497	CCA APPROVAL	SCALE FULL · SHEET 68

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	wk.

REV		A																			
SHEET		20																			
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN Gruenewald 28 JUN 66
CHECKER Buehl 1 Jul 66
MEA ENGINEER D. Barta 5 Jul 66
APPROVAL AUG 12 66
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacobs
CCB APPROVAL 9/22/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "B" (C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010775

SCALE NONE
SHEET 1 OF 20

MIL 1377A6 12-65

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014672.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A - FROM END OF SHIELD B - TO END OF SHIELD G - GREEN K - BLACK L - BLUE N - BROWN R - RED W - WHITE Y - YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION
8	UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET	2 OF 20

NOTE NUMBER	GENERAL NOTES DESCRIPTION
11	ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS CONNECTORS 56P13, AND P14 USE ITEM NUMBERS 13 AND 17. CONNECTOR 56P18, USE ITEM NUMBER 14.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 25.
13	APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 AND 30, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSEMBLY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET	3 OF 20

NOTE NUMBER	GENERAL NOTES DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED. INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 22 AND 31.
24	PERFORM WORKMANSHIP VIBRATION A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
25	ASSEMBLE INSULATION SLEEVE ITEM 34 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P18. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET	4 OF 20

NOTE NUMBER GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET	5 OF 20

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010775-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010775-002	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	3	1	2010775-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 10 FT TOT LG
	4	1	2010775-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 10 FT TOT LG
	5	1	2010775-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 10 FT TOT LG
	6	1	2010775-006	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 10 FT TOT LG
	7	1	2010775-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 5 FT TOT LG
	8	1	2010775-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 75 FT TOT LG
	9	1	2010775-009	WIRE PER 1010789-002, 24 AWG, BLK, 25 FT TOT LG
	10	1	2014742-021	CONNECTOR, ASSEMBLY, ELECTRICAL (56P18)
9	11	1	1010771-201	CONNECTOR, PLUG, ELECTRICAL (P13)
9	12	1	1010929-017	CONNECTOR, PLUG, ELECTRICAL (P14)
9	13	X	1010770- 2	CONTACT SOCKET, SUPPLIED WITH CONNECTORS 1010929 AND 1010771
	14	60	1010955- 1	CONTACT, MALE
	15	52	1010955- 2	CONTACT, MALE

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 6 OF 20	

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	17	17	1010958- 1	PLUG, PROTECTIVE SEALING
9	18	24	1010402- 2	SLEEVE, SOLDER
9	19	21	1012534- 36	INSULATION, SLEEVING, ELEC, (HEAT SHRINKABLE)
	22	AR	1012504	PRIMER, METAL PARTS
	23	1	2014670- 4	ADAPTOR, CONNECTOR
	24	1	2014670- 10	ADAPTOR, CONNECTOR
	25	AR	1012507- 4	TAPE, LACING
	27	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	28	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
	31	AR	1012503	COMPOUND, POTTING, POLYURETHANE
	32	1	2010775-010	WIRE PER 1010789-011, 24AWG, YEL, YEL JKT, 5 FEET TOTAL LENGTH
	33	1	1012534- 38	INSULATION, SLEEVING (HEAT SHRINKABLE)
	34	93	1010490-114	INSULATION, SLEEVING (HEAT SHRINKABLE)

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 7 OF 20	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 1	2		P13-66 P13-67					.13 .13	NO NO		13 13	
B 2	5											
B 2R			P13-59 P14-1					.13 .13	NO NO		13 13	
B 2Y			P13-58 P14-2					.13 .13	NO NO		13 13	
B 3	5											
B 3R			P13-30 P14-5					.13 .13	NO NO		13 13	
B 3Y			P13-27 P14-6					.13 .13	NO NO		13 13	
B 4	5											
B 4R			P14-3 P18-A8					.13 .18	NO NO		13 15	
B 4Y			P14-4 P18-A9					.13 .18	NO NO		13 15	
B 5	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 5B	9		P18-A5 SHLD B5					.18 .20	NO NO		14	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 8 OF 20	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 5R			P13-87 P18-A3					.13 .18	NO NO		13 15	
B 5Y			P13-86 P18-A4					.13 .18	NO NO		13 15	
B 6	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 6B	9		P18-B3 SHLD B6					.18 .20	NO NO		14	
B 6R			P13-90 P18-B2					.13 .18	NO NO		13 15	
B 6Y			P13-91 P18-B1					.13 .18	NO NO		13 15	
B 7	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 7B	9		P18-C4 SHLD B7					.18 .20	NO NO		14	
B 7R			P13-38 P18-D4					.13 .18	NO NO		13 15	
B 7Y			P13-39 P18-F4					.13 .18	NO NO		13 15	
B 8	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 8B	9		P18-C5 SHLD B8					.18 .20	NO NO		14	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 9 OF 20	

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 8R			P13-41 P18-D5					.13 .18	NO NO		13 15	
B 8Y			P13-40 P18-F5					.13 .18	NO NO		13 15	
B 9	5											
B 9R			P13-71 P18-B8					.13 .18	NO NO		13 15	
B 9Y			P13-70 P18-B9					.13 .18	NO NO		13 15	
B 10	3											
B 10R			P13-76 P18-H15					.13 .18	NO NO		13 14	
B 10Y			P13-77 P18-H14					.13 .18	NO NO		13 14	
B 11	6											
B 11G			P13-16 P18-H12					.13 .18	NO NO		13 14	
B 11R			P13-5 P18-G12					.13 .18	NO NO		13 14	
B 11Y			P13-33 P18-G13					.13 .18	NO NO		13 14	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 10 OF 20

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 12	4											
B 12R			P13-84 P18-C8					.13 .18	NO NO		13 14	
B 12Y			P13-85 P18-C9					.13 .18	NO NO		13 14	
B 13	8				1.75 1.00	1.50 .75				6B 6B	18 18	
B 13A	9		SHLD B13 P13-37					.20 .13	NO NO		 13	
B 13B	9		P18-G10 SHLD B13					.18 .20	NO NO		14	
B 13R			P13-34 P18-H10					.13 .18	NO NO		13 15	
B 13Y			P13-35 P18-K10					.13 .18	NO NO		13 15	
B 14	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 14B	9		P18-G4 SHLD B14					.18 .20	NO NO		14	
B 14R			P13-63 P18-H4					.13 .18	NO NO		13 15	
B 14Y			P13-62 P18-K4					.13 .18	NO NO		13 15	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 11 OF 20

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 15	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 15B	9		P18-G3 SHLD B15					.18 .20	NO NO		14	
B 15R			P13-57 P18-H3					.13 .18	NO NO		13 15	
B 15Y			P13-56 P18-K3					.13 .18	NO NO		13 15	
B 16	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 16B	9		P18-G8 SHLD B16					.18 .20	NO NO		14	
B 16R			P13-45 P18-K8					.13 .18	NO NO		13 15	
B 16Y			P13-46 P18-H8					.13 .18	NO NO		13 15	
B 17	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 17B	9		P18-G7 SHLD B17					.18 .20	NO NO		14	
B 17R			P13-26 P18-K7					.13 .18	NO NO		13 15	
B 17Y			P13-25 P18-H7					.13 .18	NO NO		13 15	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 12 OF 20

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 18	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 18B	9		P18-G6 SHLD B18					.18 .20	NO NO		14	
B 18R			P13-50 P18-K6					.13 .18	NO NO		13 15	
B 18Y			P13-49 P18-H6					.13 .18	NO NO		13 15	
B 19	8				1.75 1.00	1.50 .75				7 6B	19 18	
B 19B	9		P18-G5 SHLD B19					.18 .20	NO NO		14	
B 19R			P13-48 P18-H5					.13 .18	NO NO		13 15	
B 19Y			P13-47 P18-K5					.13 .18	NO NO		13 15	
B 20	6											
B 20G			P13-19 P18-H13					.13 .18	NO NO		13 14	
B 20R			P13-8 P18-K12					.13 .18	NO NO		13 14	
B 20Y			P13-36 P18-K13					.13 .18	NO NO		13 14	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 13 OF 20

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	21	8			1.75 1.00	1.50 .75				7 68	19 18	
B	21B	9		P18-G9 SHLD B21				.18 .20	NO NO		14	
B	21R			P13-23 P18-K9				.13 .18	NO NO		13 15	
B	21Y			P13-24 P18-H9				.13 .18	NO NO		13 15	
B	22	8			1.75 1.00	1.50 .75				7 68	19 18	
B	22B	9		P18-G2 SHLD B22				.18 .20	NO NO		14	
B	22R			P13-6 P18-H1				.13 .18	NO NO		13 15	
B	22Y			P13-7 P18-H2				.13 .18	NO NO		13 15	
B	23	7										
B	23G			P13-14 P18-F10				.13 .18	NO NO		13 15	
B	23R			P13-12 P18-F8				.13 .18	NO NO		13 15	
B	23Y			P13-13 P18-F9				.13 .18	NO NO		13 15	

SIZE A	CODE IDENT NO. 80230	2010775
SCALE-NONE	REV LTR A	SHEET 14 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	24	4										
B	24R			P13-32 P18-D8				.13 .18	NO NO		13 14	
B	24Y			P13-55 P18-D9				.13 .18	NO NO		13 14	
B	25	8			1.75 1.00	1.50 .75				7 68	19 18	
B	25B	9		P18-G1 SHLD B25				.18 .20	NO NO		14	
B	25R			P13-79 P18-F1				.13 .18	NO NO		13 15	
B	25Y			P13-78 P18-F2				.13 .18	NO NO		13 15	
B	26	8			1.75 1.00	1.50 .75				7 68	19 18	
B	26B	9		P18-A6 SHLD B26				.18 .20	NO NO		14	
B	26R			P13-83 P18-C6				.13 .18	NO NO		13 15	
B	26Y			P13-82 P18-B6				.13 .18	NO NO		13 15	
B	27	8			1.75 1.00	1.50 .75				7 68	19 18	

SIZE A	CODE IDENT NO. 80230	2010775
SCALE-NONE	REV LTR A	SHEET 15 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	27B	9		P18-C3 SHLD B27				.18 .20	NO NO		14	
B	27R			P13-54 P18-C2				.13 .18	NO NO		13 15	
B	27Y			P13-53 P18-C1				.13 .18	NO NO		13 15	
B	28	8			1.75 1.00	1.50 .75				7 68	19 18	
B	28B	9		P18-D3 SHLD B28				.18 .20	NO NO		14	
B	28R			P13-52 P18-D1				.13 .18	NO NO		13 15	
B	28Y			P13-51 P18-D2				.13 .18	NO NO		13 15	
B	29	8			1.75 1.00	1.50 .75				7 68	19 18	
B	29B	9		P18-C10 SHLD B29				.18 .20	NO NO		14	
B	29R			P13-11 P18-C11				.13 .18	NO NO		13 15	
B	29Y			P13-10 P18-C12				.13 .18	NO NO		13 15	
B	30	8			1.75 1.00	1.50 .75				7 68	19 18	

SIZE A	CODE IDENT NO. 80230	2010775
SCALE-NONE	REV LTR A	SHEET 16 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	30B	9		P18-B13 SHLD B30				.18 .20	NO NO		14	
B	30R			P13-64 P18-B14				.13 .18	NO NO		13 15	
B	30Y			P13-65 P18-B15				.13 .18	NO NO		13 15	
B	31	8			1.75 1.00	1.50 .75				7 68	19 18	
B	31B	9		P18-D10 SHLD B31				.18 .20	NO NO		14	
B	31R			P13-72 P18-D12				.13 .18	NO NO		13 15	
B	31Y			P13-73 P18-D11				.13 .18	NO NO		13 15	
B	32	8			1.75 1.00	1.50 .75				7 68	19 18	
B	32B	9		P18-B10 SHLD B32				.18 .20	NO NO		14	
B	32R			P13-18 P18-B12				.13 .18	NO NO		13 15	
B	32Y			P13-17 P18-B11				.13 .18	NO NO		13 15	
B	34	8			1.75 1.00	1.50 .75				7 68	19 18	

SIZE A	CODE IDENT NO. 80230	2010775
SCALE-NONE	REV LTR A	SHEET 17 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 34B	9		P18-C13 SHLD B34					.18 .20	NO NO		14	
B 34R			P13-80 P18-C15					.13 .18	NO NO		13 15	
B 34Y			P13-81 P18-C14					.13 .18	NO NO		13 15	
B 35	3											
B 35R			P13-68 P18-F15					.13 .18	NO NO		13 14	
B 35Y			P13-69 P18-F13					.13 .18	NO NO		13 14	
B 36	2		P13-9 P18-F3					.13 .18	NO NO		13 15	
B 37	4											
B 37R			P13-43 P18-G14					.13 .18	NO NO		13 14	
B 37Y			P13-44 P18-G15					.13 .18	NO NO		13 14	
B 38	1		P13-1 P18-A7					.13 .18	NO NO		13 14	
B 39	32				1.75 1.00	1.50 .75				7 68	33 18	

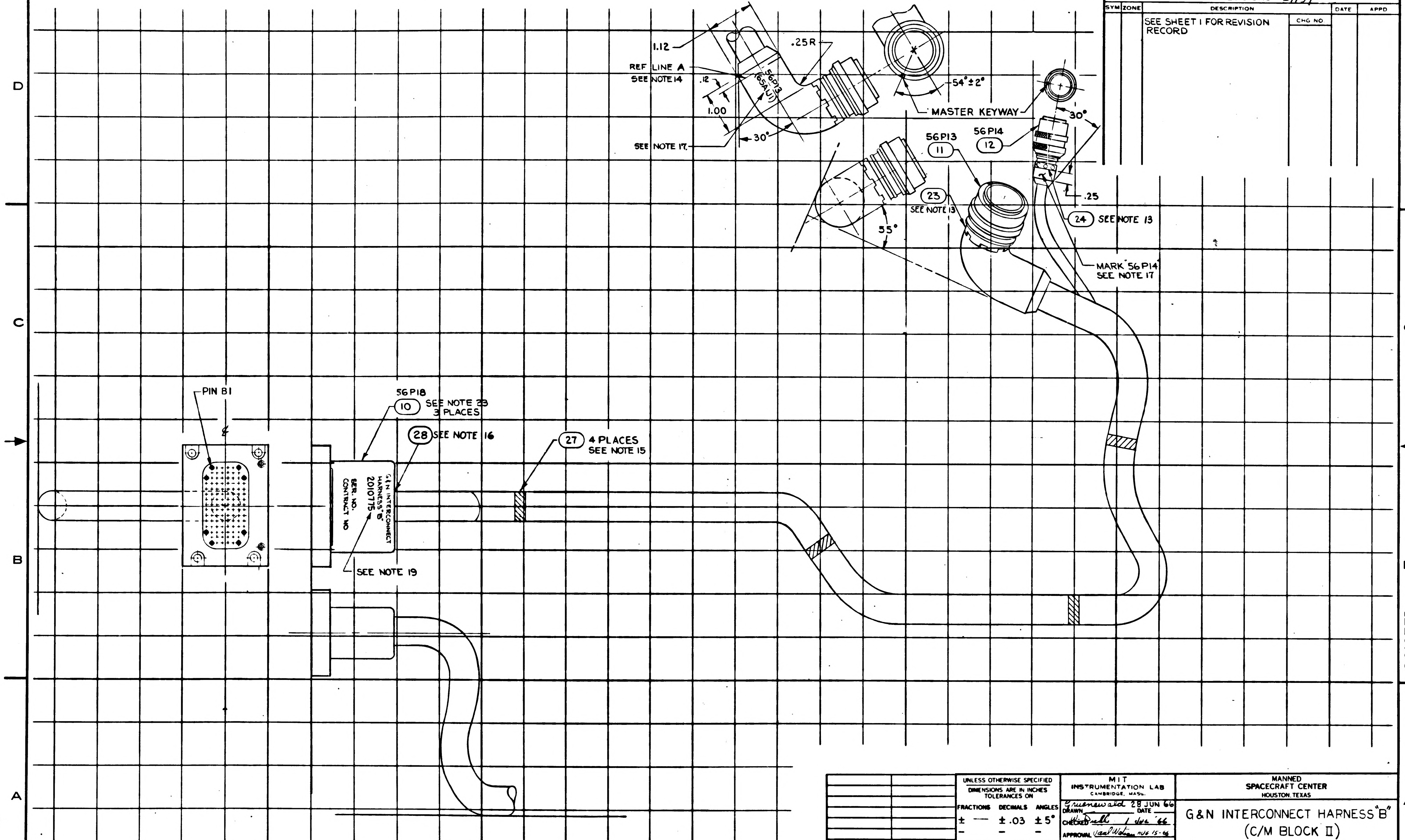
SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 18 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 39B	9		P18-D13 SHLD B39					.18 .20	NO NO		14	
B 39Y			P13-88 P18-D14					.13 .18	NO NO		13 14	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 19 OF 20

2010775 A

SYM	ZONE	REVISIONS 31139 DESCRIPTION	CHG NO.	DATE	APPD
		SEE SHEET 1 FOR REVISION RECORD			



1.12
.25R
REF LINE A
SEE NOTE 14
.12
1.00
56P13 (65A(J1))
30°
SEE NOTE 17.
54°±2°
MASTER KEYWAY
30°
56P13
11
56P14
12
23
SEE NOTE 13
55°
.25
24 SEE NOTE 13
MARK "56P14"
SEE NOTE 17
PIN B1
56P18
10 SEE NOTE 23
3 PLACES
28 SEE NOTE 16
27 4 PLACES
SEE NOTE 15
G&N INTERCONNECT
HARNESS "B"
2010775
SER. NO.
CONTRACT NO
SEE NOTE 19
2010775

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.03	±5°
–	–	–

DO NOT SCALE THIS DRAWING

MATERIAL ———

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Gruenewald DATE 28 JUN 66
CHECKED W. Duelli 1 Aug '66
APPROVAL Vaal Watson AUG 15-66
APPROVAL
NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "B"
(C/M BLOCK II)

CODE IDENT NO.	SIZE	
80230	D	2010775
SCALE 1:1		SHEET 20 OF 20

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567 Ⓜ	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	wA.
		B	REVISED PER TDRR 31198	4 Oct 66	57

REV	B																			
SHEET	20																			
REV STATUS OF SHEETS REV	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	
REV STATUS OF SHEETS SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN	Gruenewald	28 JUN 66
CHECKER	Diehl	1 Jul 66
NEA ENGINEER	D. Barta	5 Jul 66
APPROVAL		AUG 66
CONTR NO.	NAS 9-497	
NASA APPROVAL	R. Jacob	
CCB APPROVAL		9/22/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "B" (C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010775
SCALE NONE		SHEET 1 OF 20

MIL 1377A6 12-65

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014672.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A - FROM END OF SHIELD B - TO END OF SHIELD G - GREEN K - BLACK L - BLUE N - BROWN R - RED W - WHITE Y - YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION
8	UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET 2 OF 20	

NOTE NUMBER	GENERAL NOTES DESCRIPTION
11	ALL UNUSED CONTACT CAVITIES ON CONNECTORS 56P13 AND P14 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 17.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 25.
13	APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 AND 30, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSEMBLY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR B	SHEET 3 OF 20	

NOTE NUMBER	GENERAL NOTES DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED. INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 22 AND 31.
24	PERFORM WORKMANSHIP VIBRATION A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
25	ASSEMBLE INSULATION SLEEVE ITEM 34 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P18. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET 4 OF 20	

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010775	
SCALE-NONE	REV LTR A	SHEET 5 OF 20	

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010775-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010775-002	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	3	1	2010775-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 10 FT TOT LG
	4	1	2010775-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 10 FT TOT LG
	5	1	2010775-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 10 FT TOT LG
	6	1	2010775-006	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 10 FT TOT LG
	7	1	2010775-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 5 FT TOT LG
	8	1	2010775-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 75 FT TOT LG
	9	1	2010775-009	WIRE PER 1010789-002, 24 AWG, BLK, 25 FT TOT LG
	10	1	2014742-021	CONNECTOR, ASSEMBLY, ELECTRICAL (56P18)
9	11	1	1010771-201	CONNECTOR, PLUG, ELECTRICAL (P13)
9	12	1	1010929-017	CONNECTOR, PLUG, ELECTRICAL (P14)
9	13	X	1010770- 2	CONTACT SOCKET, SUPPLIED WITH CONNECTORS 1010929 AND 1010771
	14	41	1010955- 1	CONTACT, MALE
	15	52	1010955- 2	CONTACT, MALE

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR B
SHEET 6 OF 20

MIL 2084 9-65

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	17	17	1010958- 1	PLUG, PROTECTIVE SEALING
9	18	24	1010402- 2	SLEEVE, SOLDER
9	19	21	1012534- 36	INSULATION, SLEEVING, ELEC, (HEAT SHRINKABLE)
	22	AR	1012504	PRIMER, METAL PARTS
	23	1	2014670- 4	ADAPTOR, CONNECTOR
	24	1	2014670- 10	ADAPTOR, CONNECTOR
	25	AR	1012507- 4	TAPE, LACING
	27	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	28	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
	31	AR	1012503	COMPOUND, POTTING, POLYURETHANE
	32	1	2010775-010	WIRE PER 1010789-011, 24AWG, YEL, YEL JKT, 5 FEET TOTAL LENGTH
	33	1	1012534- 38	INSULATION, SLEEVING (HEAT SHRINKABLE)
	34	93	1010490-114	INSULATION, SLEEVING (HEAT SHRINKABLE)

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 7 OF 20

MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	1	2		P13-66 P13-67					.13 .13	NO NO		13 13	
B	2	5											
B	2R			P13-59 P14-1					.13 .13	NO NO		13 13	
B	2Y			P13-58 P14-2					.13 .13	NO NO		13 13	
B	3	5											
B	3R			P13-30 P14-5					.13 .13	NO NO		13 13	
B	3Y			P13-27 P14-6					.13 .13	NO NO		13 13	
B	4	5											
B	4R			P14-3 P18-A8					.13 .18	NO NO		13 15	
B	4Y			P14-4 P18-A9					.13 .18	NO NO		13 15	
B	5	8				1.75 1.00	1.50 .75				7 6B	19 18	
B	5B	9		P18-A5 SHLD B5					.18 .20	NO NO		14	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 8 OF 20

MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B	5R			P13-87 P18-A3					.13 .18	NO NO		13 15	
B	5Y			P13-86 P18-A4					.13 .18	NO NO		13 15	
B	6	8				1.75 1.00	1.50 .75				7 6B	19 18	
B	6B	9		P18-B3 SHLD B6					.18 .20	NO NO		14	
B	6R			P13-90 P18-B2					.13 .18	NO NO		13 15	
B	6Y			P13-91 P18-B1					.13 .18	NO NO		13 15	
B	7	8				1.75 1.00	1.50 .75				7 6B	19 18	
B	7B	9		P18-C4 SHLD B7					.18 .20	NO NO		14	
B	7R			P13-38 P18-D4					.13 .18	NO NO		13 15	
B	7Y			P13-39 P18-F4					.13 .18	NO NO		13 15	
B	8	8				1.75 1.00	1.50 .75				7 6B	19 18	
B	8B	9		P18-C5 SHLD B8					.18 .20	NO NO		14	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 9 OF 20

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 8R			P13-41 P18-D5					.13 .18	NO NO		13 15	
B 8Y			P13-40 P18-F5					.13 .18	NO NO		13 15	
B 9	5											
B 9R			P13-71 P18-B8					.13 .18	NO NO		13 15	
B 9Y			P13-70 P18-B9					.13 .18	NO NO		13 15	
B 10	3											
B 10R			P13-76 P18-H15					.13 .18	NO NO		13 14	
B 10Y			P13-77 P18-H14					.13 .18	NO NO		13 14	
B 11	6											
B 11G			P13-16 P18-H12					.13 .18	NO NO		13 14	
B 11R			P13-5 P18-G12					.13 .18	NO NO		13 14	
B 11Y			P13-33 P18-G13					.13 .18	NO NO		13 14	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 10 OF 20	

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 12	4											
B 12R			P13-84 P18-C8					.13 .18	NO NO		13 14	
B 12Y			P13-85 P18-C9					.13 .18	NO NO		13 14	
B 13	8				1.75 1.00	1.50 .75				68 68	18 18	
B 13A	9		SHLD B13 P13-37					.20 .13	NO NO		 13	
B 13B	9		P18-G10 SHLD B13					.18 .20	NO NO		14	
B 13R			P13-34 P18-H10					.13 .18	NO NO		13 15	
B 13Y			P13-35 P18-K10					.13 .18	NO NO		13 15	
B 14	8				1.75 1.00	1.50 .75				7 68	19 18	
B 14B	9		P18-G4 SHLD B14					.18 .20	NO NO		14	
B 14R			P13-63 P18-H4					.13 .18	NO NO		13 15	
B 14Y			P13-62 P18-K4					.13 .18	NO NO		13 15	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 11 OF 20	

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 15	8				1.75 1.00	1.50 .75				7 68	19 18	
B 15B	9		P18-G3 SHLD B15					.18 .20	NO NO		14	
B 15R			P13-57 P18-H3					.13 .18	NO NO		13 15	
B 15Y			P13-56 P18-K3					.13 .18	NO NO		13 15	
B 16	8				1.75 1.00	1.50 .75				7 68	19 18	
B 16B	9		P18-G8 SHLD B16					.18 .20	NO NO		14	
B 16R			P13-45 P18-K8					.13 .18	NO NO		13 15	
B 16Y			P13-46 P18-H8					.13 .18	NO NO		13 15	
B 17	8				1.75 1.00	1.50 .75				7 68	19 18	
B 17B	9		P18-G7 SHLD B17					.18 .20	NO NO		14	
B 17R			P13-26 P18-K7					.13 .18	NO NO		13 15	
B 17Y			P13-25 P18-H7					.13 .18	NO NO		13 15	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 12 OF 20	

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 18	8				1.75 1.00	1.50 .75				7 68	19 18	
B 18B	9		P18-G6 SHLD B18					.18 .20	NO NO		14	
B 18R			P13-50 P18-K6					.13 .18	NO NO		13 15	
B 18Y			P13-49 P18-H6					.13 .18	NO NO		13 15	
B 19	8				1.75 1.00	1.50 .75				7 68	19 18	
B 19B	9		P18-G5 SHLD B19					.18 .20	NO NO		14	
B 19R			P13-48 P18-H5					.13 .18	NO NO		13 15	
B 19Y			P13-47 P18-K5					.13 .18	NO NO		13 15	
B 20	6											
B 20G			P13-19 P18-H13					.13 .18	NO NO		13 14	
B 20R			P13-8 P18-K12					.13 .18	NO NO		13 14	
B 20Y			P13-36 P18-K13					.13 .18	NO NO		13 14	

SIZE A	CODE IDENT NO. 80230	2010775	
SCALE-NONE	REV LTR A	SHEET 13 OF 20	

MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (6)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 21	8				1.75 1.00	1.50 .75				7 68	19 18	
B 21B	9		P18-G9 SHLD B21					.18 .20	NO NO		14	
B 21R			P13-23 P18-K9					.13 .18	NO NO		13 15	
B 21Y			P13-24 P18-H9					.13 .18	NO NO		13 15	
B 22	8				1.75 1.00	1.50 .75				7 68	19 18	
B 22B	9		P18-G2 SHLD B22					.18 .20	NO NO		14	
B 22R			P13-6 P18-H1					.13 .18	NO NO		13 15	
B 22Y			P13-7 P18-H2					.13 .18	NO NO		13 15	
B 23	7											
B 23G			P13-14 P18-F10					.13 .18	NO NO		13 15	
B 23R			P13-12 P18-F8					.13 .18	NO NO		13 15	
B 23Y			P13-13 P18-F9					.13 .18	NO NO		13 15	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 14 OF 20
MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 24	4											
B 24R			P13-32 P18-D8					.13 .18	NO NO		13 14	
B 24Y			P13-55 P18-D9					.13 .18	NO NO		13 14	
B 25	8				1.75 1.00	1.50 .75				7 68	19 18	
B 25B	9		P18-G1 SHLD B25					.18 .20	NO NO		14	
B 25R			P13-79 P18-F1					.13 .18	NO NO		13 15	
B 25Y			P13-78 P18-F2					.13 .18	NO NO		13 15	
B 26	8				1.75 1.00	1.50 .75				7 68	19 18	
B 26B	9		P18-A6 SHLD B26					.18 .20	NO NO		14	
B 26R			P13-83 P18-C6					.13 .18	NO NO		13 15	
B 26Y			P13-82 P18-B6					.13 .18	NO NO		13 15	
B 27	8				1.75 1.00	1.50 .75				7 68	19 18	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 15 OF 20
MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 27B	9		P18-C3 SHLD B27					.18 .20	NO NO		14	
B 27R			P13-54 P18-C2					.13 .18	NO NO		13 15	
B 27Y			P13-53 P18-C1					.13 .18	NO NO		13 15	
B 28	8				1.75 1.00	1.50 .75				7 68	19 18	
B 28B	9		P18-D3 SHLD B28					.18 .20	NO NO		14	
B 28R			P13-52 P18-D1					.13 .18	NO NO		13 15	
B 28Y			P13-51 P18-D2					.13 .18	NO NO		13 15	
B 29	8				1.75 1.00	1.50 .75				7 68	19 18	
B 29B	9		P18-C10 SHLD B29					.18 .20	NO NO		14	
B 29R			P13-11 P18-C11					.13 .18	NO NO		13 15	
B 29Y			P13-10 P18-C12					.13 .18	NO NO		13 15	
B 30	8				1.75 1.00	1.50 .75				7 68	19 18	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 16 OF 20
MIL 2084 9-65

WIRING HARNESS B 2010775

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 30B	9		P18-B13 SHLD B30					.18 .20	NO NO		14	
B 30R			P13-64 P18-B14					.13 .18	NO NO		13 15	
B 30Y			P13-65 P18-B15					.13 .18	NO NO		13 15	
B 31	8				1.75 1.00	1.50 .75				7 68	19 18	
B 31B	9		P18-D10 SHLD B31					.18 .20	NO NO		14	
B 31R			P13-72 P18-D12					.13 .18	NO NO		13 15	
B 31Y			P13-73 P18-D11					.13 .18	NO NO		13 15	
B 32	8				1.75 1.00	1.50 .75				7 68	19 18	
B 32B	9		P18-B10 SHLD B32					.18 .20	NO NO		14	
B 32R			P13-18 P18-B12					.13 .18	NO NO		13 15	
B 32Y			P13-17 P18-B11					.13 .18	NO NO		13 15	
B 34	8				1.75 1.00	1.50 .75				7 68	19 18	

SIZE A
CODE IDENT NO. 80230
2010775
SCALE-NONE
REV LTR A
SHEET 17 OF 20
MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 34B	9		P18-C13 SHLD B34					.18 .20	NO NO		14	
B 34R			P13-80 P18-C15					.13 .18	NO NO		13 15	
B 34Y			P13-81 P18-C14					.13 .18	NO NO		13 15	
B 35	3											
B 35R			P13-68 P18-F15					.13 .18	NO NO		13 14	
B 35Y			P13-69 P18-F13					.13 .18	NO NO		13 14	
B 36	2		P13-9 P18-F3					.13 .18	NO NO		13 15	
B 37	4											
B 37R			P13-43 P18-G14					.13 .18	NO NO		13 14	
B 37Y			P13-44 P18-G15					.13 .18	NO NO		13 14	
B 38	1		P13-1 P18-A7					.13 .18	NO NO		13 14	
B 39	32				1.75 1.00	1.50 .75				7 6B	33 18	

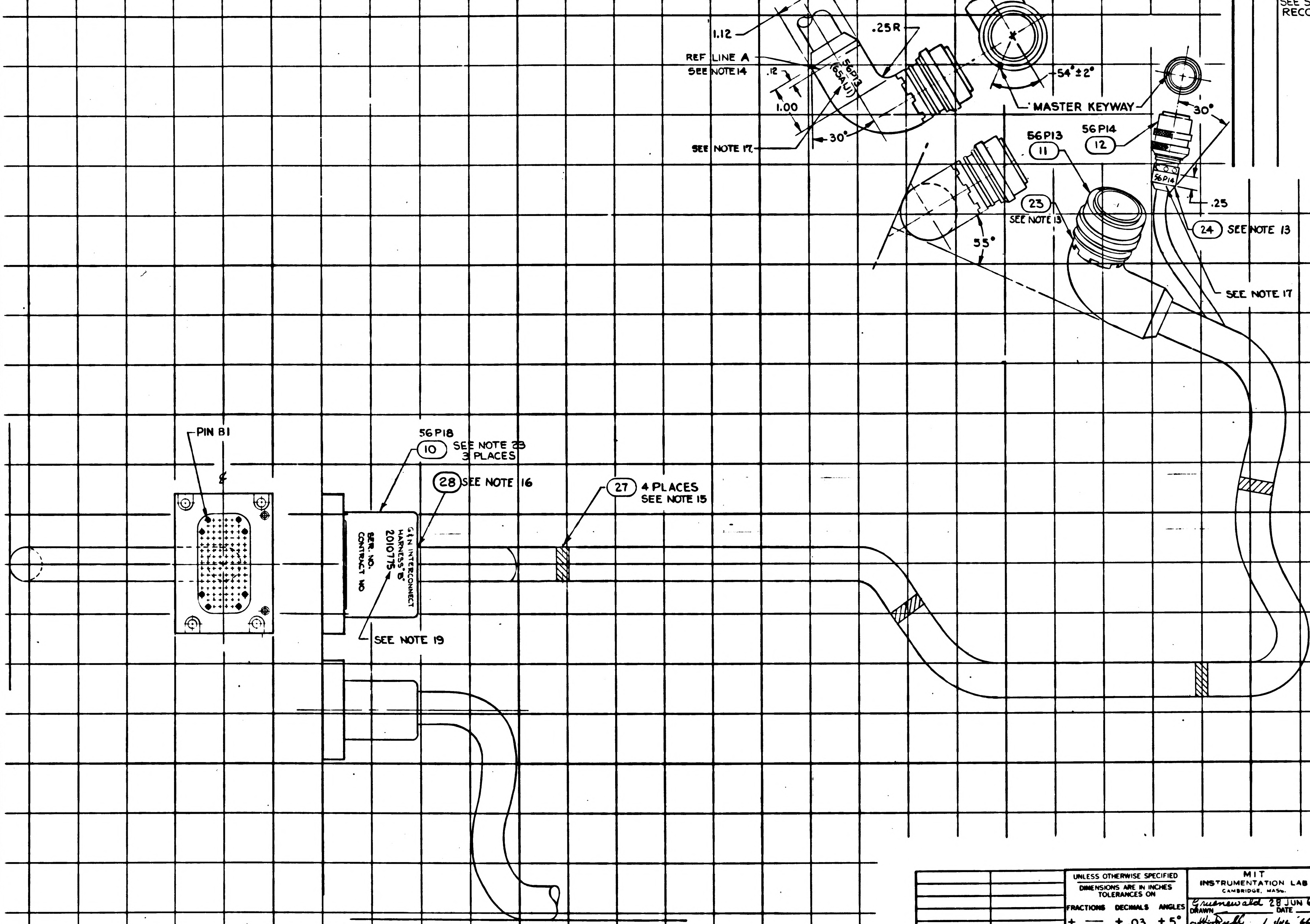
SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 18 OF 20

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 39B	9		P18-D13 SHLD B39					.18 .20	NO NO		14	
B 39Y			P13-88 P18-D14					.13 .18	NO NO		13 14	

SIZE	CODE IDENT NO.	
A	80230	2010775
SCALE-NONE	REV LTR A	SHEET 19 OF 20

B 2010775

REVISIONS 31139					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
		SEE SHEET 1 FOR REVISION RECORD			



1.12
.25R
REF LINE A
SEE NOTE 14
.12
56P13 (65AU1)
1.00
30°
SEE NOTE 17
54° ± 2°
MASTER KEYWAY
30°
56P13
11
56P14
12
56P14
.25
23
SEE NOTE 13
55°
24 SEE NOTE 13
SEE NOTE 17
PIN 81
℄
56P18
10 SEE NOTE 23
3 PLACES
28 SEE NOTE 16
27 4 PLACES
SEE NOTE 15
G&N INTERCONNECT HARNESS "B"
2010775
SER. NO.
CONTRACT NO
SEE NOTE 19

2010775

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	± .03	± 5°

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Gruenewald DATE 28 JUN 66
CHECKED W. Duell 1 Dec '66
APPROVAL Paul Watson AUG 15-66
APPROVAL
NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "B"
(C/M BLOCK II)

CODE IDENT NO.	SIZE	
80230	D	2010775
SCALE 1:1		SHEET 20 OF 20

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W.T.

REV				A	A	A	A	A	A	A	A	A	A									
SHEET				21	22	23	24	25	26	27	28	29	30									
REV STATUS OF SHEETS	REV				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER W. Diehl 29 JUN 66
ENGINEER Barta 5 JUL 66
APPROVAL AUG 15 66
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacob
~~MIT~~ CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "C" (C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010776
SCALE NONE
SHEET 1 OF 30

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014673.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 2 OF *30*

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
CONNECTOR 56P15 AND 16 USE ITEM NUMBERS 19 AND 14.
CONNECTOR 56P12 USE ITEM NUMBERS 18 AND 13.
CONNECTOR 56P19 USE ITEM NUMBER 15.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 32.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 23 AND 24 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, ITEM 25, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM, EXCEPT FOR CONDUCTORS USING ITEM 7. THESE SHALL BE LESS THAN 2 OHMS. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 3 OF *30*

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED. INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, ~~SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA,~~ EXCEPT ELECTRIFICATION TIME NOT APPLICABLE.
SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 22 AND 29.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 37 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P19. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 4 OF *30*

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 5 OF *30*

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010776-001	WIRE PER 1010789-006, 22AWG, YEL, 5 FT TOT LG
	2	1	2010776-002	WIRE PER 1010789-016, 26 AWG, YEL, 10 FT TOT LG
	3	1	2010776-003	WIRE PER 1010789-008, 22AWG, YEL, RED, 30 FT TOT LG
	4	1	2010776-004	WIRE PER 1010789-017, 26 AWG, YEL, RED, 25 FT TOT LG
	5	1	2010776-005	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN 5 FT TOT LG
	6	1	2010776-006	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	7	1	2010776-007	WIRE PER 1010707-1, RED JKT, 29 AWG, RED, WHT, BLUE, 26 FT TOT LG
	8	1	2010776-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 40 FT TOT LG
	9	1	2010776-009	WIRE PER 1010789-002, 24 AWG, BLK, 35 FT TOT LG
9	10	1	1010929-001	CONNECTOR, PLUG, ELECTRICAL (P12)
9	11	1	1010965- 1	CONNECTOR, PLUG, ELECTRICAL (P16)
9	12	1	1010965- 2	CONNECTOR, PLUG, ELECTRICAL (P15)
9	13	X	1010770- 2	CONTACT, SOCKET SUPPLIED WITH CONNECTOR 1010929
9	14	X	1010781- 1	CONTACT, SOCKET SUPPLIED WITH CONNECTOR 1010965
9	15	98	1010955- 1	CONTACT, MALE

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 6 OF 30

MIL 2084 9-65

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	16	84	1010955- 2	CONTACT, MALE
	17	1	2014743-021	CONNECTOR, PLUG, ELECTRICAL (P19)
9	18	13	1010958- 1	PLUG, PROTECTIVE SEALING
9	19	30	1010984	PLUG, PROTECTIVE SEALING
9	20	33	1010402- 2	SLEEVE SOLDER
9	21	15	1012534- 36	INSULATION SLEEVE (HEAT SHRINKABLE)
9	22	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	23	AR	1010679	ADHESIVE ACTIVATOR
9	24	AR	1010661	EPOXY RESIN
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
9	29	AR	1012504	PRIMER, METAL PARTS
9	30	29	1010862	BUSHING, SLEEVE
9	32	AR	1012507- 4	TAPE, LACING
9	33	6	1012534- 37	SLEEVE, INSULATION (HEAT SHRINKABLE)
	34	2	2014670- 6	ADAPTER, CONNECTOR
	35	1	2014670- 4	ADAPTER, CONNECTOR
9	36	12	1010763- 2	SLEEVE, SOLDER

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 7 OF 30

MIL 2084 9-65

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	37	142	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 8 OF 30

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C	1	7			1.75	1.50				68	36	A
					1.75	1.50				7	21	
C	1A	9	SHLD C1					.20	NO			
			P12-38					.13	NO		13	
C	1L		P12-63					.13	NO		13, 30	
			P15-3					.13	NO		14, 30	
C	1R		P12-39					.13	NO		13, 30	
			P15-1					.13	NO		14, 30	
C	1W		P12-64					.13	NO		13, 30	
			P15-2					.13	NO		14, 30	
C	2	7			1.75	1.50				68	36	
					1.75	1.50				7	21	
C	2A	9	SHLD C2					.20	NO			
			P12-59					.13	NO		13	
C	2L		P12-84					.13	NO		13, 30	
			P15-14					.13	NO		14, 30	
C	2R		P12-60					.13	NO		13, 30	
			P15-12					.13	NO		14, 30	
C	2W		P12-85					.13	NO		13, 30	
			P15-13					.13	NO		14, 30	
C	3	7			1.75	1.50				68	36	
					1.75	1.50				7	21	
C	3A	9	SHLD C3					.20	NO			
			P12-80					.13	NO		13	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 9 OF 30

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 3L			P12-81 P15-61					.13 .13	NO NO		13, 30 14, 30	
C 3R			P12-56 P15-59					.13 .13	NO NO		13, 30 14, 30	
C 3W			P12-57 P15-60					.13 .13	NO NO		13, 30 14, 30	
C 4	8				1.75 1.75	1.50 1.50				68 7	20 21	
C 4A	9		SHLD C4 P12-33					.20 .13	NO NO		 13	
C 4R			P12-16 P15-6					.13 .13	NO NO		13 14	
C 4Y			P12-17 P15-7					.13 .13	NO NO		13 14	
C 5	8				1.75 1.75	1.50 1.50				68 7	20 21	
C 5A	9		SHLD C5 P12-27					.20 .13	NO NO		 13	
C 5R			P12-26 P15-17					.13 .13	NO NO		13 14	
C 5Y			P12-12 P15-18					.13 .13	NO NO		13 14	
C 6	8				1.75 1.75	1.50 1.50				68 7	20 21	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 10 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 6A	9		SHLD C6 P12-47					.20 .13	NO NO		 13	
C 6R			P12-72 P15-35					.13 .13	NO NO		13 14	
C 6Y			P12-71 P15-36					.13 .13	NO NO		13 14	
C 7	8				1.75 1.00	1.50 .75				68 68	20 20	
C 7A	9		SHLD C7 P12-48					.20 .13	NO NO		 13	
C 7B	9		P19-C5 SHLD C7					.18 .20	NO NO		15	
C 7R			P12-49 P19-B5					.13 .18	NO NO		13	
C 7Y			P12-28 P19-A5					.13 .18	NO NO		13	
C 8	8				1.75 1.00	1.50 .75				68 68	20 20	
C 8A	9		SHLD C8 P12-53					.20 .13	NO NO		 13	
C 8B	9		P19-C4 SHLD C8					.18 .20	NO NO		15	
C 8R			P12-54 P19-A4					.13 .18	NO NO		13	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 11 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 8Y			P12-78 P19-B4					.13 .18	NO NO		13	
C 9	8				1.75 1.00	1.50 .75				68 68	20 20	
C 9A	9		SHLD C9 P12-29					.20 .13	NO NO		 13	
C 9B	9		P19-C7 SHLD C9					.18 .20	NO NO		15	
C 9R			P12-13 P19-B7					.13 .18	NO NO		13	
C 9Y			P12-14 P19-A7					.13 .18	NO NO		13	
C 10	8				1.75 1.00	1.50 .75				68 68	20 20	
C 10A	9		SHLD C10 P12-50					.20 .13	NO NO		 13	
C 10B	9		P19-C6 SHLD C10					.18 .20	NO NO		15	
C 10R			P12-75 P19-A6					.13 .18	NO NO		13	
C 10Y			P12-74 P19-B6					.13 .18	NO NO		13	
C 11	8				1.75 1.00	1.50 .75				68 68	20 20	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 12 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 11A	9		SHLD C11 P12-30					.20 .13	NO NO		 13	
C 11B	9		P19-C3 SHLD C11					.18 .20	NO NO		15	
C 11R			P12-15 P19-B3					.13 .18	NO NO		13	
C 11Y			P12-31 P19-A3					.13 .18	NO NO		13	
C 12	8				1.75 1.00	1.50 .75				68 68	20 20	
C 12A	9		SHLD C12 P12-52					.20 .13	NO NO		 13	
C 12B	9		P19-C2 SHLD C12					.18 .20	NO NO		15	
C 12R			P12-51 P19-B1					.13 .18	NO NO		13	
C 12Y			P12-76 P19-B2					.13 .18	NO NO		13	
C 13	8				1.75 1.00	1.50 .75				68 68	20 20	
C 13A	9		SHLD C13 P12-42					.20 .13	NO NO		 13	
C 13B	9		P19-C8 SHLD C13					.18 .20	NO NO		15	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 13 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 13R			P12-67 P19-A8					.13 .18	NO NO		13	
C 13Y			P12-43 P19-B8					.13 .18	NO NO		13	
C 14	8				1.75 1.00	1.50 .75				68 68	20 20	
C 14A	9		SHLD C14 P12-45					.20 .13	NO NO		 13	
C 14B	9		P19-C9 SHLD C14					.18 .20	NO NO		15	
C 14R			P12-70 P19-B9					.13 .18	NO NO		13	
C 14Y			P12-46 P19-A9					.13 .18	NO NO		13	
C 15	8				1.75 1.00	1.50 .75				68 68	20 20	
C 15A	9		SHLD C15 P12-44					.20 .13	NO NO		 13	
C 15B	9		P19-C10 SHLD C15					.18 .20	NO NO		15	
C 15R			P12-69 P19-A10					.13 .18	NO NO		13	
C 15Y			P12-68 P19-B10					.13 .18	NO NO		13	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 14 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 16	4											
C 16R			P12-9 P19-K4					.13 .18	NO NO		13 16	
C 16Y			P12-22 P19-H4					.13 .18	NO NO		13 16	
C 17	4											
C 17R			P12-24 P19-G3					.13 .18	NO NO		13 16	
C 17Y			P12-23 P19-G4					.13 .18	NO NO		13 16	
C 18	4											
C 18R			P12-11 P19-F3					.13 .18	NO NO		13 16	
C 18Y			P12-10 P19-F4					.13 .18	NO NO		13 16	
C 19	4											
C 19R			P12-66 P19-K3					.13 .18	NO NO		13 16	
C 19Y			P12-41 P19-H3					.13 .18	NO NO		13 16	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 15 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 20	5											
C 20G			P12-19 P19-F22					.13 .18	NO NO		13 15	
C 20R			P12-8 P19-H22					.13 .18	NO NO		13 15	
C 20Y			P12-7 P19-G22					.13 .18	NO NO		13 15	
C 21	3											
C 21R			P12-18 P19-G19					.13 .18	NO NO		13 15	
C 21Y			P12-6 P19-F19					.13 .18	NO NO		13 15	
C 22	3											
C 22R			P12-4 P19-G18					.13 .18	NO NO		13 15	
C 22Y			P12-5 P19-F18					.13 .18	NO NO		13 15	
C 23	3											
C 23R			P12-3 P19-G17					.13 .18	NO NO		13 15	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 16 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 23Y			P12-2 P19-F17					.13 .18	NO NO		13 15	
C 24	4											
C 24R			P12-82 P19-G13					.13 .18	NO NO		13 16	
C 24Y			P12-58 P19-H13					.13 .18	NO NO		13 16	
C 25	4											
C 25R			P12-35 P19-H14					.13 .18	NO NO		13 16	
C 25Y			P12-34 P19-G14					.13 .18	NO NO		13 16	
C 26	4											
C 26R			P12-61 P19-G15					.13 .18	NO NO		13 16	
C 26Y			P12-37 P19-H15					.13 .18	NO NO		13 16	
C 27	1		P12-1 P19-D11					.13 .18	NO NO		13 16	
C 28	7				1.75 1.00	1.50 .75				7 68	21 36	

SIZE A
CODE IDENT NO. 80230
2010776
SCALE-NONE
REV LTR A
SHEET 17 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C 28B	9		P19-D25 SHLD C28					.18 .20	NO NO		15	
C 28L			NONE NONE				1.75 1.00		NO NO			
C 28R			P15-5 P19-D23					.13 .18	NO NO		14, 30 16	
C 28W			P15-4 P19-D24					.13 .18	NO NO		14, 30 16	
C 29	7				1.75 1.00	1.50 .75				7 68	21 36	
C 29B	9		P19-C23 SHLD C29					.18 .20	NO NO		15	
C 29L			NONE NONE				1.75 1.00		NO NO			
C 29R			P15-16 P19-B23					.13 .18	NO NO		14, 30	
C 29W			P15-15 P19-A23					.13 .18	NO NO		14, 30	
C 30	7				1.75 1.00	1.50 .75				7 68	21 36	
C 30B	9		P19-C24 SHLD C30					.18 .20	NO NO		15	
C 30L			P15-34 P19-B24					.13 .18	NO NO		14, 30	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR ✗A	SHEET 18 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C 30R			P15-33 P19-C25					.13 .18	NO NO		14, 30 16	
C 30W			P15-32 P19-B25					.13 .18	NO NO		14, 30	
C 34	3											
C 34R			P15-40 P19-K20					.13 .18	NO NO		14 15	
C 34Y			P15-39 P19-H20					.13 .18	NO NO		14 15	
C 35	3											
C 35R			P15-42 P19-H21					.13 .18	NO NO		14 15	
C 35Y			P15-41 P19-K21					.13 .18	NO NO		14 15	
C 36	3											
C 36R			P15-52 P19-K22					.13 .18	NO NO		14 15	
C 36Y			P15-51 P19-K23					.13 .18	NO NO		14 15	
C 37	5											

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR ✗A	SHEET 19 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C 37G			P16-24 P19-K16					.13 .18	NO NO		14 15	
C 37R			P16-25 P19-H17					.13 .18	NO NO		14 15	
C 37Y			P16-23 P19-H18					.13 .18	NO NO		14 15	
C 38	3											
C 38R			P16-21 P19-H16					.13 .18	NO NO		14 15	
C 38Y			P16-22 P19-H19					.13 .18	NO NO		14 15	
C 39	3											
C 39R			P15-8 P19-G10					.13 .18	NO NO		14 15	
C 39Y			P15-9 P19-G9					.13 .18	NO NO		14 15	
C 40	4											
C 40R			P15-10 P19-K9					.13 .18	NO NO		14 16	
C 40Y			P15-11 P19-H9					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR ✗A	SHEET 20 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C 41	3											
C 41R			P16-6 P19-H2					.13 .18	NO NO		14 15	
C 41Y			P16-8 P19-G2					.13 .18	NO NO		14 15	
C 42	3											
C 42R			P16-7 P19-H1					.13 .18	NO NO		14 15	
C 42Y			P16-9 P19-G1					.13 .18	NO NO		14 15	
C 43	4											
C 43R			P16-14 P19-H6					.13 .18	NO NO		14 16	
C 43Y			P16-15 P19-K6					.13 .18	NO NO		14 16	
C 44	2		P16-16 P19-K8					.13 .18	NO NO		14 16	
C 45	4											
C 45R			P16-17 P19-K7					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR ✗A	SHEET 21 OF 30

MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C	45Y			P16-18 P19-H7					.13 .18	NO NO		14 16	
C	46	5											
C	46G			P16-12 P19-K17					.13 .18	NO NO		14 15	
C	46R			P16-10 P19-K19					.13 .18	NO NO		14 15	
C	46Y			P16-11 P19-K18					.13 .18	NO NO		14 15	
C	47	3											
C	47R			P16-2 P19-G11					.13 .18	NO NO		14 15	
C	47Y			P16-4 P19-G12					.13 .18	NO NO		14 15	
C	48	3											
C	48R			P16-3 P19-H11					.13 .18	NO NO		14 15	
C	48Y			P16-5 P19-H12					.13 .18	NO NO		14 15	
C	49	3											

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR A		SHEET 22 OF 30

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C	49R			P15-38 P19-F16					.13 .18	NO NO		14 15	
C	49Y			P15-37 P19-G16					.13 .18	NO NO		14 15	
C	50	2		P16-13 P19-D1					.13 .18	NO NO		14 16	
C	51	2		P15-25 P19-H5					.13 .18	NO NO		14 16	
C	52	2		P16-20 P19-K5					.13 .18	NO NO		14 16	
C	53	2		P16-19 P19-F1					.13 .18	NO NO		14 16	
C	54	3											
C	54R			P16-27 P19-H10					.13 .18	NO NO		14 15	
C	54Y			P16-28 P19-K10					.13 .18	NO NO		14 15	
C	55	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	55B	9		P19-C20 SHLD C55					.18 .20	NO NO		15	
C	55R			P16-33 P19-A20					.13 .18	NO NO		14	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR A		SHEET 23 OF 30

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C	55Y			P16-34 P19-B20					.13 .18	NO NO		14	
C	56	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	56B	9		P19-C19 SHLD C56					.18 .20	NO NO		15	
C	56R			P16-35 P19-B19					.13 .18	NO NO		14	
C	56Y			P16-36 P19-A19					.13 .18	NO NO		14	
C	57	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	57B	9		P19-C22 SHLD C57					.18 .20	NO NO		15	
C	57R			P16-37 P19-A22					.13 .18	NO NO		14	
C	57Y			P16-38 P19-B22					.13 .18	NO NO		14	
C	58	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	58B	9		P19-C21 SHLD C58					.18 .20	NO NO		15	
C	58R			P16-39 P19-B21					.13 .18	NO NO		14	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR A		SHEET 24 OF 30

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
C	58Y			P16-40 P19-A21					.13 .18	NO NO		14	
C	59	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	59B	9		P19-C18 SHLD C59					.18 .20	NO NO		15	
C	59R			P16-41 P19-A18					.13 .18	NO NO		14	
C	59Y			P16-42 P19-B18					.13 .18	NO NO		14	
C	60	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	60B	9		P19-C17 SHLD C60					.18 .20	NO NO		15	
C	60R			P16-43 P19-B17					.13 .18	NO NO		14	
C	60Y			P16-44 P19-A17					.13 .18	NO NO		14	
C	61	8				1.75 1.00	1.50 .75				7 6B	21 20	
C	61B	9		P19-D22 SHLD C61					.18 .20	NO NO		15	
C	61R			P16-45 P19-D20					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR A		SHEET 25 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 61Y			P16-46 P19-D21					.13 .18	NO NO		14 16	
C 62	8				1.75 1.00	1.50 .75				7 68	21 20	
C 62B	9		P19-D16 SHLD C62					.18 .20	NO NO		15	
C 62R			P16-47 P19-D17					.13 .18	NO NO		14 16	
C 62Y			P16-48 P19-D18					.13 .18	NO NO		14 16	
C 63	8				1.75 1.00	1.50 .75				7 68	21 20	
C 63B	9		P19-C16 SHLD C63					.18 .20	NO NO		15	
C 63R			P16-51 P19-A16					.13 .18	NO NO		14	
C 63Y			P16-52 P19-B16					.13 .18	NO NO		14	
C 64	8				1.75 1.00	1.50 .75				7 68	21 20	
C 64B	9		P19-D15 SHLD C64					.18 .20	NO NO		15	
C 64R			P16-53 P19-C15					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 26 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 64Y			P16-54 P19-B15					.13 .18	NO NO		14	
C 65	8				1.75 1.00	1.50 .75				7 68	21 20	
C 65B	9		P19-D14 SHLD C65					.18 .20	NO NO		15	
C 65R			P16-55 P19-B14					.13 .18	NO NO		14	
C 65Y			P16-56 P19-C14					.13 .18	NO NO		14 16	
C 66	8				1.75 1.00	1.50 .75				7 68	21 20	
C 66B	9		P19-D13 SHLD C66					.18 .20	NO NO		15	
C 66R			P16-57 P19-C13					.13 .18	NO NO		14 16	
C 66Y			P16-58 P19-B13					.13 .18	NO NO		14	
C 67	1		P16-1 P19-D12					.13 .18	NO NO		14 16	
C 74	6											
C 74G			P15-22 P19-G25					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 27 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 74N			P15-21 P19-G24					.13 .18	NO NO		14 16	
C 74R			P15-19 P19-F25					.13 .18	NO NO		14 16	
C 74Y			P15-20 P19-F24					.13 .18	NO NO		14 16	
C 76	2		P16-59 P19-F15					.13 .18	NO NO		14 16	
C 77	7				1.75 1.00	1.50 .75				68 68	36 36	
C 77A	9		SHLD C77 P12-65					.20 .13	NO NO		13	
C 77B	9		P19-D7 SHLD C77					.18 .20	NO NO		15	
C 77L			NONE NONE				1.75 1.00		NO NO			
C 77R			P12-40 P19-D5					.13 .18	NO NO		13, 30 16	
C 77W			P12-21 P19-D6					.13 .18	NO NO		13, 30 16	
C 78	7				1.75 1.00	1.50 .75				68 68	36 36	
C 78A	9		SHLD C78 P12-79					.20 .13	NO NO		13	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 28 OF 30

MIL 2084 9-65

HARNESS C 2010776

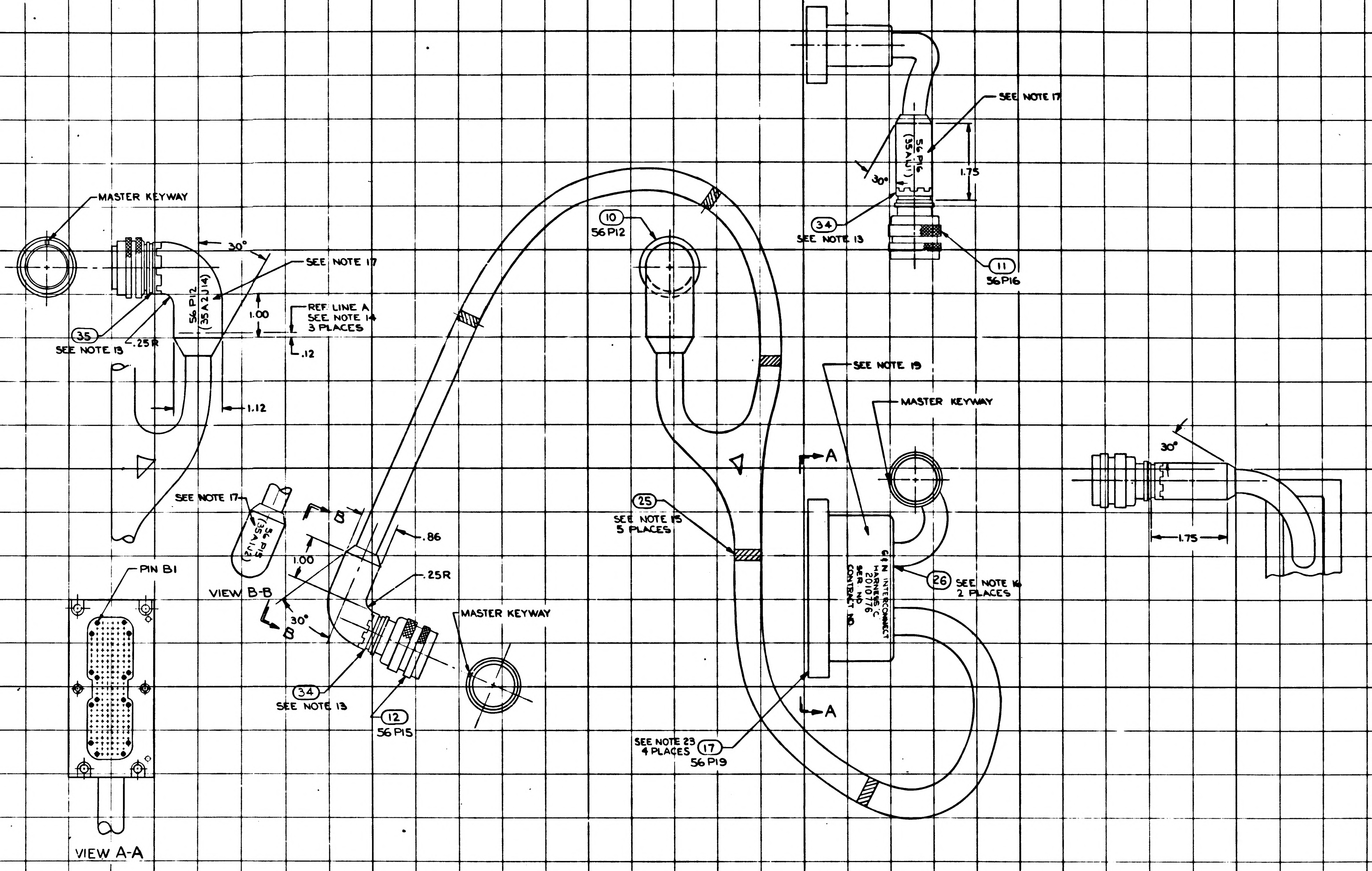
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 78B	9		P19-F7 SHLD C78					.18 .20	NO NO		15	
C 78L			NONE NONE				1.75 1.00		NO NO			
C 78R			P12-32 P19-F5					.13 .18	NO NO		13, 30 16	
C 78W			P12-55 P19-F6					.13 .18	NO NO		13, 30 16	
C 79	7				1.75 1.00	1.50 .75				68 68	36 36	
C 79A	9		SHLD C79 P12-62					.20 .13	NO NO		13	
C 79B	9		P19-G7 SHLD C79					.18 .20	NO NO		15	
C 79L			NONE NONE				1.75 1.00		NO NO			
C 79R			P12-36 P19-G5					.13 .18	NO NO		13, 30 16	
C 79W			P12-20 P19-G6					.13 .18	NO NO		13, 30 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 29 OF 30

MIL 2084 9-65

REVISIONS 31139				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		

SEE SHEET 1 FOR REVISION RECORD


MASTER KEYWAY
30°
SEE NOTE 17
56 P12 (35A2J14)
35
SEE NOTE 13
.25R
1.00
REF LINE A
SEE NOTE 14
3 PLACES
.12
1.12
SEE NOTE 17
56 P15 (35A2J15)
VIEW B-B
B
B
.86
1.00
.25R
30°
34
SEE NOTE 13
12
56P15
MASTER KEYWAY
PIN B1
VIEW A-A
10
56P12
25
SEE NOTE 15
5 PLACES
SEE NOTE 23
4 PLACES
17
56P19
SEE NOTE 19
MASTER KEYWAY
A
A
G&N INTERCONNECT HARNESS 'C' 2010776 SER NO CONTRACT NO
26
SEE NOTE 16
2 PLACES
SEE NOTE 17
56 P16 (35A1J1)
30°
1.75
34
SEE NOTE 13
11
56P16
30°
1.75

2010776

REV LTR A

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.03 ANGLES ±5°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
NAS9-497

DRAWN R.W. Turner 30 JUN 66
CHECKED W. Diehl 30 JUN 66
APPROVED 6-15-66
APPROVED 8/10/66
APPROVED 9/1/66 ECA
APPROVED R. Jacob 9/23/66 MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "C"
(C/M, BLOCK II)

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010776
SCALE 1:1
SHEET 30 OF 30

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W.T.
B	REVISED PER TDRR 31199	4 Oct. 66	S.S.

REV				A	A	B	B	B	B	B	A	A	A										
SHEET				21	22	23	24	25	26	27	28	29	30										
REV STATUS OF SHEETS	REV				B	A	B	A	A	B	B	B	B	A	B	B	B	B	A	A	B	B	B	A
	SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN R W Turner 29 JUN 66 (DAY MO YR)
CHECKER Diehl 29 JUN '66
ENGINEER D. Barta 5 JUL 66
APPROVAL AUG 15 66
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "C"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010776
SCALE NONE
SHEET 1 OF 30

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014673.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 2 OF 30

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A SEALING PLUG AS FOLLOWS
CONNECTOR 56P12 USE ITEM NUMBER 18.
CONNECTOR 56P15 AND P16 USE ITEM NUMBER 19.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 32.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 23 AND 24 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, ITEM 25, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM, EXCEPT FOR CONDUCTORS USING ITEM 7. THESE SHALL BE LESS THAN 2 OHMS. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 3 OF 30

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED. INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 22 AND 29.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 37 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P19. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 4 OF 30

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 5 OF 30

SEE NOTE LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010776-001	WIRE PER 1010789-006, 22AWG, YEL, 5 FT TOT LG
	2	1	2010776-002	WIRE PER 1010789-016, 26 AWG, YEL, 10 FT TOT LG
	3	1	2010776-003	WIRE PER 1010789-008, 22AWG, YEL, RED, 30 FT TOT LG
	4	1	2010776-004	WIRE PER 1010789-017, 26 AWG, YEL, RED, 25 FT TOT LG
	5	1	2010776-005	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN 5 FT TOT LG
	6	1	2010776-006	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	7	1	2010776-007	WIRE PER 1010707-1, RED JKT, 29 AWG, RED, WHT, BLUE, 26 FT TOT LG
	8	1	2010776-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 40 FT TOT LG
	9	1	2010776-009	WIRE PER 1010789-002, 24 AWG, BLK, 35 FT TOT LG
9	10	1	1010929-001	CONNECTOR, PLUG, ELECTRICAL (P12)
9	11	1	1010965- 1	CONNECTOR, PLUG, ELECTRICAL (P16)
9	12	1	1010965- 2	CONNECTOR, PLUG, ELECTRICAL (P15)
9	13	X	1010770- 2	CONTACT, SOCKET SUPPLIED WITH CONNECTOR 1010929
9	14	X	1010781- 1	CONTACT, SOCKET SUPPLIED WITH CONNECTOR 1010965
9	15	66	1010955- 1	CONTACT, MALE

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 6 OF 30

SEE NOTE LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	16	85	1010955- 2	CONTACT, MALE
	17	1	2014743-021	CONNECTOR, PLUG, ELECTRICAL (P19)
9	18	4	1010958- 1	PLUG, PROTECTIVE SEALING
9	19	31	1010984	PLUG, PROTECTIVE SEALING
9	20	33	1010402- 2	SLEEVE SOLDER
9	21	15	1012534- 36	INSULATION SLEEVE (HEAT SHRINKABLE)
9	22	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	23	AR	1010679	ADHESIVE ACTIVATOR
9	24	AR	1010661	EPOXY RESIN
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
9	29	AR	1012504	PRIMER, METAL PARTS
9	30	31	1010862	BUSHING, SLEEVE
9	32	AR	1012507- 4	TAPE, LACING
9	33	6	1012534- 37	SLEEVE, INSULATION (HEAT SHRINKABLE)
	34	2	2014670- 6	ADAPTER, CONNECTOR
	35	1	2014670- 4	ADAPTER, CONNECTOR
9	36	12	1010763- 2	SLEEVE, SOLDER

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 7 OF 30

SEE NOTE LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	37	151	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 8 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE; FIG	ACCESSORY ITEMS	REMARKS
C 1	7				1.75 1.75	1.50 1.50				6B 7	36 33	A
C 1A	9		SHLD C1 P12-38					.20 .13	NO NO		13	
C 1L			P12-63 P15-3					.13 .13	NO NO		13, 30 14, 30	
C 1R			P12-39 P15-1					.13 .13	NO NO		13, 30 14, 30	
C 1W			P12-64 P15-2					.13 .13	NO NO		13, 30 14, 30	
C 2	7				1.75 1.75	1.50 1.50				6B 7	36 33	
C 2A	9		SHLD C2 P12-59					.20 .13	NO NO		13	
C 2L			P12-84 P15-14					.13 .13	NO NO		13, 30 14, 30	
C 2R			P12-60 P15-12					.13 .13	NO NO		13, 30 14, 30	
C 2W			P12-85 P15-13					.13 .13	NO NO		13, 30 14, 30	
C 3	7				1.75 1.75	1.50 1.50				6B 7	36 33	
C 3A	9		SHLD C3 P12-80					.20 .13	NO NO		13	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 9 OF 30

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 3L			P12-81 P15-61					.13 .13	NO NO		13, 30 14, 30	
C 3R			P12-56 P15-59					.13 .13	NO NO		13, 30 14, 30	
C 3W			P12-57 P15-60					.13 .13	NO NO		13, 30 14, 30	
C 4	8				1.75 1.75	1.50 1.50				6B 7	20 21	
C 4A	9		SHLD C4 P12-33					.20 .13	NO NO		13	
C 4R			P12-16 P15-6					.13 .13	NO NO		13 14	
C 4Y			P12-17 P15-7					.13 .13	NO NO		13 14	
C 5	8				1.75 1.75	1.50 1.50				6B 7	20 21	
C 5A	9		SHLD C5 P12-27					.20 .13	NO NO		13	
C 5R			P12-26 P15-17					.13 .13	NO NO		13 14	
C 5Y			P12-12 P15-18					.13 .13	NO NO		13 14	
C 6	8				1.75 1.75	1.50 1.50				6B 7	20 21	

SIZE A	CODE IDENT NO. 80230	2010776	
SCALE-NONE	REV LTR A		SHEET 10 OF 30

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CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 6A	9		SHLD C6 P12-47					.20 .13	NO NO		13	
C 6R			P12-72 P15-35					.13 .13	NO NO		13 14	
C 6Y			P12-71 P15-36					.13 .13	NO NO		13 14	
C 7	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 7A	9		SHLD C7 P12-48					.20 .13	NO NO		13	
C 7B	9		P19-C5 SHLD C7					.18 .20	NO NO		15	
C 7R			P12-49 P19-B5					.13 .18	NO NO		13 16	
C 7Y			P12-28 P19-A5					.13 .18	NO NO		13 16	
C 8	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 8A	9		SHLD C8 P12-53					.20 .13	NO NO		13	
C 8B	9		P19-C4 SHLD C8					.18 .20	NO NO		15	
C 8R			P12-54 P19-A4					.13 .18	NO NO		13 16	

SIZE A	CODE IDENT NO. 80230	2010776	
SCALE-NONE	REV LTR B		SHEET 11 OF 30

FORM 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 8Y			P12-78 P19-B4					.13 .18	NO NO		13 16	
C 9	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 9A	9		SHLD C9 P12-29					.20 .13	NO NO		13	
C 9B	9		P19-C7 SHLD C9					.18 .20	NO NO		15	
C 9R			P12-13 P19-B7					.13 .18	NO NO		13 16	
C 9Y			P12-14 P19-A7					.13 .18	NO NO		13 16	
C 10	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 10A	9		SHLD C10 P12-50					.20 .13	NO NO		13	
C 10B	9		P19-C6 SHLD C10					.18 .20	NO NO		15	
C 10R			P12-75 P19-A6					.13 .18	NO NO		13 16	
C 10Y			P12-74 P19-B6					.13 .18	NO NO		13 16	
C 11	8				1.75 1.00	1.50 .75				6B 6B	20 20	

SIZE A	CODE IDENT NO. 80230	2010776	
SCALE-NONE	REV LTR B		SHEET 12 OF 30

FORM 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 11A	9		SHLD C11 P12-30					.20 .13	NO NO		13	
C 11B	9		P19-C3 SHLD C11					.18 .20	NO NO		15	
C 11R			P12-15 P19-B3					.13 .18	NO NO		13 16	
C 11Y			P12-31 P19-A3					.13 .18	NO NO		13 16	
C 12	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 12A	9		SHLD C12 P12-52					.20 .13	NO NO		13	
C 12B	9		P19-C2 SHLD C12					.18 .20	NO NO		15	
C 12R			P12-51 P19-B1					.13 .18	NO NO		13 16	
C 12Y			P12-76 P19-B2					.13 .18	NO NO		13 16	
C 13	8				1.75 1.00	1.50 .75				6B 6B	20 20	
C 13A	9		SHLD C13 P12-42					.20 .13	NO NO		13	
C 13B	9		P19-C8 SHLD C13					.18 .20	NO NO		15	

SIZE A	CODE IDENT NO. 80230	2010776	
SCALE-NONE	REV LTR B		SHEET 13 OF 30

FORM 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 13R			P12-67 P19-A8					.13 .18	NO NO		13 16	
C 13Y			P12-43 P19-B8					.13 .18	NO NO		13 16	
C 14	8				1.75 1.00	1.50 .75				68 68	20 20	
C 14A	9		SHLD C14 P12-45					.20 .13	NO NO		13	
C 14B	9		P19-C9 SHLD C14					.18 .20	NO NO		15	
C 14R			P12-70 P19-B9					.13 .18	NO NO		13 16	
C 14Y			P12-46 P19-A9					.13 .18	NO NO		13 16	
C 15	8				1.75 1.00	1.50 .75				68 68	20 20	
C 15A	9		SHLD C15 P12-44					.20 .13	NO NO		13	
C 15B	9		P19-C10 SHLD C15					.18 .20	NO NO		15	
C 15R			P12-69 P19-A10					.13 .18	NO NO		13 16	
C 15Y			P12-68 P19-B10					.13 .18	NO NO		13 16	

SIZE A | CODE IDENT NO. 80230 | 2010776
SCALE-NONE | REV LTR B | SHEET 14 OF 30

FORM 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 16	4											
C 16R			P12-9 P19-K4					.13 .18	NO NO		13 16	
C 16Y			P12-22 P19-H4					.13 .18	NO NO		13 16	
C 17	4											
C 17R			P12-24 P19-G3					.13 .18	NO NO		13 16	
C 17Y			P12-23 P19-G4					.13 .18	NO NO		13 16	
C 18	4											
C 18R			P12-11 P19-F3					.13 .18	NO NO		13 16	
C 18Y			P12-10 P19-F4					.13 .18	NO NO		13 16	
C 19	4											
C 19R			P12-66 P19-K3					.13 .18	NO NO		13 16	
C 19Y			P12-41 P19-H3					.13 .18	NO NO		13 16	

SIZE A | CODE IDENT NO. 80230 | 2010776
SCALE-NONE | REV LTR A | SHEET 15 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 20	5											
C 20G			P12-19 P19-F22					.13 .18	NO NO		13 15	
C 20R			P12-8 P19-H22					.13 .18	NO NO		13 15	
C 20Y			P12-7 P19-G22					.13 .18	NO NO		13 15	
C 21	3											
C 21R			P12-18 P19-G19					.13 .18	NO NO		13 15	
C 21Y			P12-6 P19-F19					.13 .18	NO NO		13 15	
C 22	3											
C 22R			P12-4 P19-G18					.13 .18	NO NO		13 15	
C 22Y			P12-5 P19-F18					.13 .18	NO NO		13 15	
C 23	3											
C 23R			P12-3 P19-G17					.13 .18	NO NO		13 15	

SIZE A | CODE IDENT NO. 80230 | 2010776
SCALE-NONE | REV LTR A | SHEET 16 OF 30

MIL 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 23Y			P12-2 P19-F17					.13 .18	NO NO		13 15	
C 24	4											
C 24R			P12-82 P19-G13					.13 .18	NO NO		13 16	
C 24Y			P12-58 P19-H13					.13 .18	NO NO		13 16	
C 25	4											
C 25R			P12-35 P19-H14					.13 .18	NO NO		13 16	
C 25Y			P12-34 P19-G14					.13 .18	NO NO		13 16	
C 26	4											
C 26R			P12-61 P19-G15					.13 .18	NO NO		13 16	
C 26Y			P12-37 P19-H15					.13 .18	NO NO		13 16	
C 27	1		P12-1 P19-D11					.13 .18	NO NO		13 15	
C 28	7				1.75 1.00	1.50 .75				7 68	33 36	

SIZE A | CODE IDENT NO. 80230 | 2010776
SCALE-NONE | REV LTR B | SHEET 17 OF 30

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 28B	9		P19-D25 SHLD C28					.18 .20	NO NO		15	
C 28L			NONE NONE				1.75 1.00		NO NO			
C 28R			P15-5 P19-D23					.13 .18	NO NO		14, 30 16	
C 28W			P15-4 P19-D24					.13 .18	NO NO		14, 30 16	
C 29	7				1.75 1.00	1.50 .75				7 68	33 36	
C 29B	9		P19-C23 SHLD C29					.18 .20	NO NO		15	
C 29L			NONE NONE				1.75 1.00		NO NO			
C 29R			P15-16 P19-B23					.13 .18	NO NO		14, 30 16	
C 29W			P15-15 P19-A23					.13 .18	NO NO		14, 30 16	
C 30	7				1.75 1.00	1.50 .75				7 68	33 36	
C 30B	9		P19-C24 SHLD C30					.18 .20	NO NO		15	
C 30L			P15-34 P19-B24					.13 .18	NO NO		14, 30 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 18 OF 30

2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 30R			P15-33 P19-C25					.13 .18	NO NO		14, 30 16	
C 30W			P15-32 P19-B25					.13 .18	NO NO		14, 30 16	
C 34	3											
C 34R			P15-40 P19-K20					.13 .18	NO NO		14 15	
C 34Y			P15-39 P19-H20					.13 .18	NO NO		14 15	
C 35	3											
C 35R			P15-42 P19-H21					.13 .18	NO NO		14 15	
C 35Y			P15-41 P19-K21					.13 .18	NO NO		14 15	
C 36	3											
C 36R			P15-52 P19-K22					.13 .18	NO NO		14 15	
C 36Y			P15-51 P19-K23					.13 .18	NO NO		14 15	
C 37	5											

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR B	SHEET 19 OF 30

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 37G			P16-24 P19-K16					.13 .18	NO NO		14 15	
C 37R			P16-25 P19-H17					.13 .18	NO NO		14 15	
C 37Y			P16-23 P19-H18					.13 .18	NO NO		14 15	
C 38	3											
C 38R			P16-21 P19-H16					.13 .18	NO NO		14 15	
C 38Y			P16-22 P19-H19					.13 .18	NO NO		14 15	
C 39	3											
C 39R			P15-8 P19-G10					.13 .18	NO NO		14 15	
C 39Y			P15-9 P19-G9					.13 .18	NO NO		14 15	
C 40	4											
C 40R			P15-10 P19-K9					.13 .18	NO NO		14 16	
C 40Y			P15-11 P19-H9					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 20 OF 30

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 41	3											
C 41R			P16-6 P19-H2					.13 .18	NO NO		14 15	
C 41Y			P16-8 P19-G2					.13 .18	NO NO		14 15	
C 42	3											
C 42R			P16-7 P19-H1					.13 .18	NO NO		14 15	
C 42Y			P16-9 P19-G1					.13 .18	NO NO		14 15	
C 43	4											
C 43R			P16-14 P19-H6					.13 .18	NO NO		14 16	
C 43Y			P16-15 P19-K6					.13 .18	NO NO		14 16	
C 44	2		P16-16 P19-K8					.13 .18	NO NO		14 16	
C 45	4											
C 45R			P16-17 P19-K7					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010776
SCALE-NONE	REV LTR A	SHEET 21 OF 30

MIL 2084 9-65

HARNESS C 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 45Y			P16-18 P19-H7					.13 .18	NO NO		14 16	
C 46	5											
C 46G			P16-12 P19-K17					.13 .18	NO NO		14 15	
C 46R			P16-10 P19-K19					.13 .18	NO NO		14 15	
C 46Y			P16-11 P19-K18					.13 .18	NO NO		14 15	
C 47	3											
C 47R			P16-2 P19-G11					.13 .18	NO NO		14 15	
C 47Y			P16-4 P19-G12					.13 .18	NO NO		14 15	
C 48	3											
C 48R			P16-3 P19-H11					.13 .18	NO NO		14 15	
C 48Y			P16-5 P19-H12					.13 .18	NO NO		14 15	
C 49	3											

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR A	SHEET 22 OF 30	

MIL 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 49R			P15-38 P19-F16					.13 .18	NO NO		14 15	
C 49Y			P15-37 P19-G16					.13 .18	NO NO		14 15	
C 50	2		P16-13 P19-D1					.13 .18	NO NO		14 16	
C 51	2		P15-25 P19-H5					.13 .18	NO NO		14 16	
C 52	2		P16-20 P19-K5					.13 .18	NO NO		14 16	
C 53	2		P16-19 P19-F1					.13 .18	NO NO		14 16	
C 54	3											
C 54R			P16-27 P19-H10					.13 .18	NO NO		14 15	
C 54Y			P16-28 P19-K10					.13 .18	NO NO		14 15	
C 55	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 55B	9		P19-C20 SHLD C55					.18 .20	NO NO		15	
C 55R			P16-33 P19-A20					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR B	SHEET 23 OF 30	

FORM 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 55Y			P16-34 P19-B20					.13 .18	NO NO		14 16	
C 56	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 56B	9		P19-C19 SHLD C56					.18 .20	NO NO		15	
C 56R			P16-35 P19-B19					.13 .18	NO NO		14 16	
C 56Y			P16-36 P19-A19					.13 .18	NO NO		14 16	
C 57	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 57B	9		P19-C22 SHLD C57					.18 .20	NO NO		15	
C 57R			P16-37 P19-A22					.13 .18	NO NO		14 16	
C 57Y			P16-38 P19-B22					.13 .18	NO NO		14 16	
C 58	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 58B	9		P19-C21 SHLD C58					.18 .20	NO NO		15	
C 58R			P16-39 P19-B21					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR B	SHEET 24 OF 30	

FORM 2084 9-65

CYZMOURE 101066 HARNESS C 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 58Y			P16-40 P19-A21					.13 .18	NO NO		14 16	
C 59	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 59B	9		P19-C18 SHLD C59					.18 .20	NO NO		15	
C 59R			P16-41 P19-A18					.13 .18	NO NO		14 16	
C 59Y			P16-42 P19-B18					.13 .18	NO NO		14 16	
C 60	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 60B	9		P19-C17 SHLD C60					.18 .20	NO NO		15	
C 60R			P16-43 P19-B17					.13 .18	NO NO		14 16	
C 60Y			P16-44 P19-A17					.13 .18	NO NO		14 16	
C 61	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 61B	9		P19-D22 SHLD C61					.18 .20	NO NO		15	
C 61R			P16-45 P19-D20					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010776	
SCALE-NONE	REV LTR B	SHEET 25 OF 30	

FORM 2084 9-65

CYZMOURE 101066 HARNESS C ▼ 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 61Y			P16-46 P19-D21					.13 .18	NO NO		14 16	
C 62	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 62B	9		P19-D16 SHLD C62					.18 .20	NO NO		15	
C 62R			P16-47 P19-D17					.13 .18	NO NO		14 16	
C 62Y			P16-48 P19-D18					.13 .18	NO NO		14 16	
C 63	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 63B	9		P19-C16 SHLD C63					.18 .20	NO NO		15	
C 63R			P16-51 P19-A16					.13 .18	NO NO		14 16	
C 63Y			P16-52 P19-B16					.13 .18	NO NO		14 16	
C 64	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 64B	9		P19-D15 SHLD C64					.18 .20	NO NO		15	
C 64R			P16-53 P19-C15					.13 .18	NO NO		14 16	

SIZE A CODE IDENT NO. 80230 2010776

SCALE-NONE REV LTR B SHEET 26 OF 30

FORM 2084 9-65

CYZMOURE 101066 HARNESS C ▼ 2010776 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 64Y			P16-54 P19-B15					.13 .18	NO NO		14 16	
C 65	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 65B	9		P19-014 SHLD C65					.18 .20	NO NO		15	
C 65R			P16-55 P19-B14					.13 .18	NO NO		14 16	
C 65Y			P16-56 P19-C14					.13 .18	NO NO		14 16	
C 66	8				1.75 1.00	1.50 .75				7 6B	21 20	
C 66B	9		P19-013 SHLD C66					.18 .20	NO NO		15	
C 66R			P16-57 P19-C13					.13 .18	NO NO		14 16	
C 66Y			P16-58 P19-B13					.13 .18	NO NO		14 16	
C 67	1		P16-1 P19-D12					.13 .18	NO NO		14 15	
C 74	6											
C 74G			P15-22 P19-G25					.13 .18	NO NO		14 16	

SIZE A CODE IDENT NO. 80230 2010776

SCALE-NONE REV LTR B SHEET 27 OF 30

FORM 2084 9-65

HARNESS C ▼ 2010776

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 74N			P15-21 P19-G24					.13 .18	NO NO		14 16	
C 74R			P15-19 P19-F25					.13 .18	NO NO		14 16	
C 74Y			P15-20 P19-F24					.13 .18	NO NO		14 16	
C 76	2		P16-59 P19-F15					.13 .18	NO NO		14 16	
C 77	7				1.75 1.00	1.50 .75				6B 6B	36 36	
C 77A	9		SHLD C77 P12-65					.20 .13	NO NO		13	
C 77B	9		P19-D7 SHLD C77					.18 .20	NO NO		15	
C 77L			NONE NONE				1.75 1.00		NO NO			
C 77R			P12-40 P19-D5					.13 .18	NO NO		13, 30 16	
C 77W			P12-21 P19-D6					.13 .18	NO NO		13, 30 16	
C 78	7				1.75 1.00	1.50 .75				6B 6B	36 36	
C 78A	9		SHLD C78 P12-79					.20 .13	NO NO		13	

SIZE A CODE IDENT NO. 80230 2010776

SCALE-NONE REV LTR A SHEET 28 OF 30

MIL 2084 9-65

HARNESS C ▼ 2010776

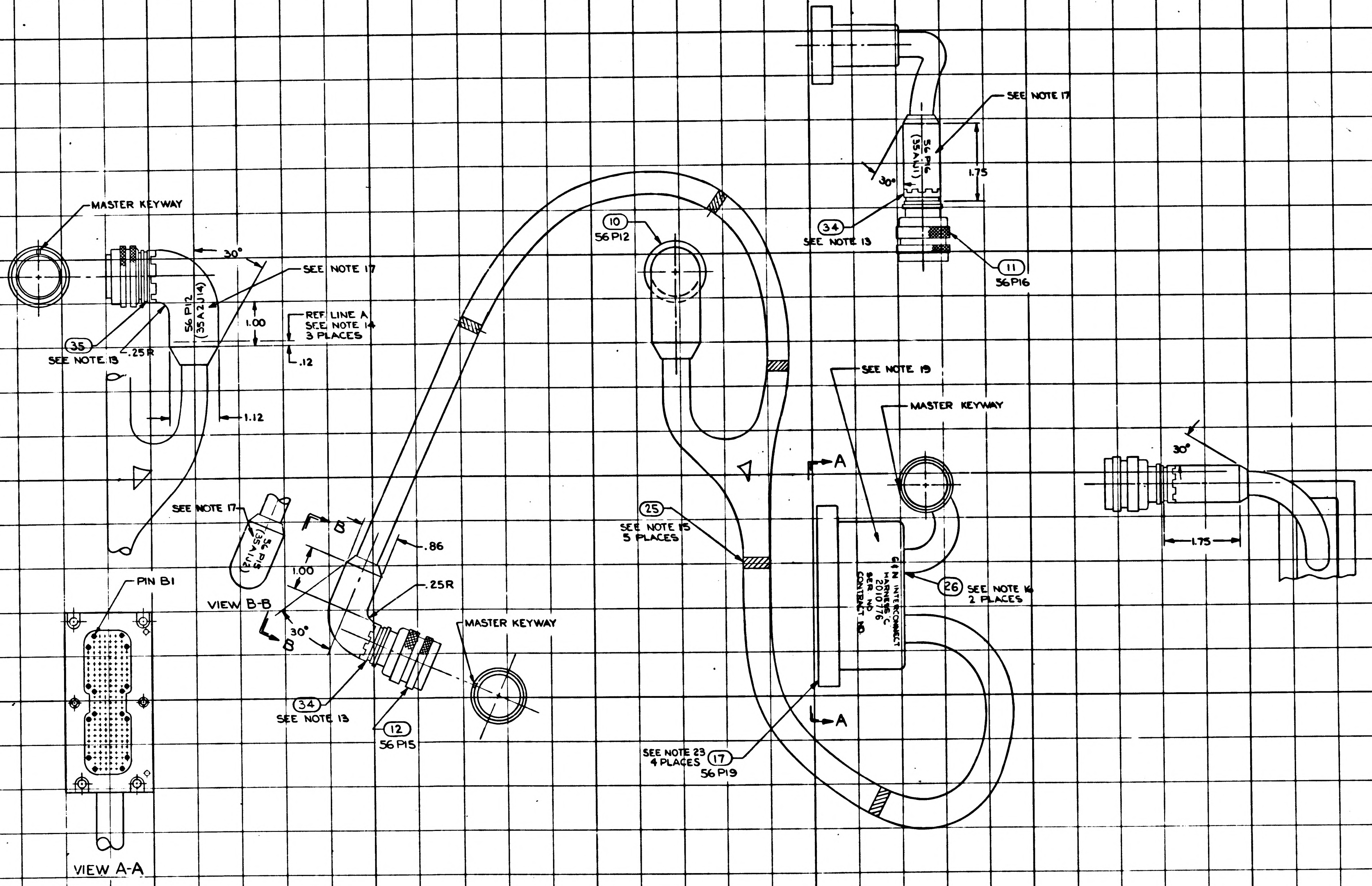
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 78B	9		P19-F7 SHLD C78					.18 .20	NO NO		15	
C 78L			NONE NONE				1.75 1.00		NO NO			
C 78R			P12-32 P19-F5					.13 .18	NO NO		13, 30 16	
C 78W			P12-55 P19-F6					.13 .18	NO NO		13, 30 16	
C 79	7				1.75 1.00	1.50 .75				6B 6B	36 36	
C 79A	9		SHLD C79 P12-62					.20 .13	NO NO		13	
C 79B	9		P19-G7 SHLD C79					.18 .20	NO NO		15	
C 79L			NONE NONE				1.75 1.00		NO NO			
C 79R			P12-36 P19-G5					.13 .18	NO NO		13, 30 16	
C 79W			P12-20 P19-G6					.13 .18	NO NO		13, 30 16	

SIZE A CODE IDENT NO. 80230 2010776

SCALE-NONE REV LTR A SHEET 29 OF 30

MIL 2084 9-65

SYM	ZONE	REVISIONS 3139 DESCRIPTION	CHG NO	DATE	APPD
SEE SHEET 1 FOR REVISION RECORD					



MASTER KEYWAY
30°
SEE NOTE 17
56 P12 (35A2J14)
35
SEE NOTE 13
.25R
1.00
REF LINE A
SEE NOTE 14
3 PLACES
.12
1.12
SEE NOTE 17
56 P15 (35A1J3)
B
.86
1.00
.25R
VIEW B-B
30°
B
34
SEE NOTE 13
12
56P15
MASTER KEYWAY
PIN B1
VIEW A-A
10
56 P12
25
SEE NOTE 15
5 PLACES
A
A
G&N INTERCONNECT HARNESS "C" 2010776
SER NO
CONTRACT NO
SEE NOTE 19
MASTER KEYWAY
26
SEE NOTE 16
2 PLACES
SEE NOTE 23
4 PLACES
17
56P19
SEE NOTE 17
56 P16 (35A1J1)
30°
1.75
34
SEE NOTE 13
11
56P16
30°
1.75

2010776

REV LTR A

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.03 ANGLES ±5°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
MAD-497

DRAWN R.W. Turner 30 JUN 66
CHECKED N. Diehl 30 JUN 66
APPROVED Watson
APPROVED 8/10/66
APPROVED CCB 9/10/66
APPROVED MSC R. Jacob 9/27/66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "C"
(C/M, BLOCK II)

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010776
SCALE 1:1
SHEET 30 OF 30

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	

REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A						
SHEET	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39						

REV STATUS OF SHEETS	REV				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

R.W. Turner 29 JUN 66
DRAFTSMAN DAY MO YR
CHECKER 1 JUL 66
ENGINEER Basta 6 Jul 66
APPROVAL Aug 15 66
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacob
CCA APPROVAL 9/22/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "D" (C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010777

SCALE NONE
SHEET 1 OF 39

MIL 1377A6 12-65

NOTE NUMBER — GENERAL NOTES DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014674.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A- FROM END OF SHIELD
B- TO END OF SHIELD
G- GREEN
K- BLACK
L- BLUE
N- BROWN
R- RED
W- WHITE
Y- YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER.

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.

8 UNLESS OTHERWISE SPECIFIED, FEATURE CENTER LINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

NOTE NUMBER — GENERAL NOTES DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS'
CONNECTOR 56J2 USE ITEM NUMBERS 15 AND 19.
CONNECTOR 56P17 USE ITEM NUMBER 17.
CONNECTORS 56J1, J3, AND J4 USE ITEM NUMBERS 16 AND 19.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 24.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 & 30 TO THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN, AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

NOTE NUMBER — GENERAL NOTES DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN'
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 28 AND 33.

24 CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE ASSEMBLED AS SHOWN ON THE CONFIGURATION DRAWING.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 36, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 34. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 25. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.

27 ASSEMBLE INSULATION TUBING, ITEM 35, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

28 CONDUCTORS SHALL ENTER CONNECTOR 56P17 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE TERM. AREA NO. COLUMN.

NOTE NUMBER — GENERAL NOTES DESCRIPTION

29 ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 42, OVER CONDUCTOR D130. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 25, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071 FIGURE 6B.

30 PERFORM WORKMANSHIP VIBRATION'
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

31 BOND NUT PLATE ASSEMBLIES TO CONNECTORS 56J1, J2, J3, AND J4 PER ND1002004, USING ITEMS 47 AND 48.

32 ASSEMBLE SHRINK SLEEVE, ITEM 49, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P17. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

33 SOLDER PER ND1002071 USING ITEM 50, OR ITEMS 51 AND 52.

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010777-001	WIRE PER 1010789-006, 22 AWG, YEL- 5 FT TOT LG
	2	1	2010777-002	WIRE PER 1010789-016, 26 AWG, YEL- 65 FT TOT LG
	3	1	2010777-003	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT- 5 FT TOT LG
	4	1	2010777-004	WIRE PER 1010789-008, 22 AWG, YEL, RED- 5 FT TOT LG
	5	1	2010777-005	WIRE PER 1010789-017, 26 AWG, YEL, RED- 50 FT TOT LG
	6	1	2010777-006	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT- 60 FT TOT LG
	7	1	2010777-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN- 5 FT TOT LG
	8	1	2010777-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT- 5 FT TOT LG
	9	1	2010777-009	WIRE PER 1010789-002, 24 AWG, BLK- 78 FT TOT LG
	10	1	2010777-010	WIRE PER 1010789-024, 26 AWG, BLK- 50 FT TOT LG
9	11	1	1010930-009	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J1)
9	12	1	1010930-105	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J2)
9	13	1	1010930-002	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J3)

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 6 OF 39	

LIST OF MATERIALS

SFE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	14	1	1010930-001	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J4)
9	15	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010930
9	16	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010930.
9	17	172	1010955-001	CONTACT, MALE
9	18	132	1010955-002	CONTACT, MALE
9	19	52	1010958-001	PLUG, PROTECTIVE, DUST AND MOISTURE SEAL
9	20	78	1010402- 2	SLEEVE, SOLDER, HIGH TEMPERATURE
	21	1	2014670-004	ADAPTER, CONNECTOR
	22	1	2014670-012	ADAPTER, CONNECTOR
	23	1	2014670-007	ADAPTER, CONNECTOR
9	24	AR	1012507-004	TAPE, LACING AND TYING
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	28	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
9	33	AR	1012504	PRIMER, METAL PARTS
9	34	AR	1010989	TAPE, SHEILDING, EMI/RFI- 16 FT TOT LG

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 7 OF 39	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	35	AR	1006776- 19	INSULATION SLEEVING ELECTRICAL-
	36	1	2010777-011	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED, SILVER PLATED, 22AWG- 30 FT TOT LG
	37	1	2014744-021	CONNECTOR, PLUG, ELECTRICAL- (56P17)
	39	2	2021203	TERMINAL LUG, SOLDER
	40	2	MS35333-69	WASHER, LOCK
9	41	2	1006783- 93	SCREW, BUTTON HEAD, HEX SOCKET
	42	1	2010777-012	WIRE BRAID, QQ-B-575, 1/8 DIA., 36 AWG- 2 FT TOT LG
	43	1	2014670-011	ADAPTER, CONNECTOR
	44	2	2010725-011	NUT PLATE ASSEMBLY
	45	1	2010725-021	NUT PLATE ASSEMBLY
	46	1	2010725-031	NUT PLATE ASSEMBLY
9	47	AR	1010682	EPOXY, RESIN
9	48	AR	1010683	CURING AGENT, AMINE
9	49	199	1010490-114	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINK
	50	AR	SN60WRAP	SOLDER, QQ-S-571
	51	AR	SN60WS	SOLDER, QQ-S-571
	52	AR	MIL-F-14256 TYPE A OR W	FLUX

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 8 OF 39	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	53	4	1010402- 1	SLEEVE, SOLDER HI TEMPERATURE

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 9 OF 39	

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	1	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	1A	9		SHLD D1					.20	NO			
				J4-30					.13	NO		16	
D	1B	9		P17-G31	2				.18	NO		17	
				SHLD D1					.20	NO			
D	1R			J4-52					.13	NO		16	
				P17-H31	2				.18	NO		18	
D	1Y			J4-51					.13	NO		16	
				P17-K31	2				.18	NO		18	
D	2	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	2A	9		SHLD D2					.20	NO			
				J4-31					.13	NO		16	
D	2B	9		P17-G32	2				.18	NO		17	
				SHLD D2					.20	NO			
D	2R			J4-54					.13	NO		16	
				P17-K32	2				.18	NO		18	
D	2Y			J4-53					.13	NO		16	
				P17-H32	2				.18	NO		18	
D	3	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	3A	9		SHLD D3					.20	NO			
				J4-29					.13	NO		16	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	3B	10		P17-G33	2				.22	NO			
				SHLD D3					.20	NO			
D	3R			J4-13					.13	NO		16	
				P17-H33	2				.22	NO			
D	3Y			J4-14					.13	NO		16	
				P17-K33	2				.22	NO			
D	4	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	4A	9		SHLD D4					.20	NO			
				J4-32					.13	NO		16	
D	4B	10		P17-G34	2				.22	NO			
				SHLD D4					.20	NO			
D	4R			J4-16					.13	NO		16	
				P17-K34	2				.22	NO			
D	4Y			J4-15					.13	NO		16	
				P17-H34	2				.22	NO			
D	5	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	5A	9		SHLD D5					.20	NO			
				J4-36					.13	NO		16	
D	5B	9		P17-G29	2				.18	NO		17	
				SHLD D5					.20	NO			
D	5R			J4-59					.13	NO		16	
				P17-H29	2				.18	NO		18	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
SHEET 11 OF 39

MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	5Y			J4-60					.13	NO		16	
				P17-K29	2				.18	NO		18	
D	6	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	6A	9		SHLD D6					.20	NO			
				J4-37					.13	NO		16	
D	6B	9		P17-G30	2				.18	NO		17	
				SHLD D6					.20	NO			
D	6R			J4-61					.13	NO		16	
				P17-K30	2				.18	NO		18	
D	6Y			J4-38					.13	NO		16	
				P17-H30	2				.18	NO		18	
D	7	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	7A	9		SHLD D7					.20	NO			
				J4-33					.13	NO		16	
D	7B	10		P17-F27	2				.22	NO			
				SHLD D7					.20	NO			
D	7R			J4-56					.13	NO		16	
				P17-F28	2				.22	NO			
D	7Y			J4-55					.13	NO		16	
				P17-F29	2				.22	NO			
D	8	6				1.50	1.25				68	20	
						1.00	.75				68	20	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
SHEET 12 OF 39

MIL 2084 9-65

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	8A	9		SHLD D8					.20	NO			
				J4-34					.13	NO		16	
D	8B	10		P17-F33	2				.22	NO			
				SHLD D8					.20	NO			
D	8R			J4-57					.13	NO		16	
				P17-F31	2				.22	NO			
D	8Y			J4-58					.13	NO		16	
				P17-F32	2				.22	NO			
D	9	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	9A	9		SHLD D9					.20	NO			
				J4-27					.13	NO		16	
D	9B	9		P17-G27	2				.18	NO		17	
				SHLD D9					.20	NO			
D	9R			J4-48					.13	NO		16	
				P17-H27	2				.18	NO		18	
D	9Y			J4-47					.13	NO		16	
				P17-K27	2				.18	NO		18	
D	10	6				1.50	1.25				68	20	
						1.00	.75				68	20	
D	10A	9		SHLD D10					.20	NO			
				J4-28					.13	NO		16	
D	10B	9		P17-G28	2				.18	NO		17	
				SHLD D10					.20	NO			

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
SHEET 13 OF 39

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 10R			J4-49					.13	NO		16	
			P17-K28	2				.18	NO		18	
D 10Y			J4-50					.13	NO		16	
			P17-H28	2				.18	NO		18	
D 11	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 11A	9		SHLD D11					.20	NO			
			J4-35					.13	NO		16	
D 11B	10		P17-G25	1				.22	NO			
			SHLD D11					.20	NO			
D 11R			J4-17					.13	NO		16	
			P17-H25	1				.22	NO			
D 11Y			J4-18					.13	NO		16	
			P17-K25	1				.22	NO			
D 12	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 12A	9		SHLD D12					.20	NO			
			J4-20					.13	NO		16	
D 12B	10		P17-G26	1				.22	NO			
			SHLD D12					.20	NO			
D 12R			J4-19					.13	NO		16	
			P17-K26	1				.22	NO			
D 12Y			J4-8					.13	NO		16	
			P17-H26	1				.22	NO			

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 14 OF 39	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 13	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 13A	9		SHLD D13					.20	NO			
			J4-22					.13	NO		16	
D 13B	9		P17-C25	1				.18	NO		17	
			SHLD D13					.20	NO			
D 13R			J4-41					.13	NO		16	
			P17-A25	1				.18	NO		18	
D 13Y			J4-42					.13	NO		16	
			P17-B25	1				.18	NO		18	
D 14	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 14A	9		SHLD D14					.20	NO			
			J4-24					.13	NO		16	
D 14B	9		P17-C39	2				.18	NO		17	
			SHLD D14					.20	NO			
D 14R			J4-43					.13	NO		16	
			P17-B39	2				.18	NO		18	
D 14Y			J4-44					.13	NO		16	
			P17-A39	2				.18	NO		18	
D 15	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 15A	9		SHLD D15					.20	NO			
			J4-25					.13	NO		16	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 15 OF 39	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 15B	9		P17-D40	2				.18	NO		17	
			SHLD D15					.20	NO			
D 15R			J4-45					.13	NO		16	
			P17-D41	2				.18	NO		18	
D 15Y			J4-46					.13	NO		16	
			P17-C41	2				.18	NO		18	
D 16	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 16A	9		SHLD D16					.20	NO			
			J4-21					.13	NO		16	
D 16B	9		P17-C24	1				.18	NO		17	
			SHLD D16					.20	NO			
D 16R			J4-39					.13	NO		16	
			P17-B24	1				.18	NO		18	
D 16Y			J4-40					.13	NO		16	
			P17-D24	1				.18	NO		18	
D 17	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 17A	9		SHLD D17					.20	NO			
			J4-10					.13	NO		16	
D 17B	9		P17-C38	2				.18	NO		17	
			SHLD D17					.20	NO			
D 17R			J4-9					.13	NO		16	
			P17-A38	2				.18	NO		18	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 16 OF 39	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 17Y			J4-23					.13	NO		16	
			P17-B38	2				.18	NO		18	
D 18	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 18A	9		SHLD D18					.20	NO			
			J4-11					.13	NO		16	
D 18B	9		P17-C40	2				.18	NO		17	
			SHLD D18					.20	NO			
D 18R			J4-26					.13	NO		16	
			P17-B41	2				.18	NO		18	
D 18Y			J4-12					.13	NO		16	
			P17-B40	2				.18	NO		18	
D 19	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 19A	9		SHLD D19					.20	NO			
			J4-1					.13	NO		16	
D 19B	9		P17-C26	1				.18	NO		17	
			SHLD D19					.20	NO			
D 19R			J4-6					.13	NO		16	
			P17-B26	1				.18	NO		18	
D 19Y			J4-7					.13	NO		16	
			P17-A26	1				.18	NO		18	
D 20	1		J4-5					.13	NO		16	
			P17-D25	1				.18	NO		17	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A	SHEET 17 OF 39	

WIRING HARNESS D 2010777

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 21	1		J4-4					.13	NO		16	
			P17-F25	1				.18	NO		17	
D 22	6				1.50	1.25				6B	20	
					1.00	.75				6B	20	
D 22A	9		SHLD D22					.20	NO			
			J1-17					.13	NO		16	
D 22B	9		P17-F3	1				.18	NO		17	
			SHLD D22					.20	NO			
D 22R			J1-34					.13	NO		16	
			P17-F1	1				.18	NO		18	
D 22Y			J1-33					.13	NO		16	
			P17-F2	1				.18	NO		18	
D 23	6				1.50	1.25				6B	20	
					1.00	.75				6B	20	
D 23A	9		SHLD D23					.20	NO			
			J1-18					.13	NO		16	
D 23B	9		P17-K3	1				.18	NO		17	
			SHLD D23					.20	NO			
D 23R			J1-35					.13	NO		16	
			P17-H4	1				.18	NO		18	
D 23Y			J1-36					.13	NO		16	
			P17-K4	1				.18	NO		18	
D 24	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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WIRING HARNESS D 2C10777

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 24A	9		SHLD D24					.20	NO			
			J1-14					.13	NO		16	
D 24B	9		P17-G3	1				.18	NO		17	
			SHLD D24					.20	NO			
D 24R			J1-30					.13	NO		16	
			P17-G2	1				.18	NO		18	
D 24Y			J1-29					.13	NO		16	
			P17-G1	1				.18	NO		18	
D 25	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 25A	9		SHLD D25					.20	NO			
			J1-15					.13	NO		16	
D 25B	9		P17-H3	1				.18	NO		17	
			SHLD D25					.20	NO			
D 25R			J1-31					.13	NO		16	
			P17-H1	1				.18	NO		18	
D 25Y			J1-32					.13	NO		16	
			P17-H2	1				.18	NO		18	
D 26	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 26A	9		SHLD D26					.20	NO			
			J1-20					.13	NO		16	
D 26B	9		P17-G6	1				.18	NO		17	
			SHLD D26					.20	NO			

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
SHEET 19 OF 39

MIL 2084 9-65

WIRING HARNESS D 2010777

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 26R			J1-19					.13	NO		16	
			P17-H6	1				.18	NO		18	
D 26Y			J1-37					.13	NO		16	
			P17-K6	1				.18	NO		18	
D 27	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 27A	9		SHLD D27					.20	NO			
			J1-21					.13	NO		16	
D 27B	9		P17-G5	1				.18	NO		17	
			SHLD D27					.20	NO			
D 27R			J1-38					.13	NO		16	
			P17-K5	1				.18	NO		18	
D 27Y			J1-39					.13	NO		16	
			P17-H5	1				.18	NO		18	
D 28	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 28A	9		SHLD D28					.20	NO			
			J1-13					.13	NO		16	
D 28B	10		P17-C4	1				.22	NO			
			SHLD D28					.20	NO			
D 28R			J1-28					.13	NO		16	
			P17-A4	1				.22	NO			
D 28Y			J1-27					.13	NO		16	
			P17-B4	1				.22	NO			

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
SHEET 20 OF 39

MIL 2084 9-65

WIRING HARNESS D 2010777

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 29	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 29A	9		SHLD D29					.20	NO			
			J1-16					.13	NO		16	
D 29B	10		P17-C5	1				.22	NO			
			SHLD D29					.20	NO			
D 29R			J1-6					.13	NO		16	
			P17-B5	1				.22	NO			
D 29Y			J1-5					.13	NO		16	
			P17-A5	1				.22	NO			
D 30	6				1.75	1.50				6B	20	
					1.00	.75				6B	20	
D 30A	9		SHLD D30					.20	NO			
			J1-1					.13	NO		16	
D 30B	10		P17-C6	1				.22	NO			
			SHLD D30					.20	NO			
D 30R			J1-4					.13	NO		16	
			P17-A6	1				.22	NO			
D 30Y			J1-3					.13	NO		16	
			P17-B6	1				.22	NO			
D 31	7											
D 31G			J1-26					.13	NO		16	
			P17-D4	1				.18	NO		18	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 31R			J1-43					.13	NO		16	
			P17-D6	1				.18	NO		18	
D 31Y			J1-44					.13	NO		16	
			P17-D5	1				.18	NO		18	
D 32	7											
D 32G			J1-8					.13	NO		16	
			P17-F4	1				.18	NO		18	
D 32R			J1-7					.13	NO		16	
			P17-F5	1				.18	NO		18	
D 32Y			J1-2					.13	NO		16	
			P17-F6	1				.18	NO		18	
D 35	2		J1-25					.13	NO		16	
			P17-A3	1				.18	NO		18	
D 36	4											
D 36R			J1-40					.13	NO		16	
			P17-K8	1				.18	NO		17	
D 36Y			J1-23					.13	NO		16	
			P17-H8	1				.18	NO		17	
D 37	4											
D 37R			J1-41					.13	NO		16	
			P17-K9	1				.18	NO		17	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 37Y			J1-42					.13	NO		16	
			P17-K10	1				.18	NO		17	
D 40	2		J3-8					.13	NO		16	8
			P17-C16	1				.18	NO		18	8
D 42	2		J3-7					.13	NO		16	8
			P17-B16	1				.18	NO		18	8
D 50	2		J3-2					.13	NO		16	8
			P17-C18	1				.18	NO		18	8
D 55	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 55A	9		SHLD D55					.20	NO			
			J3-30					.13	NO		16	
D 55B	10		P17-C4	1				.22	NO		17	
			SHLD D55					.20	NO			
D 55R			J3-31					.13	NO		16	
			P17-A4	1				.22	NO		17	
D 55Y			J3-15					.13	NO		16	
			P17-B4	1				.22	NO		17	
D 56	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 56A	9		SHLD D56					.20	NO			
			J3-52					.13	NO		16	
D 56B	10		P17-C5	1				.22	NO		17	
			SHLD D56					.20	NO			

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 56R			J3-77					.13	NO		16	
			P17-B5	1				.22	NO		17	
D 56Y			J3-53					.13	NO		16	
			P17-A5	1				.22	NO		17	
D 57	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 57A	9		SHLD D57					.20	NO			
			J3-51					.13	NO		16	
D 57B	10		P17-C6	1				.22	NO		17	
			SHLD D57					.20	NO			
D 57R			J3-75					.13	NO		16	
			P17-A6	1				.22	NO		17	
D 57Y			J3-76					.13	NO		16	
			P17-B6	1				.22	NO		17	
D 58	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 58A	9		SHLD D58					.20	NO			
			J3-46					.13	NO		16	
D 58B	10		P17-G33	2				.22	NO		17	
			SHLD D58					.20	NO			
D 58R			J3-71					.13	NO		16	
			P17-H33	2				.22	NO		17	
D 58Y			J3-70					.13	NO		16	
			P17-K33	2				.22	NO		17	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 59	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 59A	9		SHLD D59					.20	NO			
			J3-69					.13	NO		16	
D 59B	10		P17-G34	2				.22	NO		17	
			SHLD D59					.20	NO			
D 59R			J3-45					.13	NO		16	
			P17-K34	2				.22	NO		17	
D 59Y			J3-44					.13	NO		16	
			P17-H34	2				.22	NO		17	
D 60	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 60A	9		SHLD D60					.20	NO			
			J3-28					.13	NO		16	
D 60B	10		P17-F27	2				.22	NO		17	
			SHLD D60					.20	NO			
D 60R			J3-13					.13	NO		16	
			P17-F28	2				.22	NO		17	
D 60Y			J3-29					.13	NO		16	
			P17-F29	2				.22	NO		17	
D 61	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 61A	9		SHLD D61					.20	NO			
			J3-74					.13	NO		16	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 61B	10		P17-F33 SHLD D61	2				.22 .20	NO NO		17	
D 61R			J3-49 P17-F31	2				.13 .22	NO NO		16 17	
D 61Y			J3-50 P17-F32	2				.13 .22	NO NO		16 17	
D 62	6				1.50 1.00	1.25 .75				68 68	20 20	
D 62A	9		SHLD D62 J3-27					.20 .13	NO NO		16	
D 62B	10		P17-G25 SHLD D62	1				.22 .20	NO NO		17	
D 62R			J3-26 P17-H25	1				.13 .22	NO NO		16 17	
D 62Y			J3-47 P17-K25	1				.13 .22	NO NO		16 17	
D 63	6				1.50 1.00	1.25 .75				68 68	20 20	
D 63A	9		SHLD D63 J3-48					.20 .13	NO NO		16	
D 63B	10		P17-G26 SHLD D63	1				.22 .20	NO NO		17	
D 63R			J3-72 P17-K26	1				.13 .22	NO NO		16 17	

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 63Y			J3-73 P17-H26	1				.13 .22	NO NO		16 17	
D 64	4											
D 64R			J3-67 P17-H9	1				.13 .18	NO NO		16 17	
D 64Y			J3-68 P17-H10	1				.13 .18	NO NO		16 17	
D 65	8				1.75 1.00	1.50 .75				68 68	20 20	
D 65A	9		SHLD D65 J2-44					.20 .13	NO NO		15	
D 65B	9		P17-C21 SHLD D65	1				.18 .20	NO NO		17	
D 65G			J2-25 P17-B21	1				.13 .18	NO NO		15 17	
D 65R			J2-46 P17-C20	1				.13 .18	NO NO		15 17	
D 65Y			J2-45 P17-B20	1				.13 .18	NO NO		15 17	
D 66	3				1.75 1.00	1.50 .75				68 68	53 53	
D 66A	9		SHLD D66 J2-26					.20 .13	NO NO		15	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR A | SHEET 27 OF 39

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 66B	9		P17-B19 SHLD D66	1				.18 .20	NO NO		17	
D 66Y			J2-47 P17-C19	1				.13 .18	NO NO		15 17	
D 67	5											A A
D 67R			J2-55 P17-A31	2				.13 .18	NO NO		15 18	A A
D 67Y			J2-56 P17-B31	2				.13 .18	NO NO		15 18	A A
D 68	5											A A
D 68R			J2-54 P17-A32	2				.13 .18	NO NO		15 18	A A
D 68Y			J2-32 P17-B32	2				.13 .18	NO NO		15 18	A A
D 69	5											A A
D 69R			J2-17 P17-A33	2				.13 .18	NO NO		15 18	A A
D 69Y			J2-33 P17-B33	2				.13 .18	NO NO		15 18	A A
D 70	5											A A

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SCALE-NONE | REV LTR A | SHEET 28 OF 39

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 70R			J2-16 P17-A34	2				.13 .18	NO NO		15 18	A A
D 70Y			J2-5 P17-B34	2				.13 .18	NO NO		15 18	A A
D 71	5											A A
D 71R			J2-57 P17-A35	2				.13 .18	NO NO		15 18	A A
D 71Y			J2-34 P17-B35	2				.13 .18	NO NO		15 18	A A
D 72	5											A A
D 72R			J2-18 P17-A36	2				.13 .18	NO NO		15 18	A A
D 72Y			J2-35 P17-B36	2				.13 .18	NO NO		15 18	A A
D 73	5											A A
D 73R			J2-15 P17-A28	2				.13 .18	NO NO		15 18	A A
D 73Y			J2-30 P17-B28	2				.13 .18	NO NO		15 18	A A
D 74	5											A A

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR A | SHEET 29 OF 39

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 74R			J2-52					.13	NO		15	A
			P17-A29	2				.18	NO		18	A
D 74Y			J2-53					.13	NO		15	A
			P17-B29	2				.18	NO		18	A
D 75	5											A
												A
D 75R			J2-50					.13	NO		15	A
			P17-F37	2				.18	NO		18	A
D 75Y			J2-51					.13	NO		15	A
			P17-F36	2				.18	NO		18	A
D 76	5											A
												A
D 76R			J2-13					.13	NO		15	A
			P17-K37	2				.18	NO		18	A
D 76Y			J2-29					.13	NO		15	A
			P17-H37	2				.18	NO		18	A
D 77	5											A
												A
D 77R			J2-12					.13	NO		15	A
			P17-H36	2				.18	NO		18	A
D 77Y			J2-27					.13	NO		15	A
			P17-K36	2				.18	NO		18	A
D 78	5											A
												A

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SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 78R			J2-48					.13	NO		15	A
			P17-G41	2				.18	NO		18	A
D 78Y			J2-49					.13	NO		15	A
			P17-H41	2				.18	NO		18	A
D 79	5											A
												A
D 79R			J2-1					.13	NO		15	A
			P17-F40	2				.18	NO		18	A
D 79Y			J2-4					.13	NO		15	A
			P17-F39	2				.18	NO		18	A
D 80	5											A
												A
D 80R			J2-11					.13	NO		15	A
			P17-H38	2				.18	NO		18	A
D 80Y			J2-24					.13	NO		15	A
			P17-K38	2				.18	NO		18	A
D 81	5											A
												A
D 81R			J2-10					.13	NO		15	A
			P17-K39	2				.18	NO		18	A
D 81Y			J2-2					.13	NO		15	A
			P17-H39	2				.18	NO		18	A
D 82	5											A
												A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 82R			J2-59					.13	NO		15	A
			P17-H15	2				.18	NO		18	A
D 82Y			J2-58					.13	NO		15	A
			P17-K15	2				.18	NO		18	A
D 83	5											A
												A
D 83R			J2-7					.13	NO		15	A
			P17-K14	2				.18	NO		18	A
D 83Y			J2-6					.13	NO		15	A
			P17-H14	2				.18	NO		18	A
D 84	5											A
												A
D 84R			J2-36					.13	NO		15	A
			P17-H17	2				.18	NO		18	A
D 84Y			J2-60					.13	NO		15	A
			P17-K17	2				.18	NO		18	A
D 85	5											A
												A
D 85R			J2-8					.13	NO		15	A
			P17-K16	2				.18	NO		18	A
D 85Y			J2-19					.13	NO		15	A
			P17-H16	2				.18	NO		18	A
D 86	5											A
												A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 86R			J2-61					.13	NO		15	A
			P17-H13	2				.18	NO		18	A
D 86Y			J2-38					.13	NO		15	A
			P17-K13	2				.18	NO		18	A
D 87	5											A
												A
D 87R			J2-39					.13	NO		15	A
			P17-K12	2				.18	NO		18	A
D 87Y			J2-20					.13	NO		15	A
			P17-H12	2				.18	NO		18	A
D 88	5											A
												A
D 88R			J2-43					.13	NO		15	A
			P17-H21	2				.18	NO		18	A
D 88Y			J2-42					.13	NO		15	A
			P17-G21	2				.18	NO		18	A
D 89	5											A
												A
D 89R			J2-22					.13	NO		15	A
			P17-G20	2				.18	NO		18	A
D 89Y			J2-9					.13	NO		15	A
			P17-H20	2				.18	NO		18	A
D 90	5											A
												A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR A
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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 90R			J2-41					.13	NO		15	A
			P17-H19	2				.18	NO		18	A
D 90Y			J2-40					.13	NO		15	A
			P17-G19	2				.18	NO		18	A
D 91	3				1.50	1.25				6B	53	
					1.00	.75				6B	53	
D 91A	9		SHLD D91					.20	NO			
			J4-2					.13	NO		16	
D 91B	9		P17-D27	1				.18	NO		17	
			SHLD D91					.20	NO			
D 91Y			J4-3					.13	NO		16	
			P17-D26	1				.18	NO		17	
D 96	7											
D 96G			J1-11					.13	NO		16	
			P17-F8	1				.18	NO		18	
D 96R			J1-10					.13	NO		16	
			P17-G7	1				.18	NO		18	
D 96Y			J1-9					.13	NO		16	
			P17-F7	1				.18	NO		18	
D 97	2		J3-18					.13	NO		16	B
			P17-A15	1				.18	NO		18	B
D 98	2		J3-36					.13	NO		16	B
			P17-B15	1				.18	NO		18	B

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A		SHEET 34 OF 39

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 99	2		J3-19					.13	NO		16	B
			P17-C15	1				.18	NO		18	B
D 100	2		J3-62					.13	NO		16	B
			P17-E17	1				.18	NO		18	B
D 101	2		J3-63					.13	NO		16	B
			P17-C17	1				.18	NO		18	B
D 102	2		J3-38					.13	NO		16	B
			P17-B18	1				.18	NO		18	B
D 103	2		J3-84					.13	NO		16	B
			P17-D13	1				.18	NO		18	B
D 104	2		J3-60					.13	NO		16	B
			P17-D12	1				.18	NO		18	B
D 105	2		J3-59					.13	NO		16	B
			P17-D11	1				.18	NO		18	B
D 106	2		J3-41					.13	NO		16	B
			P17-B2	1				.18	NO		18	B
D 107	2		J3-65					.13	NO		16	B
			P17-B1	1				.18	NO		18	B
D 108	2		J3-40					.13	NO		16	B
			P17-B3	1				.18	NO		18	B
D 109	2		J3-42					.13	NO		16	B
			P17-C1	1				.18	NO		18	B
D 110	2		J3-66					.13	NO		16	B
			P17-D1	1				.18	NO		18	B

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A		SHEET 35 OF 39

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 111	2		J3-21					.13	NO		16	B
			P17-D2	1				.18	NO		18	B
D 112	2		J3-22					.13	NO		16	B
			P17-C2	1				.18	NO		18	B
D 113	2		J3-39					.13	NO		16	B
			P17-D3	1				.18	NO		18	B
D 114	2		J3-64					.13	NO		16	B
			P17-C3	1				.18	NO		18	B
D 115	2		J3-33					.13	NO		16	B
			P17-A12	1				.18	NO		18	B
D 116	2		J3-17					.13	NO		16	B
			P17-B12	1				.18	NO		18	B
D 117	2		J3-57					.13	NO		16	B
			P17-A11	1				.18	NO		18	B
D 118	2		J3-82					.13	NO		16	B
			P17-B11	1				.18	NO		18	B
D 119	2		J3-81					.13	NO		16	B
			P17-A14	1				.18	NO		18	B
D 120	2		J3-80					.13	NO		16	B
			P17-B13	1				.18	NO		18	B
D 121	2		J3-56					.13	NO		16	B
			P17-A13	1				.18	NO		18	B
D 122	2		J3-24					.13	NO		16	B
			P17-A9	1				.18	NO		18	B

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A		SHEET 36 OF 39

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LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 123	2		J3-43					.13	NO		16	B
			P17-C10	1				.18	NO		18	B
D 124	2		J3-25					.13	NO		16	B
			P17-C9	1				.18	NO		18	B
D 125	2		J3-23					.13	NO		16	B
			P17-B9	1				.18	NO		18	B
D 126	2		J3-5					.13	NO		16	B
			P17-D8	1				.18	NO		18	B
D 127	2		J3-14					.13	NO		16	B
			P17-C8	1				.18	NO		18	B
D 128	2		J3-4					.13	NO		16	B
			P17-B10	1				.18	NO		18	B
D 129	2		J3-1					.13	NO		16	B
			P17-A10	1				.18	NO		18	B
D 130	4				1.50	1.25				6B	20	SEE NOTE 29
					1.00	.75				6B	20	
D 130A	9		SHLD D130					.20	NO			
			E2					.19	NO			
D 130B	9		P17-C11	1				.18	NO		17	
			SHLD D130					.20	NO			
D 130R			J3-3					.13	NO		16	
			P17-D10	1				.18	NO		17	
D 130Y			J3-11					.13	NO		16	
			P17-D9	1				.18	NO		17	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR A		SHEET 37 OF 39

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 131	36		E1					.19	NO		39	A
			P17-H40	2				.18	NO		17	A
D 132	36		E2					.19	NO		39	B
			P17-C12	1				.18	NO		17	B

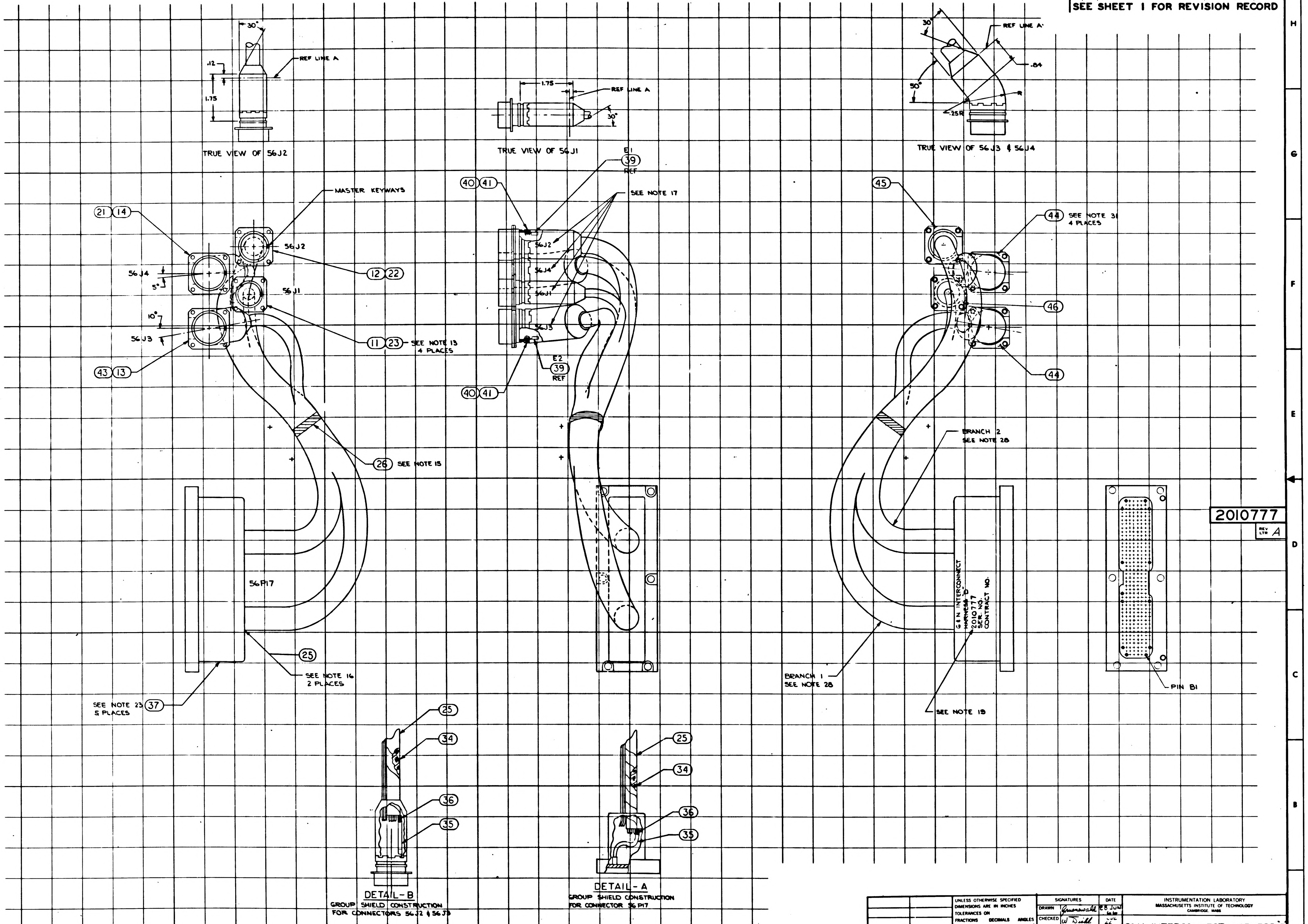
SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR A	SHEET 38 OF 39

MIL 2084 9-65

REVISIONS 31139

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

SEE SHEET 1 FOR REVISION RECORD



TRUE VIEW OF 56J2
30°
.12
1.75
REF LINE A
TRUE VIEW OF 56J1
1.75
REF LINE A
30°
TRUE VIEW OF 56J3 & 56J4
30
REF LINE A'
.84
50°
.25R
R
MASTER KEYWAYS
21 14
56J4
56J2
5°
56J1
12 22
10°
56J3
11 23 SEE NOTE 13 4 PLACES
43 13
26 SEE NOTE 15
56P17
25
SEE NOTE 16 2 PLACES
SEE NOTE 23 37 5 PLACES
E1
39 REF
40 41
SEE NOTE 17
56J2
56J4
56J1
56J3
E2
39 REF
40 41
45
44 SEE NOTE 31 4 PLACES
46
44
BRANCH 2 SEE NOTE 28
BRANCH 1 SEE NOTE 28
G&N INTERCONNECT HARNESS D 2010777 SER. NO. CONTRACT NO.
SEE NOTE 19
PIN B1
25
34
36
35
DETAIL-B
GROUP SHIELD CONSTRUCTION FOR CONNECTORS 56J2 & 56J3
25
34
36
35
DETAIL-A
GROUP SHIELD CONSTRUCTION FOR CONNECTOR 56P17

2010777

REV LTR A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± —— DECIMALS ±.03 ANGLES ± 2° DO NOT SCALE THIS DRAWING	SIGNATURES		DATE	INSTRUMENTATION LABORATORY MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS	
MATERIAL	DRAWN	Gruenewald	28 JUN 66	G&N INTERCONNECT HARNESS D (C/M BLOCK II)	
	CHECKED	W Diehl	JUL 66		
	DESIGNER				
	ENGINEER		8/12/66		
	Contract NAS 9-497				
HEAT TREATMENT	APPROVAL	9/12/66		CODE IDENT NO 80230	SIZE E
FINAL FINISH	R. Jacob 9/27/66			MIT DRAWING NO 2010777	
				SCALE 1/1	WT
				SHEET [illegible] OF [illegible]	

NEXT ASSY	USED ON
APPLICATION	

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567 (A)	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	
		B	REVISED PER TDRR 31200	10·4·66	JJB

REV		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
SHEET		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV STATUS OF SHEETS	REV	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

R.W. Turner 29 JUN 66
DRAFTSMAN DAY MO YR
CHECKER 1 Jul 66
ENGINEER 6 Jul 66
APPROVAL
CONTR NO. NAS 9-497
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "D"
(C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010777
SCALE NONE		SHEET 1 OF 40

MIL 1377A6 12-68

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014674.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
- A- FROM END OF SHIELD
- B- TO END OF SHIELD
- G- GREEN
- K- BLACK
- L- BLUE
- N- BROWN
- R- RED
- W- WHITE
- Y- YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER.

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.

8 UNLESS OTHERWISE SPECIFIED, FEATURE CENTER LINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 2 OF

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES OF CONNECTORS 56J1, J2, J3, AND J4 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 19.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 24.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 + 30 TO THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN, AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR 8	SHEET 3 OF

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN'
- A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
- B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.

TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 28 AND 33.

24 CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE ASSEMBLED AS SHOWN ON THE CONFIGURATION DRAWING.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 36, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 34. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 25. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.

27 ASSEMBLE INSULATION TUBING, ITEM 35, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

28 CONDUCTORS SHALL ENTER CONNECTOR 56P17 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE TERM. AREA NO. COLUMN.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR 8	SHEET 4 OF

NOTE GENERAL NOTES

NUMBER DESCRIPTION

29 ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 42, OVER CONDUCTOR D130. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 25, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071 FIGURE 6B.

30 PERFORM WORKMANSHIP VIBRATION'
- A. SINUSOIDAL SWEEP AT 3.5 G RMS, LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
- B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT.
- C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
- D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

31 BOND NUT PLATE ASSEMBLIES TO CONNECTORS 56J1, J2, J3, AND J4 PER ND1002004, USING ITEMS 47 AND 48.

32 ASSEMBLE SHRINK SLEEVE, ITEM 49, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P17. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

33 SOLDER PER ND1002071 USING ITEM 50, OR ITEMS 51 AND 52.

34 BOND TERMINAL LUG ITEM 39 AND SCREW TO ADAPTER PER ND1002187, TYPE III, USING ITEMS 29, 30, 54, AND 55.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 5 OF

NOTE NUMBER	GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 6 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010777-001	WIRE PER 1010789-006, 22 AWG, YEL- 5 FT TOT LG
	2	1	2010777-002	WIRE PER 1010789-016, 26 AWG, YEL- 65 FT TOT LG
	3	1	2010777-003	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT- 5 FT TOT LG
	4	1	2010777-004	WIRE PER 1010789-008, 22 AWG, YEL, RED- 5 FT TOT LG
	5	1	2010777-005	WIRE PER 1010789-017, 26 AWG, YEL, RED- 50 FT TOT LG
	6	1	2010777-006	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT- 60 FT TOT LG
	7	1	2010777-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN- 5 FT TOT LG
	8	1	2010777-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT- 5 FT TOT LG
	9	1	2010777-009	WIRE PER 1010789-002, 24 AWG, BLK- 78 FT TOT LG
	10	1	2010777-010	WIRE PER 1010789-024, 26 AWG, BLK- 50 FT TOT LG
9	11	1	1010930-009	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J1)
9	12	1	1010930-105	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J2)
9	13	1	1010930-002	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J3)

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 7 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	14	1	1010930-001	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J4)
9	15	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010930
9	16	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010930.
9	17	67	1010955-001	CONTACT, MALE
9	18	132	1010955-002	CONTACT, MALE
9	19	52	1010958-001	PLUG, PROTECTIVE, DUST AND MOISTURE SEAL
9	20	78	1010402- 2	SLEEVE, SOLDER, HIGH TEMPERATURE
	21	1	2014670-004	ADAPTER, CONNECTOR
	22	1	2014670-012	ADAPTER, CONNECTOR
	23	1	2014670-007	ADAPTER, CONNECTOR
9	24	AR	1012507-004	TAPE, LACING AND TYING
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	28	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
9	33	AR	1012504	PRIMER, METAL PARTS
9	34	AR	1010989	TAPE, SHEILDING, EMI/RFI- 16 FT TOT LG

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 8 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	35	AR	1006776- 19	INSULATION SLEEVING ELECTRICAL-
	36	1	2010777-011	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED, SILVER PLATED, 22AWG- 30 FT TOT LG
	37	1	2014744-021	CONNECTOR, PLUG, ELECTRICAL- (56P17)
	39	2	2021203	TERMINAL LUG, SOLDER
	40	2	MS35333-69	WASHER, LOCK
9	41	2	1006783- 93	SCREW, BUTTON HEAD, HEX SOCKET
	42	1	2010777-012	WIRE BRAID, QQ-B-575, 1/8 DIA., 36 AWG- 2 FT TOT LG
	43	1	2014670-011	ADAPTER, CONNECTOR
	44	2	2010725-011	NUT PLATE ASSEMBLY
	45	1	2010725-021	NUT PLATE ASSEMBLY
	46	1	2010725-031	NUT PLATE ASSEMBLY
9	47	AR	1010682	EPOXY, RESIN
9	48	AR	1010683	CURING AGENT, AMINE
9	49	199	1010490-114	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINK
	50	AR	SN60WRAP	SOLDER, QQ-S-571
	51	AR	SN60WS	SOLDER, QQ-S-571
	52	AR	MIL-F-14256 TYPE A OR W	FLUX

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 9 OF

LIMA 101266 WIRING HARNESS D 2010777 B

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	53	4	1010402- 1	SLEEVE, SOLDER HI TEMPERATURE
9	54	AR	1008822	COLORANT, EPOXY BASE
9	55	AR	1006277	SILICA, PULVERIZED PYROGENIC

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 10 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 1	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 1A	9		SHLD D1					.20	NO			
			J4-30					.13	NO		16	
D 1B	9		P17-G31	2				.18	NO		17	
			SHLD D1					.20	NO			
D 1R			J4-52					.13	NO		16	
			P17-H31	2				.18	NO		18	
D 1Y			J4-51					.13	NJ		16	
			P17-K31	2				.18	NO		18	
D 2	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 2A	9		SHLD D2					.20	NO			
			J4-31					.13	NO		16	
D 2B	9		P17-G32	2				.18	NO		17	
			SHLD D2					.20	NO			
D 2R			J4-54					.13	NO		16	
			P17-K32	2				.18	NO		18	
D 2Y			J4-53					.13	NO		16	
			P17-H32	2				.18	NO		18	
D 3	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 3A	9		SHLD D3					.20	NO			
			J4-29					.13	NO		16	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 11 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 3B	10		P17-G33	2				.22	NO			
			SHLD D3					.20	NO			
D 3R			J4-13					.13	NO		16	
			P17-H33	2				.22	NO			
D 3Y			J4-14					.13	NO		16	
			P17-K33	2				.22	NO			
D 4	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 4A	9		SHLD D4					.20	NO			
			J4-32					.13	NO		16	
D 4B	10		P17-G34	2				.22	NO			
			SHLD D4					.20	NO			
D 4R			J4-16					.13	NO		16	
			P17-K34	2				.22	NO			
D 4Y			J4-15					.13	NO		16	
			P17-H34	2				.22	NO			
D 5	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 5A	9		SHLD D5					.20	NO			
			J4-36					.13	NO		16	
D 5B	9		P17-G29	2				.18	NO		17	
			SHLD D5					.20	NO			
D 5R			J4-59					.13	NO		16	
			P17-H29	2				.18	NO		18	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 12 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 5Y			J4-60					.13	NO		16	
			P17-K29	2				.18	NO		18	
D 6	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 6A	9		SHLD D6					.20	NO			
			J4-37					.13	NO		16	
D 6B	9		P17-G30	2				.18	NO		17	
			SHLD D6					.20	NO			
D 6R			J4-61					.13	NO		16	
			P17-K30	2				.18	NO		18	
D 6Y			J4-38					.13	NO		16	
			P17-H30	2				.18	NO		18	
D 7	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 7A	9		SHLD D7					.20	NO			
			J4-33					.13	NO		16	
D 7B	10		P17-F27	2				.22	NO			
			SHLD D7					.20	NO			
D 7R			J4-56					.13	NO		16	
			P17-F28	2				.22	NO			
D 7Y			J4-55					.13	NO		16	
			P17-F29	2				.22	NO			
D 8	6				1.50	1.25				68	20	
					1.00	.75				68	20	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 13 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 8A	9		SHLD D8 J4-34					.20 .13	NO NO		 16	
D 8B	10		P17-F33 SHLD D8	2				.22 .20	NO NO			
D 8R			J4-57 P17-F31	 2				.13 .22	NO NO		16	
D 8Y			J4-58 P17-F32	 2				.13 .22	NO NO		16	
D 9	6				1.50 1.00	1.25 .75				68 68	20 20	
D 9A	9		SHLD D9 J4-27					.20 .13	NO NO		 16	
D 9B	9		P17-G27 SHLD D9	2				.18 .20	NO NO		17	
D 9R			J4-48 P17-H27	 2				.13 .18	NO NO		16 18	
D 9Y			J4-47 P17-K27	 2				.13 .18	NO NO		16 18	
D 10	6				1.50 1.00	1.25 .75				68 68	20 20	
D 10A	9		SHLD D10 J4-28					.20 .13	NO NO		 16	
D 10B	9		P17-G28 SHLD D10	2				.18 .20	NO NO		17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 14 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 10R			J4-49 P17-K28	 2				.13 .18	NO NO		16 18	
D 10Y			J4-50 P17-H28	 2				.13 .18	NO NO		16 18	
D 11	6				1.50 1.00	1.25 .75				68 68	20 20	
D 11A	9		SHLD D11 J4-35					.20 .13	NO NO		 16	
D 11B	10		P17-G25 SHLD D11	1				.22 .20	NO NO			
D 11R			J4-17 P17-H25	 1				.13 .22	NO NO		16	
D 11Y			J4-18 P17-K25	 1				.13 .22	NO NO		16	
D 12	6				1.50 1.00	1.25 .75				68 68	20 20	
D 12A	9		SHLD D12 J4-20					.20 .13	NO NO		 16	
D 12B	10		P17-G26 SHLD D12	1				.22 .20	NO NO			
D 12R			J4-19 P17-K26	 1				.13 .22	NO NO		16	
D 12Y			J4-8 P17-H26	 1				.13 .22	NO NO		16	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 15 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 13	6				1.50 1.00	1.25 .75				68 68	20 20	
D 13A	9		SHLD D13 J4-22					.20 .13	NO NO		 16	
D 13B	9		P17-C25 SHLD D13	1				.18 .20	NO NO		17	
D 13R			J4-41 P17-A25	 1				.13 .18	NO NO		16 18	
D 13Y			J4-42 P17-B25	 1				.13 .18	NO NO		16 18	
D 14	6				1.50 1.00	1.25 .75				68 68	20 20	
D 14A	9		SHLD D14 J4-24					.20 .13	NO NO		 16	
D 14B	9		P17-C39 SHLD D14	2				.18 .20	NO NO		17	
D 14R			J4-43 P17-B39	 2				.13 .18	NO NO		16 18	
D 14Y			J4-44 P17-A39	 2				.13 .18	NO NO		16 18	
D 15	6				1.50 1.00	1.25 .75				68 68	20 20	
D 15A	9		SHLD D15 J4-25					.20 .13	NO NO		 16	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 16 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 15B	9		P17-D40 SHLD D15	2				.18 .20	NO NO		17	
D 15R			J4-45 P17-D41	 2				.13 .18	NO NO		16 18	
D 15Y			J4-46 P17-C41	 2				.13 .18	NO NO		16 18	
D 16	6				1.50 1.00	1.25 .75				68 68	20 20	
D 16A	9		SHLD D16 J4-21					.20 .13	NO NO		 16	
D 16B	9		P17-C24 SHLD D16	1				.18 .20	NO NO		17	
D 16R			J4-39 P17-B24	 1				.13 .18	NO NO		16 18	
D 16Y			J4-40 P17-D24	 1				.13 .18	NO NO		16 18	
D 17	6				1.50 1.00	1.25 .75				68 68	20 20	
D 17A	9		SHLD D17 J4-10					.20 .13	NO NO		 16	
D 17B	9		P17-C38 SHLD D17	2				.18 .20	NO NO		17	
D 17R			J4-9 P17-A38	 2				.13 .18	NO NO		16 18	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 17 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 17Y			J4-23					.13	NO		16	
			P17-B38	2				.18	NO		18	
D 18	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 18A	9		SHLD D18					.20	NO			
			J4-11					.13	NO		16	
D 18B	9		P17-C40	2				.18	NO		17	
			SHLD D18					.20	NO			
D 18R			J4-26					.13	NO		16	
			P17-B41	2				.18	NO		18	
D 18Y			J4-12					.13	NO		16	
			P17-B40	2				.18	NO		18	
D 19	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 19A	9		SHLD D19					.20	NO			
			J4-1					.13	NO		16	
D 19B	9		P17-C26	1				.18	NO		17	
			SHLD D19					.20	NO			
D 19R			J4-6					.13	NO		16	
			P17-B26	1				.18	NO		18	
D 19Y			J4-7					.13	NO		16	
			P17-A26	1				.18	NO		18	
D 20	1		J4-5					.13	NO		16	
			P17-D25	1				.18	NO		17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 18 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 21	1		J4-4					.13	NO		16	
			P17-F25	1				.18	NO		17	
D 22	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 22A	9		SHLD D22					.20	NO			
			J1-17					.13	NO		16	
D 22B	9		P17-F3	1				.18	NO		17	
			SHLD D22					.20	NO			
D 22R			J1-34					.13	NO		16	
			P17-F1	1				.18	NO		18	
D 22Y			J1-33					.13	NO		16	
			P17-F2	1				.18	NO		18	
D 23	6				1.50	1.25				68	20	
					1.00	.75				68	20	
D 23A	9		SHLD D23					.20	NO			
			J1-18					.13	NO		16	
D 23B	9		P17-K3	1				.18	NO		17	
			SHLD D23					.20	NO			
D 23R			J1-35					.13	NO		16	
			P17-H4	1				.18	NO		18	
D 23Y			J1-36					.13	NO		16	
			P17-K4	1				.18	NO		18	
D 24	6				1.75	1.50				68	20	
					1.00	.75				68	20	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 19 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 24A	9		SHLD D24					.20	NO			
			J1-14					.13	NO		16	
D 24B	9		P17-G3	1				.18	NO		17	
			SHLD D24					.20	NO			
D 24R			J1-30					.13	NO		16	
			P17-G2	1				.18	NO		18	
D 24Y			J1-29					.13	NO		16	
			P17-G1	1				.18	NO		18	
D 25	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 25A	9		SHLD D25					.20	NO			
			J1-15					.13	NO		16	
D 25B	9		P17-H3	1				.18	NO		17	
			SHLD D25					.20	NO			
D 25R			J1-31					.13	NO		16	
			P17-H1	1				.18	NO		18	
D 25Y			J1-32					.13	NO		16	
			P17-H2	1				.18	NO		18	
D 26	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 26A	9		SHLD D26					.20	NO			
			J1-20					.13	NO		16	
D 26B	9		P17-G6	1				.18	NO		17	
			SHLD D26					.20	NO			

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 20 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 26R			J1-19					.13	NO		16	
			P17-H6	1				.18	NO		18	
D 26Y			J1-37					.13	NO		16	
			P17-K6	1				.18	NO		18	
D 27	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 27A	9		SHLD D27					.20	NO			
			J1-21					.13	NO		16	
D 27B	9		P17-G5	1				.18	NO		17	
			SHLD D27					.20	NO			
D 27R			J1-38					.13	NO		16	
			P17-K5	1				.18	NO		18	
D 27Y			J1-39					.13	NO		16	
			P17-H5	1				.18	NO		18	
D 28	6				1.75	1.50				68	20	
					1.00	.75				68	20	
D 28A	9		SHLD D28					.20	NO			
			J1-13					.13	NO		16	
D 28B	10		P17-C4	1				.22	NO			
			SHLD D28					.20	NO			
D 28R			J1-28					.13	NO		16	
			P17-A4	1				.22	NO			
D 28Y			J1-27					.13	NO		16	
			P17-B4	1				.22	NO			

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 21 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 29	6				1.75 1.00	1.50 .75				68 68	20 20	
D 29A	9		SHLD D29 J1-16					.20 .13	NO NO		 16	
D 29B	10		P17-C5 SHLD D29	1				.22 .20	NO NO			
D 29R			J1-6 P17-B5	 1				.13 .22	NO NO		16	
D 29Y			J1-5 P17-A5	 1				.13 .22	NO NO		16	
D 30	6				1.75 1.00	1.50 .75				68 68	20 20	
D 30A	9		SHLD D30 J1-1					.20 .13	NO NO		 16	
D 30B	10		P17-C6 SHLD D30	1				.22 .20	NO NO			
D 30R			J1-4 P17-A6	 1				.13 .22	NO NO		16	
D 30Y			J1-3 P17-B6	 1				.13 .22	NO NO		16	
D 31	7											
D 31G			J1-26 P17-D4	 1				.13 .18	NO NO		16 18	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 22 OF

MIL 2084 9 65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 31R			J1-43 P17-D6	 1				.13 .18	NO NO		16 18	
D 31Y			J1-44 P17-D5	 1				.13 .18	NO NO		16 18	
D 32	7											
D 32G			J1-8 P17-F4	 1				.13 .18	NO NO		16 18	
D 32R			J1-7 P17-F5	 1				.13 .18	NO NO		16 18	
D 32Y			J1-2 P17-F6	 1				.13 .18	NO NO		16 18	
D 35	2		J1-25 P17-A3	 1				.13 .18	NO NO		16 18	
D 36	4											
D 36R			J1-40 P17-K8	 1				.13 .18	NO NO		16 17	
D 36Y			J1-23 P17-H8	 1				.13 .18	NO NO		16 17	
D 37	4											
D 37R			J1-41 P17-K9	 1				.13 .18	NO NO		16 17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 23 OF

MIL 2084 9 65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 37Y			J1-42 P17-K10	 1				.13 .18	NO NO		16 17	
D 40	2		J3-8 P17-C16	 1				.13 .18	NO NO		16 18	B B
D 42	2		J3-7 P17-B16	 1				.13 .18	NO NO		16 18	B B
D 50	2		J3-2 P17-C18	 1				.13 .18	NO NO		16 18	B B
D 55	6				1.50 1.00	1.25 .75				68 68	20 20	
D 55A	9		SHLD D55 J3-30					.20 .13	NO NO		 16	
D 55B	10		P17-C4 SHLD D55	1				.22 .20	NO NO		17	
D 55R			J3-31 P17-A4	 1				.13 .22	NO NO		16 17	
D 55Y			J3-15 P17-B4	 1				.13 .22	NO NO		16 17	
D 56	6				1.50 1.00	1.25 .75				68 68	20 20	
D 56A	9		SHLD D56 J3-52					.20 .13	NO NO		 16	
D 56B	10		P17-C5 SHLD D56	1				.22 .20	NO NO		17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 24 OF

MIL 2084 9 65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 56R			J3-77 P17-B5	 1				.13 .22	NO NO		16 17	
D 56Y			J3-53 P17-A5	 1				.13 .22	NO NO		16 17	
D 57	6				1.50 1.00	1.25 .75				68 68	20 20	
D 57A	9		SHLD D57 J3-51					.20 .13	NO NO		 16	
D 57B	10		P17-C6 SHLD D57	1				.22 .20	NO NO		17	
D 57R			J3-75 P17-A6	 1				.13 .22	NO NO		16 17	
D 57Y			J3-76 P17-B6	 1				.13 .22	NO NO		16 17	
D 58	6				1.50 1.00	1.25 .75				68 68	20 20	
D 58A	9		SHLD D58 J3-46					.20 .13	NO NO		 16	
D 58B	10		P17-G33 SHLD D58	2				.22 .20	NO NO		17	
D 58R			J3-71 P17-H33	 2				.13 .22	NO NO		16 17	
D 58Y			J3-70 P17-K33	 2				.13 .22	NO NO		16 17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 25 OF

MIL 2084 9 65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 59	6				1.50 1.00	1.25 .75				68 68	20 20	
D 59A	9		SHLD D59 J3-69					.20 .13	NO NO		 16	
D 59B	10		P17-G34 SHLD D59	2				.22 .20	NO NO		17	
D 59R			J3-45 P17-K34	 2				.13 .22	NO NO		16 17	
D 59Y			J3-44 P17-H34	 2				.13 .22	NO NO		16 17	
D 60	6				1.50 1.00	1.25 .75				68 68	20 20	
D 60A	9		SHLD D60 J3-28					.20 .13	NO NO		 16	
D 60B	10		P17-F27 SHLD D60	2				.22 .20	NO NO		17	
D 60R			J3-13 P17-F28	 2				.13 .22	NO NO		16 17	
D 60Y			J3-29 P17-F29	 2				.13 .22	NO NO		16 17	
D 61	6				1.50 1.00	1.25 .75				68 68	20 20	
D 61A	9		SHLD D61 J3-74					.20 .13	NO NO		 16	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 26 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 61B	10		P17-F33 SHLD D61	2				.22 .20	NO NO		17	
D 61R			J3-49 P17-F31	 2				.13 .22	NO NO		16 17	
D 61Y			J3-50 P17-F32	 2				.13 .22	NO NO		16 17	
D 62	6				1.50 1.00	1.25 .75				68 68	20 20	
D 62A	9		SHLD D62 J3-27					.20 .13	NO NO		 16	
D 62B	10		P17-G25 SHLD D62	1				.22 .20	NO NO		17	
D 62R			J3-26 P17-H25	 1				.13 .22	NO NO		16 17	
D 62Y			J3-47 P17-K25	 1				.13 .22	NO NO		16 17	
D 63	6				1.50 1.00	1.25 .75				68 68	20 20	
D 63A	9		SHLD D63 J3-48					.20 .13	NO NO		 16	
D 63B	10		P17-G26 SHLD D63	1				.22 .20	NO NO		17	
D 63R			J3-72 P17-K26	 1				.13 .22	NO NO		16 17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 27 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 63Y			J3-73 P17-H26	 1				.13 .22	NO NO		16 17	
D 64	4											
D 64R			J3-67 P17-H9	 1				.13 .18	NO NO		16 17	
D 64Y			J3-68 P17-H10	 1				.13 .18	NO NO		16 17	
D 65	8				1.75 1.00	1.50 .75				68 68	20 20	
D 65A	9		SHLD D65 J2-44					.20 .13	NO NO		 15	
D 65B	9		P17-C21 SHLD D65	1				.18 .20	NO NO		17	
D 65G			J2-25 P17-B21	 1				.13 .18	NO NO		15 17	
D 65R			J2-46 P17-C20	 1				.13 .18	NO NO		15 17	
D 65Y			J2-45 P17-B20	 1				.13 .18	NO NO		15 17	
D 66	3				1.75 1.00	1.50 .75				68 68	53 53	
D 66A	9		SHLD D66 J2-26					.20 .13	NO NO		 15	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 28 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 66B	9		P17-B19 SHLD D66	1				.18 .20	NO NO		17	
D 66Y			J2-47 P17-C19	 1				.13 .18	NO NO		15 17	
D 67	5											A A
D 67R			J2-55 P17-A31	 2				.13 .18	NO NO		15 18	A A
D 67Y			J2-56 P17-B31	 2				.13 .18	NO NO		15 18	A A
D 68	5											A A
D 68R			J2-54 P17-A32	 2				.13 .18	NO NO		15 18	A A
D 68Y			J2-32 P17-B32	 2				.13 .18	NO NO		15 18	A A
D 69	5											A A
D 69R			J2-17 P17-A33	 2				.13 .18	NO NO		15 18	A A
D 69Y			J2-33 P17-B33	 2				.13 .18	NO NO		15 18	A A
D 70	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 29 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 70R			J2-16 P17-A34	2				.13 .18	NO NO		15 18	A A
D 70Y			J2-5 P17-B34	2				.13 .18	NO NO		15 18	A A
D 71	5											A A
D 71R			J2-57 P17-A35	2				.13 .18	NO NO		15 18	A A
D 71Y			J2-34 P17-B35	2				.13 .18	NO NO		15 18	A A
D 72	5											A A
D 72R			J2-18 P17-A36	2				.13 .18	NO NO		15 18	A A
D 72Y			J2-35 P17-B36	2				.13 .18	NO NO		15 18	A A
D 73	5											A A
D 73R			J2-15 P17-A28	2				.13 .18	NO NO		15 18	A A
D 73Y			J2-30 P17-B28	2				.13 .18	NO NO		15 18	A A
D 74	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 30 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 74R			J2-52 P17-A29	2				.13 .18	NO NO		15 18	A A
D 74Y			J2-53 P17-B29	2				.13 .18	NO NO		15 18	A A
D 75	5											A A
D 75R			J2-50 P17-F37	2				.13 .18	NO NO		15 18	A A
D 75Y			J2-51 P17-F36	2				.13 .18	NO NO		15 18	A A
D 76	5											A A
D 76R			J2-13 P17-K37	2				.13 .18	NO NO		15 18	A A
D 76Y			J2-29 P17-H37	2				.13 .18	NO NO		15 18	A A
D 77	5											A A
D 77R			J2-12 P17-H36	2				.13 .18	NO NO		15 18	A A
D 77Y			J2-27 P17-K36	2				.13 .18	NO NO		15 18	A A
D 78	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 31 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 78R			J2-48 P17-G41	2				.13 .18	NO NO		15 18	A A
D 78Y			J2-49 P17-H41	2				.13 .18	NO NO		15 18	A A
D 79	5											A A
D 79R			J2-1 P17-F40	2				.13 .18	NO NO		15 18	A A
D 79Y			J2-4 P17-F39	2				.13 .18	NO NO		15 18	A A
D 80	5											A A
D 80R			J2-11 P17-H38	2				.13 .18	NO NO		15 18	A A
D 80Y			J2-24 P17-K38	2				.13 .18	NO NO		15 18	A A
D 81	5											A A
D 81R			J2-10 P17-K39	2				.13 .18	NO NO		15 18	A A
D 81Y			J2-2 P17-H39	2				.13 .18	NO NO		15 18	A A
D 82	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 32 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 82R			J2-59 P17-H15	2				.13 .18	NO NO		15 18	A A
D 82Y			J2-58 P17-K15	2				.13 .18	NO NO		15 18	A A
D 83	5											A A
D 83R			J2-7 P17-K14	2				.13 .18	NO NO		15 18	A A
D 83Y			J2-6 P17-H14	2				.13 .18	NO NO		15 18	A A
D 84	5											A A
D 84R			J2-36 P17-H17	2				.13 .18	NO NO		15 18	A A
D 84Y			J2-60 P17-K17	2				.13 .18	NO NO		15 18	A A
D 85	5											A A
D 85R			J2-8 P17-K16	2				.13 .18	NO NO		15 18	A A
D 85Y			J2-19 P17-H16	2				.13 .18	NO NO		15 18	A A
D 86	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 33 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 86R			J2-61					.13	NO		15	A
			P17-H13	2				.18	NO		18	A
D 86Y			J2-38					.13	NO		15	A
			P17-K13	2				.18	NO		18	A
D 87	5											A
												A
D 87R			J2-39					.13	NO		15	A
			P17-K12	2				.18	NO		18	A
D 87Y			J2-20					.13	NO		15	A
			P17-H12	2				.18	NO		18	A
D 88	5											A
												A
D 88R			J2-43					.13	NO		15	A
			P17-H21	2				.18	NO		18	A
D 88Y			J2-42					.13	NO		15	A
			P17-G21	2				.18	NO		18	A
D 89	5											A
												A
D 89R			J2-22					.13	NO		15	A
			P17-G20	2				.18	NO		18	A
D 89Y			J2-9					.13	NO		15	A
			P17-H20	2				.18	NO		18	A
D 90	5											A
												A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 34 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 90R			J2-41					.13	NO		15	A
			P17-H19	2				.18	NO		18	A
D 90Y			J2-40					.13	NO		15	A
			P17-G19	2				.18	NO		18	A
D 91	3				1.50	1.25				6B	53	
					1.00	.75				6B	53	
D 91A	9		SHLD D91					.20	NO			
			J4-2					.13	NO		16	
D 91B	9		P17-D27	1				.18	NO		17	
			SHLD D91					.20	NO			
D 91Y			J4-3					.13	NO		16	
			P17-D26	1				.18	NO		17	
D 96	7											
D 96G			J1-11					.13	NO		16	
			P17-F8	1				.18	NO		18	
D 96R			J1-10					.13	NO		16	
			P17-G7	1				.18	NO		18	
D 96Y			J1-9					.13	NO		16	
			P17-F7	1				.18	NO		18	
D 97	2		J3-18					.13	NO		16	B
			P17-A15	1				.18	NO		18	B
D 98	2		J3-36					.13	NO		16	B
			P17-B15	1				.18	NO		18	B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 35 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 99	2		J3-19					.13	NO		16	B
			P17-C15	1				.18	NO		18	B
D 100	2		J3-62					.13	NO		16	B
			P17-B17	1				.18	NO		18	B
D 101	2		J3-63					.13	NO		16	B
			P17-C17	1				.18	NO		18	B
D 102	2		J3-38					.13	NO		16	B
			P17-B18	1				.18	NO		18	B
D 103	2		J3-84					.13	NO		16	B
			P17-D13	1				.18	NO		18	B
D 104	2		J3-60					.13	NO		16	B
			P17-D12	1				.18	NO		18	B
D 105	2		J3-59					.13	NO		16	B
			P17-D11	1				.18	NO		18	B
D 106	2		J3-41					.13	NO		16	B
			P17-B2	1				.18	NO		18	B
D 107	2		J3-65					.13	NO		16	B
			P17-B1	1				.18	NO		18	B
D 108	2		J3-40					.13	NO		16	B
			P17-B3	1				.18	NO		18	B
D 109	2		J3-42					.13	NO		16	B
			P17-C1	1				.18	NO		18	B
D 110	2		J3-66					.13	NO		16	B
			P17-D1	1				.18	NO		18	B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 36 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 111	2		J3-21					.13	NO		16	B
			P17-D2	1				.18	NO		18	B
D 112	2		J3-22					.13	NO		16	B
			P17-C2	1				.18	NO		18	B
D 113	2		J3-39					.13	NO		16	B
			P17-D3	1				.18	NO		18	B
D 114	2		J3-64					.13	NO		16	B
			P17-C3	1				.18	NO		18	B
D 115	2		J3-33					.13	NO		16	B
			P17-A12	1				.18	NO		18	B
D 116	2		J3-17					.13	NO		16	B
			P17-B12	1				.18	NO		18	B
D 117	2		J3-57					.13	NO		16	B
			P17-A11	1				.18	NO		18	B
D 118	2		J3-82					.13	NO		16	B
			P17-B11	1				.18	NO		18	B
D 119	2		J3-81					.13	NO		16	B
			P17-A14	1				.18	NO		18	B
D 120	2		J3-80					.13	NO		16	B
			P17-B13	1				.18	NO		18	B
D 121	2		J3-56					.13	NO		16	B
			P17-A13	1				.18	NO		18	B
D 122	2		J3-24					.13	NO		16	B
			P17-A9	1				.18	NO		18	B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 37 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 123	2		J3-43					.13	NO		16	B
			P17-C10	1				.18	NO		18	B
D 124	2		J3-25					.13	NO		16	B
			P17-C9	1				.18	NO		18	B
D 125	2		J3-23					.13	NO		16	B
			P17-B9	1				.18	NO		18	B
D 126	2		J3-5					.13	NO		16	B
			P17-D8	1				.18	NO		18	B
D 127	2		J3-14					.13	NO		16	B
			P17-C8	1				.18	NO		18	B
D 128	2		J3-4					.13	NO		16	B
			P17-B10	1				.18	NO		18	B
D 129	2		J3-1					.13	NO		16	B
			P17-A10	1				.18	NO		18	B
D 130	4				1.50	1.25				68	20	SEE NOTE 29
					1.00	.75				68	20	
D 130A	9		SHLD D130					.20	NO			
			E2					.19	NO			
D 130B	9		P17-C11	1				.18	NO		17	
			SHLD D130					.20	NO			
D 130R			J3-3					.13	NO		16	
			P17-D10	1				.18	NO		17	
D 130Y			J3-11					.13	NO		16	
			P17-D9	1				.18	NO		17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 38 OF

MIL 2084 9-65

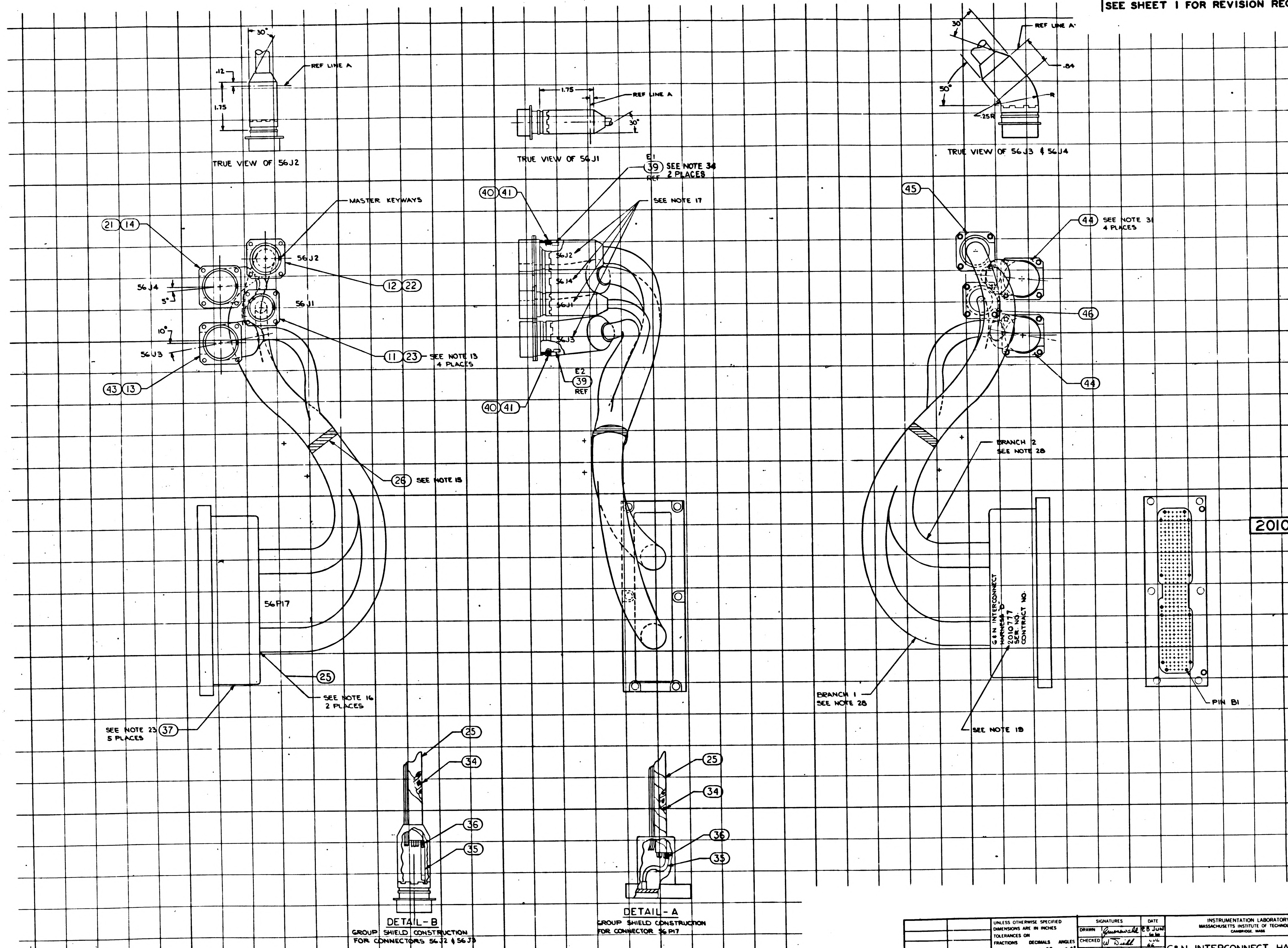
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 131	36		E1					.19	NO		39	A
			P17-H40	2				.18	NO		17	A
D 132	36		E2					.19	NO		39	B
			P17-C12	1				.18	NO		17	B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 39 OF

MIL 2084 9-65

REVISIONS 31139				
SYM	ZONE	DESCRIPTION / CHG NO	DATE	APPD

SEE SHEET 1 FOR REVISION RECORD



30°
.12
1.75
REF LINE A
TRUE VIEW OF 56J2
1.75
REF LINE A
30°
TRUE VIEW OF 56J1
30
REF LINE A'
.84
50°
R
.25R
TRUE VIEW OF 56J3 & 56J4
MASTER KEYWAYS
21 14
56J2
56J4
5°
12 22
56J1
10°
56J3
11 23 SEE NOTE 13
4 PLACES
43 13
26 SEE NOTE 15
56P17
25
SEE NOTE 16
2 PLACES
SEE NOTE 23 37
5 PLACES
40 41
E1
39 SEE NOTE 34
2 PLACES
REF
SEE NOTE 17
56J2
56J4
56J1
56J3
E2
39
REF
40 41
45
44 SEE NOTE 31
4 PLACES
46
44
BRANCH 2
SEE NOTE 28
BRANCH 1
SEE NOTE 28
G&N INTERCONNECT
HARNESS D
2010777
SER. NO.
CONTRACT NO.
SEE NOTE 15
PIN B1
25
34
36
35
25
34
36
35

DETAIL - B
GROUP SHIELD CONSTRUCTION
FOR CONNECTORS 56J2 & 56J3

DETAIL - A
GROUP SHIELD CONSTRUCTION
FOR CONNECTOR 56P17

2010777
REV LTR B

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.03 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

SIGNATURES		DATE
DRAWN	Gruenewald	28 JUN 66
CHECKED	W Diehl	JUL 66
DESIGNER		
ENGINEER		

Contract NAS 9-497
APPROVAL
CCB 9/12/66
R Jacob 9/22/66

INSTRUMENTATION LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASS

G&N INTERCONNECT HARNESS D
(C/M BLOCK II)

CODE IDENT NO	SIZE	MIT DRAWING NO
80230	E	2010777
SCALE 1/1	WT	SHEET 40

MX-10981

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567 Ⓐ

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	WS.
B	REVISED PER TDRR 31200	10·4·66	JJB JW
C	REVISED PER TDRR 31213	21 OCT 66	EC

REV		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C
SHEET		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV STATUS OF SHEETS	REV	C	B	B	C	B	B	B	B	C	C	B	B	B	B	B	B	B	B	B	B
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER 1 JUL '66
ENGINEER 6 JUL 66
APPROVAL AUG 15 '66
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacob
APPROVAL 7/22/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "D" (C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010777
SCALE NONE
SHEET 1 OF 40

MIL 1377A6 12-65

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 68 AND ND1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014674.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A- FROM END OF SHIELD B- TO END OF SHIELD G- GREEN K- BLACK L- BLUE N- BROWN R- RED W- WHITE Y- YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER.
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.
8	UNLESS OTHERWISE SPECIFIED, FEATURE CENTER LINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 2 OF

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
11	ALL UNUSED CONTACT CAVITIES OF CONNECTORS 56J1, J2, J3, AND J4 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 19.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 24.
13	APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 + 30 TO THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN, AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 3 OF

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN' A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 28 AND 33.
24	CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE ASSEMBLED AS SHOWN ON THE CONFIGURATION DRAWING.
25	GROUP SHIELDING-WRAP CABLE WITH ONE CONTINUOUS LENGTH OF SHIELDING TAPE. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.
26	COMPLETELY COVER SHIELD WITH A MINIMUM OF TWO WRAPS OF INSULATION TAPE ITEM NO.25. WRAP LAYERS IN OPPOSITE DIRECTION, CLOCKWISE, COUNTER-CLOCKWISE, ETC. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS.
27	DELETED
28	CONDUCTORS SHALL ENTER CONNECTOR 56P17 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE TERM. AREA NO. COLUMN.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR C	SHEET 4 OF

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
29	ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 42, OVER CONDUCTOR 0130. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 25, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071 FIGURE 68.
30	PERFORM WORKMANSHIP VIBRATION' A. SINUSOIDAL SWEEP AT 3.5 G RMS, LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
31	BOND NUT PLATE ASSEMBLIES TO CONNECTORS 56J1, J2, J3, AND J4 PER ND1002004, USING ITEMS 47 AND 48.
32	ASSEMBLE SHRINK SLEEVE, ITEM 49, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P17. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.
33	SOLDER PER ND1002071 USING ITEM 50, OR ITEMS 51 AND 52.
34	BOND TERMINAL LUG ITEM 39 AND SCREW TO ADAPTER PER ND1002187, TYPE III, USING ITEMS 29, 30, 54, AND 55.

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 5 OF

NOTE NUMBER

GENERAL NOTES

DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 6 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010777-001	WIRE PER 1010789-006, 22 AWG, YEL- 5 FT TOT LG
	2	1	2010777-002	WIRE PER 1010789-016, 26 AWG, YEL- 65 FT TOT LG
	3	1	2010777-003	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT- 5 FT TOT LG
	4	1	2010777-004	WIRE PER 1010789-008, 22 AWG, YEL, RED- 5 FT TOT LG
	5	1	2010777-005	WIRE PER 1010789-017, 26 AWG, YEL, RED- 50 FT TOT LG
	6	1	2010777-006	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT- 60 FT TOT LG
	7	1	2010777-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN- 5 FT TOT LG
	8	1	2010777-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT- 5 FT TOT LG
	9	1	2010777-009	WIRE PER 1010789-002, 24 AWG, BLK- 78 FT TOT LG
	10	1	2010777-010	WIRE PER 1010789-024, 26 AWG, BLK- 50 FT TOT LG
9	11	1	1010930-009	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J1)
9	12	1	1010930-105	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J2)
9	13	1	1010930-002	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J3)

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 7 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	14	1	1010930-001	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J4)
9	15	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010930
9	16	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010930.
9	17	67	1010955-001	CONTACT, MALE
9	18	132	1010955-002	CONTACT, MALE
9	19	52	1010958-001	PLUG, PROTECTIVE, DUST AND MOISTURE SEAL
9	20	78	1010402- 2	SLEEVE, SOLDER, HIGH TEMPERATURE
	21	1	2014670-004	ADAPTER, CONNECTOR
	22	1	2014670-012	ADAPTER, CONNECTOR
	23	1	2014670-007	ADAPTER, CONNECTOR
9	24	AR	1012507-004	TAPE, LACING AND TYING
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	28	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
9	33	AR	1012504	PRIMER, METAL PARTS
9	34	AR	1010989	TAPE, SHEILDING, EMI/RFI- 16 FT TOT LG

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 8 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35		1006776- 19	DELETED
	36		2010777-011	DELETED
9	37	1	2014744-021	CONNECTOR, PLUG, ELECTRICAL- (56P17)
	39	2	2021203	TERMINAL LUG, SOLDER
	40	2	MS35333-69	WASHER, LOCK
9	41	2	1006783- 93	SCREW, BUTTON HEAD, HEX SOCKET
	42	1	2010777-012	WIRE BRAID, QQ-B-575, 1/8 DIA., 36 AWG- 2 FT TOT LG
	43	1	2014670-011	ADAPTER, CONNECTOR
	44	2	2010725-011	NUT PLATE ASSEMBLY
	45	1	2010725-021	NUT PLATE ASSEMBLY
	46	1	2010725-031	NUT PLATE ASSEMBLY
9	47	AR	1010682	EPOXY, RESIN
9	48	AR	1010683	CURING AGENT, AMINE
9	49	199	1010490-114	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINK
	50	AR	SN60WRAP	SOLDER, QQ-S-571
	51	AR	SN60WS	SOLDER, QQ-S-571
	52	AR	MIL-F-14256 TYPE A OR W	FLUX

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR C	SHEET 9 OF

CYZMOURE 102666 WIRING HARNESS D 2010777 C

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	53	4	1010402- 1	SLEEVE, SOLDER HI TEMPERATURE
9	54	AR	1008822	COLORANT, EPOXY BASE
9	55	AR	1006277	SILICA, PULVERIZED PYROGENIC
9	56	4	1010811-002	BAND, CABLE

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR C | SHEET 10 OF

FORM 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	1	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	1A	9	SHLD D1 J4-30					.20 .13	NO NO		 16	
D	1B	9	P17-G31 SHLD D1	2				.18 .20	NO NO		17	
D	1R		J4-52 P17-H31	 2				.13 .18	NO NO		16 18	
D	1Y		J4-51 P17-K31	 2				.13 .18	NO NO		16 18	
D	2	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	2A	9	SHLD D2 J4-31					.20 .13	NO NO		 16	
D	2B	9	P17-G32 SHLD D2	2				.18 .20	NO NO		17	
D	2R		J4-54 P17-K32	 2				.13 .18	NO NO		16 18	
D	2Y		J4-53 P17-H32	 2				.13 .18	NO NO		16 18	
D	3	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	3A	9	SHLD D3 J4-29					.20 .13	NO NO		 16	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 11 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	3B	10	P17-G33 SHLD D3	2				.22 .20	NO NO			
D	3R		J4-13 P17-H33	 2				.13 .22	NO NO		16	
D	3Y		J4-14 P17-K33	 2				.13 .22	NO NO		16	
D	4	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	4A	9	SHLD D4 J4-32					.20 .13	NO NO		 16	
D	4B	10	P17-G34 SHLD D4	2				.22 .20	NO NO			
D	4R		J4-16 P17-K34	 2				.13 .22	NO NO		16	
D	4Y		J4-15 P17-H34	 2				.13 .22	NO NO		16	
D	5	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	5A	9	SHLD D5 J4-36					.20 .13	NO NO		 16	
D	5B	9	P17-G29 SHLD D5	2				.18 .20	NO NO		17	
D	5R		J4-59 P17-H29	 2				.13 .18	NO NO		16 18	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 12 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	5Y		J4-60 P17-K29	 2				.13 .18	NO NO		16 18	
D	6	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	6A	9	SHLD D6 J4-37					.20 .13	NO NO		 16	
D	6B	9	P17-G30 SHLD D6	2				.18 .20	NO NO		17	
D	6R		J4-61 P17-K30	 2				.13 .18	NO NO		16 18	
D	6Y		J4-38 P17-H30	 2				.13 .18	NO NO		16 18	
D	7	6			1.50 1.00	1.25 .75				6B 6B	20 20	
D	7A	9	SHLD D7 J4-33					.20 .13	NO NO		 16	
D	7B	10	P17-F27 SHLD D7	2				.22 .20	NO NO			
D	7R		J4-56 P17-F28	 2				.13 .22	NO NO		16	
D	7Y		J4-55 P17-F29	 2				.13 .22	NO NO		16	
D	8	6			1.50 1.00	1.25 .75				6B 6B	20 20	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 13 OF

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 8A	9		SHLD D8 J4-34					.20 .13	NO NO		16	
D 8B	10		P17-F33 SHLD D8	2				.22 .20	NO NO			
D 8R			J4-57 P17-F31	2				.13 .22	NO NO		16	
D 8Y			J4-58 P17-F32	2				.13 .22	NO NO		16	
D 9	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 9A	9		SHLD D9 J4-27					.20 .13	NO NO		16	
D 9B	9		P17-G27 SHLD D9	2				.18 .20	NO NO		17	
D 9R			J4-48 P17-H27	2				.13 .18	NO NO		16 18	
D 9Y			J4-47 P17-K27	2				.13 .18	NO NO		16 18	
D 10	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 10A	9		SHLD D10 J4-28					.20 .13	NO NO		16	
D 10B	9		P17-G28 SHLD D10	2				.18 .20	NO NO		17	

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 14 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 10R			J4-49 P17-K28	2				.13 .18	NO NO		16 18	
D 10Y			J4-50 P17-H28	2				.13 .18	NO NO		16 18	
D 11	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 11A	9		SHLD D11 J4-35					.20 .13	NO NO		16	
D 11B	10		P17-G25 SHLD D11	1				.22 .20	NO NO			
D 11R			J4-17 P17-H25	1				.13 .22	NO NO		16	
D 11Y			J4-18 P17-K25	1				.13 .22	NO NO		16	
D 12	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 12A	9		SHLD D12 J4-20					.20 .13	NO NO		16	
D 12B	10		P17-G26 SHLD D12	1				.22 .20	NO NO			
D 12R			J4-19 P17-K26	1				.13 .22	NO NO		16	
D 12Y			J4-8 P17-H26	1				.13 .22	NO NO		16	

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 15 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 13	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 13A	9		SHLD D13 J4-22					.20 .13	NO NO		16	
D 13B	9		P17-C25 SHLD D13	1				.18 .20	NO NO		17	
D 13R			J4-41 P17-A25	1				.13 .18	NO NO		16 18	
D 13Y			J4-42 P17-B25	1				.13 .18	NO NO		16 18	
D 14	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 14A	9		SHLD D14 J4-24					.20 .13	NO NO		16	
D 14B	9		P17-C39 SHLD D14	2				.18 .20	NO NO		17	
D 14R			J4-43 P17-B39	2				.13 .18	NO NO		16 18	
D 14Y			J4-44 P17-A39	2				.13 .18	NO NO		16 18	
D 15	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 15A	9		SHLD D15 J4-25					.20 .13	NO NO		16	

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 16 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 15B	9		P17-D40 SHLD D15	2				.18 .20	NO NO		17	
D 15R			J4-45 P17-D41	2				.13 .18	NO NO		16 18	
D 15Y			J4-46 P17-C41	2				.13 .18	NO NO		16 18	
D 16	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 16A	9		SHLD D16 J4-21					.20 .13	NO NO		16	
D 16B	9		P17-C24 SHLD D16	1				.18 .20	NO NO		17	
D 16R			J4-39 P17-B24	1				.13 .18	NO NO		16 18	
D 16Y			J4-40 P17-D24	1				.13 .18	NO NO		16 18	
D 17	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 17A	9		SHLD D17 J4-10					.20 .13	NO NO		16	
D 17B	9		P17-C38 SHLD D17	2				.18 .20	NO NO		17	
D 17R			J4-9 P17-A38	2				.13 .18	NO NO		16 18	

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 17 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	17Y			J4-23 P17-B38	2				.13 .18	NO NO		16 18	
D	18	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D	18A	9		SHLD D18 J4-11					.20 .13	NO NO		16	
D	18B	9		P17-C40 SHLD D18	2				.18 .20	NO NO		17	
D	18R			J4-26 P17-B41	2				.13 .18	NO NO		16 18	
D	18Y			J4-12 P17-B40	2				.13 .18	NO NO		16 18	
D	19	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D	19A	9		SHLD D19 J4-1					.20 .13	NO NO		16	
D	19B	9		P17-C26 SHLD D19	1				.18 .20	NO NO		17	
D	19R			J4-6 P17-B26	1				.13 .18	NO NO		16 18	
D	19Y			J4-7 P17-A26	1				.13 .18	NO NO		16 18	
D	20	1		J4-5 P17-D25	1				.13 .18	NO NO		16 17	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR	B	SHEET 18 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	21	1		J4-4 P17-F25	1				.13 .18	NO NO		16 17	
D	22	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D	22A	9		SHLD D22 J1-17					.20 .13	NO NO		16	
D	22B	9		P17-F3 SHLD D22	1				.18 .20	NO NO		17	
D	22R			J1-34 P17-F1	1				.13 .18	NO NO		16 18	
D	22Y			J1-33 P17-F2	1				.13 .18	NO NO		16 18	
D	23	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D	23A	9		SHLD D23 J1-18					.20 .13	NO NO		16	
D	23B	9		P17-K3 SHLD D23	1				.18 .20	NO NO		17	
D	23R			J1-35 P17-H4	1				.13 .18	NO NO		16 18	
D	23Y			J1-36 P17-K4	1				.13 .18	NO NO		16 18	
D	24	6				1.75 1.00	1.50 .75				6B 6B	20 20	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR	B	SHEET 19 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	24A	9		SHLD D24 J1-14					.20 .13	NO NO		16	
D	24B	9		P17-G3 SHLD D24	1				.18 .20	NO NO		17	
D	24R			J1-30 P17-G2	1				.13 .18	NO NO		16 18	
D	24Y			J1-29 P17-G1	1				.13 .18	NO NO		16 18	
D	25	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D	25A	9		SHLD D25 J1-15					.20 .13	NO NO		16	
D	25B	9		P17-H3 SHLD D25	1				.18 .20	NO NO		17	
D	25R			J1-31 P17-H1	1				.13 .18	NO NO		16 18	
D	25Y			J1-32 P17-H2	1				.13 .18	NO NO		16 18	
D	26	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D	26A	9		SHLD D26 J1-20					.20 .13	NO NO		16	
D	26B	9		P17-G6 SHLD D26	1				.18 .20	NO NO		17	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR	B	SHEET 20 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	26R			J1-19 P17-H6	1				.13 .18	NO NO		16 18	
D	26Y			J1-37 P17-K6	1				.13 .18	NO NO		16 18	
D	27	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D	27A	9		SHLD D27 J1-21					.20 .13	NO NO		16	
D	27B	9		P17-G5 SHLD D27	1				.18 .20	NO NO		17	
D	27R			J1-38 P17-K5	1				.13 .18	NO NO		16 18	
D	27Y			J1-39 P17-H5	1				.13 .18	NO NO		16 18	
D	28	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D	28A	9		SHLD D28 J1-13					.20 .13	NO NO		16	
D	28B	10		P17-C4 SHLD D28	1				.22 .20	NO NO			
D	28R			J1-28 P17-A4	1				.13 .22	NO NO		16	
D	28Y			J1-27 P17-B4	1				.13 .22	NO NO		16	

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR	B	SHEET 21 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 29	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 29A	9		SHLD D29 J1-16					.20 .13	NO NO		16	
D 29B	10		P17-C5 SHLD D29	1				.22 .20	NO NO			
D 29R			J1-6 P17-B5	1				.13 .22	NO NO		16	
D 29Y			J1-5 P17-A5	1				.13 .22	NO NO		16	
D 30	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 30A	9		SHLD D30 J1-1					.20 .13	NO NO		16	
D 30B	10		P17-C6 SHLD D30	1				.22 .20	NO NO			
D 30R			J1-4 P17-A6	1				.13 .22	NO NO		16	
D 30Y			J1-3 P17-B6	1				.13 .22	NO NO		16	
D 31	7											
D 31G			J1-26 P17-D4	1				.13 .18	NO NO		16 18	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 22 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 31R			J1-43 P17-D6	1				.13 .18	NO NO		16 18	
D 31Y			J1-44 P17-D5	1				.13 .18	NO NO		16 18	
D 32	7											
D 32G			J1-8 P17-F4	1				.13 .18	NO NO		16 18	
D 32R			J1-7 P17-F5	1				.13 .18	NO NO		16 18	
D 32Y			J1-2 P17-F6	1				.13 .18	NO NO		16 18	
D 35	2		J1-25 P17-A3	1				.13 .18	NO NO		16 18	
D 36	4											
D 36R			J1-40 P17-K8	1				.13 .18	NO NO		16 17	
D 36Y			J1-23 P17-H8	1				.13 .18	NO NO		16 17	
D 37	4											
D 37R			J1-41 P17-K9	1				.13 .18	NO NO		16 17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 23 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 37Y			J1-42 P17-K10	1				.13 .18	NO NO		16 17	
D 40	2		J3-8 P17-C16	1				.13 .18	NO NO		16 18	B B
D 42	2		J3-7 P17-B16	1				.13 .18	NO NO		16 18	B B
D 50	2		J3-2 P17-C18	1				.13 .18	NO NO		16 18	B B
D 55	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 55A	9		SHLD D55 J3-30					.20 .13	NO NO		16	
D 55B	10		P17-C4 SHLD D55	1				.22 .20	NO NO		17	
D 55R			J3-31 P17-A4	1				.13 .22	NO NO		16 17	
D 55Y			J3-15 P17-B4	1				.13 .22	NO NO		16 17	
D 56	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 56A	9		SHLD D56 J3-52					.20 .13	NO NO		16	
D 56B	10		P17-C5 SHLD D56	1				.22 .20	NO NO		17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 24 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 56R			J3-77 P17-B5	1				.13 .22	NO NO		16 17	
D 56Y			J3-53 P17-A5	1				.13 .22	NO NO		16 17	
D 57	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 57A	9		SHLD D57 J3-51					.20 .13	NO NO		16	
D 57B	10		P17-C6 SHLD D57	1				.22 .20	NO NO		17	
D 57R			J3-75 P17-A6	1				.13 .22	NO NO		16 17	
D 57Y			J3-76 P17-B6	1				.13 .22	NO NO		16 17	
D 58	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 58A	9		SHLD D58 J3-46					.20 .13	NO NO		16	
D 58B	10		P17-G33 SHLD D58	2				.22 .20	NO NO		17	
D 58R			J3-71 P17-H33	2				.13 .22	NO NO		16 17	
D 58Y			J3-70 P17-K33	2				.13 .22	NO NO		16 17	

SIZE A | CODE IDENT NO. 80230 | 2010777
SCALE-NONE | REV LTR B | SHEET 25 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 59	6				1.50 1.00	1.25 .75				68 68	20 20	
D 59A	9		SHLD D59 J3-69					.20 .13	NO NO		 16	
D 59B	10		P17-G34 SHLD D59	2				.22 .20	NO NO		17	
D 59R			J3-45 P17-K34	 2				.13 .22	NO NO		16 17	
D 59Y			J3-44 P17-H34	 2				.13 .22	NO NO		16 17	
D 60	6				1.50 1.00	1.25 .75				68 68	20 20	
D 60A	9		SHLD D60 J3-28					.20 .13	NO NO		 16	
D 60B	10		P17-F27 SHLD D60	2				.22 .20	NO NO		17	
D 60R			J3-13 P17-F28	 2				.13 .22	NO NO		16 17	
D 60Y			J3-29 P17-F29	 2				.13 .22	NO NO		16 17	
D 61	6				1.50 1.00	1.25 .75				68 68	20 20	
D 61A	9		SHLD D61 J3-74					.20 .13	NO NO		 16	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 26 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 61B	10		P17-F33 SHLD D61	2				.22 .20	NO NO		17	
D 61R			J3-49 P17-F31	 2				.13 .22	NO NO		16 17	
D 61Y			J3-50 P17-F32	 2				.13 .22	NO NO		16 17	
D 62	6				1.50 1.00	1.25 .75				68 68	20 20	
D 62A	9		SHLD D62 J3-27					.20 .13	NO NO		 16	
D 62B	10		P17-G25 SHLD D62	1				.22 .20	NO NO		17	
D 62R			J3-26 P17-H25	 1				.13 .22	NO NO		16 17	
D 62Y			J3-47 P17-K25	 1				.13 .22	NO NO		16 17	
D 63	6				1.50 1.00	1.25 .75				68 68	20 20	
D 63A	9		SHLD D63 J3-48					.20 .13	NO NO		 16	
D 63B	10		P17-G26 SHLD D63	1				.22 .20	NO NO		17	
D 63R			J3-72 P17-K26	 1				.13 .22	NO NO		16 17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 27 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 63Y			J3-73 P17-H26	 1				.13 .22	NO NO		16 17	
D 64	4											
D 64R			J3-67 P17-H9	 1				.13 .18	NO NO		16 17	
D 64Y			J3-68 P17-H10	 1				.13 .18	NO NO		16 17	
D 65	8				1.75 1.00	1.50 .75				68 68	20 20	
D 65A	9		SHLD D65 J2-44					.20 .13	NO NO		 15	
D 65B	9		P17-C21 SHLD D65	1				.18 .20	NO NO		17	
D 65G			J2-25 P17-B21	 1				.13 .18	NO NO		15 17	
D 65R			J2-46 P17-C20	 1				.13 .18	NO NO		15 17	
D 65Y			J2-45 P17-B20	 1				.13 .18	NO NO		15 17	
D 66	3				1.75 1.00	1.50 .75				68 68	53 53	
D 66A	9		SHLD D66 J2-26					.20 .13	NO NO		 15	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 28 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 66B	9		P17-B19 SHLD D66	1				.18 .20	NO NO		17	
D 66Y			J2-47 P17-C19	 1				.13 .18	NO NO		15 17	
D 67	5											A A
D 67R			J2-55 P17-A31	 2				.13 .18	NO NO		15 18	A A
D 67Y			J2-56 P17-B31	 2				.13 .18	NO NO		15 18	A A
D 68	5											A A
D 68R			J2-54 P17-A32	 2				.13 .18	NO NO		15 18	A A
D 68Y			J2-32 P17-B32	 2				.13 .18	NO NO		15 18	A A
D 69	5											A A
D 69R			J2-17 P17-A33	 2				.13 .18	NO NO		15 18	A A
D 69Y			J2-33 P17-B33	 2				.13 .18	NO NO		15 18	A A
D 70	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 29 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 70R			J2-16 P17-A34	2				.13 .18	NO NO		15 18	A A
D 70Y			J2-5 P17-B34	2				.13 .18	NO NO		15 18	A A
D 71	5											A A
D 71R			J2-57 P17-A35	2				.13 .18	NO NO		15 18	A A
D 71Y			J2-34 P17-B35	2				.13 .18	NO NO		15 18	A A
D 72	5											A A
D 72R			J2-18 P17-A36	2				.13 .18	NO NO		15 18	A A
D 72Y			J2-35 P17-B36	2				.13 .18	NO NO		15 18	A A
D 73	5											A A
D 73R			J2-15 P17-A28	2				.13 .18	NO NO		15 18	A A
D 73Y			J2-30 P17-B28	2				.13 .18	NO NO		15 18	A A
D 74	5											A A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 30 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 74R			J2-52 P17-A29	2				.13 .18	NO NO		15 18	A A
D 74Y			J2-53 P17-B29	2				.13 .18	NO NO		15 18	A A
D 75	5											A A
D 75R			J2-50 P17-F37	2				.13 .18	NO NO		15 18	A A
D 75Y			J2-51 P17-F36	2				.13 .18	NO NO		15 18	A A
D 76	5											A A
D 76R			J2-13 P17-K37	2				.13 .18	NO NO		15 18	A A
D 76Y			J2-29 P17-H37	2				.13 .18	NO NO		15 18	A A
D 77	5											A A
D 77R			J2-12 P17-H36	2				.13 .18	NO NO		15 18	A A
D 77Y			J2-27 P17-K36	2				.13 .18	NO NO		15 18	A A
D 78	5											A A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 31 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 78R			J2-48 P17-G41	2				.13 .18	NO NO		15 18	A A
D 78Y			J2-49 P17-H41	2				.13 .18	NO NO		15 18	A A
D 79	5											A A
D 79R			J2-1 P17-F40	2				.13 .18	NO NO		15 18	A A
D 79Y			J2-4 P17-F39	2				.13 .18	NO NO		15 18	A A
D 80	5											A A
D 80R			J2-11 P17-H38	2				.13 .18	NO NO		15 18	A A
D 80Y			J2-24 P17-K38	2				.13 .18	NO NO		15 18	A A
D 81	5											A A
D 81R			J2-10 P17-K39	2				.13 .18	NO NO		15 18	A A
D 81Y			J2-2 P17-H39	2				.13 .18	NO NO		15 18	A A
D 82	5											A A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 32 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 82R			J2-59 P17-H15	2				.13 .18	NO NO		15 18	A A
D 82Y			J2-58 P17-K15	2				.13 .18	NO NO		15 18	A A
D 83	5											A A
D 83R			J2-7 P17-K14	2				.13 .18	NO NO		15 18	A A
D 83Y			J2-6 P17-H14	2				.13 .18	NO NO		15 18	A A
D 84	5											A A
D 84R			J2-36 P17-H17	2				.13 .18	NO NO		15 18	A A
D 84Y			J2-60 P17-K17	2				.13 .18	NO NO		15 18	A A
D 85	5											A A
D 85R			J2-8 P17-K16	2				.13 .18	NO NO		15 18	A A
D 85Y			J2-19 P17-H16	2				.13 .18	NO NO		15 18	A A
D 86	5											A A

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 33 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 86R			J2-61 P17-H13	2				.13 .18	NO NO		15 18	A A
D 86Y			J2-38 P17-K13	2				.13 .18	NO NO		15 18	A A
D 87	5											A A
D 87R			J2-39 P17-K12	2				.13 .18	NO NO		15 18	A A
D 87Y			J2-20 P17-H12	2				.13 .18	NO NO		15 18	A A
D 88	5											A A
D 88R			J2-43 P17-H21	2				.13 .18	NO NO		15 18	A A
D 88Y			J2-42 P17-G21	2				.13 .18	NO NO		15 18	A A
D 89	5											A A
D 89R			J2-22 P17-G20	2				.13 .18	NO NO		15 18	A A
D 89Y			J2-9 P17-H20	2				.13 .18	NO NO		15 18	A A
D 90	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 34 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 90R			J2-41 P17-H19	2				.13 .18	NO NO		15 18	A A
D 90Y			J2-40 P17-G19	2				.13 .18	NO NO		15 18	A A
D 91	3				1.50 1.00	1.25 .75				68 68	53 53	
D 91A	9		SHLD D91 J4-2					.20 .13	NO NO		16	
D 91B	9		P17-D27 SHLD D91	1				.18 .20	NO NO		17	
D 91Y			J4-3 P17-D26	1				.13 .18	NO NO		16 17	
D 96	7											
D 96G			J1-11 P17-F8	1				.13 .18	NO NO		16 18	
D 96R			J1-10 P17-G7	1				.13 .18	NO NO		16 18	
D 96Y			J1-9 P17-F7	1				.13 .18	NO NO		16 18	
D 97	2		J3-18 P17-A15	1				.13 .18	NO NO		16 18	B B
D 98	2		J3-36 P17-B15	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 35 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 99	2		J3-19 P17-C15	1				.13 .18	NO NO		16 18	B B
D 100	2		J3-62 P17-B17	1				.13 .18	NO NO		16 18	B B
D 101	2		J3-63 P17-C17	1				.13 .18	NO NO		16 18	B B
D 102	2		J3-38 P17-B18	1				.13 .18	NO NO		16 18	B B
D 103	2		J3-84 P17-D13	1				.13 .18	NO NO		16 18	B B
D 104	2		J3-60 P17-D12	1				.13 .18	NO NO		16 18	B B
D 105	2		J3-59 P17-D11	1				.13 .18	NO NO		16 18	B B
D 106	2		J3-41 P17-B2	1				.13 .18	NO NO		16 18	B B
D 107	2		J3-65 P17-B1	1				.13 .18	NO NO		16 18	B B
D 108	2		J3-40 P17-B3	1				.13 .18	NO NO		16 18	B B
D 109	2		J3-42 P17-C1	1				.13 .18	NO NO		16 18	B B
D 110	2		J3-66 P17-D1	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 36 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 111	2		J3-21 P17-D2	1				.13 .18	NO NO		16 18	B B
D 112	2		J3-22 P17-C2	1				.13 .18	NO NO		16 18	B B
D 113	2		J3-39 P17-D3	1				.13 .18	NO NO		16 18	B B
D 114	2		J3-64 P17-C3	1				.13 .18	NO NO		16 18	B B
D 115	2		J3-33 P17-A12	1				.13 .18	NO NO		16 18	B B
D 116	2		J3-17 P17-B12	1				.13 .18	NO NO		16 18	B B
D 117	2		J3-57 P17-A11	1				.13 .18	NO NO		16 18	B B
D 118	2		J3-82 P17-B11	1				.13 .18	NO NO		16 18	B B
D 119	2		J3-81 P17-A14	1				.13 .18	NO NO		16 18	B B
D 120	2		J3-80 P17-B13	1				.13 .18	NO NO		16 18	B B
D 121	2		J3-56 P17-A13	1				.13 .18	NO NO		16 18	B B
D 122	2		J3-24 P17-A9	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 37 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 123	2		J3-43					.13	NO		16	B
			P17-C10	1				.18	NO		18	B
D 124	2		J3-25					.13	NO		16	B
			P17-C9	1				.18	NO		18	B
D 125	2		J3-23					.13	NO		16	B
			P17-B9	1				.18	NO		18	B
D 126	2		J3-5					.13	NO		16	B
			P17-D8	1				.18	NO		18	B
D 127	2		J3-14					.13	NO		16	B
			P17-C8	1				.18	NO		18	B
D 128	2		J3-4					.13	NO		16	B
			P17-B10	1				.18	NO		18	B
D 129	2		J3-1					.13	NO		16	B
			P17-A10	1				.18	NO		18	B
D 130	4				1.50	1.25				68	20	SEE NOTE 29
					1.00	.75				68	20	
D 130A	9		SHLD D130					.20	NO			
			E2					.19	NO			
D 130B	9		P17-C11	1				.18	NO		17	
			SHLD D130					.20	NO			
D 130R			J3-3					.13	NO		16	
			P17-D10	1				.18	NO		17	
D 130Y			J3-11					.13	NO		16	
			P17-D9	1				.18	NO		17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 38 OF

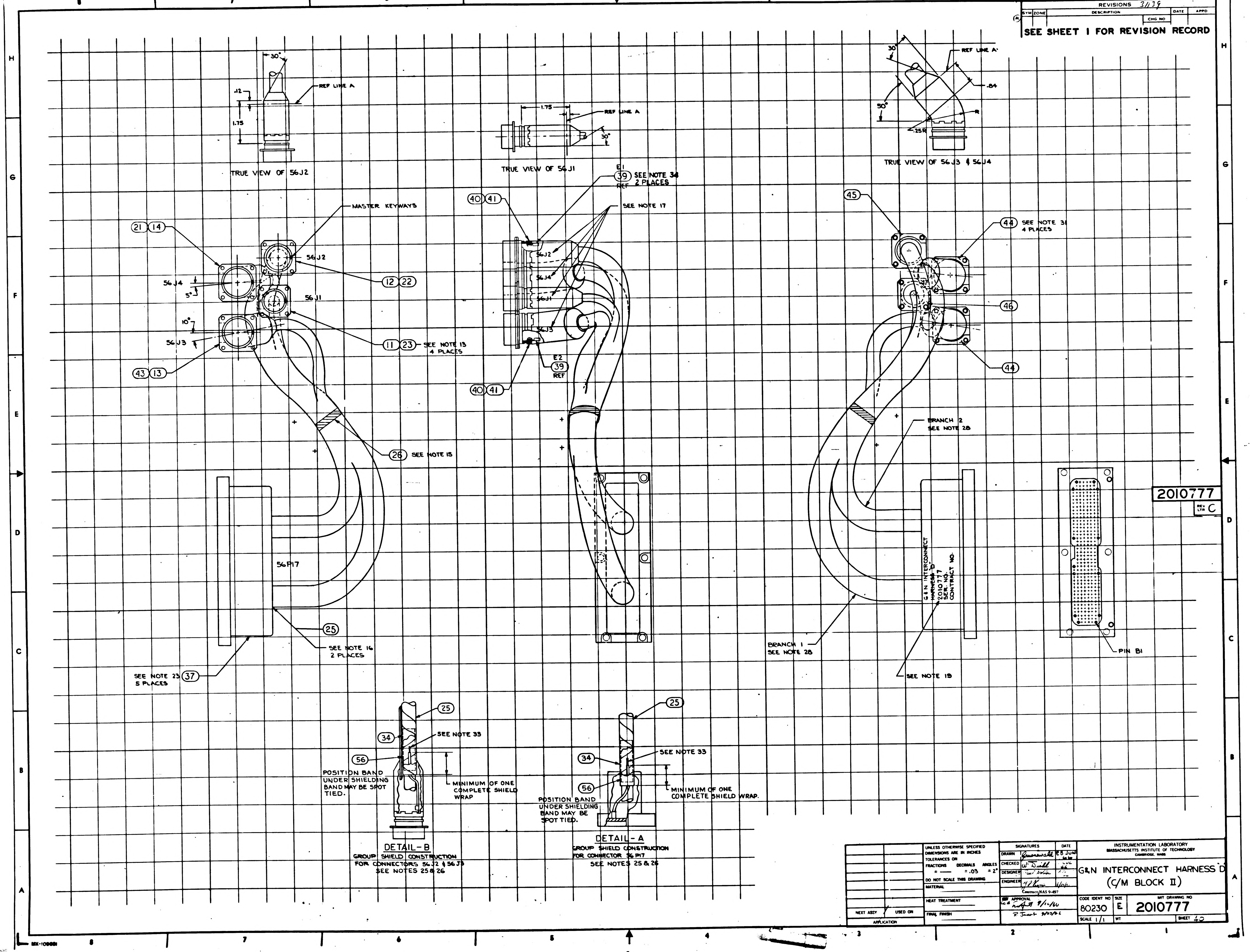
MIL 2084 9-65

CYZMOURE 102666 WIRING HARNESS D 2010777 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 131			DELETED									
D 132			DELETED									
D 133	1		E1					.19	YES		39	A
			SHLD A					.25	YES			
D 134	1		SHLD A					.25	YES			
			P17-H40	2				.18	NO		17	A
D 135	1		E2					.19	YES		39	B
			SHLD B					.25	YES			
D 136	1		SHLD B					.25	YES			
			P17-C12	1				.18	NO		17	B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR C	SHEET 39 OF

FORM 2084 9-65


30°
.12
REF LINE A
1.75
TRUE VIEW OF 56J2
1.75
REF LINE A
30°
TRUE VIEW OF 56J1
30°
REF LINE A
.84
50°
R
.25R
TRUE VIEW OF 56J3 & 56J4
MASTER KEYWAYS
21 14
56J2
56J4
5°
56J1
12 22
10°
56J3
11 23 SEE NOTE 13 4 PLACES
43 13
26 SEE NOTE 15
56P17
25
SEE NOTE 16 2 PLACES
SEE NOTE 23 37 5 PLACES
40 41
E1
39 SEE NOTE 34 2 PLACES
REF
SEE NOTE 17
56J2
56J4
56J1
56J3
E2
39
REF
40 41
45
44 SEE NOTE 31 4 PLACES
46
44
BRANCH 2 SEE NOTE 28
G&N INTERCONNECT
HARNESS "D"
2010777
SER. NO.
CONTRACT NO.
BRANCH 1 SEE NOTE 28
SEE NOTE 19
PIN B1
25
34
SEE NOTE 33
56
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP
DETAIL-B
GROUP SHIELD CONSTRUCTION FOR CONNECTORS 56J2 & 56J3
SEE NOTES 25 & 26
25
34
SEE NOTE 33
56
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP.
DETAIL-A
GROUP SHIELD CONSTRUCTION FOR CONNECTOR 56P17
SEE NOTES 25 & 26
2010777
REV LTR C

REVISIONS 3139				
SYM	ZONE	DESCRIPTION CHG NO	DATE	APPD
SEE SHEET 1 FOR REVISION RECORD				

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± —— DECIMALS ±.03 ANGLES ±2° DO NOT SCALE THIS DRAWING	SIGNATURES / DATE DRAWN Gruenewald 28 JUN 66 CHECKED W. Diehl JUL 66 DESIGNER ENGINEER 8/10/66 Contract NAS 9-497	INSTRUMENTATION LABORATORY MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS.
APPLICATION		MATERIAL HEAT TREATMENT FINAL FINISH	APPROVAL 9/12/66 R. Jacob 9/23/66	G&N INTERCONNECT HARNESS "D" (C/M BLOCK II)
				CODE IDENT NO. 80230 SIZE E MIT DRAWING NO. 2010777 SCALE 1/1 WT SHEET 40

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	wS
B	REVISED PER TDRR 31200	10·4·66	JJB
C	REVISED PER TDRR 31213	21 OCT 66	EC
D	REVISED PER TDRR 32383	11 JAN. 67	JRK RCG

REV	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	C	C						
SHEET	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40						

REV STATUS OF SHEETS																								
REV				D	B	D	C	B	B	B	D	C	D	B	B	B	B	B	B	B	B	B	B
SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAFTSMAN	R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER	1 Jul 66
ENGINEER	6 Jul 66
APPROVAL	Aug 13 66
CONTR NO.	NAS 9-497
NASA APPROVAL	R. Jacob
CCA APPROVAL	9/22/66

G&N INTERCONNECT HARNESS "D" (C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010777
SCALE NONE		SHEET 1 OF 40

MIL 1377A6 12-65

LIMA 101266 WIRING HARNESS D 2010777

NOTE NUMBER | GENERAL NOTES DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014674.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.

A- FROM END OF SHIELD
B- TO END OF SHIELD
G- GREEN
K- BLACK
L- BLUE
N- BROWN
R- RED
W- WHITE
Y- YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER.

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.

8 UNLESS OTHERWISE SPECIFIED, FEATURE CENTER LINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 2 OF

MIL 2084 9-65

GRIESMAN 011767 WIRING HARNESS D 2010777 D

NOTE NUMBER | GENERAL NOTES DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES OF CONNECTORS 56J1, J2, J3, AND J4 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 19.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 57.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 29 + 30 TO THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN, AS REQUIRED, TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR D	SHEET 3

FORM 2084 9-65

CYZMOURE 102666 WIRING HARNESS D 2010777 C

NOTE NUMBER | GENERAL NOTES DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN'
  A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
  B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 28 AND 33.

24 CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE ASSEMBLED AS SHOWN ON THE CONFIGURATION DRAWING.

25 GROUP SHIELDING-WRAP CABLE WITH ONE CONTINUOUS LENGTH OF SHIELDING TAPE. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH A MINIMUM OF TWO WRAPS OF INSULATION TAPE ITEM NO.25. WRAP LAYERS IN OPPOSITE DIRECTION, CLOCKWISE, COUNTER-CLOCKWISE, ETC. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS.

27 DELETED

28 CONDUCTORS SHALL ENTER CONNECTOR 56P17 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE TERM. AREA NO. COLUMN.

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR C	SHEET 4 OF

FORM 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

NOTE NUMBER | GENERAL NOTES DESCRIPTION

29 ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 42, OVER CONDUCTOR D130. ALLOW 1.75 INCH OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 25, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071 FIGURE 6B.

30 PERFORM WORKMANSHIP VIBRATION'
  A. SINUSOIDAL SWEEP AT 3.5 G RMS, LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
  B. VIBRATION ALONG THE X AXIS OF THE SPACECRAFT.
  C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
  D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

31 BOND NUT PLATE ASSEMBLIES TO CONNECTORS 56J1, J2, J3, AND J4 PER ND1002004, USING ITEMS 47 AND 48.

32 ASSEMBLE SHRINK SLEEVE, ITEM 49, OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P17. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

33 SOLDER PER ND1002071 USING ITEM 50, OR ITEMS 51 AND 52.

34 BOND TERMINAL LUG ITEM 39 AND SCREW TO ADAPTER PER ND1002187, TYPE III, USING ITEMS 29, 30, 54, AND 55.

SIZE A	CODE IDENT NO. 80230	2010777
SCALE-NONE	REV LTR B	SHEET 5 OF

MIL 2084 9-65

IMA 101266 WIRING HARNESS D 2010777 8

NOTE NUMBER

GENERAL NOTES

DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR 8	SHEET 6 OF	

2084 3-65

LIMA 101266 WIRING HARNESS D 2010777 B

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010777-001	WIRE PER 1010789-006, 22 AWG, YEL- 5 FT TOT LG
	2	1	2010777-002	WIRE PER 1010789-016, 26 AWG, YEL- 65 FT TOT LG
	3	1	2010777-003	WIRE PER 1010789-011, 24 AWG, YEL, YEL JKT- 5 FT TOT LG
	4	1	2010777-004	WIRE PER 1010789-008, 22 AWG, YEL, RED- 5 FT TOT LG
	5	1	2010777-005	WIRE PER 1010789-017, 26 AWG, YEL, RED- 50 FT TOT LG
	6	1	2010777-006	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT- 60 FT TOT LG
	7	1	2010777-007	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN- 5 FT TOT LG
	8	1	2010777-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT- 5 FT TOT LG
	9	1	2010777-009	WIRE PER 1010789-002, 24 AWG, BLK- 78 FT TOT LG
	10	1	2010777-010	WIRE PER 1010789-024, 26 AWG, BLK- 50 FT TOT LG
9	11	1	1010930-009	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J1)
9	12	1	1010930-105	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J2)
9	13	1	1010930-002	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J3)

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR B	SHEET 7 OF	

MIL 2084 9-65

GRIESMAN 011767 WIRING HARNESS D 2010777 D

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	14	1	1010930-001	CONNECTOR, RECEPTACLE, ELECTRICAL- (56J4)
9	15	X	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010930
9	16	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010930.
9	17	67	1010955-001	CONTACT, MALE
9	18	132	1010955-002	CONTACT, MALE
9	19	52	1010958-001	PLUG, PROTECTIVE, DUST AND MOISTURE SEAL
9	20	78	1010402- 2	SLEEVE, SOLDER, HIGH TEMPERATURE
	21	1	2014670-004	ADAPTER, CONNECTOR
	22	1	2014670-012	ADAPTER, CONNECTOR
	23	1	2014670-007	ADAPTER, CONNECTOR
	24		1012507-004	DELETED
	25	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	26	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	28	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	29	AR	1010679	ADHESIVE, ACTIVATOR
9	30	AR	1010661	EPOXY RESIN
9	33	AR	1012504	PRIMER, METAL PARTS
9	34	AR	1010989	TAPE, SHEILDING, EMI/RFI- 16 FT TOT LG

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR D	SHEET 8	

CYZMOURE 102666 WIRING HARNESS D 2010777 C

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	35		1006776- 19	DELETED
	36		2010777-011	DELETED
9	37	1	2014744-021	CONNECTOR, PLUG, ELECTRICAL- (56P17)
	39	2	2021203	TERMINAL LUG, SOLDER
	40	2	MS35333-69	WASHER, LOCK
9	41	2	1006783- 93	SCREW, BUTTON HEAD, HEX SOCKET
	42	1	2010777-012	WIRE BRAID, QQ-B-575, 1/8 DIA., 36 AWG- 2 FT TOT LG
	43	1	2014670-011	ADAPTER, CONNECTOR
	44	2	2010725-011	NUT PLATE ASSEMBLY
	45	1	2010725-021	NUT PLATE ASSEMBLY
	46	1	2010725-031	NUT PLATE ASSEMBLY
9	47	AR	1010682	EPOXY, RESIN
9	48	AR	1010683	CURING AGENT, AMINE
9	49	199	1010490-114	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINK
	50	AR	SN60WRAP	SOLDER, QQ-S-571
	51	AR	SN60WS	SOLDER, QQ-S-571
	52	AR	MIL-F-14256 TYPE A OR W	FLUX

SIZE	CODE IDENT NO.		
A	80230	2010777	
SCALE-NONE	REV LTR C	SHEET 9 OF	

FORM 2084 9-65

GRIESMAN 011767 WIRING HARNESS D 2010777 D

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	53	4	1010402- 1	SLEEVE, SOLDER HI TEMPERATURE
9	54	AR	1008822	COLORANT, EPOXY BASE
9	55	AR	1006277	SILICA, PULVERIZED PYROGENIC
9	56	4	1010811-002	BAND, CABLE
9	57	AR	1012555-002	TAPE, LACING AND TYING

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR D	SHEET 1

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	1	6			1.50 1.00	1.25 .75				68 68	20 20	
D	1A	9	SHLD D1 J4-30					.20 .13	NO NO		16	
D	1B	9	P17-G31 SHLD D1	2				.18 .20	NO NO		17	
D	1R		J4-52 P17-H31	2				.13 .18	NO NO		16 18	
D	1Y		J4-51 P17-K31	2				.13 .18	NO NO		16 18	
D	2	6			1.50 1.00	1.25 .75				68 68	20 20	
D	2A	9	SHLD D2 J4-31					.20 .13	NO NO		16	
D	2B	9	P17-G32 SHLD D2	2				.18 .20	NO NO		17	
D	2R		J4-54 P17-K32	2				.13 .18	NO NO		16 18	
D	2Y		J4-53 P17-H32	2				.13 .18	NO NO		16 18	
D	3	6			1.50 1.00	1.25 .75				68 68	20 20	
D	3A	9	SHLD D3 J4-29					.20 .13	NO NO		16	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 11 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	3B	10	P17-G33 SHLD D3	2				.22 .20	NO NO			
D	3R		J4-13 P17-H33	2				.13 .22	NO NO		16	
D	3Y		J4-14 P17-K33	2				.13 .22	NO NO		16	
D	4	6			1.50 1.00	1.25 .75				68 68	20 20	
D	4A	9	SHLD D4 J4-32					.20 .13	NO NO		16	
D	4B	10	P17-G34 SHLD D4	2				.22 .20	NO NO			
D	4R		J4-16 P17-K34	2				.13 .22	NO NO		16	
D	4Y		J4-15 P17-H34	2				.13 .22	NO NO		16	
D	5	6			1.50 1.00	1.25 .75				68 68	20 20	
D	5A	9	SHLD D5 J4-36					.20 .13	NO NO		16	
D	5B	9	P17-G29 SHLD D5	2				.18 .20	NO NO		17	
D	5R		J4-59 P17-H29	2				.13 .18	NO NO		16 18	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 12 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D	5Y		J4-60 P17-K29	2				.13 .18	NO NO		16 18	
D	6	6			1.50 1.00	1.25 .75				68 68	20 20	
D	6A	9	SHLD D6 J4-37					.20 .13	NO NO		16	
D	6B	9	P17-G30 SHLD D6	2				.18 .20	NO NO		17	
D	6R		J4-61 P17-K30	2				.13 .18	NO NO		16 18	
D	6Y		J4-38 P17-H30	2				.13 .18	NO NO		16 18	
D	7	6			1.50 1.00	1.25 .75				68 68	20 20	
D	7A	9	SHLD D7 J4-33					.20 .13	NO NO		16	
D	7B	10	P17-F27 SHLD D7	2				.22 .20	NO NO			
D	7R		J4-56 P17-F28	2				.13 .22	NO NO		16	
D	7Y		J4-55 P17-F29	2				.13 .22	NO NO		16	
D	8	6			1.50 1.00	1.25 .75				68 68	20 20	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 13 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 8A	9		SHLD D8 J4-34					.20 .13	NO NO		16	
D 8B	10		P17-F33 SHLD D8	2				.22 .20	NO NO			
D 8R			J4-57 P17-F31	2				.13 .22	NO NO		16	
D 8Y			J4-58 P17-F32	2				.13 .22	NO NO		16	
D 9	6				1.50 1.00	1.25 .75				68 68	20 20	
D 9A	9		SHLD D9 J4-27					.20 .13	NO NO		16	
D 9B	9		P17-G27 SHLD D9	2				.18 .20	NO NO		17	
D 9R			J4-48 P17-H27	2				.13 .18	NO NO		16 18	
D 9Y			J4-47 P17-K27	2				.13 .18	NO NO		16 18	
D 10	6				1.50 1.00	1.25 .75				68 68	20 20	
D 10A	9		SHLD D10 J4-28					.20 .13	NO NO		16	
D 10B	9		P17-G28 SHLD D10	2				.18 .20	NO NO		17	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 14 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 10R			J4-49 P17-K28	2				.13 .18	NO NO		16 18	
D 10Y			J4-50 P17-H28	2				.13 .18	NO NO		16 18	
D 11	6				1.50 1.00	1.25 .75				68 68	20 20	
D 11A	9		SHLD D11 J4-35					.20 .13	NO NO		16	
D 11B	10		P17-G25 SHLD D11	1				.22 .20	NO NO			
D 11R			J4-17 P17-H25	1				.13 .22	NO NO		16	
D 11Y			J4-18 P17-K25	1				.13 .22	NO NO		16	
D 12	6				1.50 1.00	1.25 .75				68 68	20 20	
D 12A	9		SHLD D12 J4-20					.20 .13	NO NO		16	
D 12B	10		P17-G26 SHLD D12	1				.22 .20	NO NO			
D 12R			J4-19 P17-K26	1				.13 .22	NO NO		16	
D 12Y			J4-8 P17-H26	1				.13 .22	NO NO		16	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 15 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 13	6				1.50 1.00	1.25 .75				68 68	20 20	
D 13A	9		SHLD D13 J4-22					.20 .13	NO NO		16	
D 13B	9		P17-C25 SHLD D13	1				.18 .20	NO NO		17	
D 13R			J4-41 P17-A25	1				.13 .18	NO NO		16 18	
D 13Y			J4-42 P17-B25	1				.13 .18	NO NO		16 18	
D 14	6				1.50 1.00	1.25 .75				68 68	20 20	
D 14A	9		SHLD D14 J4-24					.20 .13	NO NO		16	
D 14B	9		P17-C39 SHLD D14	2				.18 .20	NO NO		17	
D 14R			J4-43 P17-B39	2				.13 .18	NO NO		16 18	
D 14Y			J4-44 P17-A39	2				.13 .18	NO NO		16 18	
D 15	6				1.50 1.00	1.25 .75				68 68	20 20	
D 15A	9		SHLD D15 J4-25					.20 .13	NO NO		16	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 16 OF

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 15B	9		P17-D40 SHLD D15	2				.18 .20	NO NO		17	
D 15R			J4-45 P17-D41	2				.13 .18	NO NO		16 18	
D 15Y			J4-46 P17-C41	2				.13 .18	NO NO		16 18	
D 16	6				1.50 1.00	1.25 .75				68 68	20 20	
D 16A	9		SHLD D16 J4-21					.20 .13	NO NO		16	
D 16B	9		P17-C24 SHLD D16	1				.18 .20	NO NO		17	
D 16R			J4-39 P17-B24	1				.13 .18	NO NO		16 18	
D 16Y			J4-40 P17-D24	1				.13 .18	NO NO		16 18	
D 17	6				1.50 1.00	1.25 .75				68 68	20 20	
D 17A	9		SHLD D17 J4-10					.20 .13	NO NO		16	
D 17B	9		P17-C38 SHLD D17	2				.18 .20	NO NO		17	
D 17R			J4-9 P17-A38	2				.13 .18	NO NO		16 18	

SIZE A | CODE IDENT NO. 80230 | 2010777

SCALE-NONE | REV LTR B | SHEET 17 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 17Y			J4-23 P17-B38	2				.13 .18	NO NO		16 18	
D 18	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 18A	9		SHLD D18 J4-11					.20 .13	NO NO		16	
D 18B	9		P17-C40 SHLD D18	2				.18 .20	NO NO		17	
D 18R			J4-26 P17-B41	2				.13 .18	NO NO		16 18	
D 18Y			J4-12 P17-B40	2				.13 .18	NO NO		16 18	
D 19	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 19A	9		SHLD D19 J4-1					.20 .13	NO NO		16	
D 19B	9		P17-C26 SHLD D19	1				.18 .20	NO NO		17	
D 19R			J4-6 P17-B26	1				.13 .18	NO NO		16 18	
D 19Y			J4-7 P17-A26	1				.13 .18	NO NO		16 18	
D 20	1		J4-5 P17-D25	1				.13 .18	NO NO		16 17	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE REV LTR B SHEET 18 OF

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 21	1		J4-4 P17-F25	1				.13 .18	NO NO		16 17	
D 22	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 22A	9		SHLD D22 J1-17					.20 .13	NO NO		16	
D 22B	9		P17-F3 SHLD D22	1				.18 .20	NO NO		17	
D 22R			J1-34 P17-F1	1				.13 .18	NO NO		16 18	
D 22Y			J1-33 P17-F2	1				.13 .18	NO NO		16 18	
D 23	6				1.50 1.00	1.25 .75				6B 6B	20 20	
D 23A	9		SHLD D23 J1-18					.20 .13	NO NO		16	
D 23B	9		P17-K3 SHLD D23	1				.18 .20	NO NO		17	
D 23R			J1-35 P17-H4	1				.13 .18	NO NO		16 18	
D 23Y			J1-36 P17-K4	1				.13 .18	NO NO		16 18	
D 24	6				1.75 1.00	1.50 .75				6B 6B	20 20	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE REV LTR B SHEET 19 OF

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 24A	9		SHLD D24 J1-14					.20 .13	NO NO		16	
D 24B	9		P17-G3 SHLD D24	1				.18 .20	NO NO		17	
D 24R			J1-30 P17-G2	1				.13 .18	NO NO		16 18	
D 24Y			J1-29 P17-G1	1				.13 .18	NO NO		16 18	
D 25	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 25A	9		SHLD D25 J1-15					.20 .13	NO NO		16	
D 25B	9		P17-H3 SHLD D25	1				.18 .20	NO NO		17	
D 25R			J1-31 P17-H1	1				.13 .18	NO NO		16 18	
D 25Y			J1-32 P17-H2	1				.13 .18	NO NO		16 18	
D 26	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 26A	9		SHLD D26 J1-20					.20 .13	NO NO		16	
D 26B	9		P17-G6 SHLD D26	1				.18 .20	NO NO		17	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE REV LTR B SHEET 20 OF

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 26R			J1-19 P17-H6	1				.13 .18	NO NO		16 18	
D 26Y			J1-37 P17-K6	1				.13 .18	NO NO		16 18	
D 27	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 27A	9		SHLD D27 J1-21					.20 .13	NO NO		16	
D 27B	9		P17-G5 SHLD D27	1				.18 .20	NO NO		17	
D 27R			J1-38 P17-K5	1				.13 .18	NO NO		16 18	
D 27Y			J1-39 P17-H5	1				.13 .18	NO NO		16 18	
D 28	6				1.75 1.00	1.50 .75				6B 6B	20 20	
D 28A	9		SHLD D28 J1-13					.20 .13	NO NO		16	
D 28B	10		P17-C4 SHLD D28	1				.22 .20	NO NO			
D 28R			J1-28 P17-A4	1				.13 .22	NO NO		16	
D 28Y			J1-27 P17-B4	1				.13 .22	NO NO		16	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE REV LTR B SHEET 21 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 29	6				1.75 1.00	1.50 .75				68 68	20 20	
D 29A	9		SHLD D29 J1-16					.20 .13	NO NO		16	
D 29B	10		P17-C5 SHLD D29	1				.22 .20	NO NO			
D 29R			J1-6 P17-B5	1				.13 .22	NO NO		16	
D 29Y			J1-5 P17-A5	1				.13 .22	NO NO		16	
D 30	6				1.75 1.00	1.50 .75				68 68	20 20	
D 30A	9		SHLD D30 J1-1					.20 .13	NO NO		16	
D 30B	10		P17-C6 SHLD D30	1				.22 .20	NO NO			
D 30R			J1-4 P17-A6	1				.13 .22	NO NO		16	
D 30Y			J1-3 P17-B6	1				.13 .22	NO NO		16	
D 31	7											
D 31G			J1-26 P17-D4	1				.13 .18	NO NO		16 18	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 22 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 31R			J1-43 P17-D6	1				.13 .18	NO NO		16 18	
D 31Y			J1-44 P17-D5	1				.13 .18	NO NO		16 18	
D 32	7											
D 32G			J1-8 P17-F4	1				.13 .18	NO NO		16 18	
D 32R			J1-7 P17-F5	1				.13 .18	NO NO		16 18	
D 32Y			J1-2 P17-F6	1				.13 .18	NO NO		16 18	
D 35	2		J1-25 P17-A3	1				.13 .18	NO NO		16 18	
D 36	4											
D 36R			J1-40 P17-K8	1				.13 .18	NO NO		16 17	
D 36Y			J1-23 P17-H8	1				.13 .18	NO NO		16 17	
D 37	4											
D 37R			J1-41 P17-K9	1				.13 .18	NO NO		16 17	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 23 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 37Y			J1-42 P17-K10	1				.13 .18	NO NO		16 17	
D 40	2		J3-8 P17-C16	1				.13 .18	NO NO		16 18	B B
D 42	2		J3-7 P17-B16	1				.13 .18	NO NO		16 18	B B
D 50	2		J3-2 P17-C18	1				.13 .18	NO NO		16 18	B B
D 55	6				1.50 1.00	1.25 .75				68 68	20 20	
D 55A	9		SHLD D55 J3-30					.20 .13	NO NO		16	
D 55B	10		P17-C4 SHLD D55	1				.22 .20	NO NO		17	
D 55R			J3-31 P17-A4	1				.13 .22	NO NO		16 17	
D 55Y			J3-15 P17-B4	1				.13 .22	NO NO		16 17	
D 56	6				1.50 1.00	1.25 .75				68 68	20 20	
D 56A	9		SHLD D56 J3-52					.20 .13	NO NO		16	
D 56B	10		P17-C5 SHLD D56	1				.22 .20	NO NO		17	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 24 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D 56R			J3-77 P17-B5	1				.13 .22	NO NO		16 17	
D 56Y			J3-53 P17-A5	1				.13 .22	NO NO		16 17	
D 57	6				1.50 1.00	1.25 .75				68 68	20 20	
D 57A	9		SHLD D57 J3-51					.20 .13	NO NO		16	
D 57B	10		P17-C6 SHLD D57	1				.22 .20	NO NO		17	
D 57R			J3-75 P17-A6	1				.13 .22	NO NO		16 17	
D 57Y			J3-76 P17-B6	1				.13 .22	NO NO		16 17	
D 58	6				1.50 1.00	1.25 .75				68 68	20 20	
D 58A	9		SHLD D58 J3-46					.20 .13	NO NO		16	
D 58B	10		P17-G33 SHLD D58	2				.22 .20	NO NO		17	
D 58R			J3-71 P17-H33	2				.13 .22	NO NO		16 17	
D 58Y			J3-70 P17-K33	2				.13 .22	NO NO		16 17	

SIZE A
CODE IDENT NO. 80230
2010777
SCALE-NONE
REV LTR B
SHEET 25 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	59	6				1.50 1.00	1.25 .75				68 68	20 20	
D	59A	9		SHLD D59 J3-69					.20 .13	NO NO		16	
D	59B	10		P17-G34 SHLD D59	2				.22 .20	NO NO		17	
D	59R			J3-45 P17-K34	2				.13 .22	NO NO		16 17	
D	59Y			J3-44 P17-H34	2				.13 .22	NO NO		16 17	
D	60	6				1.50 1.00	1.25 .75				68 68	20 20	
D	60A	9		SHLD D60 J3-28					.20 .13	NO NO		16	
D	60B	10		P17-F27 SHLD D60	2				.22 .20	NO NO		17	
D	60R			J3-13 P17-F28	2				.13 .22	NO NO		16 17	
D	60Y			J3-29 P17-F29	2				.13 .22	NO NO		16 17	
D	61	6				1.50 1.00	1.25 .75				68 68	20 20	
D	61A	9		SHLD D61 J3-74					.20 .13	NO NO		16	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 26 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	61B	10		P17-F33 SHLD D61	2				.22 .20	NO NO		17	
D	61R			J3-49 P17-F31	2				.13 .22	NO NO		16 17	
D	61Y			J3-50 P17-F32	2				.13 .22	NO NO		16 17	
D	62	6				1.50 1.00	1.25 .75				68 68	20 20	
D	62A	9		SHLD D62 J3-27					.20 .13	NO NO		16	
D	62B	10		P17-G25 SHLD D62	1				.22 .20	NO NO		17	
D	62R			J3-26 P17-H25	1				.13 .22	NO NO		16 17	
D	62Y			J3-47 P17-K25	1				.13 .22	NO NO		16 17	
D	63	6				1.50 1.00	1.25 .75				68 68	20 20	
D	63A	9		SHLD D63 J3-48					.20 .13	NO NO		16	
D	63B	10		P17-G26 SHLD D63	1				.22 .20	NO NO		17	
D	63R			J3-72 P17-K26	1				.13 .22	NO NO		16 17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 27 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	63Y			J3-73 P17-H26	1				.13 .22	NO NO		16 17	
D	64	4											
D	64R			J3-67 P17-H9	1				.13 .18	NO NO		16 17	
D	64Y			J3-68 P17-H10	1				.13 .18	NO NO		16 17	
D	65	8				1.75 1.00	1.50 .75				68 68	20 20	
D	65A	9		SHLD D65 J2-44					.20 .13	NO NO		15	
D	65B	9		P17-C21 SHLD D65	1				.18 .20	NO NO		17	
D	65G			J2-25 P17-B21	1				.13 .18	NO NO		15 17	
D	65R			J2-46 P17-C20	1				.13 .18	NO NO		15 17	
D	65Y			J2-45 P17-B20	1				.13 .18	NO NO		15 17	
D	66	3				1.75 1.00	1.50 .75				68 68	53 53	
D	66A	9		SHLD D66 J2-26					.20 .13	NO NO		15	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 28 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT		WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	66B	9		P17-B19 SHLD D66	1				.18 .20	NO NO		17	
D	66Y			J2-47 P17-C19	1				.13 .18	NO NO		15 17	
D	67	5											A A
D	67R			J2-55 P17-A31	2				.13 .18	NO NO		15 18	A A
D	67Y			J2-56 P17-B31	2				.13 .18	NO NO		15 18	A A
D	68	5											A A
D	68R			J2-54 P17-A32	2				.13 .18	NO NO		15 18	A A
D	68Y			J2-32 P17-B32	2				.13 .18	NO NO		15 18	A A
D	69	5											A A
D	69R			J2-17 P17-A33	2				.13 .18	NO NO		15 18	A A
D	69Y			J2-33 P17-B33	2				.13 .18	NO NO		15 18	A A
D	70	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 29 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	70R			J2-16 P17-A34	2				.13 .18	NO NO		15 18	A A
D	70Y			J2-5 P17-B34	2				.13 .18	NO NO		15 18	A A
D	71	5											A A
D	71R			J2-57 P17-A35	2				.13 .18	NO NO		15 18	A A
D	71Y			J2-34 P17-B35	2				.13 .18	NO NO		15 18	A A
D	72	5											A A
D	72R			J2-18 P17-A36	2				.13 .18	NO NO		15 18	A A
D	72Y			J2-35 P17-B36	2				.13 .18	NO NO		15 18	A A
D	73	5											A A
D	73R			J2-15 P17-A28	2				.13 .18	NO NO		15 18	A A
D	73Y			J2-30 P17-B28	2				.13 .18	NO NO		15 18	A A
D	74	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 30 OF

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	74R			J2-52 P17-A29	2				.13 .18	NO NO		15 18	A A
D	74Y			J2-53 P17-B29	2				.13 .18	NO NO		15 18	A A
D	75	5											A A
D	75R			J2-50 P17-F37	2				.13 .18	NO NO		15 18	A A
D	75Y			J2-51 P17-F36	2				.13 .18	NO NO		15 18	A A
D	76	5											A A
D	76R			J2-13 P17-K37	2				.13 .18	NO NO		15 18	A A
D	76Y			J2-29 P17-H37	2				.13 .18	NO NO		15 18	A A
D	77	5											A A
D	77R			J2-12 P17-H36	2				.13 .18	NO NO		15 18	A A
D	77Y			J2-27 P17-K36	2				.13 .18	NO NO		15 18	A A
D	78	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 31 OF

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	78R			J2-48 P17-G41	2				.13 .18	NO NO		15 18	A A
D	78Y			J2-49 P17-H41	2				.13 .18	NO NO		15 18	A A
D	79	5											A A
D	79R			J2-1 P17-F40	2				.13 .18	NO NO		15 18	A A
D	79Y			J2-4 P17-F39	2				.13 .18	NO NO		15 18	A A
D	80	5											A A
D	80R			J2-11 P17-H38	2				.13 .18	NO NO		15 18	A A
D	80Y			J2-24 P17-K38	2				.13 .18	NO NO		15 18	A A
D	81	5											A A
D	81R			J2-10 P17-K39	2				.13 .18	NO NO		15 18	A A
D	81Y			J2-2 P17-H39	2				.13 .18	NO NO		15 18	A A
D	82	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 32 OF

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	82R			J2-59 P17-H15	2				.13 .18	NO NO		15 18	A A
D	82Y			J2-58 P17-K15	2				.13 .18	NO NO		15 18	A A
D	83	5											A A
D	83R			J2-7 P17-K14	2				.13 .18	NO NO		15 18	A A
D	83Y			J2-6 P17-H14	2				.13 .18	NO NO		15 18	A A
D	84	5											A A
D	84R			J2-36 P17-H17	2				.13 .18	NO NO		15 18	A A
D	84Y			J2-60 P17-K17	2				.13 .18	NO NO		15 18	A A
D	85	5											A A
D	85R			J2-8 P17-K16	2				.13 .18	NO NO		15 18	A A
D	85Y			J2-19 P17-H16	2				.13 .18	NO NO		15 18	A A
D	86	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 33 OF

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	86R			J2-61 P17-H13	2				.13 .18	NO NO		15 18	A A
D	86Y			J2-38 P17-K13	2				.13 .18	NO NO		15 18	A A
D	87	5											A A
D	87R			J2-39 P17-K12	2				.13 .18	NO NO		15 18	A A
D	87Y			J2-20 P17-H12	2				.13 .18	NO NO		15 18	A A
D	88	5											A A
D	88R			J2-43 P17-H21	2				.13 .18	NO NO		15 18	A A
D	88Y			J2-42 P17-G21	2				.13 .18	NO NO		15 18	A A
D	89	5											A A
D	89R			J2-22 P17-G20	2				.13 .18	NO NO		15 18	A A
D	89Y			J2-9 P17-H20	2				.13 .18	NO NO		15 18	A A
D	90	5											A A

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 34 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	90R			J2-41 P17-H19	2				.13 .18	NO NO		15 18	A A
D	90Y			J2-40 P17-G19	2				.13 .18	NO NO		15 18	A A
D	91	3				1.50 1.00	1.25 .75				68 68	53 53	
D	91A	9		SHLD D91 J4-2					.20 .13	NO NO		16	
D	91B	9		P17-D27 SHLD D91	1				.18 .20	NO NO		17	
D	91Y			J4-3 P17-D26	1				.13 .18	NO NO		16 17	
D	96	7											
D	96G			J1-11 P17-F8	1				.13 .18	NO NO		16 18	
D	96R			J1-10 P17-G7	1				.13 .18	NO NO		16 18	
D	96Y			J1-9 P17-F7	1				.13 .18	NO NO		16 18	
D	97	2		J3-18 P17-A15	1				.13 .18	NO NO		16 18	B B
D	98	2		J3-36 P17-B15	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 35 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	99	2		J3-19 P17-C15	1				.13 .18	NO NO		16 18	B B
D	100	2		J3-62 P17-B17	1				.13 .18	NO NO		16 18	B B
D	101	2		J3-63 P17-C17	1				.13 .18	NO NO		16 18	B B
D	102	2		J3-38 P17-B18	1				.13 .18	NO NO		16 18	B B
D	103	2		J3-84 P17-D13	1				.13 .18	NO NO		16 18	B B
D	104	2		J3-60 P17-D12	1				.13 .18	NO NO		16 18	B B
D	105	2		J3-59 P17-D11	1				.13 .18	NO NO		16 18	B B
D	106	2		J3-41 P17-B2	1				.13 .18	NO NO		16 18	B B
D	107	2		J3-65 P17-B1	1				.13 .18	NO NO		16 18	B B
D	108	2		J3-40 P17-B3	1				.13 .18	NO NO		16 18	B B
D	109	2		J3-42 P17-C1	1				.13 .18	NO NO		16 18	B B
D	110	2		J3-66 P17-D1	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 36 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

	LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE. FIG	ACCESSORY ITEMS	REMARKS
D	111	2		J3-21 P17-D2	1				.13 .18	NO NO		16 18	B B
D	112	2		J3-22 P17-C2	1				.13 .18	NO NO		16 18	B B
D	113	2		J3-39 P17-D3	1				.13 .18	NO NO		16 18	B B
D	114	2		J3-64 P17-C3	1				.13 .18	NO NO		16 18	B B
D	115	2		J3-33 P17-A12	1				.13 .18	NO NO		16 18	B B
D	116	2		J3-17 P17-B12	1				.13 .18	NO NO		16 18	B B
D	117	2		J3-57 P17-A11	1				.13 .18	NO NO		16 18	B B
D	118	2		J3-82 P17-B11	1				.13 .18	NO NO		16 18	B B
D	119	2		J3-81 P17-A14	1				.13 .18	NO NO		16 18	B B
D	120	2		J3-80 P17-B13	1				.13 .18	NO NO		16 18	B B
D	121	2		J3-56 P17-A13	1				.13 .18	NO NO		16 18	B B
D	122	2		J3-24 P17-A9	1				.13 .18	NO NO		16 18	B B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 37 OF

MIL 2084 9-65

LIMA 101266 WIRING HARNESS D 2010777 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 123	2		J3-43 P17-C10	 1				.13 .18	NO NO		16 18	B B
D 124	2		J3-25 P17-C9	 1				.13 .18	NO NO		16 18	B B
D 125	2		J3-23 P17-B9	 1				.13 .18	NO NO		16 18	B B
D 126	2		J3-5 P17-D8	 1				.13 .18	NO NO		16 18	B B
D 127	2		J3-14 P17-C8	 1				.13 .18	NO NO		16 18	B B
D 128	2		J3-4 P17-B10	 1				.13 .18	NO NO		16 18	B B
D 129	2		J3-1 P17-A10	 1				.13 .18	NO NO		16 18	B B
D 130	4				1.50 1.00	1.25 .75				68 68	20 20	SEE NOTE 29
D 130A	9		SHLD D130 E2					.20 .19	NO NO			
D 130B	9		P17-C11 SHLD D130	1				.18 .20	NO NO		17	
D 130R			J3-3 P17-D10	 1				.13 .18	NO NO		16 17	
D 130Y			J3-11 P17-D9	 1				.13 .18	NO NO		16 17	

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR B	SHEET 38 OF

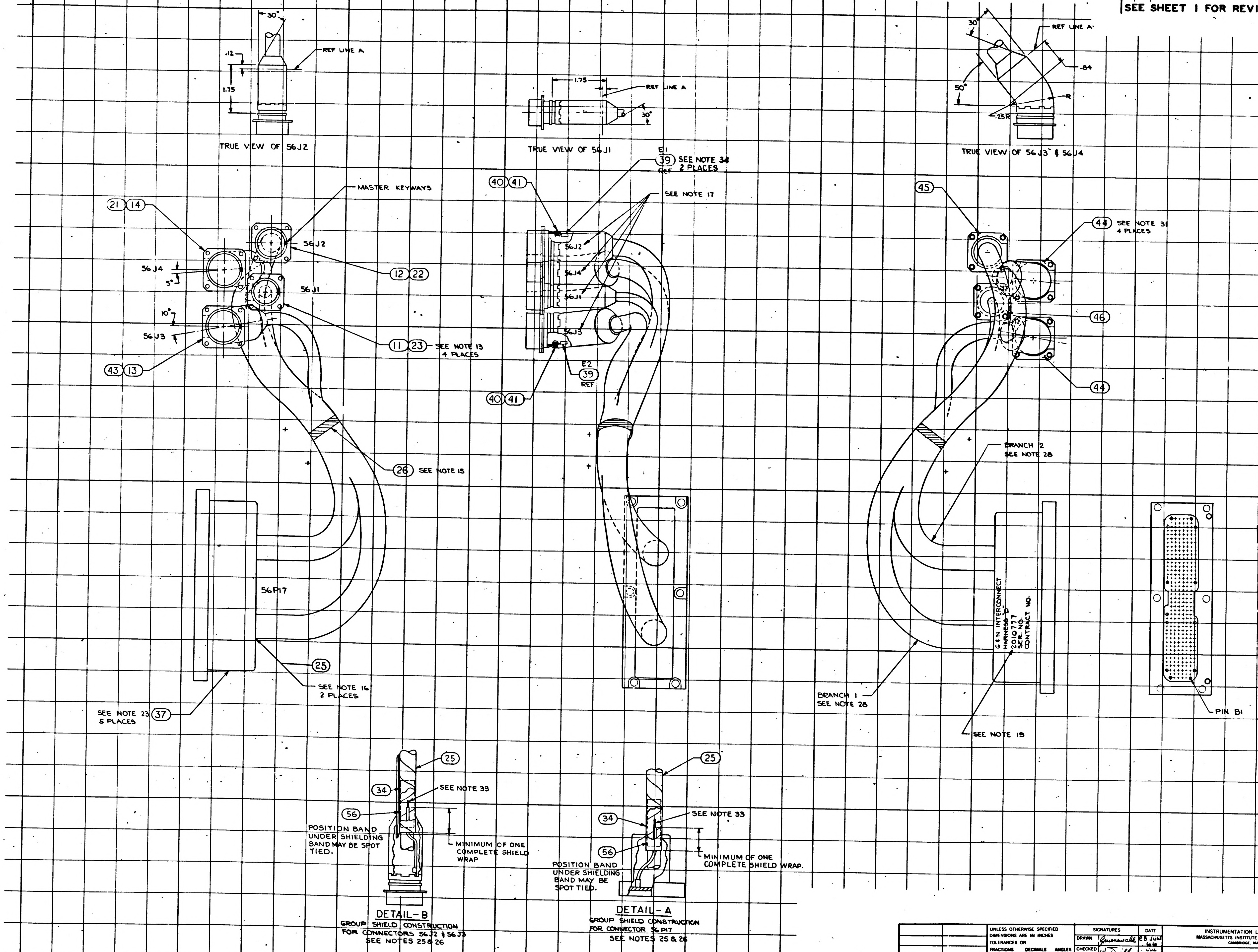
CYZMOURE 102666 WIRING HARNESS D 2010777 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
D 131			DELETED									
D 132			DELETED									
D 133	1		E1 SHLD A					.19 .25	YES YES		39	A
D 134	1		SHLD A P17-H40	 2				.25 .18	YES NO		 17	 A
D 135	1		E2 SHLD B					.19 .25	YES YES		39	B
D 136	1		SHLD B P17-C12	 1				.25 .18	YES NO		 17	 B

SIZE	CODE IDENT NO.	
A	80230	2010777
SCALE-NONE	REV LTR C	SHEET 39 OF

REVISIONS 31139				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		

SEE SHEET 1 FOR REVISION RECORD



30°
.12
1.75
REF LINE A
TRUE VIEW OF 56J2
1.75
REF LINE A
30°
TRUE VIEW OF 56J1
30
REF LINE A
.84
50°
R
.25R
TRUE VIEW OF 56J3 & 56J4
MASTER KEYWAYS
21 14
56J2
56J4
5°
56J1
12 22
10°
56J3
11 23 SEE NOTE 13 4 PLACES
43 13
E1
39 SEE NOTE 34 2 PLACES
REF
40 41
SEE NOTE 17
56J2
56J4
56J1
56J3
E2
39
REF
40 41
45
44 SEE NOTE 31 4 PLACES
46
44
26 SEE NOTE 15
BRANCH 2 SEE NOTE 28
56P17
25
SEE NOTE 16 2 PLACES
SEE NOTE 23 37 5 PLACES
G&N INTERCONNECT HARNESS "D" 2010777 SER. NO. CONTRACT NO.
BRANCH 1 SEE NOTE 28
SEE NOTE 19
PIN B1
25
34
SEE NOTE 33
56
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP
DETAIL-B
GROUP SHIELD CONSTRUCTION FOR CONNECTORS 56J2 & 56J3 SEE NOTES 25 & 26
25
34
SEE NOTE 33
56
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP.
DETAIL-A
GROUP SHIELD CONSTRUCTION FOR CONNECTOR 56P17 SEE NOTES 25 & 26

2010777
REV LTR C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.03 ANGLES ± 2° DO NOT SCALE THIS DRAWING	SIGNATURES		DATE	INSTRUMENTATION LABORATORY MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASS	
	DRAWN	Gruenewald	28 JUN 66	G&N INTERCONNECT HARNESS "D" (C/M BLOCK II)	
	CHECKED	W. Diehl	JUL 66		
	DESIGNER	Paul Tobin	66		
MATERIAL	ENGINEER				
	Contract NAS 9-497				
HEAT TREATMENT	APPROVAL CCB 9/12/66			CODE IDENT NO. 80230	SIZE E · MIT DRAWING NO. 2010777
FINAL FINISH	R. Jacob 9/23/66			SCALE 1/1	WT · SHEET 40

NEXT ASSY | USED ON
APPLICATION

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W. D.

REV																		
SHEET																		
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAFTSMAN R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER W.U. Diell 1 JUL '66
ENGINEER NEA Basta 5 JUL 66
APPROVAL AUG 15 66
CONTR NO. NAS 9-497
NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "E"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010778
SCALE NONE
SHEET 1 OF 17

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014675.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
   A - FROM END OF SHIELD
   B - TO END OF SHIELD
   G - GREEN
   K - BLACK
   L - BLUE
   N - BROWN
   R - RED
   W - WHITE
   Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 2 OF 17

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
   CONNECTOR 56P24, USE ITEM NUMBERS 14 AND 18.
   CONNECTOR 56P26, USE ITEM NUMBER 15.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 28.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 25 AND 26, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORY ITEMS AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, ITEM 30, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH. BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 3 OF 17

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
   A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
   B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA. ~~TEST PER MIL-STD-202.~~

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 23 AND 24.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 32 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P26. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 4 OF 17

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 5 OF 17

SEE NOTE LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010778-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010778-002	WIRE PER 1010789-001, 24 AWG, YEL, 5 FT TOT LG
	3	1	2010778-003	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	4	1	2010778-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 15 FT TOT LG
	6	1	2010778-005	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 20 FT TOTAL LENGTH
	7	1	2010778-006	WIRE PER 1010789-005, 24 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	8	1	2010778-007	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 40 FT TOT LG
	9	1	2010778-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	10	1	2010778-009	WIRE PER 1010789-002, 24 AWG, BLK, 15 FT TOT LG
	11	1	2010778-010	WIRE PER 1010789-012, 24 AWG, YEL, RED, YEL JKT 5 FT TOT LG
	12	1	2014745-021	CONNECTOR, PLUG, ELECTRICAL (P26)
9	13	1	1010929-004	CONNECTOR, PLUG, ELECTRICAL (P24)
9	14	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	15	80	1010955- 1	CONTACT, MALE
9	16	32	1010955- 2	CONTACT, MALE

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A		SHEET 6 OF 17

SEE NOTE LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	18	25	1010958- 1	PLUG, PROTECTIVE, SEALING
9	19	19	1010402- 2	SLEEVE, SOLDER
9	20	17	1012534- 36	INSULATION, SLEEVING (HEAT SHRINKABLE)
	23	AR	1012504	PRIMER, METAL PARTS
	24	AR	1012503	COMPOUND, POTTING, POLYURETHANE
	25	AR	1010679	ADHESIVE, ACTIVATOR
	26	AR	1010661	EPOXY RESIN
	27	1	2014670- 4	ADAPTER, CONNECTOR
9	28	AR	1012507- 4	TAPE, LACING
	29	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	30	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	31	1	2010778-011	WIRE PER 1010789-024, 26AWG, BLK, 1 FT TOT LG.
	32	76	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE).

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A		SHEET 7 OF 17

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 1	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 1B	10		P26-G13 SHLD E1					.18 .20	NO NO		15	
E 1R			P24-21 P26-G14					.13 .18	NO NO		14 16	
E 1Y			P24-39 P26-G15					.13 .18	NO NO		14 16	
E 2	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 2B	10		P26-F13 SHLD E2					.18 .20	NO NO		15	
E 2R			P24-65 P26-F14					.13 .18	NO NO		14 16	
E 2Y			P24-40 P26-F15					.13 .18	NO NO		14 16	
E 3	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 3B	10		P26-C2 SHLD E3					.18 .20	NO NO		15	
E 3R			P24-64 P26-B2					.13 .18	NO NO		14 16	
E 3Y			P24-63 P26-B1					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A		SHEET 8 OF 17

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 4	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 4B	10		P26-C3 SHLD E4					.18 .20	NO NO		15	
E 4R			P24-62 P26-A3					.13 .18	NO NO		14 16	
E 4Y			P24-38 P26-B3					.13 .18	NO NO		14 16	
E 5	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 5B	10		P26-G4 SHLD E5					.18 .20	NO NO		15	
E 5R			P24-75 P26-G6					.13 .18	NO NO		14 16	
E 5Y			P24-76 P26-G5					.13 .18	NO NO		14 16	
E 6	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 6B	10		P26-F3 SHLD E6					.18 .20	NO NO		15	
E 6R			P24-52 P26-F2					.13 .18	NO NO		14 16	
E 6Y			P24-77 P26-F1					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A		SHEET 9 OF 17

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 7	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 7B	10		P26-H3 SHLD E7					.18 .20	NO NO		15	
E 7R			P24-51 P26-H1					.13 .18	NO NO		14 16	
E 7Y			P24-30 P26-H2					.13 .18	NO NO		14 16	
E 8	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 8B	10		P26-G3 SHLD E8					.18 .20	NO NO		15	
E 8R			P24-78 P26-G1					.13 .18	NO NO		14 16	
E 8Y			P24-53 P26-G2					.13 .18	NO NO		14 16	
E 9	11				1.75 1.00	1.50 .75				7 6B	20 19	
E 9B	10		P26-D3 SHLD E9					.18 .20	NO NO		15	
E 9R			P24-74 P26-D1					.13 .18	NO NO		14 15	
E 9Y			P24-50 P26-D2					.13 .18	NO NO		14 15	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 10 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 10	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 10B	10		P26-C5 SHLD E10					.18 .20	NO NO		15	
E 10R			P24-71 P26-A5					.13 .18	NO NO		14 16	
E 10Y			P24-47 P26-B5					.13 .18	NO NO		14 16	
E 11	4											
E 11R			P24-44 P26-B14					.13 .18	NO NO		14 15	
E 11Y			P24-24 P26-C14					.13 .18	NO NO		14 15	
E 13	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 13B	31		P26-D6 SHLD E13					.18 .20	NO NO		15	
E 13R			P24-70 P26-D5					.13 .18	NO NO		14 16	
E 13Y			P24-46 P26-D4					.13 .18	NO NO		14 16	
E 14	8				1.75 1.00	1.50 .75				7 6B	20 19	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 11 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 14B	10		P26-C4 SHLD E14					.18 .20	NO NO		15	
E 14R			P24-48 P26-A4					.13 .18	NO NO		14 16	
E 14Y			P24-72 P26-B4					.13 .18	NO NO		14 16	
E 15	7											
E 15G			P24-80 P26-F9					.13 .18	NO NO		14 15	
E 15N			P24-79 P26-D10					.13 .18	NO NO		14 15	
E 15R			P24-54 P26-F10					.13 .18	NO NO		14 15	
E 15Y			P24-55 P26-D9					.13 .18	NO NO		14 15	
E 16	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 16B	10		P26-C10 SHLD E16					.18 .20	NO NO		15	
E 16R			P24-32 P26-B10					.13 .18	NO NO		14 16	
E 16Y			P24-33 P26-A10					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 12 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 17	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 17B	10		P26-C9 SHLD E17					.18 .20	NO NO		15	
E 17R			P24-81 P26-A9					.13 .18	NO NO		14 16	
E 17Y			P24-56 P26-B9					.13 .18	NO NO		14 16	
E 18	4											
E 18R			P24-85 P26-K12					.13 .18	NO NO		14 15	
E 18Y			P24-60 P26-H12					.13 .18	NO NO		14 15	
E 19	4											
E 19R			P24-59 P26-H13					.13 .18	NO NO		14 15	
E 19Y			P24-84 P26-K13					.13 .18	NO NO		14 15	
E 20	2		P24-82 P26-C13					.13 .18	NO NO		14 15	
E 21	9				1.75 1.00	1.50 .75				7 6B	20 19	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 13 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 21B	31		P26-D6 SHLD E21					.18 .20	NO NO			
E 21G			P24-13 P26-A6					.13 .18	NO NO		14 15	
E 21R			P24-12 P26-C6					.13 .18	NO NO		14 15	
E 21Y			P24-4 P26-B6					.13 .18	NO NO		14 15	
E 22	9				1.75 1.00	1.50 .75				7 68	20 19	
E 22B	10		P26-D8 SHLD E22					.18 .20	NO NO		15	
E 22G			P24-3 P26-B8					.13 .18	NO NO		14 15	
E 22R			P24-10 P26-C8					.13 .18	NO NO		14 15	
E 22Y			P24-2 P26-A8					.13 .18	NO NO		14 15	
E 23	9				1.75 1.00	1.50 .75				7 68	20 19	
E 23B	10		P26-D7 SHLD E23					.18 .20	NO NO		15	
E 23G			P24-7 P26-A7					.13 .18	NO NO		14 15	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 14 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 23R			P24-8 P26-C7					.13 .18	NO NO		14 15	
E 23Y			P24-19 P26-B7					.13 .18	NO NO		14 15	
E 24	6											
E 24G			P24-35 P26-B13					.13 .18	NO NO		14 16	
E 24R			P24-34 P26-A13					.13 .18	NO NO		14 16	
E 24Y			P24-58 P26-A12					.13 .18	NO NO		14 16	
E 25	4											
E 25R			P24-43 P26-K6					.13 .18	NO NO		14 15	
E 25Y			P24-23 P26-K7					.13 .18	NO NO		14 15	
E 26	4											
E 26R			P24-68 P26-K10					.13 .18	NO NO		14 15	
E 26Y			P24-67 P26-K11					.13 .18	NO NO		14 15	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 15 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

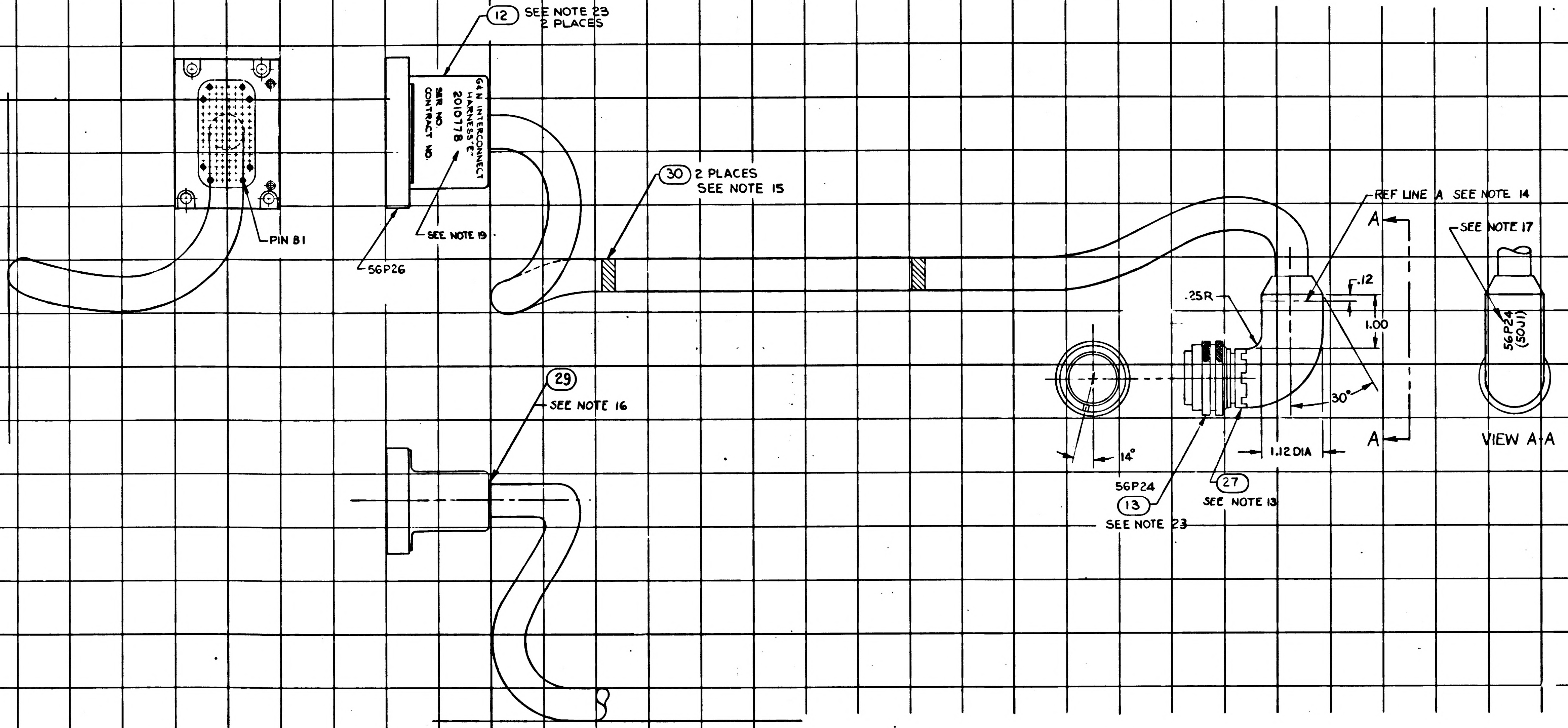
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 28	1		P24-20 P26-D15					.13 .18	NO NO		14 15	
E 29	3		P24-1 P26-K3					.13 .18	NO NO		14 16	
E 34	8				1.75 1.00	1.50 .75				68 68	19 19	
E 34A	10		SHLD E34 P24-42					.20 .13	NO NO		 14	
E 34B	10		P26-D14 SHLD E34					.18 .20	NO NO		15	
E 34R			P24-41 P26-B15					.13 .18	NO NO		14 16	
E 34Y			P24-66 P26-C15					.13 .18	NO NO		14 16	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 16 OF 17

MIL 2084 9-65

A | 2010778 | 2

REVISIONS ~~TDRC 31139~~					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD



(12) SEE NOTE 23
2 PLACES
G&N INTERCONNECT HARNESS "E"
2010778
SER NO
CONTRACT NO
PIN 81
56P26
SEE NOTE 19
(30) 2 PLACES
SEE NOTE 15
REF LINE A SEE NOTE 14
SEE NOTE 17
A
.12
.25R
1.00
56P24 (50J1)
30°
A
VIEW A-A
14°
1.12 DIA
56P24
(13)
SEE NOTE 23
(27)
SEE NOTE 13
(29)
SEE NOTE 16

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	2 PLACE DECIMALS	ANGLES
± —	±.03	±2°

DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE. MASS

DRAWN Gruenewald DATE 28 JUN 66
CHECKED W. Duell 1 JUL 66
APPROVAL Paul Watson AUG 15, 66
APPROVAL 1/10/66
NASA APPROVAL R Jacob 9/23/66
CCB ~~MIT~~ APPROVAL E. Austin

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "E"
(C/M BLOCK II)

CODE IDENT NO. 80230
SIZE D
2010778
SCALE 1:1
SHEET 17 OF 17

2010778

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W.D.
		B	REVISED PER TDRR 31201	4 OCT 66	BW SS

REV STATUS OF SHEETS	REV	B	A	B	A	A	B	A	A	A	A	A	A	A	A	A	A	B
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAFTSMAN R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER Diell 1 JUL 66
NSA ENGINEER Barta 5 JUL 66
APPROVAL AUG 15-66
CONTR NO. NAS 9-497
NASA APPROVAL R. Jacob
CCB APPROVAL 8/24/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "E"
(C/M, BLOCK II)

SIZE A | CODE IDENT. NO 80230 | 2010778

SCALE NONE | SHEET 1 OF 17

MIL 1377A6 12-65

NOTE NUMBER | GENERAL NOTES DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014675.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A	SHEET 2 OF 17	

NOTE NUMBER | GENERAL NOTES DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES OF CONNECTOR 56P24 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 18.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 28.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 25 AND 26, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF THE ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORY ITEMS AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, ITEM 30, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH. BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR B	SHEET 3 OF 17	

NOTE NUMBER | GENERAL NOTES DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA. ~~TEST PER MIL-STD-202.~~

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 23 AND 24.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 32 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P26. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A	SHEET 4 OF 17	

NOTE NUMBER | GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010778	
SCALE-NONE	REV LTR A	SHEET 5 OF 17	

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010778-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010778-002	WIRE PER 1010789-001, 24 AWG, YEL, 5 FT TOT LG
	3	1	2010778-003	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	4	1	2010778-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 15 FT TOT LG
	6	1	2010778-005	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 20 FT TOTAL LENGTH
	7	1	2010778-006	WIRE PER 1010789-005, 24 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	8	1	2010778-007	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 40 FT TOT LG
	9	1	2010778-008	WIRE PER 1010789-013, 24 AWG, YEL, RED, GRN, YEL JKT, 10 FT TOT LG
	10	1	2010778-009	WIRE PER 1010789-002, 24 AWG, BLK, 15 FT TOT LG
	11	1	2010778-010	WIRE PER 1010789-012, 24 AWG, YEL, RED, YEL JKT 5 FT TOT LG
	12	1	2014745-021	CONNECTOR, PLUG, ELECTRICAL (P26)
9	13	1	1010929-004	CONNECTOR, PLUG, ELECTRICAL (P24)
9	14	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010929
9	15	44	1010955- 1	CONTACT, MALE
9	16	32	1010955- 2	CONTACT, MALE

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR B	SHEET 6 OF 17

MIL 2084 9-65

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	18	25	1010958- 1	PLUG, PROTECTIVE, SEALING
9	19	19	1010402- 2	SLEEVE, SOLDER
9	20	17	1012534- 36	INSULATION, SLEEVING (HEAT SHRINKABLE)
	23	AR	1012504	PRIMER, METAL PARTS
	24	AR	1012503	COMPOUND, POTTING, POLYURETHANE
	25	AR	1010679	ADHESIVE, ACTIVATOR
	26	AR	1010661	EPOXY RESIN
	27	1	2014670- 4	ADAPTER, CONNECTOR
9	28	AR	1012507- 4	TAPE, LACING
	29	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	30	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
	31	1	2010778-011	WIRE PER 1010789-024, 26AWG, BLK, 1 FT TOT LG.
	32	76	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE).

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 7 OF 17

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 1	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 1B	10		P26-G13 SHLD E1					.18 .20	NO NO		15	
E 1R			P24-21 P26-G14					.13 .18	NO NO		14 16	
E 1Y			P24-39 P26-G15					.13 .18	NO NO		14 16	
E 2	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 2B	10		P26-F13 SHLD E2					.18 .20	NO NO		15	
E 2R			P24-65 P26-F14					.13 .18	NO NO		14 16	
E 2Y			P24-40 P26-F15					.13 .18	NO NO		14 16	
E 3	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 3B	10		P26-C2 SHLD E3					.18 .20	NO NO		15	
E 3R			P24-64 P26-B2					.13 .18	NO NO		14 16	
E 3Y			P24-63 P26-B1					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 8 OF 17

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 4	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 4B	10		P26-C3 SHLD E4					.18 .20	NO NO		15	
E 4R			P24-62 P26-A3					.13 .18	NO NO		14 16	
E 4Y			P24-38 P26-B3					.13 .18	NO NO		14 16	
E 5	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 5B	10		P26-G4 SHLD E5					.18 .20	NO NO		15	
E 5R			P24-75 P26-G6					.13 .18	NO NO		14 16	
E 5Y			P24-76 P26-G5					.13 .18	NO NO		14 16	
E 6	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 6B	10		P26-F3 SHLD E6					.18 .20	NO NO		15	
E 6R			P24-52 P26-F2					.13 .18	NO NO		14 16	
E 6Y			P24-77 P26-F1					.13 .18	NO NO		14 16	

SIZE	CODE IDENT NO.	
A	80230	2010778
SCALE-NONE	REV LTR A	SHEET 9 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 7	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 7B	10		P26-H3 SHLD E7					.18 .20	NO NO		15	
E 7R			P24-51 P26-H1					.13 .18	NO NO		14 16	
E 7Y			P24-30 P26-H2					.13 .18	NO NO		14 16	
E 8	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 8B	10		P26-G3 SHLD E8					.18 .20	NO NO		15	
E 8R			P24-78 P26-G1					.13 .18	NO NO		14 16	
E 8Y			P24-53 P26-G2					.13 .18	NO NO		14 16	
E 9	11				1.75 1.00	1.50 .75				7 6B	20 19	
E 9B	10		P26-D3 SHLD E9					.18 .20	NO NO		15	
E 9R			P24-74 P26-D1					.13 .18	NO NO		14 15	
E 9Y			P24-50 P26-D2					.13 .18	NO NO		14 15	

SIZE A | CODE IDENT NO. 80230 | 2010778
SCALE-NONE | REV LTR A | SHEET 10 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 10	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 10B	10		P26-C5 SHLD E10					.18 .20	NO NO		15	
E 10R			P24-71 P26-A5					.13 .18	NO NO		14 16	
E 10Y			P24-47 P26-B5					.13 .18	NO NO		14 16	
E 11	4											
E 11R			P24-44 P26-B14					.13 .18	NO NO		14 15	
E 11Y			P24-24 P26-C14					.13 .18	NO NO		14 15	
E 13	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 13B	31		P26-D6 SHLD E13					.18 .20	NO NO		15	
E 13R			P24-70 P26-D5					.13 .18	NO NO		14 16	
E 13Y			P24-46 P26-D4					.13 .18	NO NO		14 16	
E 14	8				1.75 1.00	1.50 .75				7 6B	20 19	

SIZE A | CODE IDENT NO. 80230 | 2010778
SCALE-NONE | REV LTR A | SHEET 11 OF 17

MIL 2084 9-65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 14B	10		P26-C4 SHLD E14					.18 .20	NO NO		15	
E 14R			P24-48 P26-A4					.13 .18	NO NO		14 16	
E 14Y			P24-72 P26-B4					.13 .18	NO NO		14 16	
E 15	7											
E 15G			P24-80 P26-F9					.13 .18	NO NO		14 15	
E 15N			P24-79 P26-D10					.13 .18	NO NO		14 15	
E 15R			P24-54 P26-F10					.13 .18	NO NO		14 15	
E 15Y			P24-55 P26-D9					.13 .18	NO NO		14 15	
E 16	8				1.75 1.00	1.50 .75				7 68	20 19	
E 16B	10		P26-C10 SHLD E16					.18 .20	NO NO		15	
E 16R			P24-32 P26-B10					.13 .18	NO NO		14 16	
E 16Y			P24-33 P26-A10					.13 .18	NO NO		14 16	

SIZE A | CODE IDENT NO. 80230 | 2010778
SCALE-NONE | REV LTR A | SHEET 12 OF 17

MIL 2084 9 65

WIRING HARNESS E 2010778

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 17	8				1.75 1.00	1.50 .75				7 6B	20 19	
E 17B	10		P26-C9 SHLD E17					.18 .20	NO NO		15	
E 17R			P24-81 P26-A9					.13 .18	NO NO		14 16	
E 17Y			P24-56 P26-B9					.13 .18	NO NO		14 16	
E 18	4											
E 18R			P24-85 P26-K12					.13 .18	NO NO		14 15	
E 18Y			P24-60 P26-H12					.13 .18	NO NO		14 15	
E 19	4											
E 19R			P24-59 P26-H13					.13 .18	NO NO		14 15	
E 19Y			P24-84 P26-K13					.13 .18	NO NO		14 15	
E 20	2		P24-82 P26-C13					.13 .18	NO NO		14 15	
E 21	9				1.75 1.00	1.50 .75				7 6B	20 19	

SIZE A | CODE IDENT NO. 80230 | 2010778
SCALE-NONE | REV LTR A | SHEET 13 OF 17

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 21B	31		P26-D6 SHLD E21					.18 .20	NO NO			
E 21G			P24-13 P26-A6					.13 .18	NO NO		14 15	
E 21R			P24-12 P26-C6					.13 .18	NO NO		14 15	
E 21Y			P24-4 P26-B6					.13 .18	NO NO		14 15	
E 22	9				1.75 1.00	1.50 .75				7 6B	20 19	
E 22B	10		P26-D8 SHLD E22					.18 .20	NO NO		15	
E 22G			P24-3 P26-B8					.13 .18	NO NO		14 15	
E 22R			P24-10 P26-C8					.13 .18	NO NO		14 15	
E 22Y			P24-2 P26-A8					.13 .18	NO NO		14 15	
E 23	9				1.75 1.00	1.50 .75				7 6B	20 19	
E 23B	10		P26-D7 SHLD E23					.18 .20	NO NO		15	
E 23G			P24-7 P26-A7					.13 .18	NO NO		14 15	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 14 OF 17

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 23R			P24-8 P26-C7					.13 .18	NO NO		14 15	
E 23Y			P24-19 P26-B7					.13 .18	NO NO		14 15	
E 24	6											
E 24G			P24-35 P26-B13					.13 .18	NO NO		14 16	
E 24R			P24-34 P26-A13					.13 .18	NO NO		14 16	
E 24Y			P24-58 P26-A12					.13 .18	NO NO		14 16	
E 25	4											
E 25R			P24-43 P26-K6					.13 .18	NO NO		14 15	
E 25Y			P24-23 P26-K7					.13 .18	NO NO		14 15	
E 26	4											
E 26R			P24-68 P26-K10					.13 .18	NO NO		14 15	
E 26Y			P24-67 P26-K11					.13 .18	NO NO		14 15	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 15 OF 17

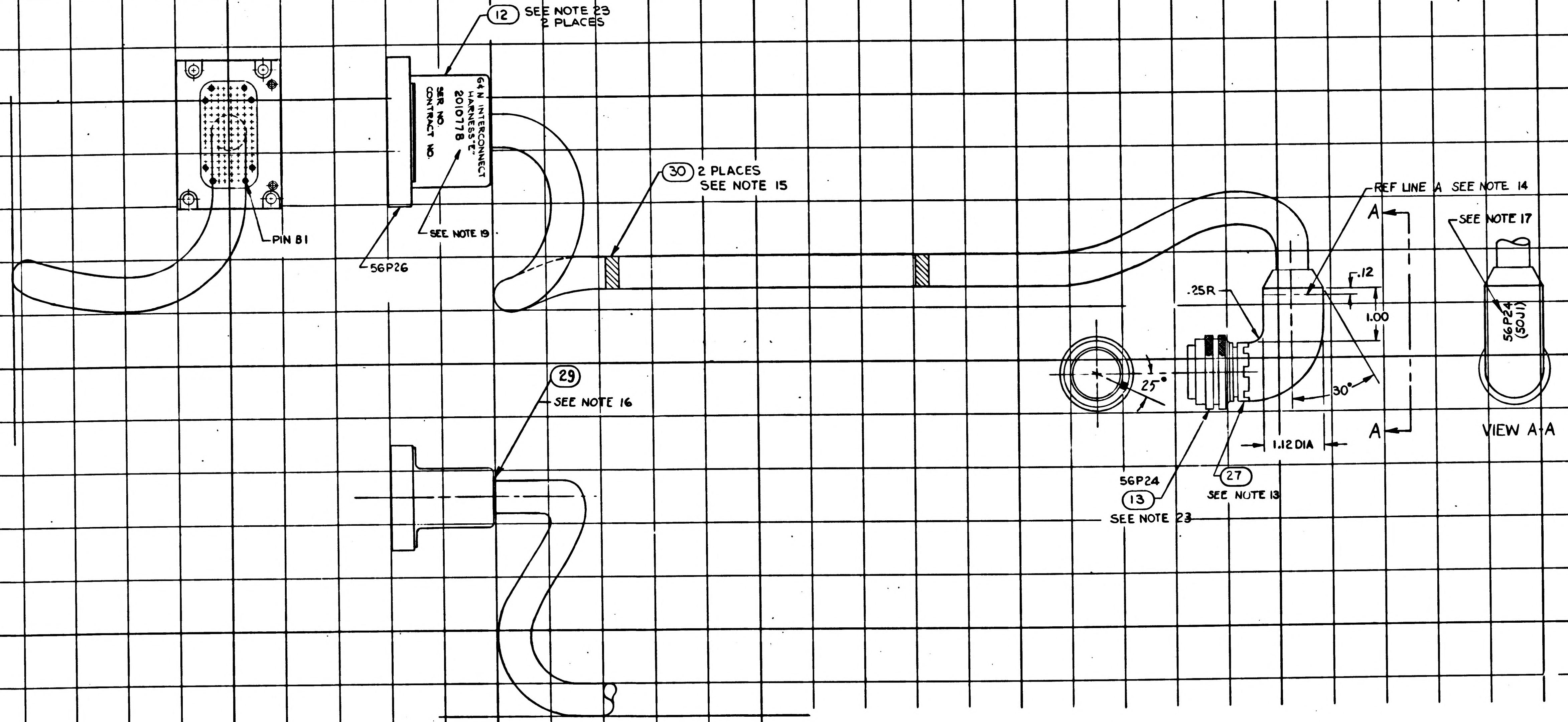
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
E 28	1		P24-20 P26-D15					.13 .18	NO NO		14 15	
E 29	3		P24-1 P26-K3					.13 .18	NO NO		14 16	
E 34	8				1.75 1.00	1.50 .75				6B 6B	19 19	
E 34A	10		SHLD E34 P24-42					.20 .13	NO NO		 14	
E 34B	10		P26-D14 SHLD E34					.18 .20	NO NO		15	
E 34R			P24-41 P26-B15					.13 .18	NO NO		14 16	
E 34Y			P24-66 P26-C15					.13 .18	NO NO		14 16	

SIZE A
CODE IDENT NO. 80230
2010778
SCALE-NONE
REV LTR A
SHEET 16 OF 17

B 2010778

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS TDML 31139



12 SEE NOTE 23
2 PLACES
G&N INTERCONNECT HARNESS "E"
2010778
SER NO
CONTRACT NO.
PIN 81
SEE NOTE 19
56P26
30 2 PLACES
SEE NOTE 15
REF LINE A SEE NOTE 14
A
SEE NOTE 17
.12
1.00
.25R
25°
30°
1.12 DIA
A
56P24
(50J1)
VIEW A-A
56P24
13
SEE NOTE 23
27
SEE NOTE 13
29
SEE NOTE 16

2010778

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	2 PLACE DECIMALS	ANGLES
± —	±.03	±2°

DO NOT SCALE THIS DRAWING

MATERIAL ———

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Gruenwald DATE 28 JUN 66
CHECKED W. Drell 1 JUL 66
APPROVAL Paul Watson AUG 15, 66
APPROVAL J. Nevins 8/10/66
NASA APPROVAL R. Tosch 9/27/66
CCB ~~MIT~~ APPROVAL E. Austin

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "E"
(C/M BLOCK II)

CODE IDENT NO. 80230
SIZE D
2010778
SCALE 1:1
SHEET 17 OF 17

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	W.D.

REV															
SHEET															
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN R. W. Turner 29 JUN 66 (DAY MO YR)
CHECKER W. Diell 29 Jun 66
ENGINEER D. Baxta 5 JUL 66
APPROVAL Aug 15 66
CONTR NO: NAS 9-497

NASA APPROVAL R. Jacob
CCG APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "F"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010779
SCALE NONE
SHEET 1 OF 14

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014676.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE A	CODE IDENT NO. 80230	2010779		
SCALE-NONE	REV LTR A	SHEET 2 OF 14		

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
CONNECTOR 56P23, USE ITEM NUMBERS 9 AND 13.
CONNECTOR 56P28, USE ITEM NUMBER 10.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 18.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 21 AND 24, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE A	CODE IDENT NO. 80230	2010779		
SCALE-NONE	REV LTR A	SHEET 3 OF 14		

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202 METHOD 302 EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 19 AND 20.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 26 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P28. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE A	CODE IDENT NO. 80230	2010779		
SCALE-NONE	REV LTR A	SHEET 4 OF 14		

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE A	CODE IDENT NO. 80230	2010779		
SCALE-NONE	REV LTR A	SHEET 5 OF 14		

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010779-001	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	2	1	2010779-002	WIRE PER 1010789-008, 22 AWG, YEL, RED, 5 FT TOT LG
	3	1	2010779-003	WIRE PER 1010789-003, 24 AWG, YEL, RED, 10 FT TOT LG
	4	1	2010779-004	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 5 FT TOT LG
	5	1	2010779-005	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 20 FT TOT LG
	6	1	2010779-006	WIRE PER 1010789-002, 24 AWG, BLK, 10 FT TOT LG
	7	1	2014746-021	CONNECTOR, PLUG, ELECTRICAL (56P28)
9	8	1	1010771-207	CONNECTOR, PLUG, ELECTRICAL (56P23)
9	9	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010771
9	10	47	1010955- 1	CONTACT, MALE
9	11	17	1010955- 2	CONTACT, MALE
	12	1	2014670- 5	ADAPTOR, CONNECTOR
9	13	24	1010958- 1	PLUG, PROTECTIVE SEALING
9	14	10	1010402- 2	SLEEVE, SOLDER
	16	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	17	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE

SIZE	CODE IDENT NO.			
A	80230	2010779		
SCALE-NONE	REV LTR	A	SHEET	6 OF 14

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	18	AR	1012507-004	TAPE, LACING AND TYING
9	19	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	20	AR	1012504	PRIMER, METAL PARTS
9	21	AR	1010679	ADHESIVE ACTIVATOR
9	24	AR	1010661	EPOXY RESIN
9	25	6	1012534- 36	SLEEVING, ELECTRICAL (HEAT SHRINKABLE)
9	26	43	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)

SIZE	CODE IDENT NO.			
A	80230	2010779		
SCALE-NONE	REV LTR	A	SHEET	7 OF 14

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 1	2											
F 1R			P23-24 P28-H6					.13 .18	NO NO		9 10	
F 1Y			P23-25 P28-K6					.13 .18	NO NO		9 10	
F 2	2											
F 2R			P23-21 P28-H7					.13 .18	NO NO		9 10	
F 2Y			P23-22 P28-K7					.13 .18	NO NO		9 10	
F 3	3											
F 3R			P23-30 P28-A5					.13 .18	NO NO		9 10	
F 3Y			P23-31 P28-A6					.13 .18	NO NO		9 10	
F 4	3											
F 4R			P23-27 P28-B5					.13 .18	NO NO		9 10	
F 4Y			P23-28 P28-B6					.13 .18	NO NO		9 10	

SIZE	CODE IDENT NO.			
A	80230	2010779		
SCALE-NONE	REV LTR	A	SHEET	8 OF 14

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 5	3											
F 5R			P23-53 P28-G8					.13 .18	NO NO		9 10	
F 5Y			P23-54 P28-F8					.13 .18	NO NO		9 10	
F 6	3											
F 6R			P23-56 P28-G9					.13 .18	NO NO		9 10	
F 6Y			P23-57 P28-F9					.13 .18	NO NO		9 10	
F 7	4											
F 7G			P23-6 P28-B7					.13 .18	NO NO		9 10	
F 7R			P23-5 P28-A7					.13 .18	NO NO		9 10	
F 7Y			P23-7 P28-B8					.13 .18	NO NO		9 10	
F 8	5				1.75 1.00	1.50 .75				68 68	14 14	
F 8A	6		SHLD F8 P23-37					.20 .13	NO NO		 9	

SIZE	CODE IDENT NO.			
A	80230	2010779		
SCALE-NONE	REV LTR	A	SHEET	9 OF 14

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 8B	6		P28-C8 SHLD F8					.18 .20	NO NO		10 10	
F 8R			P23-38 P28-B9					.13 .18	NO NO		9 11	
F 8Y			P23-39 P28-C9					.13 .18	NO NO		9 11	
F 9	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 9B	6		P28-G3 SHLD F9					.18 .20	NO NO		10	
F 9R			P23-42 P28-G2					.13 .18	NO NO		9 11	
F 9Y			P23-41 P28-G1					.13 .18	NO NO		9 11	
F 10	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 10B	6		P28-H3 SHLD F10					.18 .20	NO NO		10	
F 10R			P23-44 P28-H1					.13 .18	NO NO		9 11	
F 10Y			P23-45 P28-H2					.13 .18	NO NO		9 11	
F 11	5				1.75 1.00	1.50 .75				7 6B	25 14	

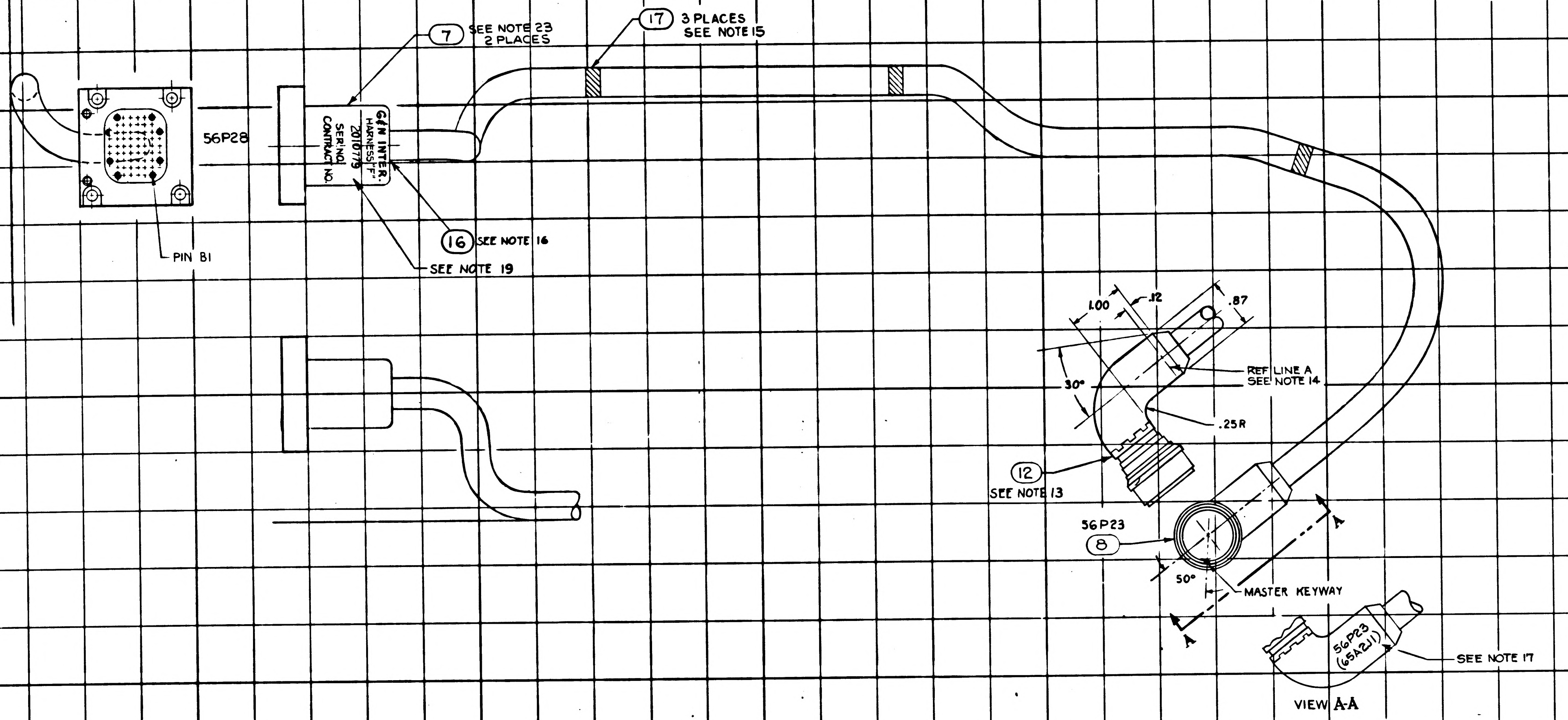
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 11B	6		P28-D7 SHLD F11					.18 .20	NO NO		10 10	
F 11R			P23-50 P28-D8					.13 .18	NO NO		9 11	
F 11Y			P23-51 P28-D9					.13 .18	NO NO		9 11	
F 12	4											
F 12G			P23-3 P28-B4					.13 .18	NO NO		9 10	
F 12R			P23-2 P28-A4					.13 .18	NO NO		9 10	
F 12Y			P23-1 P28-A3					.13 .18	NO NO		9 10	
F 13	5				1.75 1.00	1.50 .75				6B 6B	14 14	
F 13A	6		SHLD F13 P23-35					.20 .13	NO NO		 9	
F 13B	6		P28-B3 SHLD F13					.18 .20	NO NO		10	
F 13R			P23-33 P28-B1					.13 .18	NO NO		9 11	
F 13Y			P23-34 P28-B2					.13 .18	NO NO		9 11	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 14	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 14B	6		P28-F3 SHLD F14					.18 .20	NO NO		10	
F 14R			P23-9 P28-F2					.13 .18	NO NO		9 11	
F 14Y			P23-10 P28-F1					.13 .18	NO NO		9 11	
F 15	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 15B	6		P28-D3 SHLD F15					.18 .20	NO NO		10	
F 15R			P23-12 P28-D1					.13 .18	NO NO		9 11	
F 15Y			P23-13 P28-D2					.13 .18	NO NO		9 11	
F 16	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 16B	6		P28-C3 SHLD F16					.18 .20	NO NO		10	
F 16R			P23-18 P28-C2					.13 .18	NO NO		9 11	
F 16Y			P23-19 P28-C1					.13 .18	NO NO		9 11	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 17	1		P23-59 P28-K3					.13 .18	NO NO		9 11	

2010779 A

SYM	ZONE	REVISIONS TOM 3/139 DESCRIPTION	CHG NO.	DATE	APPD
		SEE SHEET 1 FOR REVISION RECORD			



7 SEE NOTE 23 2 PLACES
17 3 PLACES SEE NOTE 15
56P28
G&N INTER. HARNESS "F" 2010779 SER NO. CONTRACT NO.
PIN B1
16 SEE NOTE 16
SEE NOTE 19
1.00
.12
.87
REF LINE A SEE NOTE 14
30°
.25R
12 SEE NOTE 13
56P23
8
50°
MASTER KEYWAY
A
A
56P23 (65A2J1)
SEE NOTE 17
VIEW A-A

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS 2 PLACE ±.03 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN R.W. Turner DATE 30 JUN 66
CHECKED W. Diehl 30 Jun '66
APPROVAL AUG 1 3 66
APPROVAL
NASA APPROVAL R. Jacob 7/23/66
CCB APPROVAL E. Austin

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "F"
(CM, BLOCK II)

CODE IDENT NO. 80230
SIZE D
2010779
SCALE 1:1
SHEET 14 OF 14

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL 66	W.S.
B	REVISED PER TDRR 31202	4 OCT 66	SS APW

REV															
SHEET															
REV STATUS OF SHEETS	REV	B	A	B	A	A	B	A	A	A	B	B	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

R. W. Turner 29 JUN 66
DRAFTSMAN DAY MO YR
CHECKER Dell 29 Jun 66
ENGINEER Barta 5 JUL 66
APPROVAL
CONTR NO. NAS 9-497

NASA APPROVAL R. Jacob
CCA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT HARNESS "F"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010779
SCALE NONE
SHEET 1 OF 14

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

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A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
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R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 2 OF 14	

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES OF CONNECTOR 56P23 SHALL BE FILLED WITH A ~~SPECIAL~~ SEALING PLUG ITEM NUMBER 13

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 18.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE I, USING ITEMS 21 AND 24, TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR B	SHEET 3 OF 14	

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202 METHOD 302 EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 19 AND 20.

24 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

25 ASSEMBLE INSULATION SLEEVE ITEM 26 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P28. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 4 OF 14	

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 5 OF 14	

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010779-001	WIRE PER 1010789-016, 26 AWG, YEL, 5 FT TOT LG
	2	1	2010779-002	WIRE PER 1010789-008, 22 AWG, YEL, RED, 5 FT TOT LG
	3	1	2010779-003	WIRE PER 1010789-003, 24 AWG, YEL, RED, 10 FT TOT LG
	4	1	2010779-004	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 5 FT TOT LG
	5	1	2010779-005	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 20 FT TOT LG
	6	1	2010779-006	WIRE PER 1010789-002, 24 AWG, BLK, 10 FT TOT LG
	7	1	2014746-021	CONNECTOR, PLUG, ELECTRICAL (56P28)
9	8	1	1010771-207	CONNECTOR, PLUG, ELECTRICAL (56P23)
9	9	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTOR 1010771
9	10	26	1010955- 1	CONTACT, MALE
9	11	17	1010955- 2	CONTACT, MALE
	12	1	2014670- 5	ADAPTOR, CONNECTOR
9	13	24	1010958- 1	PLUG, PROTECTIVE SEALING
9	14	10	1010402- 2	SLEEVE, SOLDER
	16	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	17	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR 8	SHEET 6 OF 14	

FORM 2084 9-65

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	18	AR	1012507-004	TAPE, LACING AND TYING
9	19	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	20	AR	1012504	PRIMER, METAL PARTS
9	21	AR	1010679	ADHESIVE ACTIVATOR
9	24	AR	1010661	EPOXY RESIN
9	25	6	1012534- 36	SLEEVING, ELECTRICAL (HEAT SHRINKABLE)
9	26	43	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 7 OF 14	

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 1	2											
F 1R			P23-24 P28-H6					.13 .18	NO NO		9 10	
F 1Y			P23-25 P28-K6					.13 .18	NO NO		9 10	
F 2	2											
F 2R			P23-21 P28-H7					.13 .18	NO NO		9 10	
F 2Y			P23-22 P28-K7					.13 .18	NO NO		9 10	
F 3	3											
F 3R			P23-30 P28-A5					.13 .18	NO NO		9 10	
F 3Y			P23-31 P28-A6					.13 .18	NO NO		9 10	
F 4	3											
F 4R			P23-27 P28-B5					.13 .18	NO NO		9 10	
F 4Y			P23-28 P28-B6					.13 .18	NO NO		9 10	

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 8 OF 14	

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 5	3											
F 5R			P23-53 P28-G8					.13 .18	NO NO		9 10	
F 5Y			P23-54 P28-F8					.13 .18	NO NO		9 10	
F 6	3											
F 6R			P23-56 P28-G9					.13 .18	NO NO		9 10	
F 6Y			P23-57 P28-F9					.13 .18	NO NO		9 10	
F 7	4											
F 7G			P23-6 P28-B7					.13 .18	NO NO		9 10	
F 7R			P23-5 P28-A7					.13 .18	NO NO		9 10	
F 7Y			P23-7 P28-B8					.13 .18	NO NO		9 10	
F 8	5				1.75 1.00	1.50 .75				6B 6B	14 14	
F 8A	6		SHLD F8 P23-37					.20 .13	NO NO		9	

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A	SHEET 9 OF 14	

MIL 2084 9-65

LIMA 101066 WIRING HARNESS F 2010779 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 8B	6		P28-C8 SHLD F8					.18 .20	NO NO		10	
F 8R			P23-38 P28-B9					.13 .18	NO NO		9 11	
F 8Y			P23-39 P28-C9					.13 .18	NO NO		9 11	
F 9	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 9B	6		P28-G3 SHLD F9					.18 .20	NO NO		10	
F 9R			P23-42 P28-G2					.13 .18	NO NO		9 11	
F 9Y			P23-41 P28-G1					.13 .18	NO NO		9 11	
F 10	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 10B	6		P28-H3 SHLD F10					.18 .20	NO NO		10	
F 10R			P23-44 P28-H1					.13 .18	NO NO		9 11	
F 10Y			P23-45 P28-H2					.13 .18	NO NO		9 11	
F 11	5				1.75 1.00	1.50 .75				7 6B	25 14	

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR B		SHEET 10 OF 14

FORM 2084 9-65

LIMA 101066 WIRING HARNESS F 2010779 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 11B	6		P28-D7 SHLD F11					.18 .20	NO NO		10	
F 11R			P23-50 P28-D8					.13 .18	NO NO		9 11	
F 11Y			P23-51 P28-D9					.13 .18	NO NO		9 11	
F 12	4											
F 12G			P23-3 P28-B4					.13 .18	NO NO		9 10	
F 12R			P23-2 P28-A4					.13 .18	NO NO		9 10	
F 12Y			P23-1 P28-A3					.13 .18	NO NO		9 10	
F 13	5				1.75 1.00	1.50 .75				6B 6B	14 14	
F 13A	6		SHLD F13 P23-35					.20 .13	NO NO		 9	
F 13B	6		P28-B3 SHLD F13					.18 .20	NO NO		10	
F 13R			P23-33 P28-B1					.13 .18	NO NO		9 11	
F 13Y			P23-34 P28-B2					.13 .18	NO NO		9 11	

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR B		SHEET 11 OF 14

FORM 2084 9-65

WIRING HARNESS F 2010779

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 14	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 14B	6		P28-F3 SHLD F14					.18 .20	NO NO		10	
F 14R			P23-9 P28-F2					.13 .18	NO NO		9 11	
F 14Y			P23-10 P28-F1					.13 .18	NO NO		9 11	
F 15	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 15B	6		P28-D3 SHLD F15					.18 .20	NO NO		10	
F 15R			P23-12 P28-D1					.13 .18	NO NO		9 11	
F 15Y			P23-13 P28-D2					.13 .18	NO NO		9 11	
F 16	5				1.75 1.00	1.50 .75				7 6B	25 14	
F 16B	6		P28-C3 SHLD F16					.18 .20	NO NO		10	
F 16R			P23-18 P28-C2					.13 .18	NO NO		9 11	
F 16Y			P23-19 P28-C1					.13 .18	NO NO		9 11	

SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A		SHEET 12 OF 14

MIL 2084 9-65

WIRING HARNESS F 2010779

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
F 17	1		P23-59 P28-K3					.13 .18	NO NO		9 11	

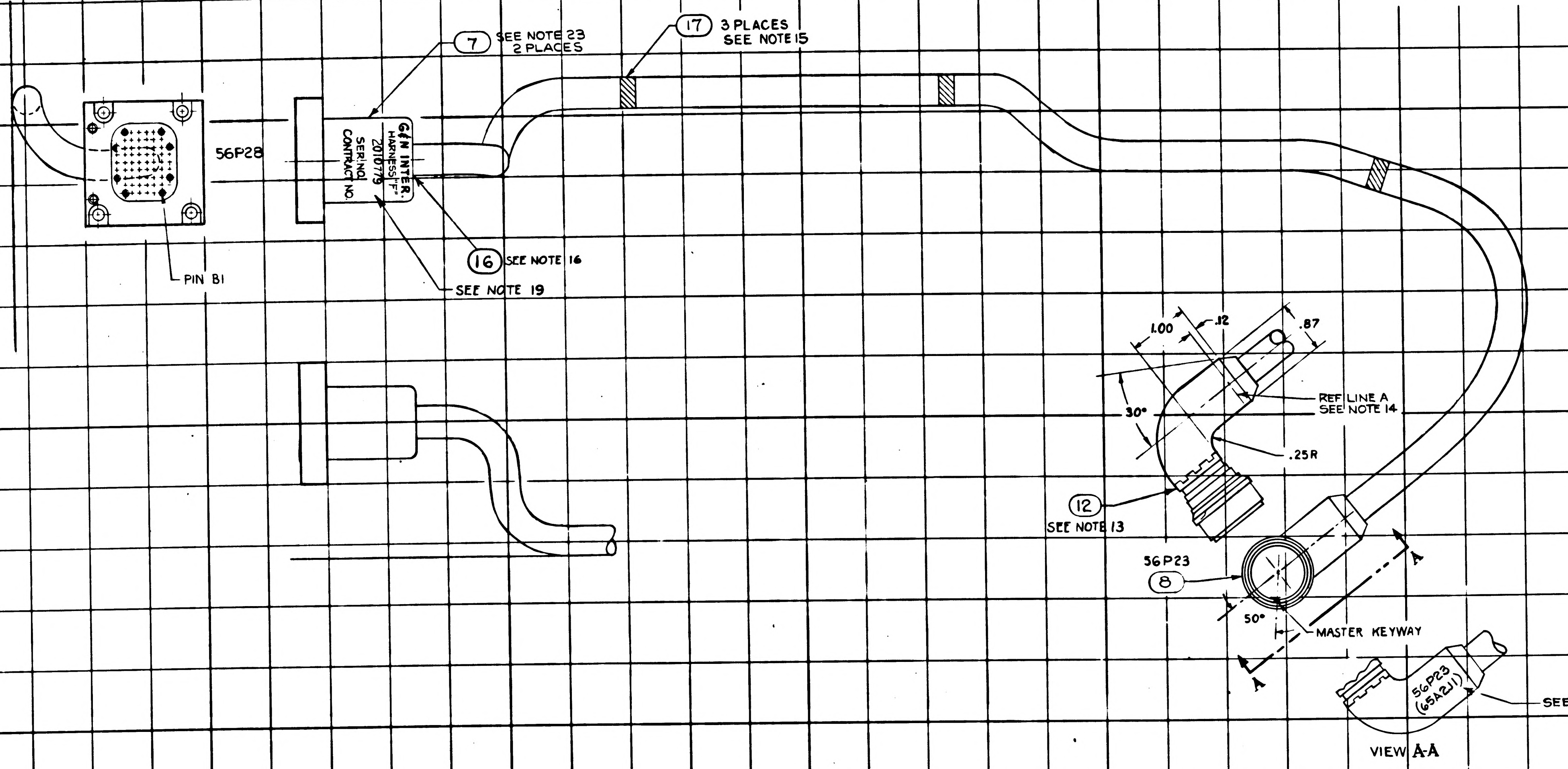
SIZE	CODE IDENT NO.		
A	80230	2010779	
SCALE-NONE	REV LTR A		SHEET 13 OF 14

MIL 2084 9-65

2010779 A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
		SEE SHEET 1 FOR REVISION RECORD			

REVISIONS TDM 31139


56P28
PIN B1
7 SEE NOTE 23 2 PLACES
G&N INTER. HARNESS "F" 2010779 SER. NO. CONTRACT NO.
16 SEE NOTE 16
SEE NOTE 19
17 3 PLACES SEE NOTE 15
1.00
.12
.87
30°
REF LINE A SEE NOTE 14
.25R
12 SEE NOTE 13
56P23
8
50°
MASTER KEYWAY
A
A
56P23 (65A2J1)
SEE NOTE 17
VIEW A-A

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS 2 PLACE ±.03 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN R.W. Turner DATE 30 JUN 66
CHECKED W. Diehl 30 JUN '66
APPROVAL [illegible] AUG 12 '66
APPROVAL [illegible]
NASA APPROVAL R. Jacob 7/27/66
CCB APPROVAL E. Ans [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "F"
(CM, BLOCK II)

CODE IDENT NO 80230
SIZE D
2010779
SCALE 1:1
SHEET 14 OF 14

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	

REV		A	A	A	A	A	A	A	A	A	A										
SHEET		21	22	23	24	25	26	27	28	29	30										
REV STATUS OF SHEETS	REV				A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN J. Krahn 29 JUN 66 (DAY MO YR)
CHECKER W. Riehl 30 JUN 66
ENGINEER D. Barta 5 JUL 66
APPROVAL Aug 15 66
CONTR NO NAS 9-497
NASA APPROVAL R. Jacob
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT
HARNESS "G"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010780
SCALE NONE
SHEET 1 OF 30

MIL 1377A6 12-65

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014677.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER.

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 2 OF 30

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
CONNECTOR 56P22, USE ITEM NUMBERS 17 AND 24.
CONNECTOR 56P29, USE ITEM NUMBER 20.
CONNECTORS 56P20,21, AND 32, USE ITEM NUMBERS 18 AND 24.
CONNECTORS 56J6, 7, AND 8, USE ITEM NUMBERS 18 AND 24.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 26.

13 APPLY BONDING MATERIAL PER ND1002187 TYPE I, USING ITEMS 33 AND 34 TO THE THREADED PORTION OF THE ADAPTER AND TO THE THREADED PORTION OF THE CONNECTOR PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTOR OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM, EXCEPT FOR CONDUCTORS USING ITEM NUMBER 44. THESE SHALL BE LESS THAN 2 OHMS. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 3 OF 30

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 29 AND 30.

24 CONDUCTORS SHALL ENTER CONNECTOR 56P29 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE REMARKS COLUMN.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 38, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 39. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 27. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS.

27 ASSEMBLE INSULATION TUBING, ITEM 42, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

28 LOOP LEADS BACK AND SPOT TIE TO WIRE JACKET

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 4 OF 30

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

29 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

30 SOLDER PER ND1002071, USING ITEM 48, OR ITEMS 49 AND 50.

31 ASSEMBLE INSULATION SLEEVE ITEM 51 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P29. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

32 LACE HARNESS BRANCHES TOGETHER USING A CONTINUOUS CLOVE HITCH AT LOCATIONS SHOWN.

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 5 OF 30

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010780-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010780-002	WIRE PER 1010789-016, 26 AWG, YEL, 265 FT TOT LG
	3	1	2010780-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 5 FT TOT LG
	4	1	2010780-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 5 FT TOT LG
	5	1	2010780-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 75 FT TOT LG
	6	1	2010780-006	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 5 FT TOT LG
	7	1	2010780-007	WIRE PER 1010789-004, 24 AWG, YEL, RED, GRN, 5 FT TOT LG
	8	1	2010780-008	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 5 FT TOT LG
	9	1	2010780-009	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	10	1	2010780-010	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 88 FT TOT LG
	11	1	2010780-011	WIRE PER 1010789-002, 24 AWG, BLK, 15 FT TOT LG
	12	1	2014747-021	CONNECTOR, PLUG, ELECTRICAL (56P29)
9	13	1	1010929-002	CONNECTOR, PLUG, ELECTRICAL (56P20)
9	14	1	1010929-008	CONNECTOR, PLUG, ELECTRICAL (56P21)

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 6 OF 30

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P22)
9	16	1	1010929-001	CONNECTOR, PLUG, ELECTRICAL (56P32)
9	17	REF	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	18	REF	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTORS 1010929 AND 1010930
9	19	3	1010930-017	CONNECTOR, RECEPTACLE, ELECTRICAL (56J6, 56J7, AND 56J8).
9	20	107	1010955- 1	CONTACT, MALE
9	21	75	1010955- 2	CONTACT, MALE
	22	2	2014670- 4	ADAPTER, CONNECTOR
	23	1	2014670- 5	ADAPTER, CONNECTOR
9	24	91	1010958- 1	PLUG, PROTECTIVE SEALING
9	25	19	1010402- 2	SLEEVE, SOLDER
9	26	AR	1012507- 4	TAPE, LACING
	27	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	28	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	29	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	30	AR	1012504	PRIMER, METAL PARTS
9	33	AR	1010661	EPOXY RESIN

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 7 OF 30

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	34	AR	1010679	ADHESIVE, ACTIVATOR
	35	3	2014670-010	ADAPTER, CONNECTOR
9	36	19	1012534- 36	SLEEVING, INSULATION (HEAT SHRINKABLE)
	37	1	2021203	TERMINAL LUG, SOLDER
	38	1	2010780-012	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED, SILVER PLATED, 22AWG, 16 FT TOT LG.
	39	AR	1010989	TAPE, SHIELDING, EMI/RFI
	40	1	1006783- 93	SCREW, BUTTON HD
	41	1	MS35333-69	WASHER, LOCK
	42	AR	1006776- 19	INSULATION SLEEVING
	43	1	2014670- 11	ADAPTER, CONNECTOR
	44	1	2010780-013	WIRE PER 1010707-1, RED JKT, 29AWG, RED, WHT, BLU, 15 FT TOTAL LG.
9	45	6	1010862	BUSHING, SLEEVE
9	46	6	1010763- 2	SOLDER, SLEEVE
	47	1	2010780-014	WIRE PER 1010789-12, 24AWG, YEL, RED, YEL, JKT, 16 FT TOT LG.
	48	AR	SN60WRAP	SOLDER QQ-S-571
	49	AR	SN60WS	SOLDER QQ-S-571

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 8 OF 30

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	50	AR	MIL-F-14256 TYPE A OR W	FLUX
9	51	105	1010490-114	INSULATION, SLEEVING (HEAT SHRINKABLE)

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 9 OF 30

WIRING HARNESS G 2010780 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 1	5											
G 1R			P21-51 P29-H5					.13 .18	NO NO		18 21	BRANCH 1
G 1Y			P21-29 P29-K5					.13 .18	NO NO		18 21	BRANCH 1
G 2	5											
G 2R			P21-53 P29-K3					.13 .18	NO NO		18 21	BRANCH 1
G 2Y			P21-52 P29-K4					.13 .18	NO NO		18 21	BRANCH 1
G 3	5											
G 3R			P21-28 P29-K7					.13 .18	NO NO		18 21	BRANCH 1
G 3Y			P21-49 P29-K6					.13 .18	NO NO		18 21	BRANCH 1
G 6	5											
G 6R			P21-3 P29-G11					.13 .18	NO NO		18 21	BRANCH 1
G 6Y			P21-10 P29-H11					.13 .18	NO NO		18 21	BRANCH 1

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR A	SHEET 10 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 7	10				1.75 1.00	1.50 .75				7 68	36 25	
G 7B	11		P29-F2 SHLD G7					.18 .20	NO NO		20	BRANCH 1
G 7R			P21-39 P29-G2					.13 .18	NO NO		18 21	BRANCH 1
G 7Y			P21-38 P29-H2					.13 .18	NO NO		18 21	BRANCH 1
G 8	10				1.75 1.00	1.50 .75				7 68	36 25	
G 8B	11		P29-F1 SHLD G8					.18 .20	NO NO		20	BRANCH 1
G 8R			P21-37 P29-G1					.13 .18	NO NO		18 21	BRANCH 1
G 8Y			P21-61 P29-H1					.13 .18	NO NO		18 21	BRANCH 1
G 11	10				1.75 1.00	1.50 .75				7 68	36 25	
G 11B	11		P29-C6 SHLD G11					.18 .20	NO NO		20	BRANCH 1
G 11R			P21-17 P29-B6					.13 .18	NO NO		18 21	BRANCH 1
G 11Y			P21-16 P29-A6					.13 .18	NO NO		18 21	BRANCH 1

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR A	SHEET 11 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 12	10				1.75 1.00	1.50 .75				7 68	36 25	
G 12B	11		P29-D2 SHLD G12					.18 .20	NO NO		20	BRANCH 1
G 12R			P21-59 P29-C2					.13 .18	NO NO		18 21	BRANCH 1
G 12Y			P21-36 P29-B2					.13 .18	NO NO		18 21	BRANCH 1
G 13	10				1.75 1.00	1.50 .75				7 68	36 25	
G 13B	11		P29-D1 SHLD G13					.18 .20	NO NO		20	BRANCH 1
G 13R			P21-57 P29-B1					.13 .18	NO NO		18 21	BRANCH 1
G 13Y			P21-58 P29-C1					.13 .18	NO NO		18 21	BRANCH 1
G 14	5											
G 14R			P21-42 P29-K9					.13 .18	NO NO		18 21	BRANCH 1
G 14Y			P21-43 P29-H9					.13 .18	NO NO		18 21	BRANCH 1
G 15	5											

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR A	SHEET 12 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780 A

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 15R			P21-24 P29-G9					.13 .18	NO NO		18 21	BRANCH 1
G 15Y			P21-44 P29-G10					.13 .18	NO NO		18 21	BRANCH 1
G 16	5											
G 16R			P21-46 P29-H10					.13 .18	NO NO		18 21	BRANCH 1
G 16Y			P21-25 P29-K10					.13 .18	NO NO		18 21	BRANCH 1
G 17	8											
G 17G			P21-26 P29-G12					.13 .18	NO NO		18 21	BRANCH 2
G 17R			P21-12 P29-H12					.13 .18	NO NO		18 21	BRANCH 2
G 17Y			P21-27 P29-H13					.13 .18	NO NO		18 21	BRANCH 2
G 18	5											
G 18R			P20-7 P29-K23					.13 .18	NO NO		18 21	BRANCH 2
G 18Y			P20-8 P29-K22					.13 .18	NO NO		18 21	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR A	SHEET 13 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 22	4											
G 22R			P20-5 P29-C23					.13 .18	NO NO		18 20	BRANCH 2
G 22Y			P20-4 P29-C24					.13 .18	NO NO		18 20	BRANCH 2
G 23	7											
G 23G			P20-30 P29-B25					.13 .18	NO NO		18 20	BRANCH 2
G 23R			P20-15 P29-C25					.13 .18	NO NO		18 20	BRANCH 2
G 23Y			P20-14 P29-B24					.13 .18	NO NO		18 20	BRANCH 2
G 24	5											
G 24R			P20-46 P29-A23					.13 .18	NO NO		18 21	BRANCH 2
G 24Y			P20-71 P29-B23					.13 .18	NO NO		18 21	BRANCH 2
G 25	5											
G 25R			P20-73 P29-B22					.13 .18	NO NO		18 21	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR A		SHEET 14 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 25Y			P20-72 P29-A22					.13 .18	NO NO		18 21	BRANCH 2
G 26	5											
G 26R			P20-28 P29-A21					.13 .18	NO NO		18 21	BRANCH 2
G 26Y			P20-48 P29-B21					.13 .18	NO NO		18 21	BRANCH 2
G 27	10				1.75 1.00	1.50 .75				7 68	36 25	
G 27B	11		P29-C9 SHLD G27					.18 .20	NO NO		20	BRANCH 1
G 27R			P20-80 P29-A9					.13 .18	NO NO		18 21	BRANCH 1
G 27Y			P20-81 P29-B9					.13 .18	NO NO		18 21	BRANCH 1
G 28	10				1.75 1.00	1.50 .75				7 68	36 25	
G 28B	11		P29-C10 SHLD G28					.18 .20	NO NO		20	BRANCH 1
G 28R			P20-57 P29-B10					.13 .18	NO NO		18 21	BRANCH 1
G 28Y			P20-82 P29-A10					.13 .18	NO NO		18 21	BRANCH 1

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR A		SHEET 15 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 29	10				1.75 1.00	1.50 .75				7 68	36 25	
G 29B	11		P29-D11 SHLD G29					.18 .20	NO NO		20	BRANCH 1
G 29R			P20-85 P29-B11					.13 .18	NO NO		18 21	BRANCH 1
G 29Y			P20-61 P29-C11					.13 .18	NO NO		18 21	BRANCH 1
G 30	10				1.75 1.00	1.50 .75				7 68	36 25	
G 30B	11		P29-D12 SHLD G30					.18 .20	NO NO		20	BRANCH 2
G 30R			P20-83 P29-C12					.13 .18	NO NO		18 21	BRANCH 2
G 30Y			P20-84 P29-B12					.13 .18	NO NO		18 21	BRANCH 2
G 31	10				1.75 1.00	1.50 .75				7 68	36 25	
G 31B	11		P29-D13 SHLD G31					.18 .20	NO NO		20	BRANCH 2
G 31R			P20-59 P29-B13					.13 .18	NO NO		18 21	BRANCH 2
G 31Y			P20-35 P29-C13					.13 .18	NO NO		18 21	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR A		SHEET 16 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 32	10				1.75 1.00	1.50 .75				7 68	36 25	
G 32B	11		P29-D14 SHLD G32					.18 .20	NO NO		20	BRANCH 2
G 32R			P20-34 P29-C14					.13 .18	NO NO		18 21	BRANCH 2
G 32Y			P20-33 P29-B14					.13 .18	NO NO		18 21	BRANCH 2
G 33	9											
G 33G			P20-22 P29-B15					.13 .18	NO NO		18 21	BRANCH 2
G 33N			P20-40 P29-C15					.13 .18	NO NO		18 21	BRANCH 2
G 33R			P20-64 P29-C16					.13 .18	NO NO		18 21	BRANCH 2
G 33Y			P20-39 P29-B16					.13 .18	NO NO		18 21	BRANCH 2
G 35	6											
G 35G			P20-43 P29-C19					.13 .18	NO NO		18 20	BRANCH 2
G 35R			P20-68 P29-C18					.13 .18	NO NO		18 20	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR A		SHEET 17 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 35Y			P20-69 P29-D18					.13 .18	NO NO		18 20	BRANCH 2
G 36	3											
G 36R			P20-66 P29-A20					.13 .18	NO NO		18 20	BRANCH 2
G 36Y			P20-42 P29-B20					.13 .18	NO NO		18 20	BRANCH 2
G 37	5											
G 37R			P20-74 P29-C22					.13 .18	NO NO		18 21	BRANCH 2
G 37Y			P20-75 P29-C21					.13 .18	NO NO		18 21	BRANCH 2
G 38	10				1.75 1.00	1.50 .75				7 68	36 25	
G 38B	11		P29-G17 SHLD G38					.18 .20	NO NO		20	BRANCH 2
G 38R			P20-79 P29-G15					.13 .18	NO NO		18 21	BRANCH 2
G 38Y			P20-78 P29-G16					.13 .18	NO NO		18 21	BRANCH 2
G 39	10				1.75 1.00	1.50 .75				7 68	36 25	

SIZE A | CODE IDENT NO. 80230 | 2010780

SCALE-NONE | REV LTR A | SHEET 18 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 39B	11		P29-H17 SHLD G39					.18 .20	NO NO		20	BRANCH 2
G 39R			P20-54 P29-H16					.13 .18	NO NO		18 21	BRANCH 2
G 39Y			P20-31 P29-H15					.13 .18	NO NO		18 21	BRANCH 2
G 40	2		P22-1 P32-1					.13 .13	NO NO		17 18	A
G 41	2		P22-5 P32-5					.13 .13	NO NO		17 18	A
G 42	2		P22-6 P32-6					.13 .13	NO NO		17 18	A
G 43	2		P22-16 P32-16					.13 .13	NO NO		17 18	A
G 44	2		P22-17 P32-17					.13 .13	NO NO		17 18	A
G 45	2		P22-18 P32-18					.13 .13	NO NO		17 18	A
G 46	2		P22-19 P32-19					.13 .13	NO NO		17 18	A
G 47	2		P22-7 P32-7					.13 .13	NO NO		17 18	A
G 48	2		P22-8 P32-8					.13 .13	NO NO		17 18	A

SIZE A | CODE IDENT NO. 80230 | 2010780

SCALE-NONE | REV LTR A | SHEET 19 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 49	2		P22-20 P32-20					.13 .13	NO NO		17 18	A
G 50	2		P22-2 P32-2					.13 .13	NO NO		17 18	A
G 51	2		P22-9 P32-9					.13 .13	NO NO		17 18	A
G 52	2		P22-21 P32-21					.13 .13	NO NO		17 18	A
G 53	2		P22-22 P32-22					.13 .13	NO NO		17 18	A
G 54	2		P22-23 P32-23					.13 .13	NO NO		17 18	A
G 55	2		P22-10 P32-10					.13 .13	NO NO		17 18	A
G 56	2		P22-24 P32-24					.13 .13	NO NO		17 18	A
G 57	2		P22-3 P32-3					.13 .13	NO NO		17 18	A
G 58	2		P22-11 P32-11					.13 .13	NO NO		17 18	A
G 59	2		P22-79 P32-79					.13 .13	NO NO		17 18	A
G 60	2		P22-13 P32-13					.13 .13	NO NO		17 18	A

SIZE A | CODE IDENT NO. 80230 | 2010780

SCALE-NONE | REV LTR A | SHEET 20 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	TERM.JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 61	2		P22-33 P32-33					.13 .13	NO NO		17 18	A
G 62	2		P22-4 P32-4					.13 .13	NO NO		17 18	A
G 63	2		P22-12 P32-12					.13 .13	NO NO		17 18	A
G 64	2		P22-74 P32-74					.13 .13	NO NO		17 18	A
G 65	2		P22-14 P32-14					.13 .13	NO NO		17 18	A
G 66	2		P22-29 P32-29					.13 .13	NO NO		17 18	A
G 67	2		P22-30 P32-30					.13 .13	NO NO		17 18	A
G 68	2		P22-15 P32-15					.13 .13	NO NO		17 18	A
G 69	2		P22-28 P32-28					.13 .13	NO NO		17 18	A
G 70	2		P22-50 P32-50					.13 .13	NO NO		17 18	A
G 71	2		P22-51 P32-51					.13 .13	NO NO		17 18	A
G 72	2		P22-76 P32-76					.13 .13	NO NO		17 18	A

SIZE A | CODE IDENT NO. 80230 | 2010780

SCALE-NONE | REV LTR A | SHEET 21 OF 30

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 73	2		P22-75 P32-75					.13 .13	NO NO		17 18	A
G 74	2		P22-49 P32-49					.13 .13	NO NO		17 18	A
G 75	2		P22-55 P32-55					.13 .13	NO NO		17 18	A
G 76	2		P22-56 P32-56					.13 .13	NO NO		17 18	A
G 77	2		P22-43 P32-43					.13 .13	NO NO		17 18	A
G 78	2		P22-44 P32-44					.13 .13	NO NO		17 18	A
G 79	2		P22-54 P32-54					.13 .13	NO NO		17 18	A
G 80	2		P22-59 P32-59					.13 .13	NO NO		17 18	A
G 81	2		P22-34 P32-34					.13 .13	NO NO		17 18	A
G 82	2		P22-83 P32-83					.13 .13	NO NO		17 18	A
G 83	2		P22-57 P32-57					.13 .13	NO NO		17 18	A
G 84	2		P22-58 P32-58					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 22 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 85	2		P22-39 P32-39					.13 .13	NO NO		17 18	A
G 86	2		P22-35 P32-35					.13 .13	NO NO		17 18	A
G 87	2		P22-64 P32-64					.13 .13	NO NO		17 18	A
G 88	2		P22-65 P32-65					.13 .13	NO NO		17 18	A
G 89	2		P22-40 P32-40					.13 .13	NO NO		17 18	A
G 90	2		P22-32 P32-32					.13 .13	NO NO		17 18	A
G 91	2		P22-31 P32-31					.13 .13	NO NO		17 18	A
G 92	2		P22-78 P32-78					.13 .13	NO NO		17 18	A
G 93	2		P22-42 P32-42					.13 .13	NO NO		17 18	A
G 94	2		P22-41 P32-41					.13 .13	NO NO		17 18	A
G 95	2		P22-38 P32-38					.13 .13	NO NO		17 18	A
G 96	5											

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 23 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 96R			P20-26 P29-K18					.13 .18	NO NO		18 21	BRANCH 2
G 96Y			P20-47 P29-H18					.13 .18	NO NO		18 21	BRANCH 2
G 97	5											
G 97R			P20-13 P29-H19					.13 .18	NO NO		18 21	BRANCH 2
G 97Y			P20-27 P29-K19					.13 .18	NO NO		18 21	BRANCH 2
G 98	5											
G 98R			P20-51 P29-K20					.13 .18	NO NO		18 21	BRANCH 2
G 98Y			P20-29 P29-H20					.13 .18	NO NO		18 21	BRANCH 2
G 99	1		P20-62 P29-D19					.13 .18	NO NO		18 20	BRANCH 2
G 100	2		P22-60 P32-60					.13 .13	NO NO		17 18	A
G 101	2		P22-36 P32-36					.13 .13	NO NO		17 18	A
G 102	2		P22-37 P32-37					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 24 OF 30

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 103	2		P22-61 P32-61					.13 .13	NO NO		17 18	A
G 104	2		P22-69 P32-69					.13 .13	NO NO		17 18	A
G 105	2		P22-68 P32-68					.13 .13	NO NO		17 18	A
G 106	2		P22-67 P32-67					.13 .13	NO NO		17 18	A
G 107	2		P22-66 P32-66					.13 .13	NO NO		17 18	A
G 112	5											
G 112R			P21-41 P29-A3					.13 .18	NO NO		18 21	BRANCH 1
G 112Y			P21-22 P29-B3					.13 .18	NO NO		18 21	BRANCH 1
G 113	2		P20-12 P29-K21					.13 .18	NO NO		18 21	BRANCH 2
G 114	2		P20-77 P29-D21					.13 .18	NO NO		18 21	BRANCH 2
G 117	2		P22-77 P32-77					.13 .13	NO NO		17 18	A
G 118	2		P22-52 P32-52					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 25 OF 30

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 119	2		P21-55 P29-A5					.13 .18	NO NO		18 21	 BRANCH 1
G 120	38		E35 P32-81					.19 .13	NO NO		37 18	A
G 130	2		P20-67 P29-D25					.13 .18	NO NO		18 21	
G 131	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 131A	11		SHLD G131 P22-46					.20 .13	NO NO		 17	
G 131B	11		P32-46 SHLD G131					.13 .20	NO NO		18	
G 131R			P22-45 P32-45					.13 .13	NO NO		17 18	
G 131Y			P22-25 P32-25					.13 .13	NO NO		17 18	
G 132	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 132A	11		SHLD G132 P22-72					.20 .13	NO NO		 17	
G 132B	11		P32-72 SHLD G132					.13 .20	NO NO		18	
G 132R			P22-70 P32-70					.13 .13	NO NO		17 18	

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 26 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 132Y			P22-71 P32-71					.13 .13	NO NO		17 18	
G 133	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 133A	11		SHLD G133 P22-27					.20 .13	NO NO		 17	
G 133B	11		P32-27 SHLD G133					.13 .20	NO NO		18	
G 133R			P22-47 P32-47					.13 .13	NO NO		17 18	
G 133Y			P22-26 P32-26					.13 .13	NO NO		17 18	
G 134	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 134A	11		SHLD G134 P20-9					.20 .13	NO NO		 18	
G 134B	11		P29-F23 SHLD G134					.18 .20	NO NO		20	BRANCH 2
G 134L			NONE NONE				1.75 1.00		NO NO			
G 134R			P20-23 P29-F25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 134W			P20-24 P29-F24					.13 .18	NO NO		18, 45 21	 BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 27 OF 30

MIL 2084 9-65

WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 135	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 135A	11		SHLD G135 P20-10					.20 .13	NO NO		 18	
G 135B	11		P29-G23 SHLD G135					.18 .20	NO NO		20	BRANCH 2
G 135L			NONE NONE				1.75 1.00		NO NO			
G 135R			P20-3 P29-G24					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 135W			P20-11 P29-G25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 136	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 136A	11		SHLD G136 P20-45					.20 .13	NO NO		 18	
G 136B	11		P29-H23 SHLD G136					.18 .20	NO NO		20	BRANCH 2
G 136L			NONE NONE				1.75 1.50		NO NO			
G 136R			P20-25 P29-H25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 136W			P20-44 P29-H24					.13 .18	NO NO		18, 45 21	 BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 28 OF 30

MIL 2084 9-65

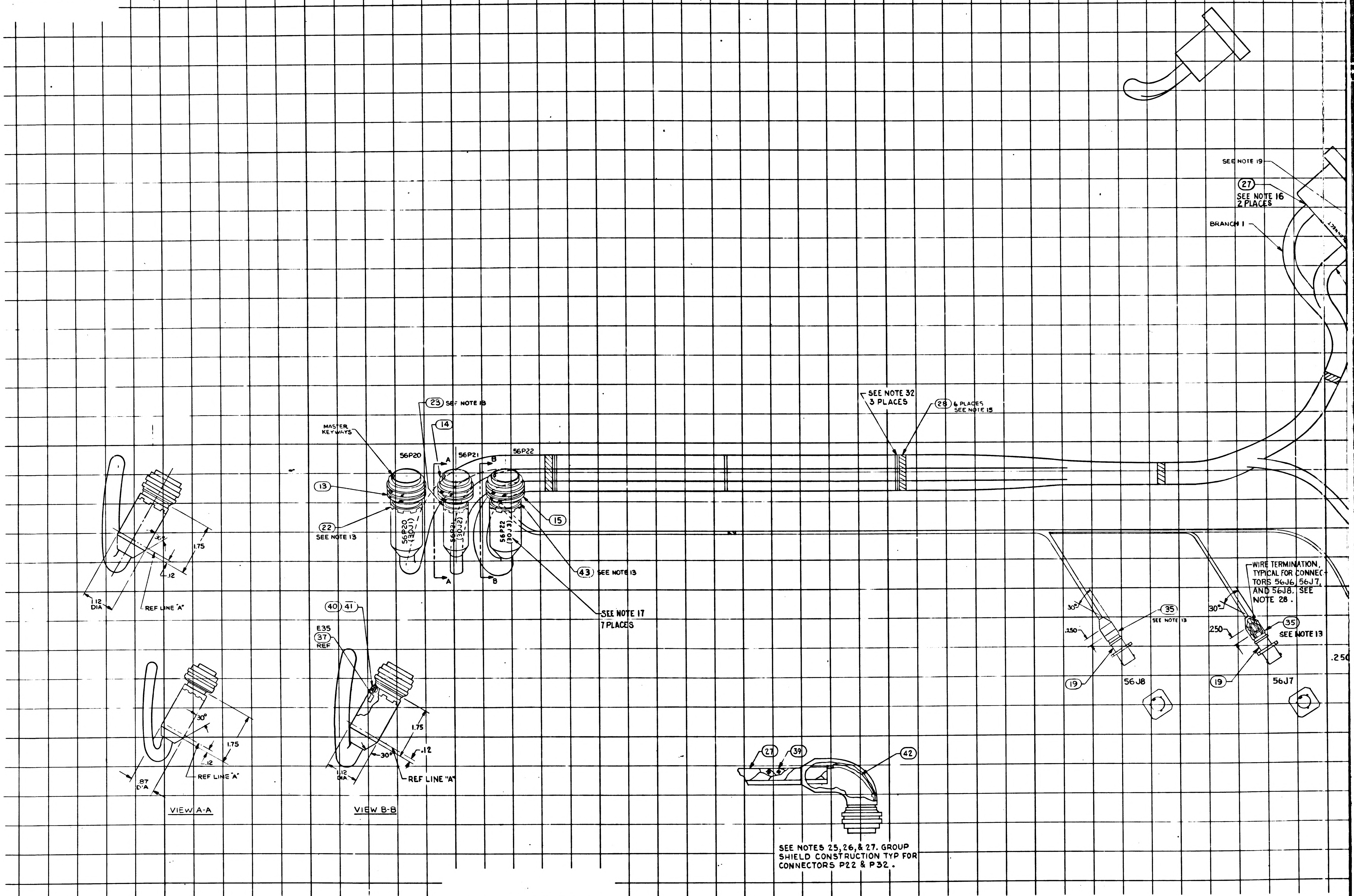
WIRING HARNESS G 2010780

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 137	10				1.75 1.00	1.50 .75				7 7	36 36	
G 137R			J7-7 P29-A18					.13 .22	NO NO		18	 BRANCH 2
G 137Y			J7-4 P29-B18					.13 .22	NO NO		18	 BRANCH 2
G 138	10				1.75 1.00	1.50 .75				7 7	36 36	
G 138R			J8-7 P29-A18					.13 .22	NO NO		18 20	 BRANCH 2
G 138Y			J8-4 P29-B18					.13 .22	NO NO		18 20	 BRANCH 2
G 139	47				1.75 1.00	1.50 .75				7 7	36 36	
G 139R			J6-7 P29-A19					.13 .18	NO NO		18 20	 BRANCH 2
G 139Y			J6-4 P29-B19					.13 .18	NO NO		18 20	 BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR A	SHEET 29 OF ~~32~~ 30

MIL 2084 9-65

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.



SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
MASTER KEYWAYS
23 SEE NOTE 13
14
56P20
56P21
56P22
A
B
13
22
SEE NOTE 13
56P20 (30J1)
56P21 (30J2)
56P22 (30J3)
15
43 SEE NOTE 13
SEE NOTE 17
7 PLACES
SEE NOTE 32
3 PLACES
28 6 PLACES
SEE NOTE 15
1.75
.12
1.12 DIA
REF LINE "A"
30°
.87 DIA
VIEW A-A
40 41
E35
37
REF
.12
REF LINE "A"
VIEW B-B
WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.
.250
35
SEE NOTE 13
19
56J8
56J7
.250
27
39
42
SEE NOTES 25, 26, & 27. GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.

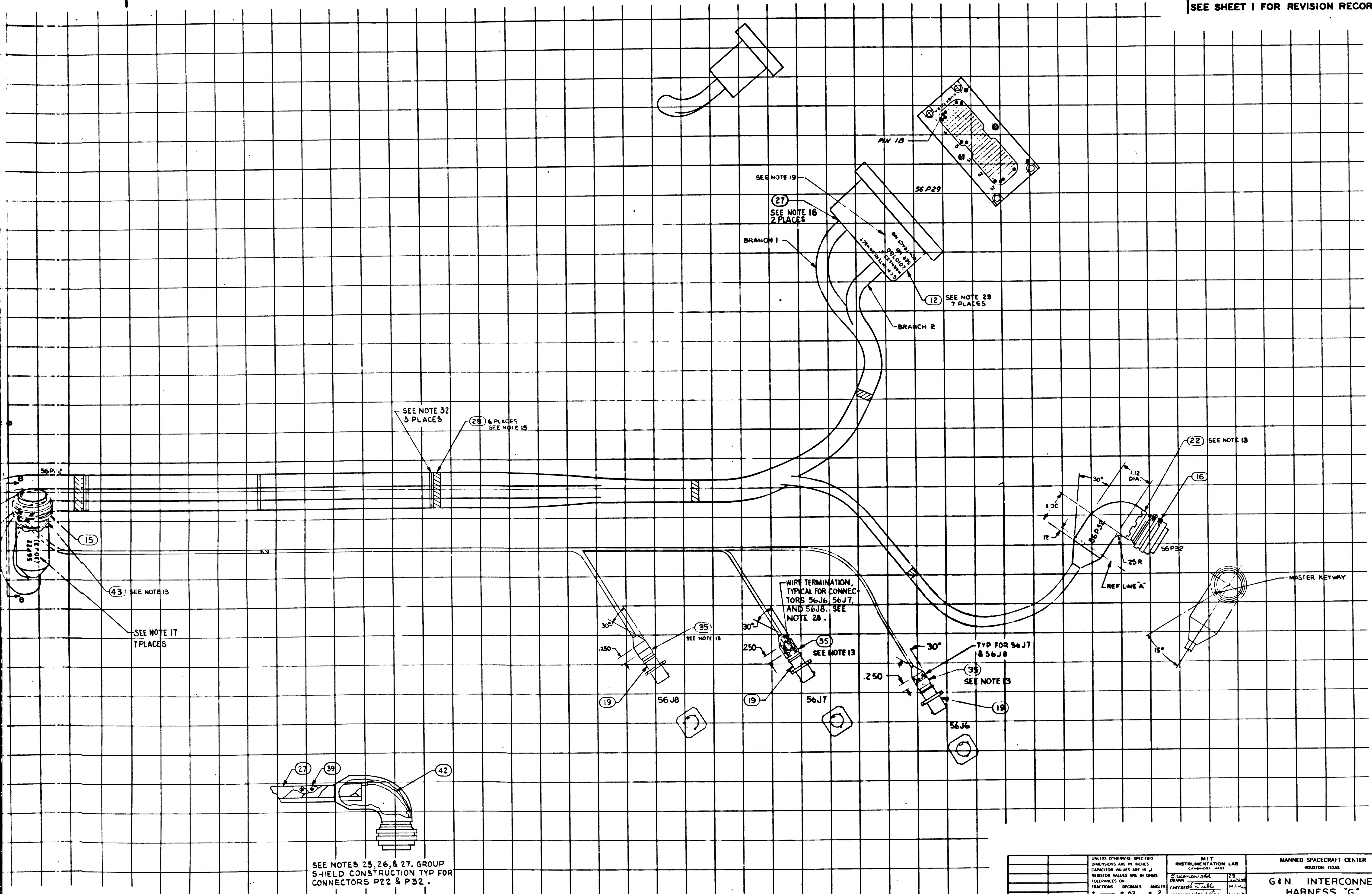
2010780	A	SH 30 OF 30

1/2010780

REVISIONS TDRR 31129

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

SEE SHEET 1 FOR REVISION RECORD



PIN 1B
56P29
SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
G&N INTERCONNECT HARNESS 2010780 SER NO CONTRACT NO
12
SEE NOTE 23
7 PLACES
BRANCH 2
SEE NOTE 32
3 PLACES
28
6 PLACES
SEE NOTE 15
56P12
B
B
15
56P22 (30J3)
43
SEE NOTE 13
SEE NOTE 17
7 PLACES
22
SEE NOTE 13
16
30°
1.12 DIA.
1.0C
.12
56P32
56P32
.25R
REF LINE "A"
MASTER KEYWAY
15°
30°
.250
35
SEE NOTE 13
19
56J8
30°
.250
35
SEE NOTE 13
19
56J7
30°
.250
TYP FOR 56J7 & 56J8
35
SEE NOTE 13
19
56J6
27
39
42

WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.

SEE NOTES 25, 26, & 27. GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.03 ANGLES ± 2
DO NOT SCALE THIS DRAWING

MATERIAL
——

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

		DATE
DRAWN	Gruenewald	28
CHECKED	W. Diell	30
APPROVED		
APPROVED		
APPROVED CCB		9/21/66
APPROVED MSC	R. Jacob	9/23/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT
HARNESS "G"
(C/M BLOCK II)

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010780
SCALE FULL		SHEET OF

2010780

2010780 A

2/2010780

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	
B	REVISED PER TDRR 31203	4 OCT 66	SS

REV	B	B	B	B	B	B	B	B	B	B	B									
SHEET	21	22	23	24	25	26	27	28	29	30	31									
REV STATUS OF SHEETS REV	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.

DRAFTSMAN J. Krahn 29 JUN 66 (DAY MO YR)
CHECKER W. Diehl 30 Jun 66
ENGINEER D. Carta 6 JUL 66
APPROVAL
CONTR NO NAS 9-497
NASA APPROVAL R. Jacob
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT
HARNESS "6"
(C/M, BLOCK II)

SIZE A
CODE IDENT NO 80230
2010780
SCALE NONE
SHEET 1 OF 31

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014677.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER.

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR B		SHEET 2 OF

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

11 ALL UNUSED CAVITIES ON CONNECTORS 56P20,P21,P22, P32,J6,J7,AND, J8 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 24.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 26.

13 APPLY BONDING MATERIAL PER ND1002187 TYPE I, USING ITEMS 33 AND 34 TO THE THREADED PORTION OF THE ADAPTER AND TO THE THREADED PORTION OF THE CONNECTOR PRIOR TO ASSEMBLY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTOR OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM, EXCEPT FOR CONDUCTORS USING ITEM NUMBER 44. THESE SHALL BE LESS THAN 2 OHMS. TEST PER MIL-STD-202, METHOD 303.

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR B		SHEET 3 OF

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 29 AND 30.

24 CONDUCTORS SHALL ENTER CONNECTOR 56P29 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE REMARKS COLUMN.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 38, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 39. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 27. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE WITH A MINIMUM OF RIDGES AND FOLDS.

27 ASSEMBLE INSULATION TUBING, ITEM 42, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION. ASSEMBLE SHRINK SLEEVING AS SHOWN.

28 LOOP LEADS BACK AND SPOT TIE TO WIRE JACKET

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR B		SHEET 4 OF

NOTE NUMBER — GENERAL NOTES — DESCRIPTION

29 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

30 SOLDER PER ND1002071, USING ITEM 48, OR ITEMS 49 AND 50.

31 ASSEMBLE INSULATION SLEEVE ITEM 51 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P29. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

32 LACE HARNESS BRANCHES TOGETHER USING A CONTINUOUS CLOVE HITCH AT LOCATIONS SHOWN.

33 BOND TERMINAL LUG AND SCREW TO THE ADAPTER PER ND1002187, TYPE III, USING ITEMS 33, 34, 52, AND 53.

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR B		SHEET 5 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	50	AR	MIL-F-14256 TYPE A OR W	FLUX
9	51	105	1010490-114	INSULATION, SLEEVING (HEAT SHRINKABLE)
9	52	AR	1008822	COLORANT, EPOXY BASE
9	53	AR	1006277	SILICA, PULVERIZED PYROGENIC

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 10 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 1	5											
G 1R			P21-51 P29-H5					.13 .18	NO NO		18 21	BRANCH 1
G 1Y			P21-29 P29-K5					.13 .18	NO NO		18 21	BRANCH 1
G 2	5											
G 2R			P21-53 P29-K3					.13 .18	NO NO		18 21	BRANCH 1
G 2Y			P21-52 P29-K4					.13 .18	NO NO		18 21	BRANCH 1
G 3	5											
G 3R			P21-28 P29-K7					.13 .18	NO NO		18 21	BRANCH 1
G 3Y			P21-49 P29-K6					.13 .18	NO NO		18 21	BRANCH 1
G 6	5											
G 6R			P21-3 P29-G11					.13 .18	NO NO		18 21	BRANCH 1
G 6Y			P21-10 P29-H11					.13 .18	NO NO		18 21	BRANCH 1

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 11 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 7	10				1.75 1.00	1.50 .75				7 68	36 25	
G 7B	11		P29-F2 SHLD G7					.18 .20	NO NO		20	BRANCH 1
G 7R			P21-39 P29-G2					.13 .18	NO NO		18 21	BRANCH 1
G 7Y			P21-38 P29-H2					.13 .18	NO NO		18 21	BRANCH 1
G 8	10				1.75 1.00	1.50 .75				7 68	36 25	
G 8B	11		P29-F1 SHLD G8					.18 .20	NO NO		20	BRANCH 1
G 8R			P21-37 P29-G1					.13 .18	NO NO		18 21	BRANCH 1
G 8Y			P21-61 P29-H1					.13 .18	NO NO		18 21	BRANCH 1
G 11	10				1.75 1.00	1.50 .75				7 68	36 25	
G 11B	11		P29-C6 SHLD G11					.18 .20	NO NO		20	BRANCH 1
G 11R			P21-17 P29-B6					.13 .18	NO NO		18 21	BRANCH 1
G 11Y			P21-16 P29-A6					.13 .18	NO NO		18 21	BRANCH 1

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 12 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 12	10				1.75 1.00	1.50 .75				7 68	36 25	
G 12B	11		P29-D2 SHLD G12					.18 .20	NO NO		20	BRANCH 1
G 12R			P21-59 P29-C2					.13 .18	NO NO		18 21	BRANCH 1
G 12Y			P21-36 P29-B2					.13 .18	NO NO		18 21	BRANCH 1
G 13	10				1.75 1.00	1.50 .75				7 68	36 25	
G 13B	11		P29-D1 SHLD G13					.18 .20	NO NO		20	BRANCH 1
G 13R			P21-57 P29-B1					.13 .18	NO NO		18 21	BRANCH 1
G 13Y			P21-58 P29-C1					.13 .18	NO NO		18 21	BRANCH 1
G 14	5											
G 14R			P21-42 P29-K9					.13 .18	NO NO		18 21	BRANCH 1
G 14Y			P21-43 P29-H9					.13 .18	NO NO		18 21	BRANCH 1
G 15	5											

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 13 OF

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 15R			P21-24 P29-G9					.13 .18	NO NO		18 21	BRANCH 1
G 15Y			P21-44 P29-G10					.13 .18	NO NO		18 21	BRANCH 1
G 16	5											
G 16R			P21-46 P29-H10					.13 .18	NO NO		18 21	BRANCH 1
G 16Y			P21-25 P29-K10					.13 .18	NO NO		18 21	BRANCH 1
G 17	8											
G 17G			P21-26 P29-G12					.13 .18	NO NO		18 21	BRANCH 2
G 17R			P21-12 P29-H12					.13 .18	NO NO		18 21	BRANCH 2
G 17Y			P21-27 P29-H13					.13 .18	NO NO		18 21	BRANCH 2
G 18	5											
G 18R			P20-7 P29-K23					.13 .18	NO NO		18 21	BRANCH 2
G 18Y			P20-8 P29-K22					.13 .18	NO NO		18 21	BRANCH 2

SIZE A | CODE IDENT NO. 80230 | 2010780
SCALE-NONE | REV LTR B | SHEET 14 OF

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 22	4											
G 22R			P20-5 P29-C23					.13 .18	NO NO		18 20	BRANCH 2
G 22Y			P20-4 P29-C24					.13 .18	NO NO		18 20	BRANCH 2
G 23	7											
G 23G			P20-30 P29-B25					.13 .18	NO NO		18 20	BRANCH 2
G 23P			P20-15 P29-C25					.13 .18	NO NO		18 20	BRANCH 2
G 23Y			P20-14 P29-B24					.13 .18	NO NO		18 20	BRANCH 2
G 24	5											
G 24R			P20-46 P29-A23					.13 .18	NO NO		18 21	BRANCH 2
G 24Y			P20-71 P29-B23					.13 .18	NO NO		18 21	BRANCH 2
G 25	5											
G 25R			P20-73 P29-B22					.13 .18	NO NO		18 21	BRANCH 2

SIZE A | CODE IDENT NO. 80230 | 2010780
SCALE-NONE | REV LTR B | SHEET 15 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 25Y			P20-72 P29-A22					.13 .18	NO NO		18 21	BRANCH 2
G 26	5											
G 26R			P20-28 P29-A21					.13 .18	NO NO		18 21	BRANCH 2
G 26Y			P20-48 P29-B21					.13 .18	NO NO		18 21	BRANCH 2
G 27	10				1.75 1.00	1.50 .75				7 68	36 25	
G 27B	11		P29-C9 SHLD G27					.18 .20	NO NO		20	BRANCH 1
G 27R			P20-80 P29-A9					.13 .18	NO NO		18 21	BRANCH 1
G 27Y			P20-81 P29-B9					.13 .18	NO NO		18 21	BRANCH 1
G 28	10				1.75 1.00	1.50 .75				7 68	36 25	
G 28B	11		P29-C10 SHLD G28					.18 .20	NO NO		20	BRANCH 1
G 28R			P20-57 P29-B10					.13 .18	NO NO		18 21	BRANCH 1
G 28Y			P20-82 P29-A10					.13 .18	NO NO		18 21	BRANCH 1

SIZE A | CODE IDENT NO. 80230 | 2010780
SCALE-NONE | REV LTR B | SHEET 16 OF

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 29	10				1.75 1.00	1.50 .75				7 68	36 25	
G 29B	11		P29-D11 SHLD G29					.18 .20	NO NO		20	BRANCH 1
G 29R			P20-85 P29-B11					.13 .18	NO NO		18 21	BRANCH 1
G 29Y			P20-61 P29-C11					.13 .18	NO NO		18 21	BRANCH 1
G 30	10				1.75 1.00	1.50 .75				7 68	36 25	
G 30B	11		P29-D12 SHLD G30					.18 .20	NO NO		20	BRANCH 2
G 30R			P20-83 P29-C12					.13 .18	NO NO		18 21	BRANCH 2
G 30Y			P20-84 P29-B12					.13 .18	NO NO		18 21	BRANCH 2
G 31	10				1.75 1.00	1.50 .75				7 68	36 25	
G 31B	11		P29-D13 SHLD G31					.18 .20	NO NO		20	BRANCH 2
G 31R			P20-59 P29-B13					.13 .18	NO NO		18 21	BRANCH 2
G 31Y			P20-35 P29-C13					.13 .18	NO NO		18 21	BRANCH 2

SIZE A | CODE IDENT NO. 80230 | 2010780
SCALE-NONE | REV LTR B | SHEET 17 OF

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 32	10				1.75 1.00	1.50 .75				7 68	36 25	
G 32B	11		P29-D14 SHLD G32					.18 .20	NO NO		20	BRANCH 2
G 32R			P20-34 P29-C14					.13 .18	NO NO		18 21	BRANCH 2
G 32Y			P20-33 P29-B14					.13 .18	NO NO		18 21	BRANCH 2
G 33	9											
G 33G			P20-22 P29-B15					.13 .18	NO NO		18 21	BRANCH 2
G 33N			P20-40 P29-C15					.13 .18	NO NO		18 21	BRANCH 2
G 33R			P20-64 P29-C16					.13 .18	NO NO		18 21	BRANCH 2
G 33Y			P20-39 P29-B16					.13 .18	NO NO		18 21	BRANCH 2
G 35	6											
G 35G			P20-43 P29-C19					.13 .18	NO NO		18 20	BRANCH 2
G 35R			P20-68 P29-C18					.13 .18	NO NO		18 20	BRANCH 2

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 18 OF

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 35Y			P20-69 P29-D18					.13 .18	NO NO		18 20	BRANCH 2
G 36	3											
G 36R			P20-66 P29-A20					.13 .18	NO NO		18 20	BRANCH 2
G 36Y			P20-42 P29-B20					.13 .18	NO NO		18 20	BRANCH 2
G 37	5											
G 37R			P20-74 P29-C22					.13 .18	NO NO		18 21	BRANCH 2
G 37Y			P20-75 P29-C21					.13 .18	NO NO		18 21	BRANCH 2
G 38	10				1.75 1.00	1.50 .75				7 68	36 25	
G 38B	11		P29-G17 SHLD G38					.18 .20	NO NO		20	BRANCH 2
G 38R			P20-79 P29-G15					.13 .18	NO NO		18 21	BRANCH 2
G 38Y			P20-78 P29-G16					.13 .18	NO NO		18 21	BRANCH 2
G 39	10				1.75 1.00	1.50 .75				7 68	36 25	

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 19 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 39B	11		P29-H17 SHLD G39					.18 .20	NO NO		20	BRANCH 2
G 39R			P20-54 P29-H16					.13 .18	NO NO		18 21	BRANCH 2
G 39Y			P20-31 P29-H15					.13 .18	NO NO		18 21	BRANCH 2
G 40	2		P22-1 P32-1					.13 .13	NO NO		17 18	A
G 41	2		P22-5 P32-5					.13 .13	NO NO		17 18	A
G 42	2		P22-6 P32-6					.13 .13	NO NO		17 18	A
G 43	2		P22-16 P32-16					.13 .13	NO NO		17 18	A
G 44	2		P22-17 P32-17					.13 .13	NO NO		17 18	A
G 45	2		P22-18 P32-18					.13 .13	NO NO		17 18	A
G 46	2		P22-19 P32-19					.13 .13	NO NO		17 18	A
G 47	2		P22-7 P32-7					.13 .13	NO NO		17 18	A
G 48	2		P22-8 P32-8					.13 .13	NO NO		17 18	A

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 20 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 49	2		P22-20 P32-20					.13 .13	NO NO		17 18	A
G 50	2		P22-2 P32-2					.13 .13	NO NO		17 18	A
G 51	2		P22-9 P32-9					.13 .13	NO NO		17 18	A
G 52	2		P22-21 P32-21					.13 .13	NO NO		17 18	A
G 53	2		P22-22 P32-22					.13 .13	NO NO		17 18	A
G 54	2		P22-23 P32-23					.13 .13	NO NO		17 18	A
G 55	2		P22-10 P32-10					.13 .13	NO NO		17 18	A
G 56	2		P22-24 P32-24					.13 .13	NO NO		17 18	A
G 57	2		P22-3 P32-3					.13 .13	NO NO		17 18	A
G 58	2		P22-11 P32-11					.13 .13	NO NO		17 18	A
G 59	2		P22-79 P32-79					.13 .13	NO NO		17 18	A
G 60	2		P22-13 P32-13					.13 .13	NO NO		17 18	A

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 21 OF

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 61	2		P22-33 P32-33					.13 .13	NO NO		17 18	A
G 62	2		P22-4 P32-4					.13 .13	NO NO		17 18	A
G 63	2		P22-12 P32-12					.13 .13	NO NO		17 18	A
G 64	2		P22-74 P32-74					.13 .13	NO NO		17 18	A
G 65	2		P22-14 P32-14					.13 .13	NO NO		17 18	A
G 66	2		P22-29 P32-29					.13 .13	NO NO		17 18	A
G 67	2		P22-30 P32-30					.13 .13	NO NO		17 18	A
G 68	2		P22-15 P32-15					.13 .13	NO NO		17 18	A
G 69	2		P22-28 P32-28					.13 .13	NO NO		17 18	A
G 70	2		P22-50 P32-50					.13 .13	NO NO		17 18	A
G 71	2		P22-51 P32-51					.13 .13	NO NO		17 18	A
G 72	2		P22-76 P32-76					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 22 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 73	2		P22-75 P32-75					.13 .13	NO NO		17 18	A
G 74	2		P22-49 P32-49					.13 .13	NO NO		17 18	A
G 75	2		P22-55 P32-55					.13 .13	NO NO		17 18	A
G 76	2		P22-56 P32-56					.13 .13	NO NO		17 18	A
G 77	2		P22-43 P32-43					.13 .13	NO NO		17 18	A
G 78	2		P22-44 P32-44					.13 .13	NO NO		17 18	A
G 79	2		P22-54 P32-54					.13 .13	NO NO		17 18	A
G 80	2		P22-59 P32-59					.13 .13	NO NO		17 18	A
G 81	2		P22-34 P32-34					.13 .13	NO NO		17 18	A
G 82	2		P22-83 P32-83					.13 .13	NO NO		17 18	A
G 83	2		P22-57 P32-57					.13 .13	NO NO		17 18	A
G 84	2		P22-58 P32-58					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 23 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 85	2		P22-39 P32-39					.13 .13	NO NO		17 18	A
G 86	2		P22-35 P32-35					.13 .13	NO NO		17 18	A
G 87	2		P22-64 P32-64					.13 .13	NO NO		17 18	A
G 88	2		P22-65 P32-65					.13 .13	NO NO		17 18	A
G 89	2		P22-40 P32-40					.13 .13	NO NO		17 18	A
G 90	2		P22-32 P32-32					.13 .13	NO NO		17 18	A
G 91	2		P22-31 P32-31					.13 .13	NO NO		17 18	A
G 92	2		P22-78 P32-78					.13 .13	NO NO		17 18	A
G 93	2		P22-42 P32-42					.13 .13	NO NO		17 18	A
G 94	2		P22-41 P32-41					.13 .13	NO NO		17 18	A
G 95	2		P22-38 P32-38					.13 .13	NO NO		17 18	A
G 96	5											

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 24 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 96R			P20-26 P29-K18					.13 .18	NO NO		18 21	BRANCH 2
G 96Y			P20-47 P29-H18					.13 .18	NO NO		18 21	BRANCH 2
G 97	5											
G 97R			P20-13 P29-H19					.13 .18	NO NO		18 21	BRANCH 2
G 97Y			P20-27 P29-K19					.13 .18	NO NO		18 21	BRANCH 2
G 98	5											
G 98R			P20-51 P29-K20					.13 .18	NO NO		18 21	BRANCH 2
G 98Y			P20-29 P29-H20					.13 .18	NO NO		18 21	BRANCH 2
G 99	1		P20-62 P29-D19					.13 .18	NO NO		18 20	BRANCH 2
G 100	2		P22-60 P32-60					.13 .13	NO NO		17 18	A
G 101	2		P22-36 P32-36					.13 .13	NO NO		17 18	A
G 102	2		P22-37 P32-37					.13 .13	NO NO		17 18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 25 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 103	2		P22-61					.13	NO		17	A
			P32-61					.13	NO		18	
G 104	2		P22-69					.13	NO		17	A
			P32-69					.13	NO		18	
G 105	2		P22-68					.13	NO		17	A
			P32-68					.13	NO		18	
G 106	2		P22-67					.13	NO		17	A
			P32-67					.13	NO		18	
G 107	2		P22-66					.13	NO		17	A
			P32-66					.13	NO		18	
G 112	5											
G 112R			P21-41					.13	NO		18	
			P29-A3					.18	NO		21	BRANCH 1
G 112Y			P21-22					.13	NO		18	
			P29-B3					.18	NO		21	BRANCH 1
G 113	2		P20-12					.13	NO		18	
			P29-K21					.18	NO		21	BRANCH 2
G 114	2		P20-77					.13	NO		18	
			P29-D21					.18	NO		21	BRANCH 2
G 117	2		P22-77					.13	NO		17	A
			P32-77					.13	NO		18	
G 118	2		P22-52					.13	NO		17	A
			P32-52					.13	NO		18	

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 26 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 119	2		P21-55					.13	NO		18	
			P29-A5					.18	NO		21	BRANCH 1
G 120	38		F35					.19	NO		37	A
			P32-81					.13	NO		18	
G 130	2		P20-67					.13	NO		18	
			P29-D25					.18	NO		21	
G 131	10				1.75	1.50				68	25	
					1.75	1.50				68	25	
G 131A	11		SHLD G131					.20	NO			
			P22-46					.13	NO		17	
G 131B	11		P32-46					.13	NO		18	
			SHLD G131					.20	NO			
G 131R			P22-45					.13	NO		17	
			P32-45					.13	NO		18	
G 131Y			P22-25					.13	NO		17	
			P32-25					.13	NO		18	
G 132	10				1.75	1.50				68	25	
					1.75	1.50				68	25	
G 132A	11		SHLD G132					.20	NO			
			P22-72					.13	NO		17	
G 132B	11		P32-72					.13	NO		18	
			SHLD G132					.20	NO			
G 132R			P22-70					.13	NO		17	
			P32-70					.13	NO		18	

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 27 OF

FORM 2084 9-68

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 132Y			P22-71					.13	NO		17	
			P32-71					.13	NO		18	
G 133	10				1.75	1.50				68	25	
					1.75	1.50				68	25	
G 133A	11		SHLD G133					.20	NO			
			P22-27					.13	NO		17	
G 133B	11		P32-27					.13	NO		18	
			SHLD G133					.20	NO			
G 133R			P22-47					.13	NO		17	
			P32-47					.13	NO		18	
G 133Y			P22-26					.13	NO		17	
			P32-26					.13	NO		18	
G 134	44				1.75	1.50				68	46	
					1.00	.75				68	46	
G 134A	11		SHLD G134					.20	NO			
			P20-9					.13	NO		18	
G 134B	11		P29-F23					.18	NO		20	BRANCH 2
			SHLD G134					.20	NO			
G 134L			NONE				1.75		NO			
			NONE				1.00		NO			
G 134R			P20-23					.13	NO		18, 45	
			P29-F25					.18	NO		21	BRANCH 2
G 134W			P20-24					.13	NO		18, 45	
			P29-F24					.18	NO		21	BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 28 OF

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LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 135	44				1.75	1.50				68	46	
					1.00	.75				68	46	
G 135A	11		SHLD G135					.20	NO			
			P20-10					.13	NO		18	
G 135B	11		P29-G23					.18	NO		20	BRANCH 2
			SHLD G135					.20	NO			
G 135L			NONE				1.75		NO			
			NONE				1.00		NO			
G 135R			P20-3					.13	NO		18, 45	
			P29-G24					.18	NO		21	BRANCH 2
G 135W			P20-11					.13	NO		18, 45	
			P29-G25					.18	NO		21	BRANCH 2
G 136	44				1.75	1.50				68	46	
					1.00	.75				68	46	
G 136A	11		SHLD G136					.20	NO			
			P20-45					.13	NO		18	
G 136B	11		P29-H23					.18	NO		20	BRANCH 2
			SHLD G136					.20	NO			
G 136L			NONE				1.75		NO			
			NONE				1.50		NO			
G 136R			P20-25					.13	NO		18, 45	
			P29-H25					.18	NO		21	BRANCH 2
G 136W			P20-44					.13	NO		18, 45	
			P29-H24					.18	NO		21	BRANCH 2

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR B	SHEET 29 OF

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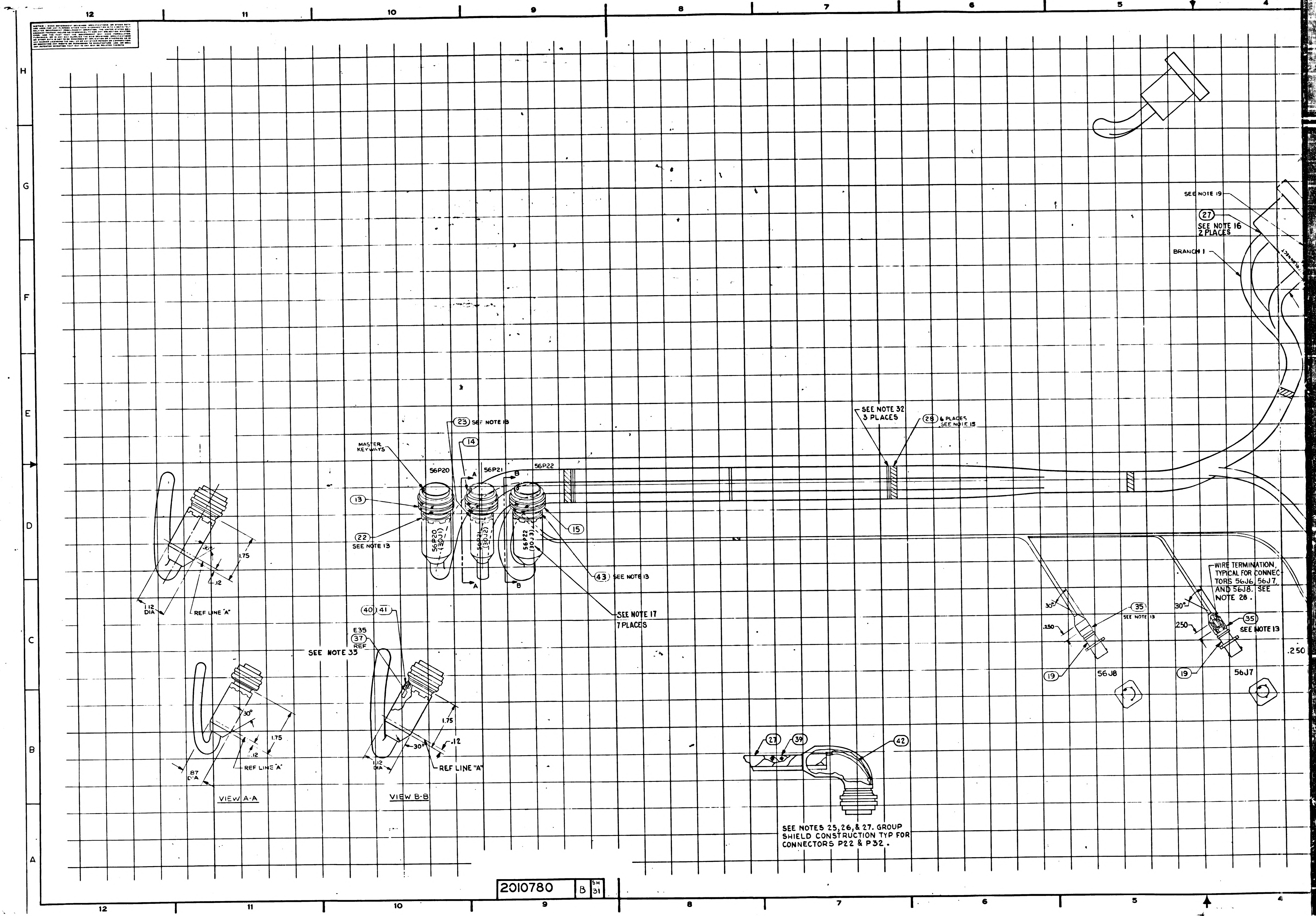
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 137	10				1.75 1.00	1.50 .75				7 7	36 36	
G 137R			J7-7 P29-A18					.13 .22	NO NO		18	BRANCH 2
G 137Y			J7-4 P29-B18					.13 .22	NO NO		18	BRANCH 2
G 138	10				1.75 1.00	1.50 .75				7 7	36 36	
G 138P			J8-7 P29-A18					.13 .22	NO NO		18 20	BRANCH 2
G 138Y			J8-4 P29-B18					.13 .22	NO NO		18 20	BRANCH 2
G 139	47				1.75 1.00	1.50 .75				7 7	36 36	
G 139R			J6-7 P29-A19					.13 .18	NO NO		18 20	BRANCH 2
G 139Y			J6-4 P29-B19					.13 .18	NO NO		18 20	BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780	
SCALE-NONE	REV LTR B	SHEET 30 OF	

FORM 2084 8-65

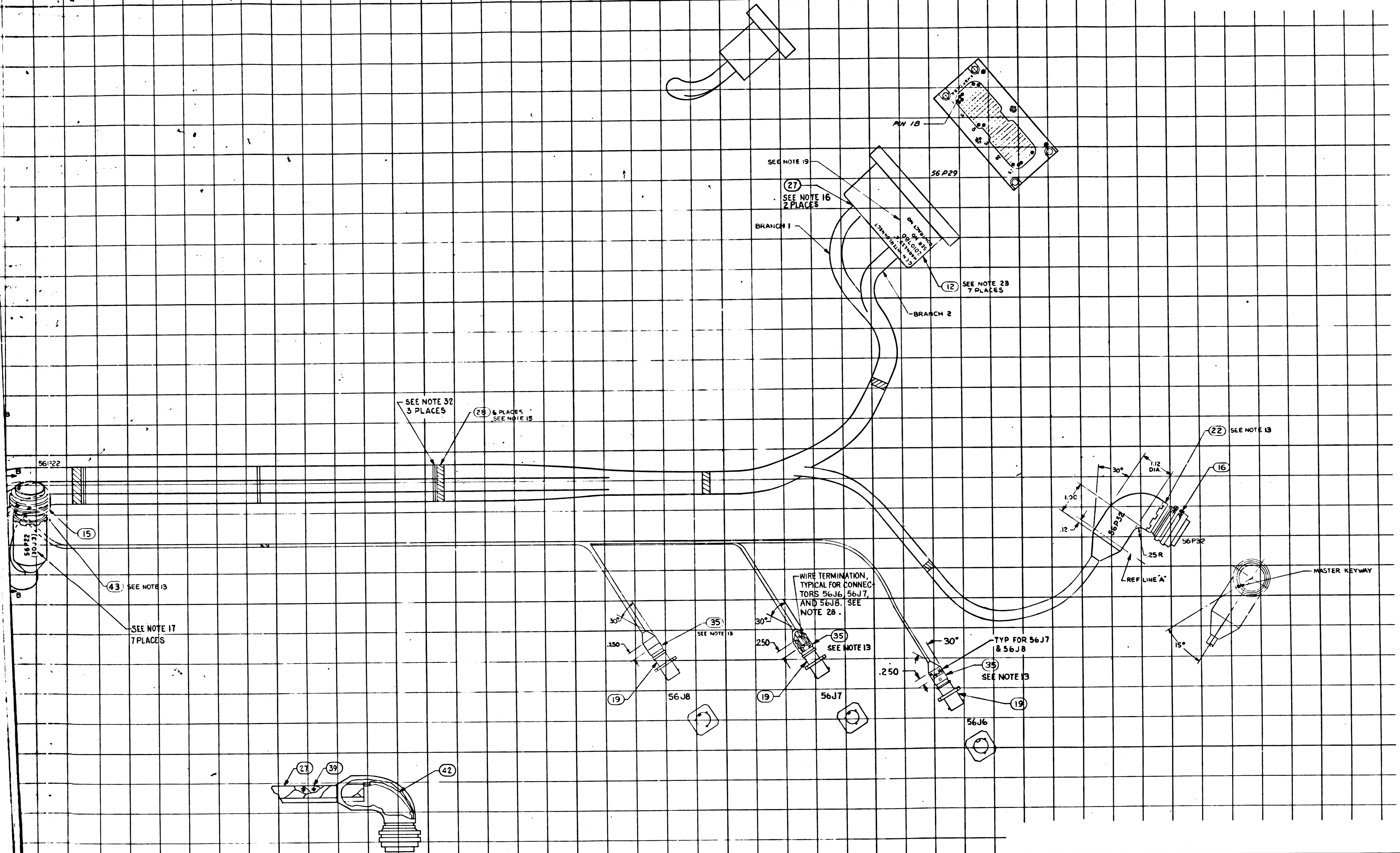
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.


12
11
10
9
8
7
6
5
4
H
G
F
E
D
C
B
A
SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
DISCONNECT
SEE NOTE 32
3 PLACES
28
6 PLACES
SEE NOTE 15
23
SEE NOTE 13
14
MASTER KEYWAYS
56P20
56P21
56P22
A
B
13
22
SEE NOTE 13
56P20
(30J1)
56P21
(30J2)
56P22
(30J3)
15
43
SEE NOTE 13
SEE NOTE 17
7 PLACES
1.75
.12
1.12
DIA
REF LINE "A"
30°
40
41
E35
37
REF
SEE NOTE 33
1.75
.12
30°
.87
DIA
REF LINE "A"
VIEW A-A
1.75
.12
30°
1.12
DIA
REF LINE "A"
VIEW B-B
WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.
30°
35
SEE NOTE 13
.250
19
56J8
30°
250
35
SEE NOTE 13
19
56J7
.250
27
39
42
SEE NOTES 25, 26, & 27. GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

REVISIONS TDRR 31139

SEE SHEET I FOR REVISION RECORD


PIN 1B
56 P29
SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
G&N INTERCONNECT
HARNESS
2010780
SER NO
CONTRACT NO
12
SEE NOTE 23
7 PLACES
BRANCH 2
SEE NOTE 32
3 PLACES
28
6 PLACES
SEE NOTE 15
56P22
B
B
B
56P22
(30J3)
15
43
SEE NOTE 13
SEE NOTE 17
7 PLACES
22
SEE NOTE 13
30°
1.12
DIA.
16
1.00
.12
56P32
56P32
.25R
REF LINE "A"
MASTER KEYWAY
15°
WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.
30°
.250
35
SEE NOTE 13
19
56J8
30°
.250
35
SEE NOTE 13
19
56J7
30°
TYP FOR 56J7 & 56J8
.250
35
SEE NOTE 13
19
56J6
27
39
42

SEE NOTES 25, 26, & 27. GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ±.03 ANGLES ± 2
DO NOT SCALE THIS DRAWING

MATERIAL ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN	Gruenewald	28 JUN
CHECKED	W. Diehl	30 Jun 6
APPROVED		AUG
APPROVED		
APPROVED CCB		9/26/66
APPROVED MSC	R. Jacob	9/23/66
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT
HARNESS "G"
(C/M BLOCK II)

CODE IDENT NO	SIZE	DRAWING NO
80230	J	2010780

SCALE FULL SHEET 31 OF

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W.S.
B	REVISED PER TDRR 31203	4 OCT 66	SS
C	REVISED PER TDRR 31214	17 OCT 66	WK AU

REV	B	B	B	B	B	B	C	B	B	C	C									
SHEET	21	22	23	24	25	26	27	28	29	30	31									
REV STATUS OF SHEETS — REV				C	B	B	C	B	B	B	B	C	C	B	B	B	B	B	B	B	B	B	B
REV STATUS OF SHEETS — SHEET				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN J. Krahn 29 JUN 66 (DAY MO YR)
CHECKER W. Diehl 30 JUN 66
ENGINEER D. Garta 5 JUL 66
APPROVAL Aug 15 66
CONTR NO NAS 9-497

NASA APPROVAL R. Jacob
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT
HARNESS "G"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010780
SCALE NONE
SHEET 1 OF 31

IL 1377A6 12-65

LIMA 101066 WIRING HARNESS G 2010780 B

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIGURE 6B AND ND 1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014677.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT.
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A - FROM END OF SHIELD B - TO END OF SHIELD G - GREEN K - BLACK L - BLUE N - BROWN R - RED W - WHITE Y - YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER.
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION.
8	UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 2 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
11	ALL UNUSED CAVITIES ON CONNECTORS 56P20,P21,P22, P32,J6,J7,AND, J8 SHALL BE FILLED WITH A SEALING PLUG ITEM NUMBER 24.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 26.
13	APPLY BONDING MATERIAL PER ND1002187 TYPE I, USING ITEMS 33 AND 34 TO THE THREADED PORTION OF THE ADAPTER AND TO THE THREADED PORTION OF THE CONNECTOR PRIOR TO ASSEMBLY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTOR OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE, TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE.
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM, EXCEPT FOR CONDUCTORS USING ITEM NUMBER 44. THESE SHALL BE LESS THAN 2 OHMS. TEST PER MIL-STD-202, METHOD 303.

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 3 OF 31

FORM 2084 9-65

UDOVICH 102266 WIRING HARNESS G 2010780 C

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN A. THE ASSEMBLY PINS AND STRUCTURE GROUND, EXCEPT THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT SHALL BE LIMITED TO 15 MA.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 29 AND 30.
24	CONDUCTORS SHALL ENTER CONNECTOR 56P29 THROUGH THE APPROPRIATE BRANCH SPECIFIED IN THE REMARKS COLUMN.
25	GROUP SHIELDING-WRAP CABLE WITH ONE CONTINUOUS LENGTH OF SHIELDING TAPE. SUCCESSIVE TURNS SHALL OVERLAP BY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.
26	COMPLETELY COVER SHIELD WITH A MINIMUM OF TWO WRAPS OF INSULATION TAPE ITEM 27. WRAP LAYERS IN OPPOSITE DIRECTION, CLOCKWISE, COUNTER CLOCKWISE, ETC. SUCCESSIVE TURNS SHALL OVERLAP BY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.
27	DELETED
28	LOOP LEADS BACK AND SPOT TIE TO WIRE JACKET

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR C	SHEET 4 OF 31

MIL 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
29	PERFORM WORKMANSHIP VIBRATION A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
30	SOLDER PER ND1002071, USING ITEM 48, OR ITEMS 49 AND 50.
31	ASSEMBLE INSULATION SLEEVE ITEM 51 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P29. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.
32	LACE HARNESS BRANCHES TOGETHER USING A CONTINUOUS CLOVE HITCH AT LOCATIONS SHOWN.
33	BOND TERMINAL LUG AND SCREW TO THE ADAPTER PER ND1002187, TYPE III, USING ITEMS 33, 34, 52, AND 53.

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 5 OF 31

FORM 2084 9-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2010780-001	WIRE PER 1010789-006, 22 AWG, YEL, 5 FT TOT LG
	2	1	2010780-002	WIRE PER 1010789-016, 26 AWG, YEL, 265 FT TOT LG
	3	1	2010780-003	WIRE PER 1010789-008, 22 AWG, YEL, RED, 5 FT TOT LG
	4	1	2010780-004	WIRE PER 1010789-003, 24 AWG, YEL, RED, 5 FT TOT LG
	5	1	2010780-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 75 FT TOT LG
	6	1	2010780-006	WIRE PER 1010789-009, 22 AWG, YEL, RED, GRN, 5 FT TOT LG
	7	1	2010780-007	WIRE PER 1010789-004, 24 AWG, YEL, RED, GRN, 5 FT TOT LG
	8	1	2010780-008	WIRE PER 1010789-018, 26 AWG, YEL, RED, GRN, 5 FT TOT LG
	9	1	2010780-009	WIRE PER 1010789-019, 26 AWG, YEL, RED, GRN, BRN, 5 FT TOT LG
	10	1	2010780-010	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 88 FT TOT LG
	11	1	2010780-011	WIRE PER 1010789-002, 24 AWG, BLK, 15 FT TOT LG
	12	1	2014747-021	CONNECTOR, PLUG, ELECTRICAL (56P29)
9	13	1	1010929-002	CONNECTOR, PLUG, ELECTRICAL (56P20)
9	14	1	1010929-008	CONNECTOR, PLUG, ELECTRICAL (56P21)

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	15	1	1010929-101	CONNECTOR, PLUG, ELECTRICAL (56P22)
9	16	1	1010929-001	CONNECTOR, PLUG, ELECTRICAL (56P32)
9	17	REF	1010770- 1	CONTACT, PIN, SUPPLIED WITH CONNECTOR 1010929
9	18	REF	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTORS 1010929 AND 1010930
9	19	3	1010930-017	CONNECTOR, RECEPTACLE, ELECTRICAL (56J6, 56J7, AND 56J8).
9	20	31	1010955- 1	CONTACT, MALE
9	21	75	1010955- 2	CONTACT, MALE
	22	2	2014670- 4	ADAPTER, CONNECTOR
	23	1	2014670- 5	ADAPTER, CONNECTOR
9	24	91	1010958- 1	PLUG, PROTECTIVE SEALING
9	25	19	1010402- 2	SLEEVE, SOLDER
9	26	AR	1012507- 4	TAPE, LACING
	27	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	28	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	29	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	30	AR	1012504	PRIMER, METAL PARTS
9	33	AR	1010661	EPOXY RESIN

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	34	AR	1010679	ADHESIVE, ACTIVATOR
	35	3	2014670-010	ADAPTER, CONNECTOR
9	36	19	1012534- 36	SLEEVING, INSULATION (HEAT SHRINKABLE)
	37	1	2021203	TERMINAL LUG, SOLDER
	38		2010780-012	DELETED
	39	AR	1010989	TAPE, SHIELDING, EMI/RFI
	40	1	1006783- 93	SCREW, BUTTON HD
	41	1	MS35333-69	WASHER, LOCK
	42		1006776- 19	DELETED
	43	1	2014670- 11	ADAPTER, CONNECTOR
	44	1	2010780-013	WIRE PER 1010707-1, RED JKT, 29AWG, RED, WHT, BLU, 15 FT TOTAL LG.
9	45	6	1010862	BUSHING, SLEEVE
9	46	6	1010763- 2	SOLDER, SLEEVE
	47	1	2010780-014	WIRE PER 1010789-12, 24AWG, YEL, RED, YEL, JKT, 16 FT TOT LG.
	48	AR	SN60WRAP	SOLDER QQ-S-571
	49	AR	SN60WS	SOLDER QQ-S-571
	50	AR	MIL-F-14256 TYPE A OR W	FLUX

UDOVICH 102266 WIRING HARNESS G 2010780 C

SEE NOTE

LIST OF MATERIALS

NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	51	105	1010490-114	INSULATION, SLEEVING (HEAT SHRINKABLE)
9	52	AR	1008822	COLORANT, EPOXY BASE
9	53	AR	1006277	SILICA, PULVERIZED PYROGENIC
9	54	2	1010811-002	BAND, CABLE

SIZE A
CODE IDENT NO. 80230
2010780
SCALE-NONE
REV LTR C
SHEET 10 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 1	5											
G 1R			P21-51 P29-H5					.13 .18	NO NO		18 21	BRANCH 1
G 1Y			P21-29 P29-K5					.13 .18	NO NO		18 21	BRANCH 1
G 2	5											
G 2R			P21-53 P29-K3					.13 .18	NO NO		18 21	BRANCH 1
G 2Y			P21-52 P29-K4					.13 .18	NO NO		18 21	BRANCH 1
G 3	5											
G 3R			P21-28 P29-K7					.13 .18	NO NO		18 21	BRANCH 1
G 3Y			P21-49 P29-K6					.13 .18	NO NO		18 21	BRANCH 1
G 6	5											
G 6R			P21-3 P29-G11					.13 .18	NO NO		18 21	BRANCH 1
G 6Y			P21-10 P29-H11					.13 .18	NO NO		18 21	BRANCH 1

SIZE A
CODE IDENT NO. 80230
2010780
SCALE-NONE
REV LTR B
SHEET 11 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 7	10				1.75 1.00	1.50 .75				7 68	36 25	
G 7B	11		P29-F2 SHLD G7					.18 .20	NO NO		20	BRANCH 1
G 7R			P21-39 P29-G2					.13 .18	NO NO		18 21	BRANCH 1
G 7Y			P21-38 P29-H2					.13 .18	NO NO		18 21	BRANCH 1
G 8	10				1.75 1.00	1.50 .75				7 68	36 25	
G 8B	11		P29-F1 SHLD G8					.18 .20	NO NO		20	BRANCH 1
G 8R			P21-37 P29-G1					.13 .18	NO NO		18 21	BRANCH 1
G 8Y			P21-61 P29-H1					.13 .18	NO NO		18 21	BRANCH 1
G 11	10				1.75 1.00	1.50 .75				7 68	36 25	
G 11B	11		P29-C6 SHLD G11					.18 .20	NO NO		20	BRANCH 1
G 11R			P21-17 P29-B6					.13 .18	NO NO		18 21	BRANCH 1
G 11Y			P21-16 P29-A6					.13 .18	NO NO		18 21	BRANCH 1

SIZE A
CODE IDENT NO. 80230
2010780
SCALE-NONE
REV LTR B
SHEET 12 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 12	10				1.75 1.00	1.50 .75				7 68	36 25	
G 12B	11		P29-D2 SHLD G12					.18 .20	NO NO		20	BRANCH 1
G 12R			P21-59 P29-C2					.13 .18	NO NO		18 21	BRANCH 1
G 12Y			P21-36 P29-B2					.13 .18	NO NO		18 21	BRANCH 1
G 13	10				1.75 1.00	1.50 .75				7 68	36 25	
G 13B	11		P29-D1 SHLD G13					.18 .20	NO NO		20	BRANCH 1
G 13R			P21-57 P29-B1					.13 .18	NO NO		18 21	BRANCH 1
G 13Y			P21-58 P29-C1					.13 .18	NO NO		18 21	BRANCH 1
G 14	5											
G 14R			P21-42 P29-K9					.13 .18	NO NO		18 21	BRANCH 1
G 14Y			P21-43 P29-H9					.13 .18	NO NO		18 21	BRANCH 1
G 15	5											

SIZE A
CODE IDENT NO. 80230
2010780
SCALE-NONE
REV LTR B
SHEET 13 OF 31

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 15R			P21-24 P29-G9					.13 .18	NO NO		18 21	BRANCH 1
G 15Y			P21-44 P29-G10					.13 .18	NO NO		18 21	BRANCH 1
G 16	5											
G 16R			P21-46 P29-H10					.13 .18	NO NO		18 21	BRANCH 1
G 16Y			P21-25 P29-K10					.13 .18	NO NO		18 21	BRANCH 1
G 17	8											
G 17G			P21-26 P29-G12					.13 .18	NO NO		18 21	BRANCH 2
G 17R			P21-12 P29-H12					.13 .18	NO NO		18 21	BRANCH 2
G 17Y			P21-27 P29-H13					.13 .18	NO NO		18 21	BRANCH 2
G 18	5											
G 18R			P20-7 P29-K23					.13 .18	NO NO		18 21	BRANCH 2
G 18Y			P20-8 P29-K22					.13 .18	NO NO		18 21	BRANCH 2

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 22	4											
G 22R			P20-5 P29-C23					.13 .18	NO NO		18 20	BRANCH 2
G 22Y			P20-4 P29-C24					.13 .18	NO NO		18 20	BRANCH 2
G 23	7											
G 23G			P20-30 P29-B25					.13 .18	NO NO		18 20	BRANCH 2
G 23R			P20-15 P29-C25					.13 .18	NO NO		18 20	BRANCH 2
G 23Y			P20-14 P29-B24					.13 .18	NO NO		18 20	BRANCH 2
G 24	5											
G 24R			P20-46 P29-A23					.13 .18	NO NO		18 21	BRANCH 2
G 24Y			P20-71 P29-B23					.13 .18	NO NO		18 21	BRANCH 2
G 25	5											
G 25R			P20-73 P29-B22					.13 .18	NO NO		18 21	BRANCH 2

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 25Y			P20-72 P29-A22					.13 .18	NO NO		18 21	BRANCH 2
G 26	5											
G 26R			P20-28 P29-A21					.13 .18	NO NO		18 21	BRANCH 2
G 26Y			P20-48 P29-B21					.13 .18	NO NO		18 21	BRANCH 2
G 27	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 27B	11		P29-C9 SHLD G27					.18 .20	NO NO		20	BRANCH 1
G 27R			P20-80 P29-A9					.13 .18	NO NO		18 21	BRANCH 1
G 27Y			P20-81 P29-B9					.13 .18	NO NO		18 21	BRANCH 1
G 28	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 28B	11		P29-C10 SHLD G28					.18 .20	NO NO		20	BRANCH 1
G 28R			P20-57 P29-B10					.13 .18	NO NO		18 21	BRANCH 1
G 28Y			P20-82 P29-A10					.13 .18	NO NO		18 21	BRANCH 1

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 29	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 29B	11		P29-D11 SHLD G29					.18 .20	NO NO		20	BRANCH 1
G 29R			P20-85 P29-B11					.13 .18	NO NO		18 21	BRANCH 1
G 29Y			P20-61 P29-C11					.13 .18	NO NO		18 21	BRANCH 1
G 30	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 30B	11		P29-D12 SHLD G30					.18 .20	NO NO		20	BRANCH 2
G 30R			P20-83 P29-C12					.13 .18	NO NO		18 21	BRANCH 2
G 30Y			P20-84 P29-B12					.13 .18	NO NO		18 21	BRANCH 2
G 31	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 31B	11		P29-D13 SHLD G31					.18 .20	NO NO		20	BRANCH 2
G 31R			P20-59 P29-B13					.13 .18	NO NO		18 21	BRANCH 2
G 31Y			P20-35 P29-C13					.13 .18	NO NO		18 21	BRANCH 2

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 32	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 32B	11		P29-D14 SHLD G32					.18 .20	NO NO		20	BRANCH 2
G 32R			P20-34 P29-C14					.13 .18	NO NO		18 21	BRANCH 2
G 32Y			P20-33 P29-B14					.13 .18	NO NO		18 21	BRANCH 2
G 33	9											
G 33G			P20-22 P29-B15					.13 .18	NO NO		18 21	BRANCH 2
G 33N			P20-40 P29-C15					.13 .18	NO NO		18 21	BRANCH 2
G 33R			P20-64 P29-C16					.13 .18	NO NO		18 21	BRANCH 2
G 33Y			P20-39 P29-B16					.13 .18	NO NO		18 21	BRANCH 2
G 35	6											
G 35G			P20-43 P29-C19					.13 .18	NO NO		18 20	BRANCH 2
G 35R			P20-68 P29-C18					.13 .18	NO NO		18 20	BRANCH 2

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 18 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 35Y			P20-69 P29-D18					.13 .18	NO NO		18 20	BRANCH 2
G 36	3											
G 36R			P20-66 P29-A20					.13 .18	NO NO		18 20	BRANCH 2
G 36Y			P20-42 P29-B20					.13 .18	NO NO		18 20	BRANCH 2
G 37	5											
G 37R			P20-74 P29-C22					.13 .18	NO NO		18 21	BRANCH 2
G 37Y			P20-75 P29-C21					.13 .18	NO NO		18 21	BRANCH 2
G 38	10				1.75 1.00	1.50 .75				7 6B	36 25	
G 38B	11		P29-G17 SHLD G38					.18 .20	NO NO		20	BRANCH 2
G 38R			P20-79 P29-G15					.13 .18	NO NO		18 21	BRANCH 2
G 38Y			P20-78 P29-G16					.13 .18	NO NO		18 21	BRANCH 2
G 39	10				1.75 1.00	1.50 .75				7 6B	36 25	

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 19 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 39B	11		P29-H17 SHLD G39					.18 .20	NO NO		20	BRANCH 2
G 39R			P20-54 P29-H16					.13 .18	NO NO		18 21	BRANCH 2
G 39Y			P20-31 P29-H15					.13 .18	NO NO		18 21	BRANCH 2
G 40	2		P22-1 P32-1					.13 .13	NO NO		17 18	A
G 41	2		P22-5 P32-5					.13 .13	NO NO		17 18	A
G 42	2		P22-6 P32-6					.13 .13	NO NO		17 18	A
G 43	2		P22-16 P32-16					.13 .13	NO NO		17 18	A
G 44	2		P22-17 P32-17					.13 .13	NO NO		17 18	A
G 45	2		P22-18 P32-18					.13 .13	NO NO		17 18	A
G 46	2		P22-19 P32-19					.13 .13	NO NO		17 18	A
G 47	2		P22-7 P32-7					.13 .13	NO NO		17 18	A
G 48	2		P22-8 P32-8					.13 .13	NO NO		17 18	A

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 20 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 49	2		P22-20 P32-20					.13 .13	NO NO		17 18	A
G 50	2		P22-2 P32-2					.13 .13	NO NO		17 18	A
G 51	2		P22-9 P32-9					.13 .13	NO NO		17 18	A
G 52	2		P22-21 P32-21					.13 .13	NO NO		17 18	A
G 53	2		P22-22 P32-22					.13 .13	NO NO		17 18	A
G 54	2		P22-23 P32-23					.13 .13	NO NO		17 18	A
G 55	2		P22-10 P32-10					.13 .13	NO NO		17 18	A
G 56	2		P22-24 P32-24					.13 .13	NO NO		17 18	A
G 57	2		P22-3 P32-3					.13 .13	NO NO		17 18	A
G 58	2		P22-11 P32-11					.13 .13	NO NO		17 18	A
G 59	2		P22-79 P32-79					.13 .13	NO NO		17 18	A
G 60	2		P22-13 P32-13					.13 .13	NO NO		17 18	A

SIZE A CODE IDENT NO. 80230 2010780

SCALE-NONE REV LTR B SHEET 21 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 61	2		P22-33 P32-33					.13 .13	NO NO		17 18	A
G 62	2		P22-4 P32-4					.13 .13	NO NO		17 18	A
G 63	2		P22-12 P32-12					.13 .13	NO NO		17 18	A
G 64	2		P22-74 P32-74					.13 .13	NO NO		17 18	A
G 65	2		P22-14 P32-14					.13 .13	NO NO		17 18	A
G 66	2		P22-29 P32-29					.13 .13	NO NO		17 18	A
G 67	2		P22-30 P32-30					.13 .13	NO NO		17 18	A
G 68	2		P22-15 P32-15					.13 .13	NO NO		17 18	A
G 69	2		P22-28 P32-28					.13 .13	NO NO		17 18	A
G 70	2		P22-50 P32-50					.13 .13	NO NO		17 18	A
G 71	2		P22-51 P32-51					.13 .13	NO NO		17 18	A
G 72	2		P22-76 P32-76					.13 .13	NO NO		17 18	A

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 22 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 73	2		P22-75 P32-75					.13 .13	NO NO		17 18	A
G 74	2		P22-49 P32-49					.13 .13	NO NO		17 18	A
G 75	2		P22-55 P32-55					.13 .13	NO NO		17 18	A
G 76	2		P22-56 P32-56					.13 .13	NO NO		17 18	A
G 77	2		P22-43 P32-43					.13 .13	NO NO		17 18	A
G 78	2		P22-44 P32-44					.13 .13	NO NO		17 18	A
G 79	2		P22-54 P32-54					.13 .13	NO NO		17 18	A
G 80	2		P22-59 P32-59					.13 .13	NO NO		17 18	A
G 81	2		P22-34 P32-34					.13 .13	NO NO		17 18	A
G 82	2		P22-83 P32-83					.13 .13	NO NO		17 18	A
G 83	2		P22-57 P32-57					.13 .13	NO NO		17 18	A
G 84	2		P22-58 P32-58					.13 .13	NO NO		17 18	A

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 23 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 85	2		P22-39 P32-39					.13 .13	NO NO		17 18	A
G 86	2		P22-35 P32-35					.13 .13	NO NO		17 18	A
G 87	2		P22-64 P32-64					.13 .13	NO NO		17 18	A
G 88	2		P22-65 P32-65					.13 .13	NO NO		17 18	A
G 89	2		P22-40 P32-40					.13 .13	NO NO		17 18	A
G 90	2		P22-32 P32-32					.13 .13	NO NO		17 18	A
G 91	2		P22-31 P32-31					.13 .13	NO NO		17 18	A
G 92	2		P22-78 P32-78					.13 .13	NO NO		17 18	A
G 93	2		P22-42 P32-42					.13 .13	NO NO		17 18	A
G 94	2		P22-41 P32-41					.13 .13	NO NO		17 18	A
G 95	2		P22-38 P32-38					.13 .13	NO NO		17 18	A
G 96	5											

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 24 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 96R			P20-26 P29-K18					.13 .18	NO NO		18 21	BRANCH 2
G 96Y			P20-47 P29-H18					.13 .18	NO NO		18 21	BRANCH 2
G 97	5											
G 97R			P20-13 P29-H19					.13 .18	NO NO		18 21	BRANCH 2
G 97Y			P20-27 P29-K19					.13 .18	NO NO		18 21	BRANCH 2
G 98	5											
G 98R			P20-51 P29-K20					.13 .18	NO NO		18 21	BRANCH 2
G 98Y			P20-29 P29-H20					.13 .18	NO NO		18 21	BRANCH 2
G 99	1		P20-62 P29-D19					.13 .18	NO NO		18 20	BRANCH 2
G 100	2		P22-60 P32-60					.13 .13	NO NO		17 18	A
G 101	2		P22-36 P32-36					.13 .13	NO NO		17 18	A
G 102	2		P22-37 P32-37					.13 .13	NO NO		17 18	A

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 25 OF 31

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 103	2		P22-61 P32-61					.13 .13	NO NO		17 18	A
G 104	2		P22-69 P32-69					.13 .13	NO NO		17 18	A
G 105	2		P22-68 P32-68					.13 .13	NO NO		17 18	A
G 106	2		P22-67 P32-67					.13 .13	NO NO		17 18	A
G 107	2		P22-66 P32-66					.13 .13	NO NO		17 18	A
G 112	5											
G 112R			P21-41 P29-A3					.13 .18	NO NO		18 21	 BRANCH 1
G 112Y			P21-22 P29-B3					.13 .18	NO NO		18 21	 BRANCH 1
G 113	2		P20-12 P29-K21					.13 .18	NO NO		18 21	 BRANCH 2
G 114	2		P20-77 P29-D21					.13 .18	NO NO		18 21	 BRANCH 2
G 117	2		P22-77 P32-77					.13 .13	NO NO		17 18	A
G 118	2		P22-52 P32-52					.13 .13	NO NO		17 18	A

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 26 OF 31

FORM 2084 9-65

UDOVICH 102266 WIRING HARNESS G 2010780 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 119	2		P21-55 P29-A5					.13 .18	NO NO		18 21	BRANCH 1
G 120			DELETED									
G 130	2		P20-67 P29-D25					.13 .18	NO NO		18 21	
G 131	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 131A	11		SHLD G131 P22-46					.20 .13	NO NO		 17	
G 131B	11		P32-46 SHLD G131					.13 .20	NO NO		18	
G 131R			P22-45 P32-45					.13 .13	NO NO		17 18	
G 131Y			P22-25 P32-25					.13 .13	NO NO		17 18	
G 132	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 132A	11		SHLD G132 P22-72					.20 .13	NO NO		 17	
G 132B	11		P32-72 SHLD G132					.13 .20	NO NO		18	
G 132R			P22-70 P32-70					.13 .13	NO NO		17 18	

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR C	SHEET 27 OF 31

MIL 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 132Y			P22-71 P32-71					.13 .13	NO NO		17 18	
G 133	10				1.75 1.75	1.50 1.50				6B 6B	25 25	
G 133A	11		SHLD G133 P22-27					.20 .13	NO NO		 17	
G 133B	11		P32-27 SHLD G133					.13 .20	NO NO		18	
G 133R			P22-47 P32-47					.13 .13	NO NO		17 18	
G 133Y			P22-26 P32-26					.13 .13	NO NO		17 18	
G 134	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 134A	11		SHLD G134 P20-9					.20 .13	NO NO		 18	
G 134B	11		P29-F23 SHLD G134					.18 .20	NO NO		20	BRANCH 2
G 134L			NONE NONE				1.75 1.00		NO NO			
G 134R			P20-23 P29-F25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 134W			P20-24 P29-F24					.13 .18	NO NO		18, 45 21	 BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780
SCALE-NONE	REV LTR B	SHEET 28 OF 31

FORM 2084 9-65

LIMA 101066 WIRING HARNESS G 2010780 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
G 135	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 135A	11		SHLD G135 P20-10					.20 .13	NO NO		 18	
G 135B	11		P29-G23 SHLD G135					.18 .20	NO NO		20	BRANCH 2
G 135L			NONE NONE				1.75 1.00		NO NO			
G 135R			P20-3 P29-G24					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 135W			P20-11 P29-G25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 136	44				1.75 1.00	1.50 .75				6B 6B	46 46	
G 136A	11		SHLD G136 P20-45					.20 .13	NO NO		 18	
G 136B	11		P29-H23 SHLD G136					.18 .20	NO NO		20	BRANCH 2
G 136L			NONE NONE				1.75 1.50		NO NO			
G 136R			P20-25 P29-H25					.13 .18	NO NO		18, 45 21	 BRANCH 2
G 136W			P20-44 P29-H24					.13 .18	NO NO		18, 45 21	 BRANCH 2

SIZE A	CODE IDENT NO. 80230	2010780
SCALE NONE	REV LTR B	SHEET 29 OF 31

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE GNE, FIG	ACCESSORY ITEMS	REMARKS
G 137	10				1.75 1.00	1.50 .75				7 7	36 36	
G 137R			J7-7 P29-A18					.13 .22	NO NO		18	BRANCH 2
G 137Y			J7-4 P29-B18					.13 .22	NO NO		18	BRANCH 2
G 138	10				1.75 1.00	1.50 .75				7 7	36 36	
G 138R			J8-7 P29-A18					.13 .22	NO NO		18 20	BRANCH 2
G 138Y			J8-4 P29-B18					.13 .22	NO NO		18 20	BRANCH 2
G 139	47				1.75 1.00	1.50 .75				7 7	36 36	
G 139R			J6-7 P29-A19					.13 .18	NO NO		18 20	BRANCH 2
G 139Y			J6-4 P29-B19					.13 .18	NO NO		18 20	BRANCH 2
G 140	1		E35 SHLD A					.19 .25	YES YES		37	A
G 141	1		SHLD A P32-81					.25 .13	YES NO		18	A

SIZE	CODE IDENT NO.	
A	80230	2010780
SCALE-NONE	REV LTR C	SHEET 30 OF 31

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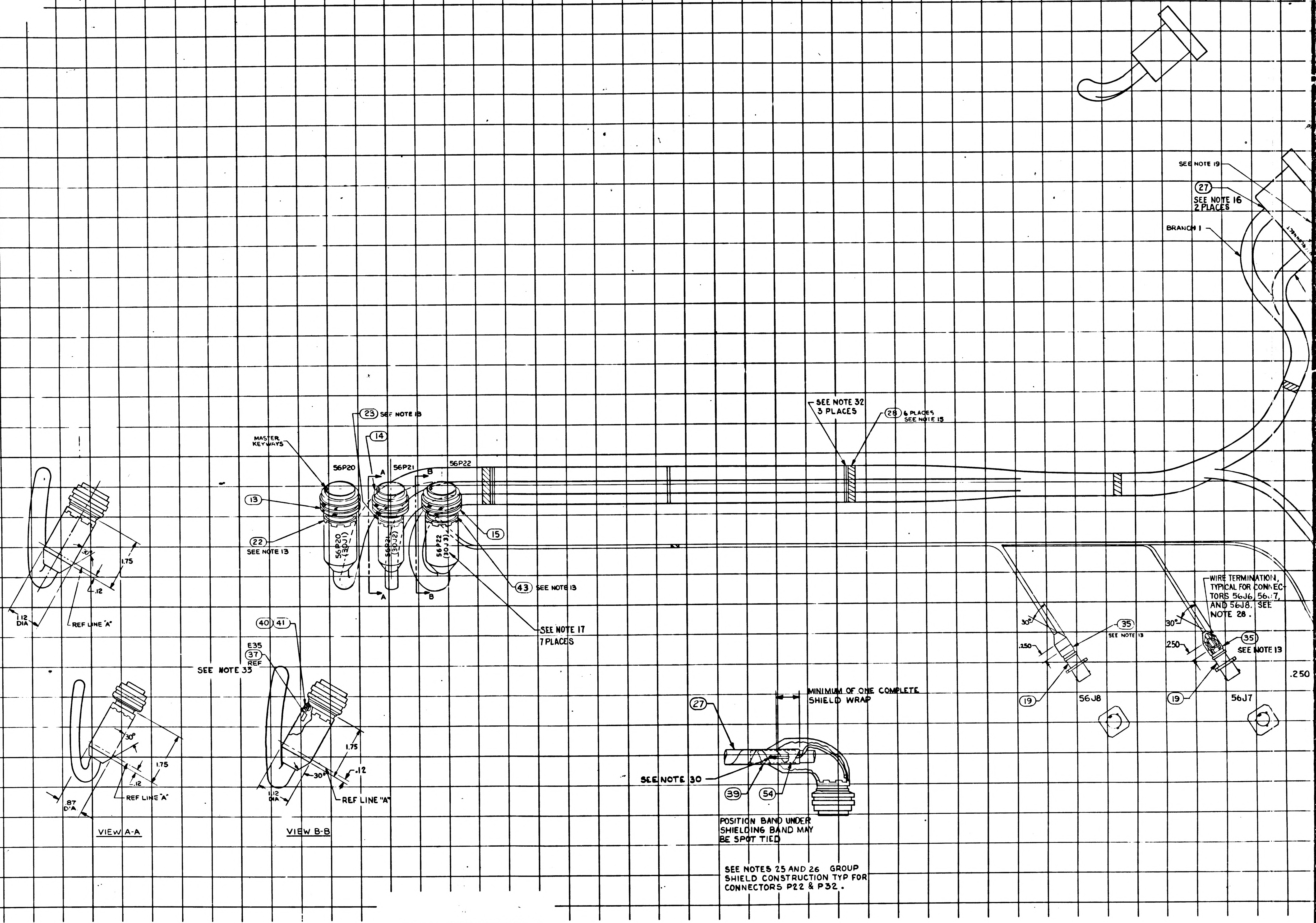
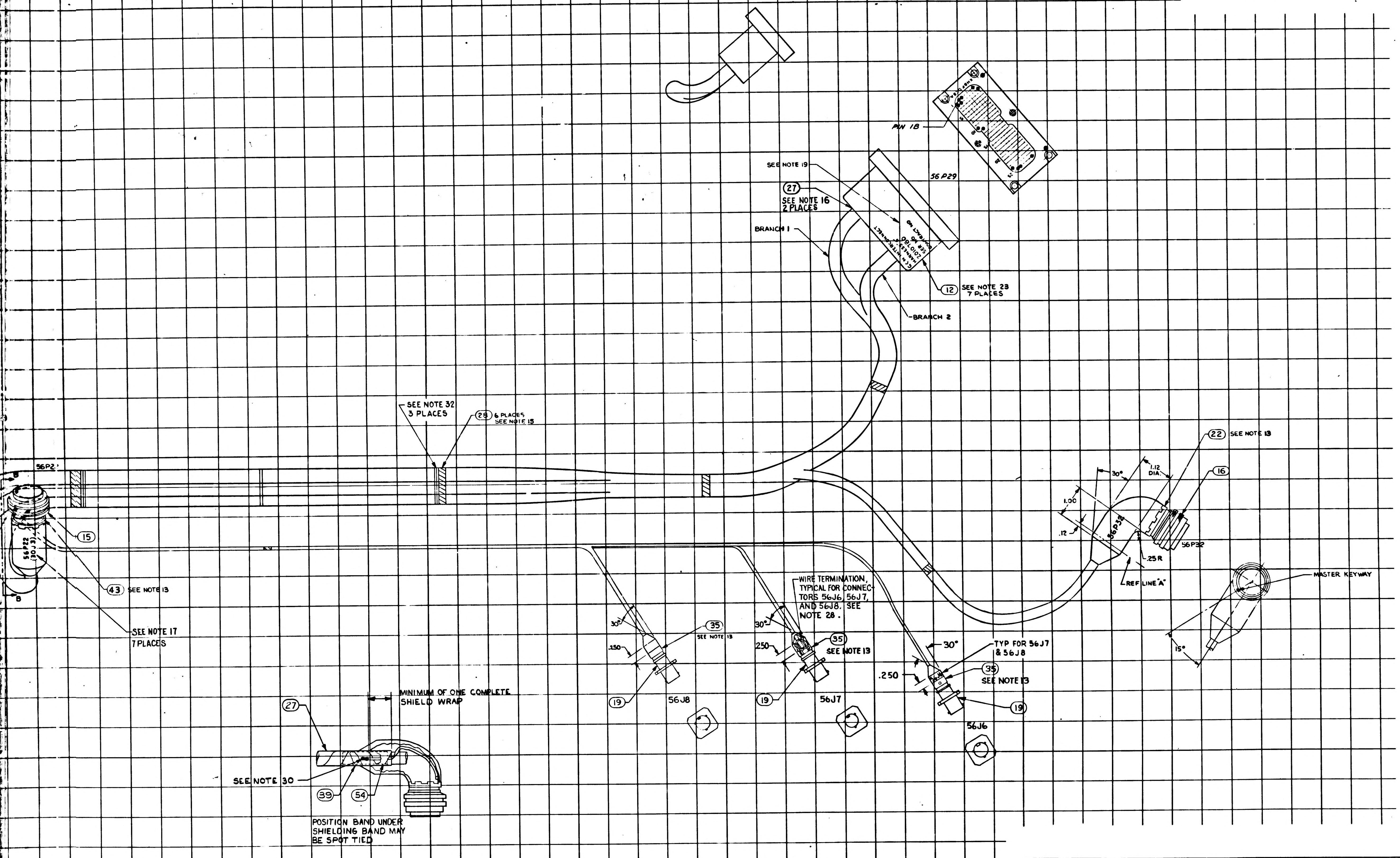

SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
SEE NOTE 32
3 PLACES
28
6 PLACES
SEE NOTE 15
23
SEE NOTE 13
14
MASTER KEYWAYS
56P20
56P21
56P22
A
B
13
22
SEE NOTE 13
56P20 (30J1)
56P21 (30J2)
56P22 (30J3)
15
43
SEE NOTE 13
SEE NOTE 17
7 PLACES
30°
1.75
.12
1.12 DIA
REF LINE "A"
40
41
E35
37
REF
SEE NOTE 33
30°
1.75
.12
.87 DIA
REF LINE "A"
VIEW A-A
1.75
.12
30°
1.12 DIA
REF LINE "A"
VIEW B-B
MINIMUM OF ONE COMPLETE SHIELD WRAP
27
SEE NOTE 30
39
54
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED
SEE NOTES 25 AND 26 GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.
30°
.250
35
SEE NOTE 13
19
56J8
WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.
30°
.250
35
SEE NOTE 13
19
56J7
.250

REVISIONS TDRR 31139				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		

SEE SHEET I FOR REVISION RECORD


PIN 1B
56 P29
SEE NOTE 19
27
SEE NOTE 16
2 PLACES
BRANCH 1
G&N INTERCONNECT HARNESS "G" 2010780 SER NO CONTRACT NO
12
SEE NOTE 23
7 PLACES
BRANCH 2
SEE NOTE 32
3 PLACES
28
6 PLACES
SEE NOTE 15
56P22
15
56P22 (30J3)
43
SEE NOTE 13
B
SEE NOTE 17
7 PLACES
22
SEE NOTE 13
30°
1.12 DIA.
16
1.00
.12
56P32
56P32
.25R
REF LINE "A"
MASTER KEYWAY
15°
WIRE TERMINATION, TYPICAL FOR CONNECTORS 56J6, 56J7, AND 56J8. SEE NOTE 28.
30°
35
SEE NOTE 13
.250
19
56J8
30°
250
35
SEE NOTE 13
19
56J7
30°
TYP FOR 56J7 & 56J8
.250
35
SEE NOTE 13
19
56J6
27
MINIMUM OF ONE COMPLETE SHIELD WRAP
SEE NOTE 30
39
54
POSITION BAND UNDER SHIELDING BAND MAY BE SPOT TIED

SEE NOTES 25 AND 26 GROUP SHIELD CONSTRUCTION TYP FOR CONNECTORS P22 & P32.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± ——— DECIMALS ± .03 ANGLES ± 2 DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS		MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	DRAWN Gruenewald	28 JUN 66	G&N INTERCONNECT HARNESS "G" (C/M BLOCK II)
	CHECKED W. Diell	30 JUN 66	
	APPROVED Karl Watson	AUG 15 66	
	APPROVED		
MATERIAL ———	APPROVED CCB	9/24/66	CODE IDENT NO. 80230 | SIZE J | DRAWING NO. 2010780
	APPROVED R. Jacob MSC	9/23/66 DATE	SCALE FULL | SHEET 31 OF 31

NEXT ASSY	USED ON
APPLICATION	

2010780 C SH 31

2/2010780

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
2014567	2014567	A	INITIAL RELEASE CLASS A PER TDRR 31139	7 Jul '66	

REV		A	A	A	A																
SHEET		21	22	23	24																
REV STATUS OF SHEETS	REV	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN	R.W. Turner	29 JUN 66
CHECKER	A.D.W. Diehl	1 Jul '66
ENGINEER	HEA D. Barta	5 Jul 66
APPROVAL		Aug 15 66
CONTR NO.	NAS 9-497	
NASA APPROVAL	R. Jacob	
CCA APPROVAL		

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "H"
(C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010781
SCALE NONE		SHEET 1 OF 24

MIL 1377A6 12-65

NOTE NUMBER — GENERAL NOTES DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIG. 6A, 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014678.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
   A - FROM END OF SHIELD
   B - TO END OF SHIELD
   G - GREEN
   K - BLACK
   L - BLUE
   N - BROWN
   R - RED
   W - WHITE
   Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 2 OF 24

NOTE NUMBER — GENERAL NOTES DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A CONTACT OR CONTACT AND SEALING PLUG AS FOLLOWS
   CONNECTOR 56J5 AND P25 USE ITEM NUMBERS 19 AND 24.
   CONNECTOR 56P27, USE ITEM NUMBER 20.
   CONNECTOR 56P30, AND 31 USE ITEM NUMBERS 18 AND 23.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 40.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE 1, USING ITEMS 38 AND 39 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 3 OF 24

NOTE NUMBER — GENERAL NOTES DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
   A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND AND THOSE PINS SPECIFIED IN PAR. B.
   B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT LIMITED TO 15 MILLIAMPS.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 34 AND 35.

24 CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE GROUP SHIELDED PER DETAILS A, B AND C OF THE CONFIGURATION DRAWING.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 10, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 29. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 32. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.

27 ASSEMBLE INSULATION TUBING, ITEM 30, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION.
ASSEMBLE SHRINK SLEEVING AS SHOWN.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 4 OF 24

NOTE NUMBER — GENERAL NOTES DESCRIPTION

30 ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 57, OVER CONDUCTORS H135, H136, AND H137. ALLOW 1.50 INCHES OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 32, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071, FIG. 6B.

31 NUMBERS INDICATE SEQUENCE IN WHICH GROUP SHIELD A IS TO BE WRAPPED. CUT DRAIN WIRE BACK 1/2 INCH WITHIN SHIELD WRAP AT P30 AND P31 ENDS.

32 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

33 BOND NUT PLATE ASSEMBLIES TO CONNECTOR 56J5 PER ND1002004, USING ITEMS 61 AND 62.

34 TO CRIMP LEADS TO CONTACTS OF CONNECTORS P30 AND P31, USE SHORT LENGTHS OF 22AWG WIRE TO BUILD UP LEAD DIAMETER TO FIT CONTACT BARREL. TOTAL NUMBER OF FUNCTIONAL AND DUMMY LEADS MUST EQUAL SIX PER CONTACT. TWIST LEADS TOGETHER BEFORE CRIMPING TO CONTACT. AFTER CRIMPING, CUT DUMMY LEADS FLUSH WITH TOP OF CONTACT.

35 SOLDER PER ND1002071, USING ITEM 63, OR ITEMS 64 AND 65.

36 ASSEMBLE INSULATION SLEEVE, ITEM 66 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P27. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 5 OF 24

NOTE NUMBER | GENERAL NOTES DESCRIPTION

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	2	1	2010781-002	WIRE PER 1010789-006, 22 AWG, YEL, 240 FT TOT LG
	3	1	2010781-003	WIRE PER 1010789-016, 26 AWG, YEL, 170 FT TOT LG
	4	1	2010781-004	WIRE PER 1010789-008, 22 AWG, YEL, RED, 10 FT TOT LG
	5	1	2010781-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 8 FT TOT LG
	8	1	2010781-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 20 FT TOT LG
	9	1	2010781-009	WIRE PER 1010789-024, 26 AWG, BLK, 5 FT TOT LG
	10	1	2010781-010	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED SILVER PLATED, 22AWG 30 FT TOT LG.
	11	1	2010781-011	WIRE PER 1010789-002, 24 AWG, BLK, 5 FT TOT LG
	12	1	2014748-021	CONNECTOR, PLUG, ELECTRICAL, (56P27)
9	13	1	1010929-003	CONNECTOR, PLUG, ELECTRICAL, (56P25)
9	14	1	1010921- 1	CONNECTOR, PLUG, ELECTRICAL, (56P30)
9	15	1	1010921- 2	CONNECTOR, PLUG, ELECTRICAL, (56P31)
9	16	1	1010930-003	CONNECTOR, RECEPTACLE, ELECTRICAL (56J5)
9	18	36	1010932- 2	CONTACT, PIN

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	19	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTORS 1010929, AND 1010930.
9	20	57	1010955- 1	CONTACT, MALE
9	21	7	1010955- 2	CONTACT, MALE
	22	2	2014670- 13	ADAPTER, CONNECTOR
9	23	7	1010983- 1	PLUG, PROTECTIVE SEALING
9	24	39	1010958- 1	PLUG, PROTECTIVE SEALING
9	29	AR	1010989	TAPE, SHIELDING, EMI/RFI
9	30	AR	1006776- 19	INSULATION SLEEVING
	32	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	33	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	34	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	35	AR	1012504	PRIMER, METAL PARTS
9	38	AR	1010661	EPOXY RESIN
9	39	AR	1010679	ADHESIVE ACTIVATOR
9	40	AR	1012507-004	TAPE, LACING AND TYING
	50	4	2021203	TERMINAL LUG SOLDER
	51	4	MS35333-69	WASHER, LOCK
9	52	4	1006783- 93	SCREW, BUTTON HD

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	53	13	1010402- 2	SLEEVE, SOLDER
	57	1	2010781-012	WIRE BRAID, QQ-B-575, .12 DIA, 36 AWG, 10 FT TOTAL LENGTH
9	59	1	1012534- 36	SLEEVING, INSULATION, ELEC, (HEAT SHRINKABLE)
	60	1	2010725-011	NUT PLATE ASSEMBLY
9	61	AR	1010682	EPOXY RESIN
9	62	AR	1010683	CURING AGENT, AMINE
	63	AR	SN60WRAP	SOLDER QQ-S-571
	64	AR	SN60WS	SOLDER QQ-S-571
	65	AR	MIL-F-14256 TYPE A OR W	FLUX
9	66	59	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 3	2		P27-A6 P30-9					.18 .13	NO NO		20	
H 4	2		P27-A7 P30-9					.18 .13	NO NO		20	
H 5	2		P27-B6 P30-9					.18 .13	NO NO		20	
H 6	2		P27-B7 P30-9					.18 .13	NO NO		20 18	
H 7	2		P27-C6 P30-10					.18 .13	NO NO		20	
H 8	2		P27-C7 P30-10					.18 .13	NO NO		20	
H 9	2		P27-D6 P30-10					.18 .13	NO NO		20 18	
H 12	2		P27-A3 P31-9					.18 .13	NO NO		20	
H 13	2		P27-A4 P31-9					.18 .13	NO NO		20	
H 14	2		P27-A5 P31-9					.18 .13	NO NO		20	
H 15	2		P27-B4 P31-9					.18 .13	NO NO		20 18	
H 16	2		P27-B5 P31-10					.18 .13	NO NO		20	

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR A	SHEET 10 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 17	2		P27-C4 P31-10					.18 .13	NO NO		20	
H 18	2		P27-C5 P31-10					.18 .13	NO NO		20 18	
H 20	2		P27-F7 P30-8					.18 .13	NO NO		20	
H 21	2		P27-G7 P30-8					.18 .13	NO NO		20	
H 22	2		P27-H7 P30-8					.18 .13	NO NO		20 18	
H 24	2		P27-F8 P31-8					.18 .13	NO NO		20	
H 25	2		P27-G8 P31-8					.18 .13	NO NO		20	
H 26	2		P27-H8 P31-8					.18 .13	NO NO		20 18	
H 33	2		P27-B8 P30-16					.18 .13	NO NO		20	
H 34	2		P27-B9 P31-16					.18 .13	NO NO		20	
H 35	2		P27-C8 P30-16					.18 .13	NO NO		20	
H 36	2		P27-C9 P31-16					.18 .13	NO NO		20	

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR A	SHEET 11 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 37	2		P27-D7 P31-15					.18 .13	NO NO		20	
H 38	2		P27-D8 P31-15					.18 .13	NO NO		20	
H 39	2		P27-D9 P30-15					.18 .13	NO NO		20	
H 40	2		P27-F9 P30-15					.18 .13	NO NO		20	
H 41	2		P27-G9 P30-3					.18 .13	NO NO		20	
H 42	2		P27-H9 P31-3					.18 .13	NO NO		20	
H 67	5											
H 67R			P25-83 P27-K5					.13 .18	NO NO		19 21	
H 67Y			P25-84 P27-K4					.13 .18	NO NO		19 21	
H 69	2		P25-57 P27-G4					.13 .18	NO NO		19 20	
H 70	3		J5-62 P25-51					.13 .13	NO NO		19 19	B
H 71	3		J5-63 P25-78					.13 .13	NO NO		19 19	B

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR A	SHEET 12 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 72	3		J5-38 P25-77					.13 .13	NO NO		19 19	B
H 73	3		J5-40 P25-76					.13 .13	NO NO		19 19	B
H 74	3		J5-39 P25-79					.13 .13	NO NO		19 19	B
H 75	3		J5-64 P25-49					.13 .13	NO NO		19 19	B
H 76	2		J5-66 P25-30					.13 .13	NO NO		19 19	B
H 77	3		J5-65 P25-75					.13 .13	NO NO		19 19	B
H 78	2		J5-41 P25-28					.13 .13	NO NO		19 19	B
H 79	2		J5-42 P25-48					.13 .13	NO NO		19 19	B
H 80	3		J5-52 P25-2					.13 .13	NO NO		19 19	B
H 81	3		J5-76 P25-9					.13 .13	NO NO		19 19	B
H 82	3		J5-30 P25-22					.13 .13	NO NO		19 19	B
H 83	3		J5-29 P25-41					.13 .13	NO NO		19 19	B

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR A	SHEET 13 OF 24

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 84	3		J5-14 P25-66					.13 .13	NO NO		19 19	B
H 85	3		J5-50 P25-3					.13 .13	NO NO		19 19	B
H 86	3		J5-74 P25-10					.13 .13	NO NO		19 19	B
H 87	3		J5-75 P25-23					.13 .13	NO NO		19 19	B
H 88	3		J5-51 P25-42					.13 .13	NO NO		19 19	B
H 89	3		J5-77 P25-67					.13 .13	NO NO		19 19	B
H 90	3		J5-27 P25-12					.13 .13	NO NO		19 19	B
H 91	3		J5-13 P25-11					.13 .13	NO NO		19 19	B
H 92	3		J5-28 P25-24					.13 .13	NO NO		19 19	B
H 93	3		J5-73 P25-43					.13 .13	NO NO		19 19	B
H 94	3		J5-49 P25-68					.13 .13	NO NO		19 19	B
H 95	2		J5-45 P25-7					.13 .13	NO NO		19 19	B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 96	3		J5-72 P25-27					.13 .13	NO NO		19 19	B
H 97	3		J5-48 P25-45					.13 .13	NO NO		19 19	B
H 98	3		J5-47 P25-26					.13 .13	NO NO		19 19	B
H 99	3		J5-71 P25-25					.13 .13	NO NO		19 19	B
H 100	3		J5-4 P25-47					.13 .13	NO NO		19 19	B
H 101	3		J5-22 P25-70					.13 .13	NO NO		19 19	B
H 102	3		J5-46 P25-46					.13 .13	NO NO		19 19	B
H 103	2		J5-70 P25-73					.13 .13	NO NO		19 19	B
H 104	3		J5-25 P25-13					.13 .13	NO NO		19 19	B
H 105	3		J5-26 P25-72					.13 .13	NO NO		19 19	B
H 106	3		J5-11 P25-74					.13 .13	NO NO		19 19	B
H 107	3		J5-23 P25-44					.13 .13	NO NO		19 19	B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 108	3		J5-12 P25-71					.13 .13	NO NO		19 19	B
H 109	3		J5-10 P25-69					.13 .13	NO NO		19 19	B
H 110	3		J5-24 P25-18					.13 .13	NO NO		19 19	B
H 111	2		J5-44 P25-21					.13 .13	NO NO		19 19	B
H 112	2		J5-68 P25-8					.13 .13	NO NO		19 19	B
H 113	2		J5-43 P25-1					.13 .13	NO NO		19 19	B
H 120	2		P27-G3 P30-6					.18 .13	NO NO		20 18	
H 121	2		P27-G2 P31-6					.18 .13	NO NO		20 18	
H 129	5											
H 129R			P25-14 P27-F6					.13 .18	NO NO		19 21	
H 129Y			P25-32 P27-G6					.13 .18	NO NO		19 21	
H 131	8				1.00 1.75	.75 1.50				6B 6B	53 59	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 131A	11		SHLD H131 P27-H2					.20 .18	NO NO		 20	
H 131R			P27-K3 P30-17					.18 .13	NO NO		21 18	
H 131Y			P27-H3 P30-18					.18 .13	NO NO		21 18	
H 132	8				1.75 1.00	1.50 .75				6A 6B	53 53	
H 132A	11		SHLD H132 E16					.20 .19	NO NO			
H 132B	9		P27-H6 SHLD H132					.22 .20	NO NO			
H 132R			J5-19 P27-K6					.13 .22	NO NO		19	
H 132Y			J5-18 P27-K7					.13 .22	NO NO		19	
H 133	8				1.75 1.00	1.50 .75				6A 6B	53 53	
H 133A	11		SHLD H133 E17					.20 .19	NO NO			
H 133B	9		P27-H6 SHLD H133					.22 .20	NO NO		20	
H 133R			P25-38 P27-K6					.13 .22	NO NO		19 20	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 133Y			P25-40					.13	NO		19	
			P27-K7					.22	NO		20	
H 134	8				1.75	1.50				6A	53	
					1.00	.75				6A	53	
H 134A	11		SHLD H134					.20	NO			
			E16					.19	NO			
H 134B	11		E17					.19	NO			
			SHLD H134					.20	NO			
H 134R			J5-7					.13	NO		19	
			P25-5					.13	NO		19	
H 134Y			J5-8					.13	NO		19	
			P25-4					.13	NO		19	
H 135	4									6A	53	SEE NOTE 30
										6B	53	
H 135A	11		SHLD H135					.20	NO			
			E17					.19	NO		50	
H 135B	11		P31-11					.13	NO			
			SHLD H135					.20	NO			
H 135R			P25-62					.13	NO		19	
			P31-17					.13	NO			
H 135Y			P25-63					.13	NO		19	
			P31-18					.13	NO			
H 136	4									6A	53	SEE NOTE 30
										6B	53	

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 136A	11		SHLD H136					.20	NO			
			E18					.19	NO			
H 136B	11		P31-11					.13	NO			
			SHLD H136					.20	NO			
H 136R			P25-64					.13	NO		19	
			P31-17					.13	NO			
H 136Y			P25-65					.13	NO		19	
			P31-18					.13	NO			
H 137	4									6A	53	SEE NOTE 30
										6B	53	
H 137A	11		SHLD H137					.20	NO			
			E16					.19	NO		50	
H 137B	11		P31-11					.13	NO		18	
			SHLD H137					.20	NO			
H 137R			J5-9					.13	NO		19	
			P31-17					.13	NO		18	
H 137Y			J5-2					.13	NO		19	
			P31-18					.13	NO		18	
H 138	10		E15					.19	NO			A
			NONE									
H 139	10		E15					.19	NO		50	B
			E18					.19	NO		50	
H 157	2		P30-4					.13	NO			
			P31-4					.13	NO			

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 158	2		P30-14					.13	NO			
			P31-14					.13	NO			
H 159	2		P30-14					.13	NO			
			P31-14					.13	NO			
H 160	2		P30-15					.13	NO			
			P31-15					.13	NO			
H 161	2		P30-15					.13	NO			
			P31-15					.13	NO			
H 162	2		P30-16					.13	NO			
			P31-16					.13	NO			
H 163	2		P30-16					.13	NO		18	
			P31-16					.13	NO		18	
H 164	2		P30-3					.13	NO		18	
			P30-15					.13	NO		18	
H 165	2		P31-3					.13	NO		18	
			P31-15					.13	NO		18	
H 166	2		P30-1					.13	NO			A
			P31-1					.13	NO			
H 167	2		P30-1					.13	NO			A
			P31-1					.13	NO			
H 168	2		P27-B3					.18	NO		20	
			P30-7					.13	NO			
H 169	2		P27-B2					.18	NO		20	
			P31-7					.13	NO			

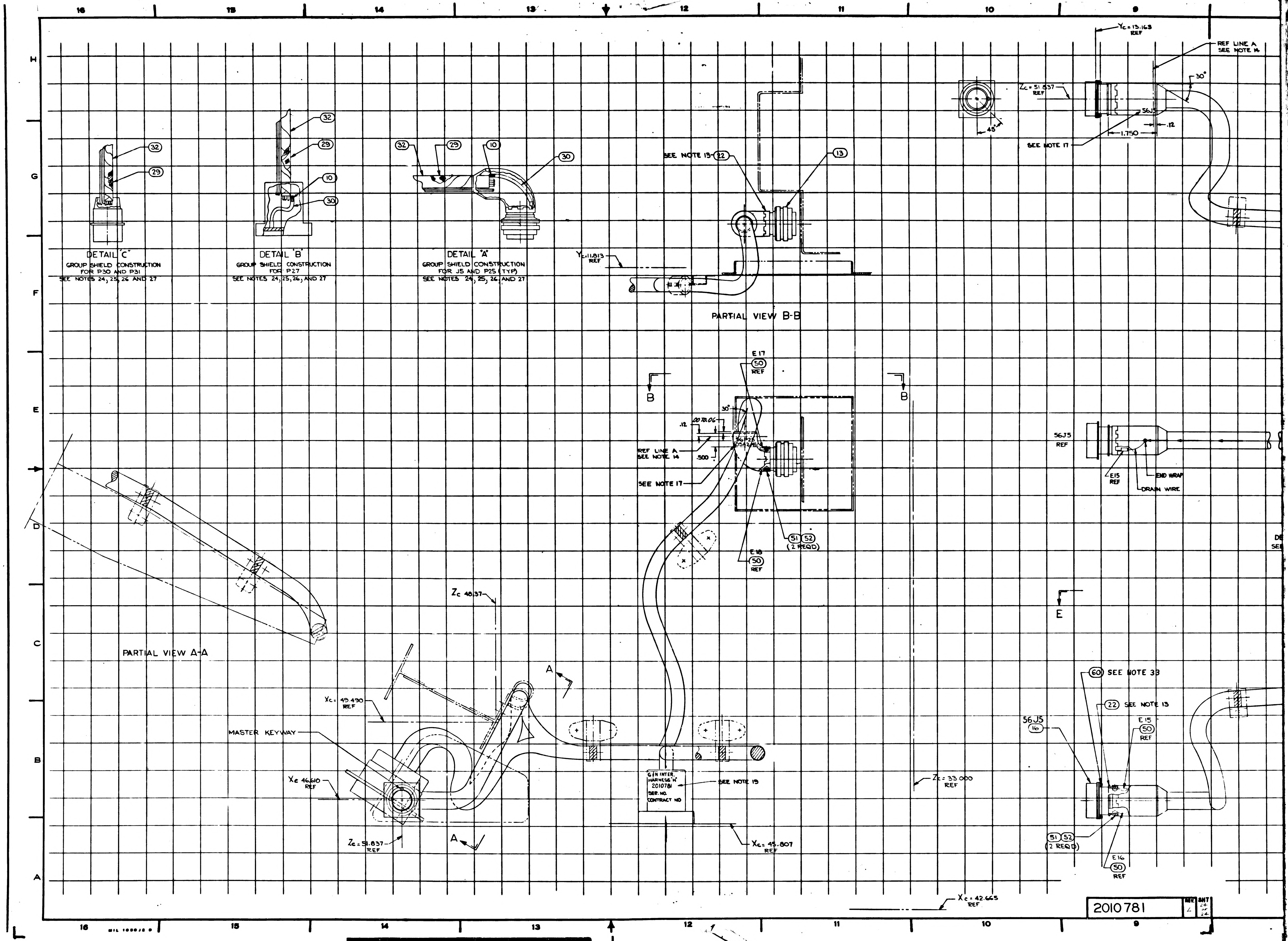
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 170	2		P27-B1					.18	NO		20	
			P30-14					.13	NO			
H 171	2		P27-C3					.18	NO		20	
			P30-7					.13	NO			
H 172	2		P27-C2					.18	NO		20	
			P31-7					.13	NO			
H 173	2		P27-C1					.18	NO		20	
			P30-14					.13	NO		18	
H 174	2		P27-D3					.18	NO		20	
			P30-7					.13	NO			
H 175	2		P27-D2					.18	NO		20	
			P31-7					.13	NO			
H 176	2		P27-D1					.18	NO		20	
			P31-14					.13	NO			
H 177	2		P27-F3					.18	NO		20	
			P30-7					.13	NO		18	
H 178	2		P27-F2					.18	NO		20	
			P31-7					.13	NO		18	
H 179	2		P27-F1					.18	NO		20	
			P31-14					.13	NO		18	
H 180	2		J5-53					.13	NO		19	A
			P30-2					.13	NO			
H 181	2		J5-78					.13	NO		19	A
			P31-2					.13	NO			

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 182	2		J5-54 P30-1					.13 .13	NO NO		19	A
H 183	2		J5-79 P30-2					.13 .13	NO NO		19	A
H 184	2		J5-80 P31-2					.13 .13	NO NO		19	A
H 185	2		J5-55 P30-1					.13 .13	NO NO		19	A
H 186	2		J5-33 P30-2					.13 .13	NO NO		19	A
H 187	2		J5-32 P31-2					.13 .13	NO NO		19	A
H 188	2		J5-16 P30-1					.13 .13	NO NO		19 18	A
H 189	2		J5-81 P30-2					.13 .13	NO NO		19	A
H 190	2		J5-57 P31-2					.13 .13	NO NO		19	A
H 191	2		J5-56 P31-1					.13 .13	NO NO		19	A
H 192	2		J5-58 P30-2					.13 .13	NO NO		19	A
H 193	2		J5-34 P31-2					.13 .13	NO NO		19	A

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 22 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 194	2		J5-35 P31-1					.13 .13	NO NO		19	A
H 196	2		J5-60 P30-4					.13 .13	NO NO		19 18	
H 197	2		J5-84 P31-4					.13 .13	NO NO		19 18	
H 198	2		J5-31 P30-2					.13 .13	NO NO		19 18	A
H 199	2		J5-15 P31-2					.13 .13	NO NO		19 18	A
H 200	2		J5-5 P31-1					.13 .13	NO NO		19 18	A
H 201	3		P25-15 P27-F5					.13 .22	NO NO		19 20	
H 202	3		P25-31 P27-H5					.13 .18	NO NO		19 21	

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 23 OF 24


16
15
14
13
12
11
10
9
H
G
F
E
D
C
B
A
32
29
10
30
SEE NOTE 13
22
13
Yc = 11.813
REF
Yc = 13.163
REF
REF LINE A
SEE NOTE 14
Zc = 51.837
REF
30°
56J5
.12
1.750
45°
SEE NOTE 17
B
E17
50
REF
30°
.00 TO .06
.12
56P25
(05A2J9)
REF LINE A
SEE NOTE 14
.500
SEE NOTE 17
51 52
(2 REQD)
E18
50
REF
56J5
REF
E15
REF
END WRAP
DRAIN WIRE
E
Zc 48.37
A
Xc = 49.490
REF
MASTER KEYWAY
Xc 46.610
REF
Zc = 51.837
REF
G/N INTER.
HARNESS "H"
2010781
SER. NO.
CONTRACT NO
SEE NOTE 19
Xc = 45.807
REF
Zc = 33.000
REF
Xc = 42.665
REF
60 SEE NOTE 33
22 SEE NOTE 13
56J5
16
E15
50
REF
51 52
(2 REQD)
E16
50
REF

DETAIL "C"
GROUP SHIELD CONSTRUCTION
FOR P30 AND P31
SEE NOTES 24, 25, 26 AND 27

DETAIL "B"
GROUP SHIELD CONSTRUCTION
FOR P27
SEE NOTES 24, 25, 26, AND 27

DETAIL "A"
GROUP SHIELD CONSTRUCTION
FOR J5 AND P25 (TYP)
SEE NOTES 24, 25, 26, AND 27

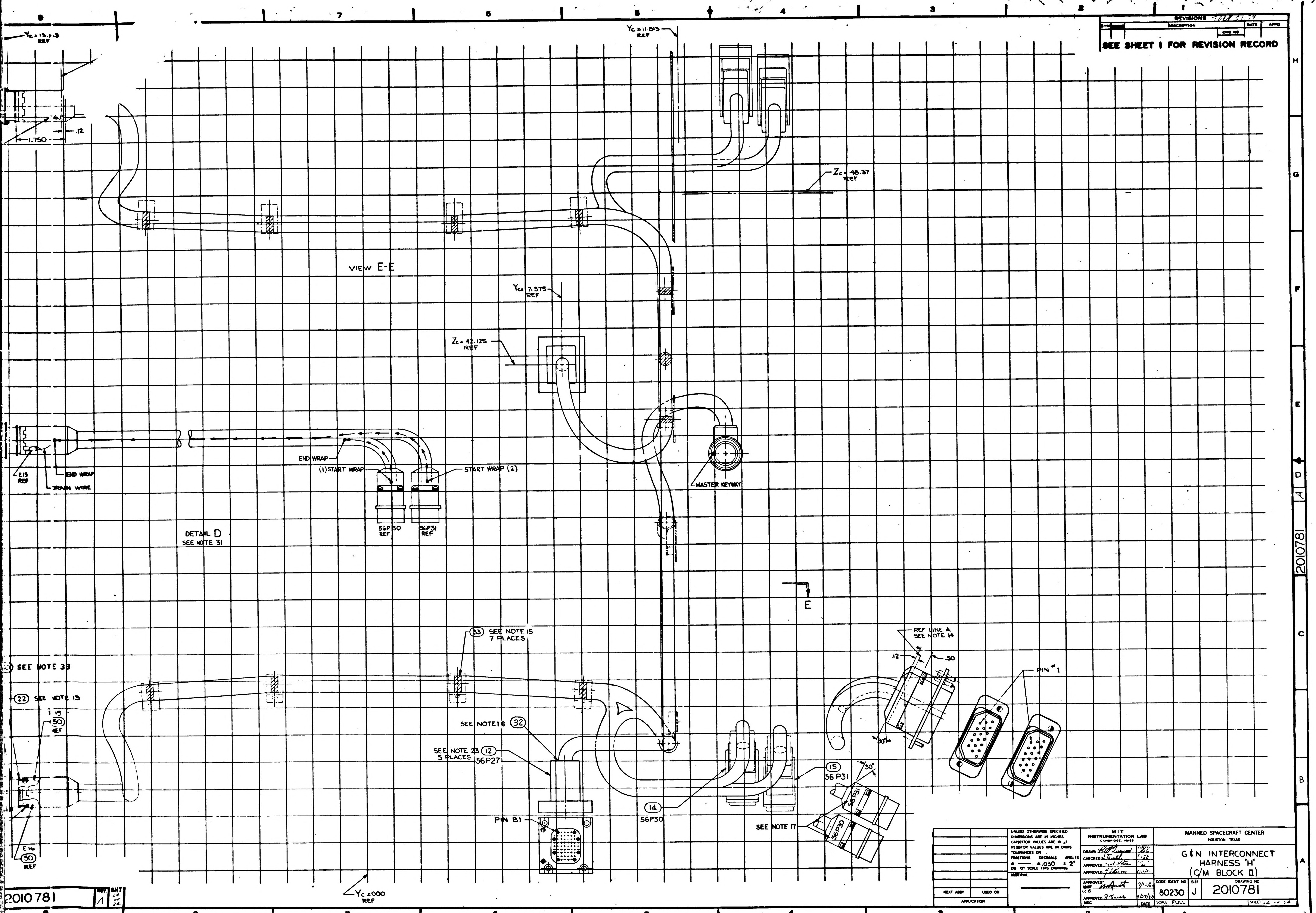
PARTIAL VIEW B-B

PARTIAL VIEW A-A

2010781	REV.	SHT
	L	24 OF 24

MIL 1000/3 B

SEE SHEET 1 FOR REVISION RECORD


REVISIONS
SYMBOL
DESCRIPTION
DATE
APPD
CHG NO
Yc = 13.4.3 REF
1.63
1.750
.12
Yc = 11.813 REF
Zc = 48.37 REF
VIEW E-E
Yc = 7.375 REF
Zc = 42.125 REF
END WRAP
(1) START WRAP
START WRAP (2)
E15 REF
END WRAP
DRAIN WIRE
MASTER KEYWAY
56P30 REF
56P31 REF
DETAIL D
SEE NOTE 31
E
33 SEE NOTE 15 7 PLACES
SEE NOTE 33
22 SEE NOTE 13
15
50 REF
SEE NOTE 16 32
SEE NOTE 23 12 5 PLACES 56P27
PIN B1
14 56P30
15 56P31
30°
56P31
56P30
SEE NOTE 17
REF LINE A SEE NOTE 14
.12
.50
PIN #1
E16
50 REF
Yc = 000 REF
A
B
C
D
E
F
G
H
1
2
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4
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6
7
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9

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.030 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R.W. Turner 1 JUL 66
CHECKED W. Diehl 1 JUL 66
APPROVED Paul Watson AUG 15 66
APPROVED J. Klawon 8/15/66
APPROVED MIT CCB 9/22/66
APPROVED MSC R. Jacob 9/23/66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "H"
(C/M BLOCK II)

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010781
SCALE FULL
SHEET 24 OF 24

2010781 A

2010781 A SHT 24 of 24

2/2010781

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 3/139	7 JUL 66	
B	REVISED PER TDRR 31204	4 OCT 66	SS

REV	A	A	B	B
SHEET	21	22	23	24

REV STATUS OF SHEETS																				
REV	B	A	B	A	A	B	A	B	B	A	A	A	A	A	A	B	B	A	A	A
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAFTSMAN R.W. Turner 29 JUN 66 (DAY MO YR)
CHECKER 1 Jul 66
ENGINEER D. Costa 5 Jul 66
APPROVAL Aug 15 66
CONTR NO. NAS 9-497
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "H"
(C/M, BLOCK II)

SIZE A
CODE IDENT. NO 80230
2010781
SCALE NONE
SHEET 1 OF 24

MIL 1377A6 12-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

1 SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIG. 6A, 6B AND ND 1002032 FOR FIGURE 7.

2 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3 INTERCONNECT LIST FOR THIS HARNESS IS 2014678.

4 PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT

5 THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER.
A - FROM END OF SHIELD
B - TO END OF SHIELD
G - GREEN
K - BLACK
L - BLUE
N - BROWN
R - RED
W - WHITE
Y - YELLOW

6 ASTERISK DENOTES LOWER CASE LETTER

7 GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION

8 UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.

9 VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

10 CRIMP CONTACTS PER ND1002032.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR ~~—~~A	SHEET 2 OF 24

MIL 2084 9-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

11 ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A SEALING PLUG AS FOLLOWS
CONNECTOR 56J5 AND P25 USE ITEM NUMBER 24.
CONNECTOR 56P30 AND P31 USE ITEM NUMBER 23.

12 LACE HARNESS PER ND1002032 USING ITEM NUMBER 40.

13 APPLY BONDING MATERIAL PER ND1002187, TYPE 1, USING ITEMS 38 AND 39 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSY.

14 ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.

15 BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.

16 WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.

17 MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE

19 MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.

20 CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR B	SHEET 3 OF 24

NOTE GENERAL NOTES

NUMBER DESCRIPTION

21 INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN
A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND AND THOSE PINS SPECIFIED IN PAR. B.
B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS.
TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT LIMITED TO 15 MILLIAMPS.

23 ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 34 AND 35.

24 CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE GROUP SHIELDED PER DETAILS A, B AND C OF THE CONFIGURATION DRAWING.

25 GROUP SHIELDING - THREAD ONE CONTINUOUS LENGTH OF GROUND WIRE, ITEM 10, THROUGH CENTER OF EMI/RFI SHIELDING TAPE, ITEM 29. ALLOW 6 INCHES OF GROUND WIRE TO EXTEND BEYOND ENDS OF SHIELDING TAPE. WRAP CABLE WITH ONE CONTINUOUS LENGTH OF PREPARED SHIELDING. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.

26 COMPLETELY COVER SHIELD WITH ONE CONTINUOUS WRAP OF INSULATION TAPE, ITEM 32. SUCCESSIVE TURNS SHALL OVERLAP BY APPROXIMATELY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS. WRAP TAPE IN OPPOSITE DIRECTION TO SHIELD WRAP.

27 ASSEMBLE INSULATION TUBING, ITEM 30, OVER GROUND WIRE AS REQUIRED TO REACH TERMINATION.
ASSEMBLE SHRINK SLEEVING AS SHOWN.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR ~~—~~A	SHEET 4 OF 24

MIL 2084 9-65

NOTE GENERAL NOTES

NUMBER DESCRIPTION

30 ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 57, OVER CONDUCTORS H135, H136, AND H137. ALLOW 1.50 INCHES OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 32, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071, FIG. 6B.

31 NUMBERS INDICATE SEQUENCE IN WHICH GROUP SHIELD A IS TO BE WRAPPED. CUT DRAIN WIRE BACK 1/2 INCH WITHIN SHIELD WRAP AT P30 AND P31 ENDS.

32 PERFORM WORKMANSHIP VIBRATION
A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE.
B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT.
C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION.
D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.

33 BOND NUT PLATE ASSEMBLIES TO CONNECTOR 56J5 PER ND1002004, USING ITEMS 61 AND 62.

34 TO CRIMP LEADS TO CONTACTS OF CONNECTORS P30 AND P31, USE SHORT LENGTHS OF 22AWG WIRE TO BUILD UP LEAD DIAMETER TO FIT CONTACT BARREL. TOTAL NUMBER OF FUNCTIONAL AND DUMMY LEADS MUST EQUAL SIX PER CONTACT. TWIST LEADS TOGETHER BEFORE CRIMPING TO CONTACT. AFTER CRIMPING, CUT DUMMY LEADS FLUSH WITH TOP OF CONTACT.

35 SOLDER PER ND1002071, USING ITEM 63, OR ITEMS 64 AND 65.

36 ASSEMBLE INSULATION SLEEVE, ITEM 66 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P27. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR ~~B~~A	SHEET 5 OF 24

NOTE NUMBER	GENERAL NOTES DESCRIPTION
37	BOND TERMINAL LUG AND SCREW TO THE ADAPTER PER ND1002187, TYPE III, USING ITEMS 38, 39, 68, AND 69.

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE	CODE IDENT NO.		
A	80230	2010781	
SCALE-NONE	REV LTR B		SHEET 6 OF 24

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	2	1	2010781-002	WIRE PER 1010789-006, 22 AWG, YEL, 240 FT TOT LG
	3	1	2010781-003	WIRE PER 1010789-016, 26 AWG, YEL, 170 FT TOT LG
	4	1	2010781-004	WIRE PER 1010789-008, 22 AWG, YEL, RED, 10 FT TOT LG
	5	1	2010781-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 8 FT TOT LG
	8	1	2010781-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 20 FT TOT LG
	9	1	2010781-009	WIRE PER 1010789-024, 26 AWG, BLK, 5 FT TOT LG
	10	1	2010781-010	WIRE PER QQ-W-343, TYPE C, CLASS C, UNCOATED SILVER PLATED, 22AWG 30 FT TOT LG.
	11	1	2010781-011	WIRE PER 1010789-002, 24 AWG, BLK, 5 FT TOT LG
	12	1	2014748-021	CONNECTOR, PLUG, ELECTRICAL, (56P27)
9	13	1	1010929-003	CONNECTOR, PLUG, ELECTRICAL, (56P25)
9	14	1	1010921- 1	CONNECTOR, PLUG, ELECTRICAL, (56P30)
9	15	1	1010921- 2	CONNECTOR, PLUG, ELECTRICAL, (56P31)
9	16	1	1010930-003	CONNECTOR, RECEPTACLE, ELECTRICAL (56J5)
9	18	36	1010932- 2	CONTACT, PIN

SIZE	CODE IDENT NO.		
A	80230	2010781	
SCALE-NONE	REV LTR A		SHEET 7 OF 24

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	19	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTORS 1010929, AND 1010930.
9	20	51	1010955- 1	CONTACT, MALE
9	21	6	1010955- 2	CONTACT, MALE
	22	2	2014670- 13	ADAPTER, CONNECTOR
9	23	7	1010983- 1	PLUG, PROTECTIVE SEALING
9	24	39	1010958- 1	PLUG, PROTECTIVE SEALING
9	29	AR	1010989	TAPE, SHIELDING, EMI/RFI
9	30	AR	1006776- 19	INSULATION SLEEVING
	32	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	33	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	34	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	35	AR	1012504	PRIMER, METAL PARTS
9	38	AR	1010661	EPOXY RESIN
9	39	AR	1010679	ADHESIVE ACTIVATOR
9	40	AR	1012507-004	TAPE, LACING AND TYING
	50	4	2021203	TERMINAL LUG SOLDER
	51	4	MS35333-69	WASHER, LOCK
9	52	4	1006783- 93	SCREW, BUTTON HD

SIZE	CODE IDENT NO.		
A	80230	2010781	
SCALE-NONE	REV LTR B		SHEET 8 OF

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	53	13	1010402- 2	SLEEVE, SOLDER
	57	1	2010781-012	WIRE BRAID, QQ-B-575, .12 DIA, 36 AWG, 10 FT TOTAL LENGTH
9	59	1	1012534- 36	SLEEVING, INSULATION, ELEC, (HEAT SHRINKABLE)
	60	1	2010725-011	NUT PLATE ASSEMBLY
9	61	AR	1010682	EPOXY RESIN
9	62	AR	1010683	CURING AGENT, AMINE
	63	AR	SN60WRAP	SOLDER QQ-S-571
	64	AR	SN60WS	SOLDER QQ-S-571
	65	AR	MIL-F-14256 TYPE A OR W	FLUX
9	66	57	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)
	67	1	2010781-013	WIRE PER 1010789-012, 24 AWG, YEL, RED, YEL JKT 5FT. TOT. LG.
9	68	AR	1008822	COLORANT, EPOXY BASE
9	69	AR	1005277	SILICA, PULVERIZED PYROGENIC

SIZE	CODE IDENT NO.		
A	80230	2010781	
SCALE-NONE	REV LTR B		SHEET 9 OF

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 3	2		P27-A6 P30-9					.18 .13	NO NO		20	
H 4	2		P27-A7 P30-9					.18 .13	NO NO		20	
H 5	2		P27-B6 P30-9					.18 .13	NO NO		20	
H 6	2		P27-B7 P30-9					.18 .13	NO NO		20 18	
H 7	2		P27-C6 P30-10					.18 .13	NO NO		20	
H 8	2		P27-C7 P30-10					.18 .13	NO NO		20	
H 9	2		P27-D6 P30-10					.18 .13	NO NO		20 18	
H 12	2		P27-A3 P31-9					.18 .13	NO NO		20	
H 13	2		P27-A4 P31-9					.18 .13	NO NO		20	
H 14	2		P27-A5 P31-9					.18 .13	NO NO		20	
H 15	2		P27-B4 P31-9					.18 .13	NO NO		20 18	
H 16	2		P27-B5 P31-10					.18 .13	NO NO		20	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 10 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 17	2		P27-C4 P31-10					.18 .13	NO NO		20	
H 18	2		P27-C5 P31-10					.18 .13	NO NO		20 18	
H 20	2		P27-F7 P30-8					.18 .13	NO NO		20	
H 21	2		P27-G7 P30-8					.18 .13	NO NO		20	
H 22	2		P27-H7 P30-8					.18 .13	NO NO		20 18	
H 24	2		P27-F8 P31-8					.18 .13	NO NO		20	
H 25	2		P27-G8 P31-8					.18 .13	NO NO		20	
H 26	2		P27-H8 P31-8					.18 .13	NO NO		20 18	
H 33	2		P27-B8 P30-16					.18 .13	NO NO		20	
H 34	2		P27-B9 P31-16					.18 .13	NO NO		20	
H 35	2		P27-C8 P30-16					.18 .13	NO NO		20	
H 36	2		P27-C9 P31-16					.18 .13	NO NO		20	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 11 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 37	2		P27-D7 P31-15					.18 .13	NO NO		20	
H 38	2		P27-D8 P31-15					.18 .13	NO NO		20	
H 39	2		P27-D9 P30-15					.18 .13	NO NO		20	
H 40	2		P27-F9 P30-15					.18 .13	NO NO		20	
H 41	2		P27-G9 P30-3					.18 .13	NO NO		20	
H 42	2		P27-H9 P31-3					.18 .13	NO NO		20	
H 67	5											
H 67R			P25-83 P27-K5					.13 .18	NO NO		19 21	
H 67Y			P25-84 P27-K4					.13 .18	NO NO		19 21	
H 69	2		P25-57 P27-G4					.13 .18	NO NO		19 20	
H 70	3		J5-62 P25-51					.13 .13	NO NO		19 19	8
H 71	3		J5-63 P25-78					.13 .13	NO NO		19 19	8

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 12 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 72	3		J5-38 P25-77					.13 .13	NO NO		19 19	8
H 73	3		J5-40 P25-76					.13 .13	NO NO		19 19	8
H 74	3		J5-39 P25-79					.13 .13	NO NO		19 19	8
H 75	3		J5-64 P25-49					.13 .13	NO NO		19 19	8
H 76	2		J5-66 P25-30					.13 .13	NO NO		19 19	8
H 77	3		J5-65 P25-75					.13 .13	NO NO		19 19	8
H 78	2		J5-41 P25-28					.13 .13	NO NO		19 19	8
H 79	2		J5-42 P25-48					.13 .13	NO NO		19 19	8
H 80	3		J5-52 P25-2					.13 .13	NO NO		19 19	8
H 81	3		J5-76 P25-9					.13 .13	NO NO		19 19	8
H 82	3		J5-30 P25-22					.13 .13	NO NO		19 19	8
H 83	3		J5-29 P25-41					.13 .13	NO NO		19 19	8

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 13 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 84	3		J5-14 P25-66					.13 .13	NO NO		19 19	B
H 85	3		J5-50 P25-3					.13 .13	NO NO		19 19	B
H 86	3		J5-74 P25-10					.13 .13	NO NO		19 19	B
H 87	3		J5-75 P25-23					.13 .13	NO NO		19 19	B
H 88	3		J5-51 P25-42					.13 .13	NO NO		19 19	B
H 89	3		J5-77 P25-67					.13 .13	NO NO		19 19	B
H 90	3		J5-27 P25-12					.13 .13	NO NO		19 19	B
H 91	3		J5-13 P25-11					.13 .13	NO NO		19 19	B
H 92	3		J5-28 P25-24					.13 .13	NO NO		19 19	B
H 93	3		J5-73 P25-43					.13 .13	NO NO		19 19	B
H 94	3		J5-49 P25-68					.13 .13	NO NO		19 19	B
H 95	2		J5-45 P25-7					.13 .13	NO NO		19 19	B

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 14 OF 24

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 96	3		J5-72 P25-27					.13 .13	NO NO		19 19	B
H 97	3		J5-48 P25-45					.13 .13	NO NO		19 19	B
H 98	3		J5-47 P25-26					.13 .13	NO NO		19 19	B
H 99	3		J5-71 P25-25					.13 .13	NO NO		19 19	B
H 100	3		J5-4 P25-47					.13 .13	NO NO		19 19	B
H 101	3		J5-22 P25-70					.13 .13	NO NO		19 19	B
H 102	3		J5-46 P25-46					.13 .13	NO NO		19 19	B
H 103	2		J5-70 P25-73					.13 .13	NO NO		19 19	B
H 104	3		J5-25 P25-13					.13 .13	NO NO		19 19	B
H 105	3		J5-26 P25-72					.13 .13	NO NO		19 19	B
H 106	3		J5-11 P25-74					.13 .13	NO NO		19 19	B
H 107	3		J5-23 P25-44					.13 .13	NO NO		19 19	B

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 15 OF 24

MIL 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 108	3		J5-12 P25-71					.13 .13	NO NO		19 19	B
H 109	3		J5-10 P25-69					.13 .13	NO NO		19 19	B
H 110	3		J5-24 P25-18					.13 .13	NO NO		19 19	B
H 111	2		J5-44 P25-21					.13 .13	NO NO		19 19	B
H 112	2		J5-68 P25-8					.13 .13	NO NO		19 19	B
H 113	2		J5-43 P25-1					.13 .13	NO NO		19 19	B
H 120	2		P27-G3 P30-6					.18 .13	NO NO		20 18	
H 121	2		P27-G2 P31-6					.18 .13	NO NO		20 18	
H 129	5											
H 129R			P25-14 P27-F6					.13 .18	NO NO		19 21	
H 129Y			P25-32 P27-G6					.13 .18	NO NO		19 21	
H 131	67				1.00 1.75	.75 1.50				6B 6B	53 59	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR B
SHEET 16 OF

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 131A	11		SHLD H131 P27-H2					.20 .18	NO NO		 20	
H 131R			P27-K3 P30-17					.18 .13	NO NO		20 18	
H 131Y			P27-H3 P30-18					.18 .13	NO NO		20 18	
H 132	8				1.75 1.00	1.50 .75				6A 6B	53 53	
H 132A	11		SHLD H132 F16					.20 .19	NO NO			
H 132B	9		P27-H6 SHLD H132					.22 .20	NO NO			
H 132R			J5-19 P27-K6					.13 .22	NO NO		19	
H 132Y			J5-18 P27-K7					.13 .22	NO NO		19	
H 133	8				1.75 1.00	1.50 .75				6A 6B	53 53	
H 133A	11		SHLD H133 E17					.20 .19	NO NO			
H 133B	9		P27-H6 SHLD H133					.22 .20	NO NO		20	
H 133R			P25-38 P27-K6					.13 .22	NO NO		19 20	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR B
SHEET 17 OF

FORM 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 133Y			P25-40 P27-K7					.13 .22	NO NO		19 20	
H 134	8				1.75 1.00	1.50 .75				6A 6A	53 53	
H 134A	11		SHLD H134 E16					.20 .19	NO NO			
H 134B	11		E17 SHLD H134					.19 .20	NO NO			
H 134R			J5-7 P25-5					.13 .13	NO NO		19 19	
H 134Y			J5-8 P25-4					.13 .13	NO NO		19 19	
H 135	4									6A 6B	53 53	SEE NOTE 30
H 135A	11		SHLD H135 E17					.20 .19	NO NO		50	
H 135B	11		P31-11 SHLD H135					.13 .20	NO NO			
H 135R			P25-62 P31-17					.13 .13	NO NO		19	
H 135Y			P25-63 P31-18					.13 .13	NO NO		19	
H 136	4									6A 6B	53 53	SEE NOTE 30

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 18 OF 24

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 136A	11		SHLD H136 E18					.20 .19	NO NO			
H 136B	11		P31-11 SHLD H136					.13 .20	NO NO			
H 136R			P25-64 P31-17					.13 .13	NO NO		19	
H 136Y			P25-65 P31-18					.13 .13	NO NO		19	
H 137	4									6A 6B	53 53	SEE NOTE 30
H 137A	11		SHLD H137 E16					.20 .19	NO NO		50	
H 137B	11		P31-11 SHLD H137					.13 .20	NO NO		18	
H 137R			J5-9 P31-17					.13 .13	NO NO		19 18	
H 137Y			J5-2 P31-18					.13 .13	NO NO		19 18	
H 138	10		E15 NONE					.19	NO			A
H 139	10		E15 E18					.19 .19	NO NO		50 50	B
H 157	2		P30-4 P31-4					.13 .13	NO NO			

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 19 OF 24

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 158	2		P30-14 P31-14					.13 .13	NO NO			
H 159	2		P30-14 P31-14					.13 .13	NO NO			
H 160	2		P30-15 P31-15					.13 .13	NO NO			
H 161	2		P30-15 P31-15					.13 .13	NO NO			
H 162	2		P30-16 P31-16					.13 .13	NO NO			
H 163	2		P30-16 P31-16					.13 .13	NO NO		18 18	
H 164	2		P30-3 P30-15					.13 .13	NO NO		18 18	
H 165	2		P31-3 P31-15					.13 .13	NO NO		18 18	
H 166	2		P30-1 P31-1					.13 .13	NO NO			A
H 167	2		P30-1 P31-1					.13 .13	NO NO			A
H 168	2		P27-B3 P30-7					.18 .13	NO NO		20	
H 169	2		P27-B2 P31-7					.18 .13	NO NO		20	

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 20 OF 24

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 170	2		P27-B1 P30-14					.18 .13	NO NO		20	
H 171	2		P27-C3 P30-7					.18 .13	NO NO		20	
H 172	2		P27-C2 P31-7					.18 .13	NO NO		20	
H 173	2		P27-C1 P30-14					.18 .13	NO NO		20 18	
H 174	2		P27-D3 P30-7					.18 .13	NO NO		20	
H 175	2		P27-D2 P31-7					.18 .13	NO NO		20	
H 176	2		P27-D1 P31-14					.18 .13	NO NO		20	
H 177	2		P27-F3 P30-7					.18 .13	NO NO		20 18	
H 178	2		P27-F2 P31-7					.18 .13	NO NO		20 18	
H 179	2		P27-F1 P31-14					.18 .13	NO NO		20 18	
H 180	2		J5-53 P30-2					.13 .13	NO NO		19	A
H 181	2		J5-78 P31-2					.13 .13	NO NO		19	A

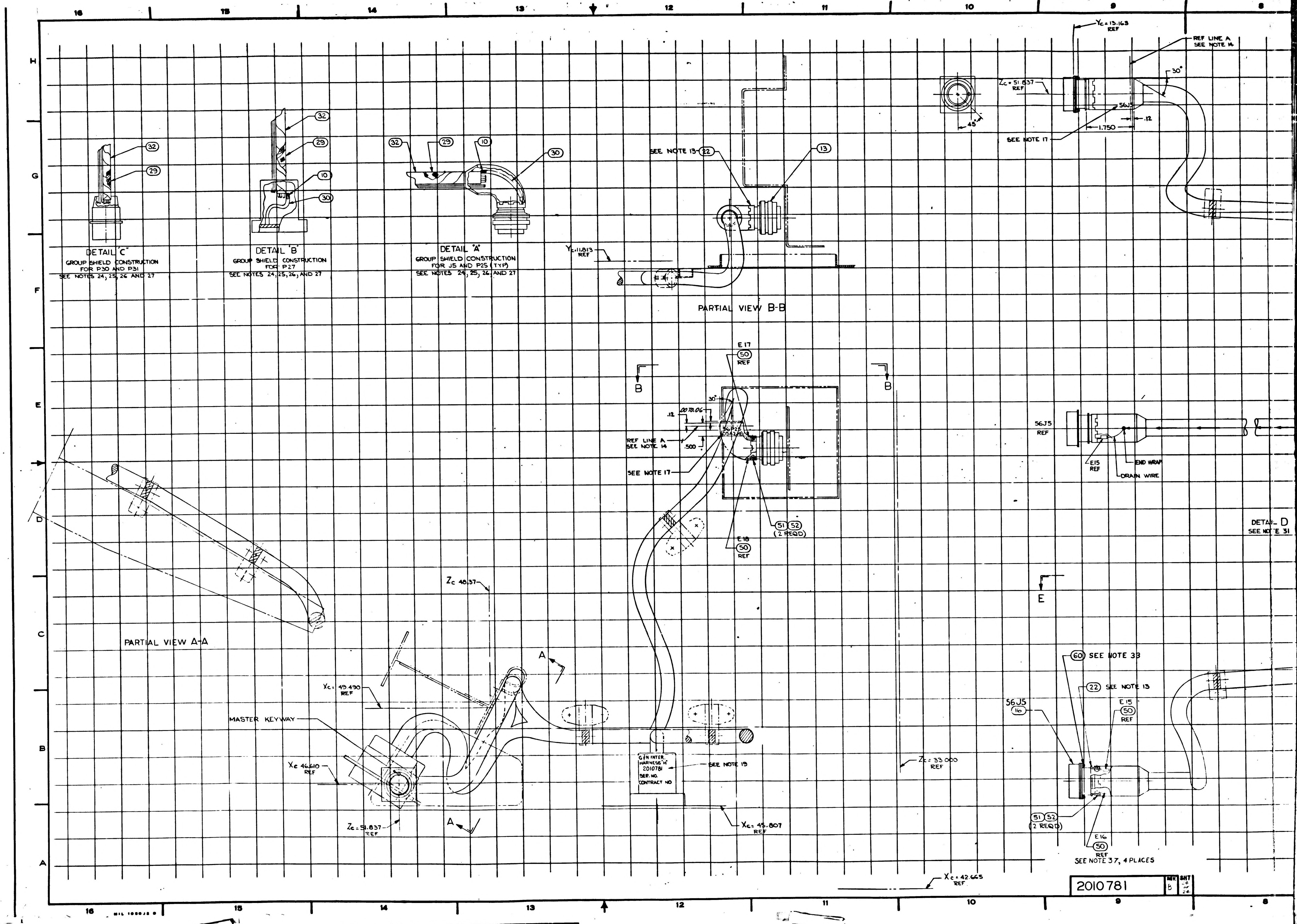
SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 21 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 182	2		J5-54 P30-1					.13 .13	NO NO		19	A
H 183	2		J5-79 P30-2					.13 .13	NO NO		19	A
H 184	2		J5-80 P31-2					.13 .13	NO NO		19	A
H 185	2		J5-55 P30-1					.13 .13	NO NO		19	A
H 186	2		J5-33 P30-2					.13 .13	NO NO		19	A
H 187	2		J5-32 P31-2					.13 .13	NO NO		19	A
H 188	2		J5-16 P30-1					.13 .13	NO NO		19 18	A
H 189	2		J5-81 P30-2					.13 .13	NO NO		19	A
H 190	2		J5-57 P31-2					.13 .13	NO NO		19	A
H 191	2		J5-56 P31-1					.13 .13	NO NO		19	A
H 192	2		J5-58 P30-2					.13 .13	NO NO		19	A
H 193	2		J5-34 P31-2					.13 .13	NO NO		19	A

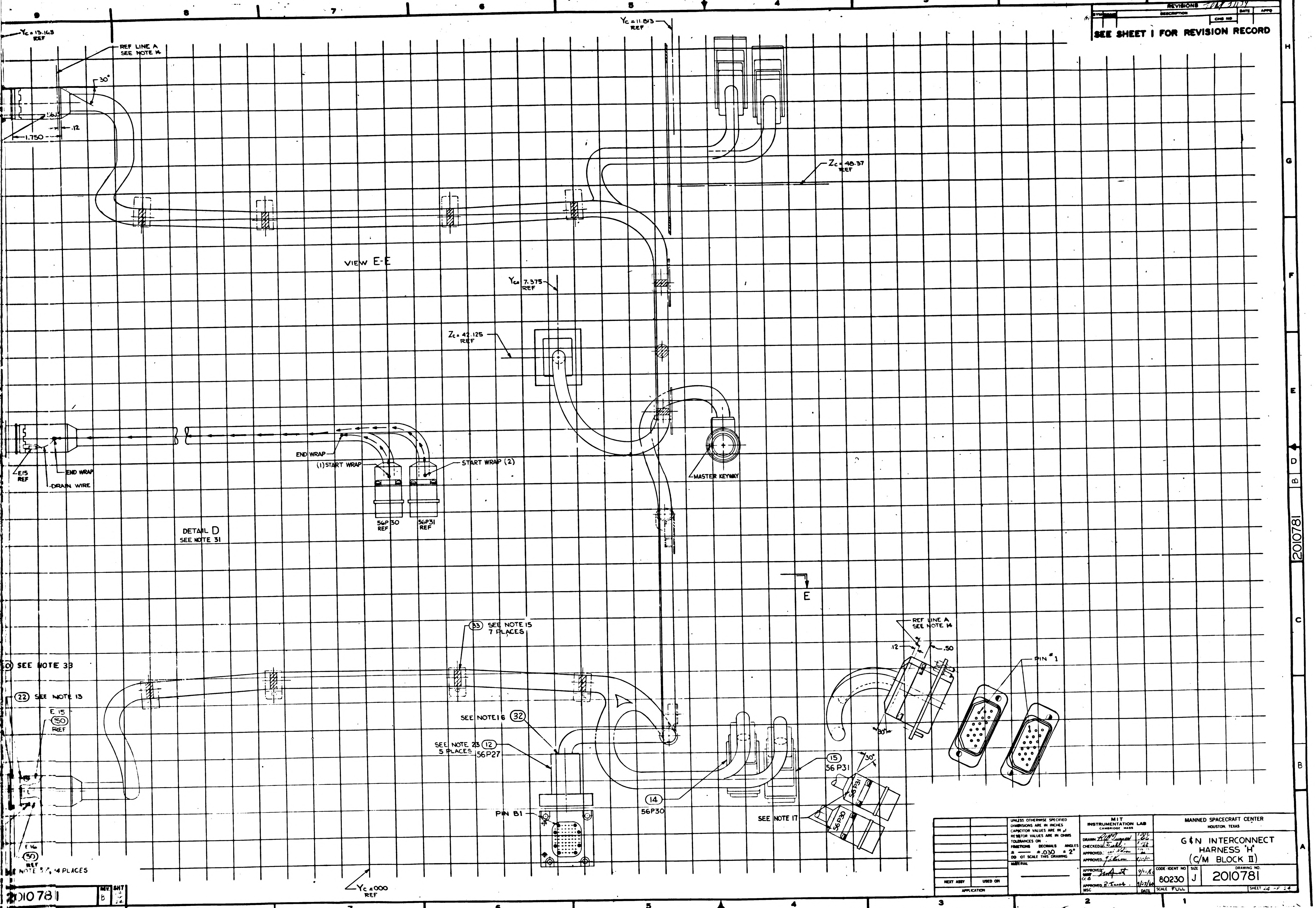
SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR A	SHEET 22 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 194	2		J5-35 P31-1					.13 .13	NO NO		19	A
H 196	2		J5-60 P30-4					.13 .13	NO NO		19 18	
H 197	2		J5-84 P31-4					.13 .13	NO NO		19 18	
H 198	2		J5-31 P30-2					.13 .13	NO NO		19 18	A
H 199	2		J5-15 P31-2					.13 .13	NO NO		19 18	A
H 200	2		J5-5 P31-1					.13 .13	NO NO		19 18	A
H 201	3		P25-15 P27-F5					.13 .22	NO NO		19 21	
H 202	3		P25-31 P27-H5					.13 .18	NO NO		19 21	

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR B	SHEET 23 OF


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
32
29
DETAIL "C"
GROUP SHIELD CONSTRUCTION
FOR P30 AND P31
SEE NOTES 24, 25, 26 AND 27
32
29
10
30
DETAIL "B"
GROUP SHIELD CONSTRUCTION
FOR P27
SEE NOTES 24, 25, 26, AND 27
32
29
10
30
DETAIL "A"
GROUP SHIELD CONSTRUCTION
FOR J5 AND P25 (TYP)
SEE NOTES 24, 25, 26, AND 27
SEE NOTE 13 22
13
Yc=11.813 REF
PARTIAL VIEW B-B
Yc=13.163 REF
REF LINE A SEE NOTE 14
Zc=51.837 REF
30°
56J5
45°
1.750
.12
SEE NOTE 17
E17
50
REF
B
B
30°
.12
.00 TO .06
56P25 (05A2J9)
REF LINE A SEE NOTE 14
.500
SEE NOTE 17
51 52 (2 REQD)
E18
50
REF
56J5 REF
E15 REF
END WRAP
DRAIN WIRE
DETAIL D
SEE NOTE 31
E
Zc 48.37
PARTIAL VIEW A-A
A
Xc= 49.490 REF
MASTER KEYWAY
Xc 46.610 REF
Zc=51.837 REF
A
G/N INTER. HARNESS "H" 2010781 SER. NO. CONTRACT NO
SEE NOTE 19
Xc= 45.807 REF
Zc= 33.000 REF
Xc= 42.665 REF
60 SEE NOTE 33
22 SEE NOTE 13
56J5
16
E15
50
REF
51 52 (2 REQD)
E16
50
REF
SEE NOTE 37, 4 PLACES
2010781
REV. B
SHT 4 of 24

1/2010781


REVISIONS
SYM
DESCRIPTION
DATE
APPD
CHG NO
SEE SHEET 1 FOR REVISION RECORD
Yc = 13.163 REF
REF LINE A SEE NOTE 14
30°
.61
.12
1.750
Yc = 11.813 REF
Zc = 48.37 REF
VIEW E-E
Yc = 7.375 REF
Zc = 42.125 REF
MASTER KEYWAY
E15 REF
END WRAP
DRAIN WIRE
END WRAP
(1) START WRAP
START WRAP (2)
56P30 REF
56P31 REF
DETAIL D
SEE NOTE 31
E
(33) SEE NOTE 15 7 PLACES
REF LINE A SEE NOTE 14
.12
.50
PIN #1
30°
(30) SEE NOTE 33
(22) SEE NOTE 13
E 15 (50) REF
SEE NOTE 16 (32)
SEE NOTE 23 (12) 5 PLACES 56P27
(15) 56 P31
30°
56P31
56P30
(14) 56P30
SEE NOTE 17
PIN B1
E16 (50) REF
NOTE 5, 14 PLACES
Yc = 000 REF
9
8
7
6
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4
3
2
1
H
G
F
E
D
C
B
A

2010781 | REV. B | SHT 24 of 24

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.030 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R.W. Turner 1 JUL 66
CHECKED W. Diehl 1 JUL 66
APPROVED ... Nelson AUG 15 66
APPROVED J. Aleno 8/15/66
APPROVED CCB 9/22/66
APPROVED MSC R. Jacob 9/23/66
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "H"
(C/M BLOCK II)

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010781
SCALE FULL
SHEET 24 OF 24

272010781

APPLICATION	
NEXT ASSY	USED ON
2014567	2014567

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 31139	7 JUL '66	W.D.
B	REVISED PER TDRR 31204	4 OCT 66	SS
C	REVISED PER TDRR 31215	17 OCT 66	WK AU

REV	A	A	C	C
SHEET	21	22	23	24

REV STATUS OF SHEETS																				
REV	C	A	B	C	A	B	C	C	C	A	A	A	A	A	A	B	B	A	C	A
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN R.W. Turner 29 JUN 66
DAY MO YR
CHECKER Diehl 1 JUL 66
ENGINEER D. Costa 5 JUL 66
APPROVAL J.T. Klein AUG 15 66
CONTR NO. NAS 9-4-97

NASA APPROVAL R. Jacob
CCE APPROVAL 7/21/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G&N INTERCONNECT HARNESS "H"
(C/M, BLOCK II)

SIZE	CODE IDENT. NO	
A	80230	2010781
SCALE NONE		SHEET 1 OF 24

MIL 1377A6 12-65

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	SHIELD TERMINATION FIGURES ARE PER ND1002071 FOR FIG. 6A, 6B AND ND 1002032 FOR FIGURE 7.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	INTERCONNECT LIST FOR THIS HARNESS IS 2014678.
4	PARTIAL CIRCUIT POINTS ARE SHOWN. PREFIX WITH UNIT NUMBER 56 FOR COMPLETE CIRCUIT POINT
5	THE SUFFIX LETTER OF A CONDUCTOR IDENTIFICATION NUMBER IDENTIFIES A SHIELD LEAD, COLOR, OR MARKED LETTER. A - FROM END OF SHIELD B - TO END OF SHIELD G - GREEN K - BLACK L - BLUE N - BROWN R - RED W - WHITE Y - YELLOW
6	ASTERISK DENOTES LOWER CASE LETTER
7	GRID MODULE ON PICTURE SHEET IS 1 INCH TRUE POSITION
8	UNLESS OTHERWISE SPECIFIED FEATURE CENTERLINES ON PICTURE SHEET ARE LOCATED WITHIN + OR - .25. ENDS OF HOOKUP WIRES OR ACCESSORIES ARE LOCATED WITHIN .12.
9	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
10	CRIMP CONTACTS PER ND1002032.

SIZE A	CODE IDENT NO. 80230	2010781	
SCALE-NONE	REV LTR A	SHEET 2 OF 24	

NOTE NUMBER	GENERAL NOTES DESCRIPTION
11	ALL UNUSED CONTACT CAVITIES SHALL BE FILLED WITH A SEALING PLUG AS FOLLOWS CONNECTOR 56J5 AND P25 USE ITEM NUMBER 24. CONNECTOR 56P30 AND P31 USE ITEM NUMBER 23.
12	LACE HARNESS PER ND1002032 USING ITEM NUMBER 40.
13	APPLY BONDING MATERIAL PER ND1002187, TYPE 1, USING ITEMS 38 AND 39 TO THE THREADED PORTION OF CONNECTOR AND TO THE THREADED PORTION OF ADAPTER PRIOR TO ASSY.
14	ALL SHIELDED TERMINATIONS SHALL BE LOCATED BELOW REFERENCE LINE A. THERE SHALL BE NO EXPOSED CONDUCTORS OR ACCESSORIES AT THE SURFACE OF THE POTTING COMPOUND.
15	BEFORE LACING HARNESS, APPLY 2 TURNS OF TAPE TO INDICATE CABLE CLAMP LOCATION.
16	WRAP TAPE AROUND HARNESS IN AREA SHOWN AS REQUIRED TO BUILD UP DIAMETER TO FIT SHELL HOLE.
17	MARK CONNECTOR WITH REFERENCE DESIGNATION AS SHOWN .12 HIGH, BLACK, PER ND1002019, CENTRALIZE
19	MARK CHARACTERS .12 HIGH, BLACK, PER ND1002019, SERIALIZE PER ND1002023.
20	CONTINUITY TEST PER CONDUCTOR CHART. RESISTANCE SHALL BE LESS THAN 1/2 OHM. TEST PER MIL-STD-202, METHOD 303.

SIZE A	CODE IDENT NO. 80230	2010781	
SCALE-NONE	REV LTR B	SHEET 3 OF 24	

NOTE NUMBER	GENERAL NOTES DESCRIPTION
21	INSULATION RESISTANCE SHALL BE GREATER THAN 100 MEGOHMS WITH 500 VDC APPLIED BETWEEN A. THE ASSEMBLY PINS AND STRUCTURE GROUND, WITH THE EXCEPTION OF THOSE PINS ELECTRICALLY CONNECTED TO STRUCTURE GROUND AND THOSE PINS SPECIFIED IN PAR. B. B. EACH PIN AND ALL OTHER PINS NOT ELECTRICALLY CONNECTED, INCLUDING ALL SPARE PINS. TEST PER MIL-STD-202, METHOD 302, EXCEPT ELECTRIFICATION TIME NOT APPLICABLE. SHORT CIRCUIT CURRENT LIMITED TO 15 MILLIAMPS.
23	ENCAPSULATE BACK OF CONNECTORS PER ND1002236 USING ITEMS 34 AND 35.
24	CONDUCTORS LISTED WITH AN A OR B IN THE REMARKS COLUMN ARE TO BE GROUP SHIELDED PER DETAILS A, B AND C OF THE CONFIGURATION DRAWING.
25	GROUP SHIELDING - WRAP CABLE WITH ONE CONTINUOUS LENGTH OF SHIELDING TAPE. SUCCESSIVE TURNS SHALL OVERLAP BY 1/2 THE WIDTH OF THE TAPE, WITH A MINIMUM OF RIDGES AND FOLDS.
26	COMPLETELY COVER SHIELD WITH A MINIMUM OF TWO WRAPS OF INSULATION TAPE ITEM 32. WRAP LAYERS IN OPPOSITE DIRECTION, CLOCKWISE, COUNTERCLOCKWISE, ETC. SUCCESSIVE TURNS SHALL OVERLAP BY 1/2 THE WIDTH OF TAPE WITH A MINIMUM OF RIDGES AND ROLLS.
27	DELETED ASSEMBLE SHRINK SLEEVING AS SHOWN.

SIZE A	CODE IDENT NO. 80230	2010781	
SCALE-NONE	REV LTR C	SHEET 4 OF 24	

NOTE NUMBER	GENERAL NOTES DESCRIPTION
30	ASSEMBLE A LENGTH OF WIRE BRAID, ITEM 57, OVER CONDUCTORS H135, H136, AND H137. ALLOW 1.50 INCHES OF LEAD TO EXTEND BEYOND BRAID. COVER BRAID WITH TEFLON TAPE, ITEM 32, PER NOTE 26. ALLOW .25 INCH OF BRAID TO EXTEND BEYOND TAPE. FOLD BRAID OVER TAPE AND TERMINATE PER ND1002071, FIG. 6B.
31	NUMBERS INDICATE SEQUENCE IN WHICH GROUP SHIELD A IS TO BE WRAPPED. CUT DRAIN WIRE BACK 1/2 INCH WITHIN SHIELD WRAP AT P30 AND P31 ENDS.
32	PERFORM WORKMANSHIP VIBRATION A. SINUSOIDAL SWEEP AT 3.5 G RMS. LIMITED TO 0.3 INCH PEAK TO PEAK DISPLACEMENT, FROM 10 TO 2000 CPS AT A RATE OF 4 OCTAVES PER MINUTE. B. VIBRATION ALONG THE X AXIS OF THE SPACE CRAFT. C. MONITOR FOR DISCONTINUITIES OF 10 MICRO SECONDS OR GREATER DURING VIBRATION. D. COMPLETE CONTINUITY AND INSULATION RESISTANCE TESTING MUST BE ACCOMPLISHED AFTER VIBRATION.
33	BOND NUT PLATE ASSEMBLIES TO CONNECTOR 56J5 PER ND1002004, USING ITEMS 61 AND 62.
34	TO CRIMP LEADS TO CONTACTS OF CONNECTORS P30 AND P31, USE SHORT LENGTHS OF 22AWG WIRE TO BUILD UP LEAD DIAMETER TO FIT CONTACT BARREL. TOTAL NUMBER OF FUNCTIONAL AND DUMMY LEADS MUST EQUAL SIX PER CONTACT. TWIST LEADS TOGETHER BEFORE CRIMPING TO CONTACT. AFTER CRIMPING, CUT DUMMY LEADS FLUSH WITH TOP OF CONTACT.
35	SOLDER PER ND1002071, USING ITEM 63, OR ITEMS 64 AND 65.
36	ASSEMBLE INSULATION SLEEVE, ITEM 66 OVER EACH ELECTRICALLY CONNECTED PIN OF CONNECTOR P27. POSITION SLEEVING FLUSH TO TOP OF NYLON INSULATOR.

SIZE A	CODE IDENT NO. 80230	2010781	
SCALE-NONE	REV LTR ~~B~~ A	SHEET 5 OF 24	

NOTE GENERAL NOTES

NUMBER	DESCRIPTION
37	BOND TERMINAL LUG AND SCREW TO THE ADAPTER PER ND1002187, TYPE III, USING ITEMS 38, 39, 68, AND 69.

LEAD TOLERANCE CHART

	LEAD LG	JKT STRIP LG	SHIELD STRIP LG	LEAD CUT LG	INS STRIP LG
UNDER 3 INCHES	+ .12-.00	+.06-.06	+.06-.06	+.06-.06	+.06-.00
3 INCH TO 3 FT	+ .50-.00	+.25-.25	+.25-.25	+.25-.25	
3 FT TO 10 FT	+1.00-.00				
10 FT AND OVER	+2.00-.00				

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR B	SHEET 6 OF 24

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	2	1	2010781-002	WIRE PER 1010789-006, 22 AWG, YEL, 240 FT TOT LG
	3	1	2010781-003	WIRE PER 1010789-016, 26 AWG, YEL, 170 FT TOT LG
	4	1	2010781-004	WIRE PER 1010789-008, 22 AWG, YEL, RED, 10 FT TOT LG
	5	1	2010781-005	WIRE PER 1010789-017, 26 AWG, YEL, RED, 8 FT TOT LG
	8	1	2010781-008	WIRE PER 1010789-015, 26 AWG, YEL, RED, YEL JKT, 20 FT TOT LG
	9	1	2010781-009	WIRE PER 1010789-024, 26 AWG, BLK, 5 FT TOT LG
	10		2010781-010	DELETED
	11	1	2010781-011	WIRE PER 1010789-002, 24 AWG, BLK, 5 FT TOT LG
	12	1	2014748-C21	CONNECTOR, PLUG, ELECTRICAL, (56P27)
9	13	1	1010929-003	CONNECTOR, PLUG, ELECTRICAL, (56P25)
9	14	1	1010921- 1	CONNECTOR, PLUG, ELECTRICAL, (56P30)
9	15	1	1010921- 2	CONNECTOR, PLUG, ELECTRICAL, (56P31)
9	16	1	1010930-003	CONNECTOR, RECEPTACLE, ELECTRICAL (56J5)
9	18	36	1010932- 2	CONTACT, PIN
9	19	X	1010770- 2	CONTACT, SOCKET, SUPPLIED WITH CONNECTORS 1010929, AND 1010930.

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR C	SHEET 7 OF 24

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
9	20	51	1010955- 1	CONTACT, MALE
9	21	6	1010955- 2	CONTACT, MALE
	22	2	2014670- 13	ADAPTER, CONNECTOR
9	23	7	1010983- 1	PLUG, PROTECTIVE SEALING
9	24	39	1010958- 1	PLUG, PROTECTIVE SEALING
9	29	AR	1010989	TAPE, SHIELDING, EMI/RFI
	30		1006776- 19	DELETED
	32	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1 INCH WIDE
	33	AR	MIL-T-23594	TAPE, TEFLON, TYPE II, 1/4 INCH WIDE
9	34	AR	1012503	COMPOUND, POTTING, POLYURETHANE
9	35	AR	1012504	PRIMER, METAL PARTS
9	38	AR	1010661	EPOXY RESIN
9	39	AR	1010679	ADHESIVE ACTIVATOR
9	40	AR	1012507-004	TAPE, LACING AND TYING
	50	4	2021203	TERMINAL LUG SOLDER
	51	4	MS35333-69	WASHER, LOCK
9	52	4	1006783- 93	SCREW, BUTTON HD
9	53	13	1010402- 2	SLEEVE, SOLDER

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR C	SHEET 8 OF 24

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	57	1	2010781-012	WIRE BRAID, QQ-B-575, .12 DIA, 36 AWG, 10 FT TOTAL LENGTH
9	59	1	1012534- 36	SLEEVING, INSULATION, ELEC, (HEAT SHRINKABLE)
	60	1	2010725-011	NUT PLATE ASSEMBLY
9	61	AR	1010682	EPOXY RESIN
9	62	AR	1010683	CURING AGENT, AMINE
	63	AR	SN60WRAP	SOLDER QQ-S-571
	64	AR	SN60WS	SOLDER QQ-S-571
	65	AR	MIL-F-14256 TYPE A OR W	FLUX
9	66	57	1010490-114	INSULATION SLEEVING (HEAT SHRINKABLE)
	67	1	2010781-013	WIRE PER 1010789-012, 24 AWG, YEL, RED, YEL JKT 5FT. TOT. LG.
9	68	AR	1008822	COLORANT, EPOXY BASE
9	69	AR	1006277	SILICA, PULVERIZED PYROGENIC
9	70	4	1010811-002	BAND, CABLE

SIZE A	CODE IDENT NO. 80230	2010781
SCALE-NONE	REV LTR C	SHEET 9 OF 24

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 3	2		P27-A6 P30-9					.18 .13	NO NO		20	
H 4	2		P27-A7 P30-9					.18 .13	NO NO		20	
H 5	2		P27-B6 P30-9					.18 .13	NO NO		20	
H 6	2		P27-B7 P30-9					.18 .13	NO NO		20 18	
H 7	2		P27-C6 P30-10					.18 .13	NO NO		20	
H 8	2		P27-C7 P30-10					.18 .13	NO NO		20	
H 9	2		P27-D6 P30-10					.18 .13	NO NO		20 18	
H 12	2		P27-A3 P31-9					.18 .13	NO NO		20	
H 13	2		P27-A4 P31-9					.18 .13	NO NO		20	
H 14	2		P27-A5 P31-9					.18 .13	NO NO		20	
H 15	2		P27-B4 P31-9					.18 .13	NO NO		20 18	
H 16	2		P27-B5 P31-10					.18 .13	NO NO		20	

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 10 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 17	2		P27-C4 P31-10					.18 .13	NO NO		20	
H 18	2		P27-C5 P31-10					.18 .13	NO NO		20 18	
H 20	2		P27-F7 P30-8					.18 .13	NO NO		20	
H 21	2		P27-G7 P30-8					.18 .13	NO NO		20	
H 22	2		P27-H7 P30-8					.18 .13	NO NO		20 18	
H 24	2		P27-F8 P31-8					.18 .13	NO NO		20	
H 25	2		P27-G8 P31-8					.18 .13	NO NO		20	
H 26	2		P27-H8 P31-8					.18 .13	NO NO		20 18	
H 33	2		P27-B8 P30-16					.18 .13	NO NO		20	
H 34	2		P27-B9 P31-16					.18 .13	NO NO		20	
H 35	2		P27-C8 P30-16					.18 .13	NO NO		20	
H 36	2		P27-C9 P31-16					.18 .13	NO NO		20	

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 11 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 37	2		P27-D7 P31-15					.18 .13	NO NO		20	
H 38	2		P27-D8 P31-15					.18 .13	NO NO		20	
H 39	2		P27-D9 P30-15					.18 .13	NO NO		20	
H 40	2		P27-F9 P30-15					.18 .13	NO NO		20	
H 41	2		P27-G9 P30-3					.18 .13	NO NO		20	
H 42	2		P27-H9 P31-3					.18 .13	NO NO		20	
H 67	5											
H 67R			P25-83 P27-K5					.13 .18	NO NO		19 21	
H 67Y			P25-84 P27-K4					.13 .18	NO NO		19 21	
H 69	2		P25-57 P27-G4					.13 .18	NO NO		19 20	
H 70	3		J5-62 P25-51					.13 .13	NO NO		19 19	B
H 71	3		J5-63 P25-78					.13 .13	NO NO		19 19	B

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 12 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 72	3		J5-38 P25-77					.13 .13	NO NO		19 19	B
H 73	3		J5-40 P25-76					.13 .13	NO NO		19 19	B
H 74	3		J5-39 P25-79					.13 .13	NO NO		19 19	B
H 75	3		J5-64 P25-49					.13 .13	NO NO		19 19	B
H 76	2		J5-66 P25-30					.13 .13	NO NO		19 19	B
H 77	3		J5-65 P25-75					.13 .13	NO NO		19 19	B
H 78	2		J5-41 P25-28					.13 .13	NO NO		19 19	B
H 79	2		J5-42 P25-48					.13 .13	NO NO		19 19	B
H 80	3		J5-52 P25-2					.13 .13	NO NO		19 19	B
H 81	3		J5-76 P25-9					.13 .13	NO NO		19 19	B
H 82	3		J5-30 P25-22					.13 .13	NO NO		19 19	B
H 83	3		J5-29 P25-41					.13 .13	NO NO		19 19	B

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 13 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 84	3		J5-14					.13	NO		19	B
			P25-66					.13	NO		19	
H 85	3		J5-50					.13	NO		19	B
			P25-3					.13	NO		19	
H 86	3		J5-74					.13	NO		19	B
			P25-10					.13	NO		19	
H 87	3		J5-75					.13	NO		19	B
			P25-23					.13	NO		19	
H 88	3		J5-51					.13	NO		19	B
			P25-42					.13	NO		19	
H 89	3		J5-77					.13	NO		19	B
			P25-67					.13	NO		19	
H 90	3		J5-27					.13	NO		19	B
			P25-12					.13	NO		19	
H 91	3		J5-13					.13	NO		19	B
			P25-11					.13	NO		19	
H 92	3		J5-28					.13	NO		19	B
			P25-24					.13	NO		19	
H 93	3		J5-73					.13	NO		19	B
			P25-43					.13	NO		19	
H 94	3		J5-49					.13	NO		19	B
			P25-68					.13	NO		19	
H 95	2		J5-45					.13	NO		19	B
			P25-7					.13	NO		19	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 14 OF 24

MIL 2084 9-65

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 96	3		J5-72					.13	NO		19	B
			P25-27					.13	NO		19	
H 97	3		J5-48					.13	NO		19	B
			P25-45					.13	NO		19	
H 98	3		J5-47					.13	NO		19	B
			P25-26					.13	NO		19	
H 99	3		J5-71					.13	NO		19	B
			P25-25					.13	NO		19	
H 100	3		J5-4					.13	NO		19	B
			P25-47					.13	NO		19	
H 101	3		J5-22					.13	NO		19	B
			P25-70					.13	NO		19	
H 102	3		J5-46					.13	NO		19	B
			P25-46					.13	NO		19	
H 103	2		J5-70					.13	NO		19	B
			P25-73					.13	NO		19	
H 104	3		J5-25					.13	NO		19	B
			P25-13					.13	NO		19	
H 105	3		J5-26					.13	NO		19	B
			P25-72					.13	NO		19	
H 106	3		J5-11					.13	NO		19	B
			P25-74					.13	NO		19	
H 107	3		J5-23					.13	NO		19	B
			P25-44					.13	NO		19	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR A
SHEET 15 OF 24

MIL 2084 9-65

LIMA 101066 G AND N INTERCONNECT 2010781 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 108	3		J5-12					.13	NO		19	B
			P25-71					.13	NO		19	
H 109	3		J5-10					.13	NO		19	B
			P25-69					.13	NO		19	
H 110	3		J5-24					.13	NO		19	B
			P25-18					.13	NO		19	
H 111	2		J5-44					.13	NO		19	B
			P25-21					.13	NO		19	
H 112	2		J5-68					.13	NO		19	B
			P25-8					.13	NO		19	
H 113	2		J5-43					.13	NO		19	B
			P25-1					.13	NO		19	
H 120	2		P27-G3					.18	NO		20	
			P30-6					.13	NO		18	
H 121	2		P27-G2					.18	NO		20	
			P31-6					.13	NO		18	
H 129	5											
H 129R			P25-14					.13	NO		19	
			P27-F6					.18	NO		21	
H 129Y			P25-32					.13	NO		19	
			P27-G6					.18	NO		21	
H 131	67				1.00	.75				6B	53	
					1.75	1.50				6B	59	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR B
SHEET 16 OF 24

FORM 2084 9-65

LIMA 101066 G AND N INTERCONNECT 2010781 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 131A	11		SHLD H131					.20	NO			
			P27-H2					.18	NO		20	
H 131R			P27-K3					.18	NO		20	
			P30-17					.13	NO		18	
H 131Y			P27-H3					.18	NO		20	
			P30-18					.13	NO		18	
H 132	8				1.75	1.50				6A	53	
					1.00	.75				6B	53	
H 132A	11		SHLD H132					.20	NO			
			E16					.19	NO			
H 132B	9		P27-H6					.22	NO			
			SHLD H132					.20	NO			
H 132R			J5-19					.13	NO		19	
			P27-K6					.22	NO			
H 132Y			J5-18					.13	NO		19	
			P27-K7					.22	NO			
H 133	8				1.75	1.50				6A	53	
					1.00	.75				6B	53	
H 133A	11		SHLD H133					.20	NO			
			E17					.19	NO			
H 133B	9		P27-H6					.22	NO		20	
			SHLD H133					.20	NO			
H 133R			P25-38					.13	NO		19	
			P27-K6					.22	NO		20	

SIZE A
CODE IDENT NO. 80230
2010781
SCALE-NONE
REV LTR B
SHEET 17 OF 24

FORM 2084 9-65

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 133Y			P25-40					.13	NO		19	
			P27-K7					.22	NO		20	
H 134	8				1.75	1.50				6A	53	
					1.00	.75				6A	53	
H 134A	11		SHLD H134					.20	NO			
			E16					.19	NO			
H 134B	11		E17					.19	NO			
			SHLD H134					.20	NO			
H 134R			J5-7					.13	NO		19	
			P25-5					.13	NO		19	
H 134Y			J5-8					.13	NO		19	
			P25-4					.13	NO		19	
H 135	4									6A	53	SEE NOTE 30
										6B	53	
H 135A	11		SHLD H135					.20	NO			
			E17					.19	NO		50	
H 135B	11		P31-11					.13	NO			
			SHLD H135					.20	NO			
H 135R			P25-62					.13	NO		19	
			P31-17					.13	NO			
H 135Y			P25-63					.13	NO		19	
			P31-18					.13	NO			
H 136	4									6A	53	SEE NOTE 30
										6B	53	

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 18 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 136A	11		SHLD H136					.20	NO			
			E18					.19	NO			
H 136B	11		P31-11					.13	NO			
			SHLD H136					.20	NO			
H 136R			P25-64					.13	NO		19	
			P31-17					.13	NO			
H 136Y			P25-65					.13	NO		19	
			P31-18					.13	NO			
H 137	4									6A	53	SEE NOTE 30
										6B	53	
H 137A	11		SHLD H137					.20	NO			
			E16					.19	NO		50	
H 137B	11		P31-11					.13	NO		18	
			SHLD H137					.20	NO			
H 137R			J5-9					.13	NO		19	
			P31-17					.13	NO		18	
H 137Y			J5-2					.13	NO		19	
			P31-18					.13	NO		18	
H 138			DELETED									
H 139			DELETED									
H 157	2		P30-4					.13	NO			
			P31-4					.13	NO			

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR C | SHEET 19 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 158	2		P30-14					.13	NO			
			P31-14					.13	NO			
H 159	2		P30-14					.13	NO			
			P31-14					.13	NO			
H 160	2		P30-15					.13	NO			
			P31-15					.13	NO			
H 161	2		P30-15					.13	NO			
			P31-15					.13	NO			
H 162	2		P30-16					.13	NO			
			P31-16					.13	NO			
H 163	2		P30-16					.13	NO		18	
			P31-16					.13	NO		18	
H 164	2		P30-3					.13	NO		18	
			P30-15					.13	NO		18	
H 165	2		P31-3					.13	NO		18	
			P31-15					.13	NO		18	
H 166	2		P30-1					.13	NO			A
			P31-1					.13	NO			
H 167	2		P30-1					.13	NO			A
			P31-1					.13	NO			
H 168	2		P27-B3					.18	NO		20	
			P30-7					.13	NO			
H 169	2		P27-B2					.18	NO		20	
			P31-7					.13	NO			

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 20 OF 24

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 170	2		P27-B1					.18	NO		20	
			P30-14					.13	NO			
H 171	2		P27-C3					.18	NO		20	
			P30-7					.13	NO			
H 172	2		P27-C2					.18	NO		20	
			P31-7					.13	NO			
H 173	2		P27-C1					.18	NO		20	
			P30-14					.13	NO		18	
H 174	2		P27-D3					.18	NO		20	
			P30-7					.13	NO			
H 175	2		P27-D2					.18	NO		20	
			P31-7					.13	NO			
H 176	2		P27-D1					.18	NO		20	
			P31-14					.13	NO			
H 177	2		P27-F3					.18	NO		20	
			P30-7					.13	NO		18	
H 178	2		P27-F2					.18	NO		20	
			P31-7					.13	NO		18	
H 179	2		P27-F1					.18	NO		20	
			P31-14					.13	NO		18	
H 180	2		J5-53					.13	NO		19	A
			P30-2					.13	NO			
H 181	2		J5-78					.13	NO		19	A
			P31-2					.13	NO			

SIZE A | CODE IDENT NO. 80230 | 2010781
SCALE-NONE | REV LTR A | SHEET 21 OF 24

G AND N INTERCONNECT 2010781

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 182	2		J5-54 P30-1					.13 .13	NO NO		19	A
H 183	2		J5-79 P30-2					.13 .13	NO NO		19	A
H 184	2		J5-80 P31-2					.13 .13	NO NO		19	A
H 185	2		J5-55 P30-1					.13 .13	NO NO		19	A
H 186	2		J5-33 P30-2					.13 .13	NO NO		19	A
H 187	2		J5-32 P31-2					.13 .13	NO NO		19	A
H 188	2		J5-16 P30-1					.13 .13	NO NO		19 18	A
H 189	2		J5-81 P30-2					.13 .13	NO NO		19	A
H 190	2		J5-57 P31-2					.13 .13	NO NO		19	A
H 191	2		J5-56 P31-1					.13 .13	NO NO		19	A
H 192	2		J5-58 P30-2					.13 .13	NO NO		19	A
H 193	2		J5-34 P31-2					.13 .13	NO NO		19	A

SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR ~~A~~ A	SHEET 22 OF 24

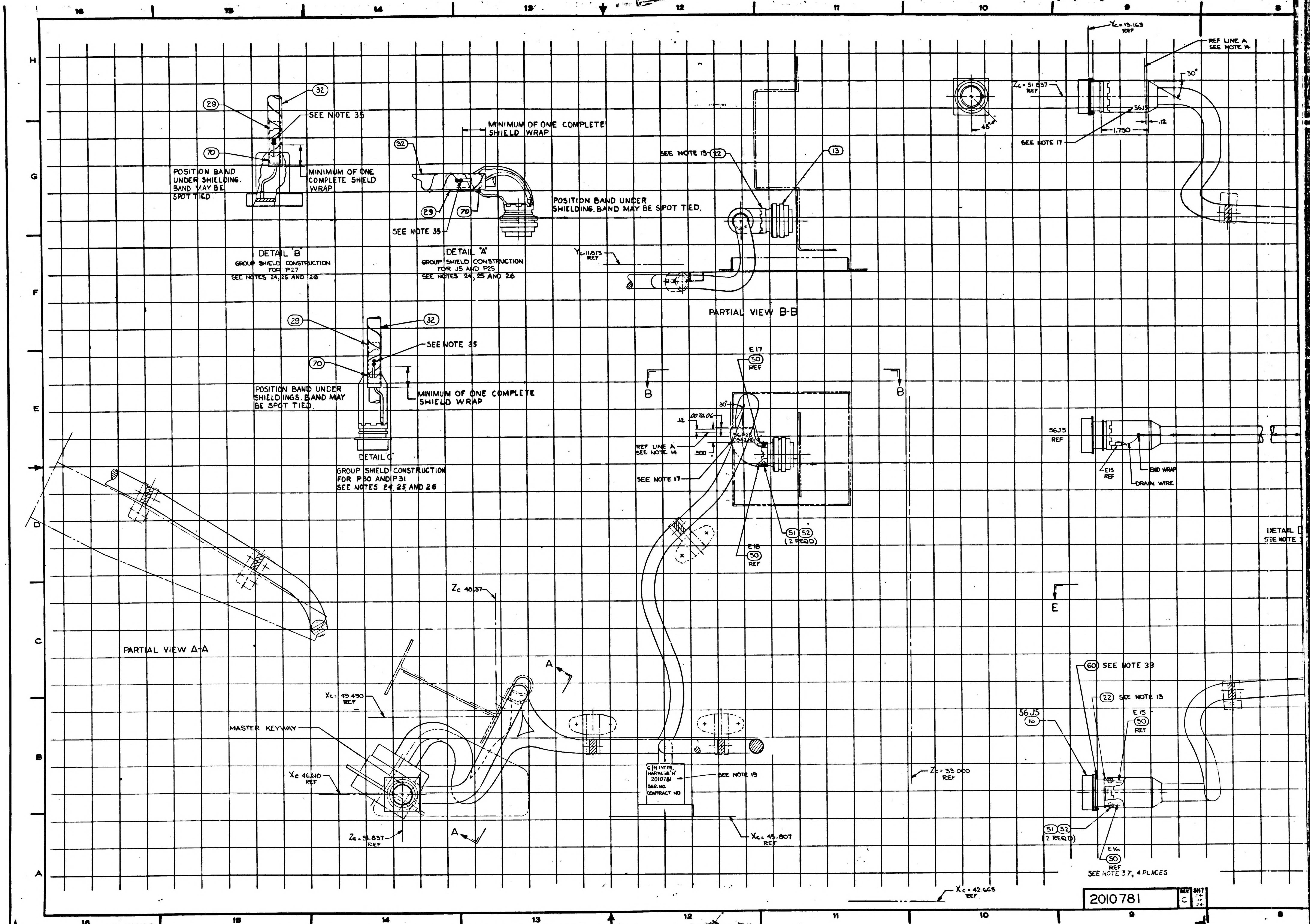
MIL 2084 9-65

UDOVICH 102266 G AND N INTERCONNECT 2010781 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
H 194	2		J5-35 P31-1					.13 .13	NO NO		19	A
H 196	2		J5-60 P30-4					.13 .13	NO NO		19 18	
H 197	2		J5-84 P31-4					.13 .13	NO NO		19 18	
H 198	2		J5-31 P30-2					.13 .13	NO NO		19 18	A
H 199	2		J5-15 P31-2					.13 .13	NO NO		19 18	A
H 200	2		J5-5 P31-1					.13 .13	NO NO		19 18	A
H 201	3		P25-15 P27-F5					.13 .22	NO NO		19 21	
H 202	3		P25-31 P27-H5					.13 .18	NO NO		19 21	
H 203	2		E15 SHLD A					.19 .25	YES YES			A
H 204	2		E15 SHLD B					.19 .25	YES YES		50	B
H 205	2		SHLD B E18					.25 .19	YES YES		 50	 B

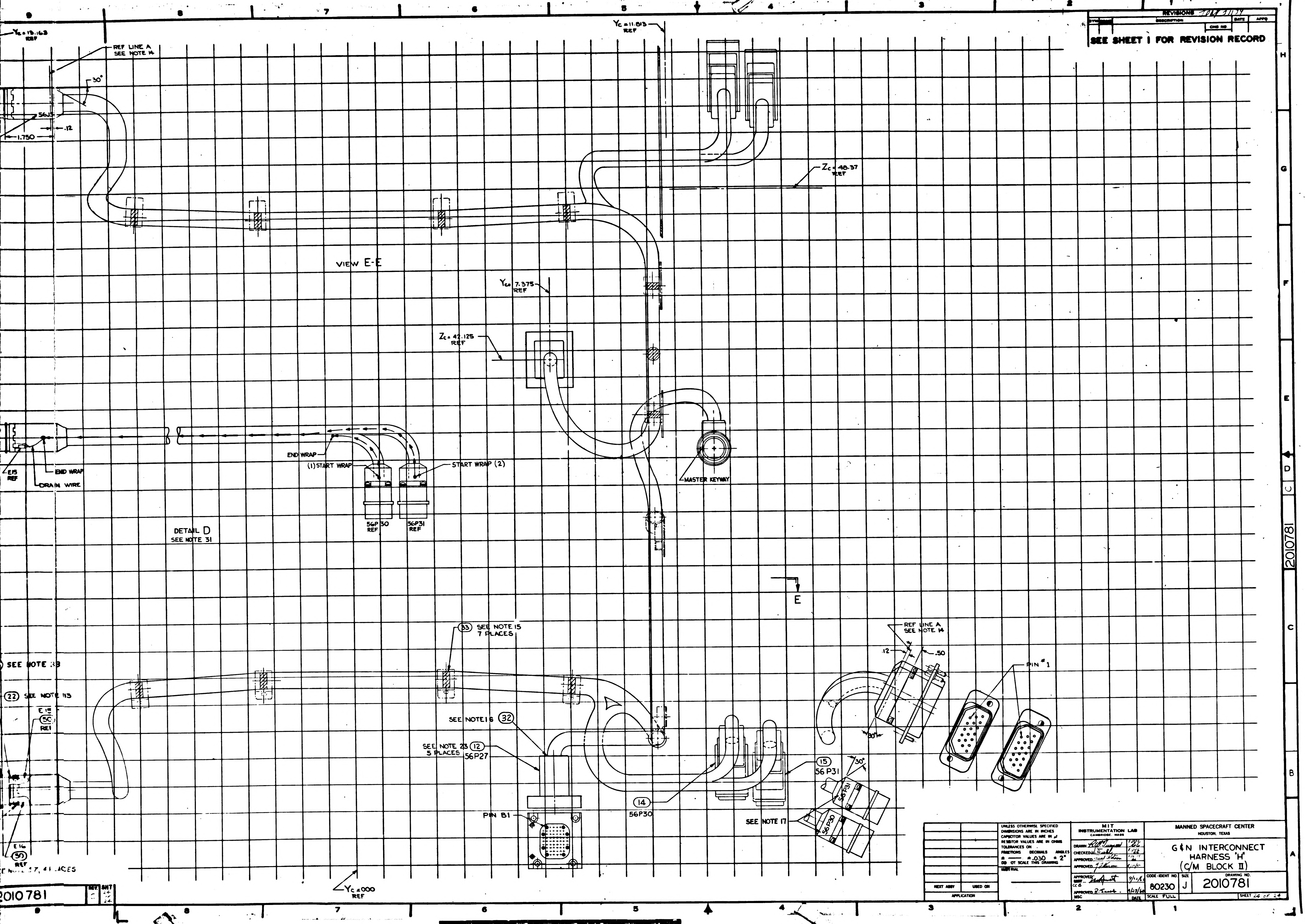
SIZE	CODE IDENT NO.	
A	80230	2010781
SCALE-NONE	REV LTR C	SHEET 23 OF 24

MIL 2084 9-65


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
29
32
SEE NOTE 35
70
POSITION BAND UNDER SHIELDING. BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP
DETAIL 'B'
GROUP SHIELD CONSTRUCTION FOR P27
SEE NOTES 24, 25 AND 26
MINIMUM OF ONE COMPLETE SHIELD WRAP
32
29
70
SEE NOTE 35
POSITION BAND UNDER SHIELDING. BAND MAY BE SPOT TIED.
DETAIL 'A'
GROUP SHIELD CONSTRUCTION FOR J5 AND P25
SEE NOTES 24, 25 AND 26
SEE NOTE 13
22
13
Yc=11.813 REF
PARTIAL VIEW B-B
Yc=13.163 REF
REF LINE A SEE NOTE 14
30°
Zc=51.837 REF
56J5
45°
.12
1.750
SEE NOTE 17
29
32
SEE NOTE 35
70
POSITION BAND UNDER SHIELDINGS. BAND MAY BE SPOT TIED.
MINIMUM OF ONE COMPLETE SHIELD WRAP
DETAIL 'C'
GROUP SHIELD CONSTRUCTION FOR P30 AND P31
SEE NOTES 24, 25 AND 26
B
B
E17
50
REF
30°
.12
.00 TO .06
56P25 (05A2J9)
REF LINE A SEE NOTE 14
.500
SEE NOTE 17
51
52
(2 REQD)
E18
50
REF
56J5 REF
E15 REF
END WRAP
DRAIN WIRE
DETAIL
SEE NOTE
E
Zc 48.37
PARTIAL VIEW A-A
A
A
Xc= 49.490 REF
MASTER KEYWAY
Xe 46.610 REF
Zc=51.837 REF
G/N INTER. HARNESS "H" 2010781 SER. NO. CONTRACT NO
SEE NOTE 19
Xc= 45.807 REF
Zc= 33.000 REF
Xc= 42.665 REF
60
SEE NOTE 33
22
SEE NOTE 13
56J5
16
E15
50
REF
51
52
(2 REQD)
E16
50
REF
SEE NOTE 37, 4 PLACES
2010781
REV. C
SHT 24 OF 24

1/2010781

REVISIONS
SEE SHEET 1 FOR REVISION RECORD



Yc = 13.163 REF
REF LINE A SEE NOTE 14
30°
56J35
1.750
.12
Yc = 11.813 REF
Zc = 48.37 REF
VIEW E-E
Yc = 7.375 REF
Zc = 42.125 REF
END WRAP
(1) START WRAP
START WRAP (2)
E15 REF
END WRAP
DRAIN WIRE
MASTER KEYWAY
56P30 REF
56P31 REF
DETAIL D
SEE NOTE 31
E
(33) SEE NOTE 15 7 PLACES
REF LINE A SEE NOTE 14
.12
.50
PIN #1
30°
SEE NOTE 33
(22) SEE NOTE 113
E15
(50)
REF
SEE NOTE 16 (32)
SEE NOTE 23 (12) 5 PLACES
56P27
(15) 56P31
30°
(14)
56P30
56P31
56P30
SEE NOTE 17
PIN B1
E16
(50)
REF
SEE NOTE 7, 4 PLACES
Yc = 000 REF
A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
8
9

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.030 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN	R.W. Turner	13 JUL 66
CHECKED	W. Diehl	1 AUG 66
APPROVED	Paul Watson	AUG 15 66
APPROVED	J. Kenna	8/16/66
APPROVED MIT CCB		9/22/66
APPROVED MSC	R. Jacob	9/23/66
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

G & N INTERCONNECT
HARNESS "H"
(C/M BLOCK II)

CODE-IDENT NO.	SIZE	DRAWING NO.
80230	J	2010781

SCALE FULL
SHEET 24 OF 24

2010781

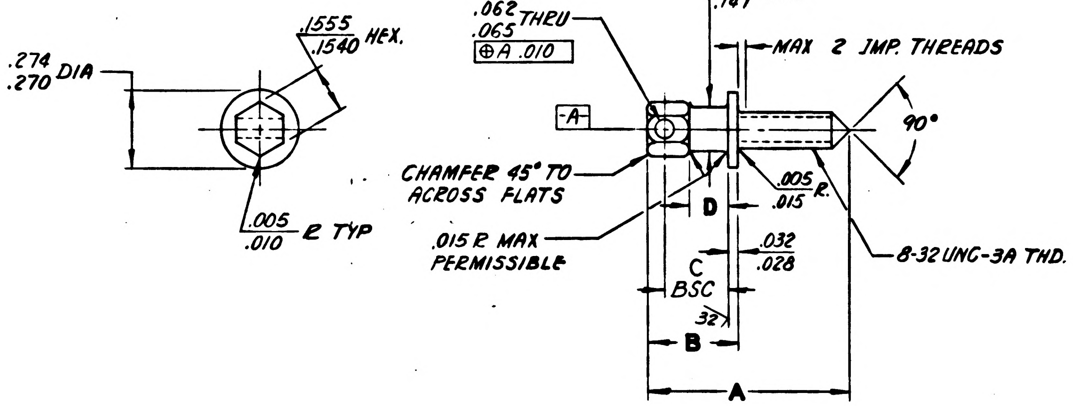
2010781

2 / 2010781

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALLOY STEEL AISI OR SAE 4140 PER FED SPEC 66.
3. HEAT TREATMENT: 200,000 PSI MIN TENSILE STRENGTH PER MIL-H-6875.
4. FINISH: NICKEL PLATE .0002-.0004 THICK PER QQ-N-290, CLASS 2.
5. CONCENTRICITY: HEXAGON SURFACE AND .149-.147 DIA. WITHIN .006 T.I.R.
6. COUNTERSINKING OF DRILLED HOLE AT MANUFACTURERS OPTION 90 DEGREES INCLUDED ANGLE.
7. DIMENSIONS TO BE MET AFTER PLATING.
8. SCREWS SHALL BE FREE OF BURRS AND SHARP EDGES.
9. MAXIMUM SURFACE ROUGHNESS 125✓ UNLESS OTHERWISE SPECIFIED.
10. PART TO BE ROLLED THREADS.
11. IDENTIFY PER ND 1002019.


.274
.270 DIA
.1555
.1540 HEX.
.005
.010 R TYP
.062
.065 THRU
⊕A .010
-A-
.149
.147 DIA.
MAX 2 IMP. THREADS
90°
CHAMFER 45° TO ACROSS FLATS
.005
.015 R.
D
.015 R MAX PERMISSIBLE
.032
.028
C BSC
32
B
A
8-32 UNC-3A THD.

DASH NO.	DIMENSION			
	A	B	C	D
2010782-001	1.125	.674	.542	.455
2010782-002	.931	.599	.467	.380

NEXT ASSY	USED ON
2014741	6014515
2014749	6014515
6014531	6014515
6014532	6014515
6014535	6014515
2014741 THRU 2014749	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN E. Litzow DATE 23 JUNE 66
CHECKED 24 JUN 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, JACK

SIZE D
CODE IDENT NO. 80230
2010782
SCALE NONE
SHEET 1 OF 1

2010782

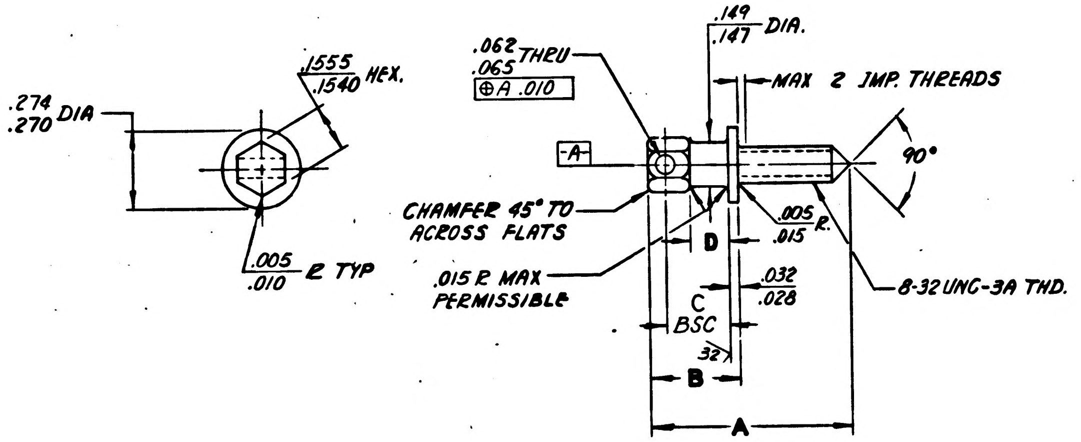
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31139		5 JULY 66	
	B	REVISED PER TDRR 31209		3 OCT 66	JJB DJW

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALLOY STEEL AISI OR SAE 4140 PER FED SPEC 66.
3. HEAT TREATMENT: 200,000 PSI MIN TENSILE STRENGTH PER MIL-H-6875.
4. FINISH: NICKEL PLATE .0002-.0004 THICK PER QQ-N-290, CLASS 2.
5. CONCENTRICITY: HEXAGON SURFACE AND .149-.147 DIA. WITHIN .006 T.I.R.
6. COUNTERSINKING OF DRILLED HOLE AT MANUFACTURERS OPTION 90 DEGREES INCLUDED ANGLE.
7. DIMENSIONS TO BE MET AFTER PLATING.
8. SCREWS SHALL BE FREE OF BURRS AND SHARP EDGES.
9. MAXIMUM SURFACE ROUGHNESS 125✓ UNLESS OTHERWISE SPECIFIED.

~~10. PART TO BE ROLLED THREADS~~

11. IDENTIFY PER ND 1002019.


.274
.270 DIA
.1555
.1540 HEX.
.005
.010 R TYP
.062
.065 THRU
⊕A .010
-A-
.149
.147 DIA.
MAX 2 IMP. THREADS
90°
CHAMFER 45° TO ACROSS FLATS
.005
.015 R.
D
.015 R MAX PERMISSIBLE
.032
.028
8-32 UNC-3A THD.
C BSC
32
B
A

DASH NO.	DIMENSION			
	A	B	C	D
2010782-001	1.125	.674	.542	.455
2010782-002	.931	.599	.467	.380

NEXT ASSY	USED ON
2014741	6014515
2014749	6014515
6014531	6014515
6014532	6014515
6014535	6014515
2014741 THRU 2014749	2014567

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN [illegible] DATE 23 JUNE 66
CHECKED [illegible] 24 JUN 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL P. Jacob
CCB APPROVAL 9/12/[illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCREW, JACK

SIZE D
CODE IDENT NO. 80230
2010782
SCALE NONE
SHEET 1 OF 1

MIL-10882 D

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31186		14 JUL 66	wD

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PAINT OUTSIDE PERIPHERAL EDGES PER
   METHOD I: ND1002289, TYPE II USING PRIMER 1010992.
   METHOD II: ND1002279, USING PRIMER 1010992 AND PAINT 1008809-1. OVERCOAT THE 1008809-1 PAINT WITH 1012543-003 PAINT PER ND1002291, TYPE III. DO NOT USE PRIMER WITH OVERCOAT.
3. CAUTION: DO NOT SET PARTS ON RUBBER GASKET WHILE CURING PAINT.
4. IDENTIFY USING DRAWING NUMBER AND APPLICABLE DASH NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. THIS IS AN INCOMPLETE DRAWING.

DASH NO.	MAKE FROM	PAINT	
-001	1008828-001	METHOD I	SEE NOTE 5
-002	1010961-001	I	
-003	1010962-001	I	
-004	1010972	I	
-005	1010973	I	
-006	1010974	I	
-007	1010991	I	
-008	1008828-002	II	
-009	1008828-003	II	
-010	1008829-001	II	
-011	1008829-002	II	
-012	1010976	METHOD II	SEE NOTE 5

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN A. J. Fluder DATE 5-JULY-66
CHECKED [illegible] 5 JULY 66
APPROVAL [illegible]
CONTRACT NAS 9-497
NASA APPROVAL R. Jacot 9/23/66
CCB APPROVAL [illegible] 9/21/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

GASKET, RETAINED

SIZE C
CODE IDENT NO. 80230
2010784
SCALE —
SHEET 1 OF 1

2010787 A

2010787

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THIS IS AN INCOMPLETE DRAWING.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR	2021212	SEAL, PLASTIC, "H" SECTION
	1	2021211	LINER-COVER
	1	2021207	COVER-CASE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DWG. NO.
CONTRACT
DRAWN R.J. Olson DATE 18 JUL 66
CHECKED Molye 20 JUL 66
APPROVAL 20 JUL 66
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER-EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

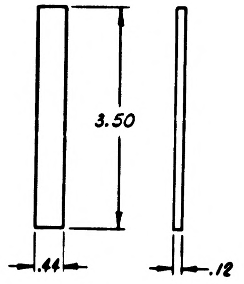
SIZE C
CODE IDENT NO. 80230
2010787
SCALE —
SHEET 1 OF 1

MIL-1088D D

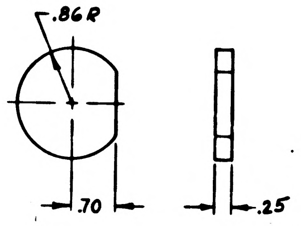
2010787

NOTES:

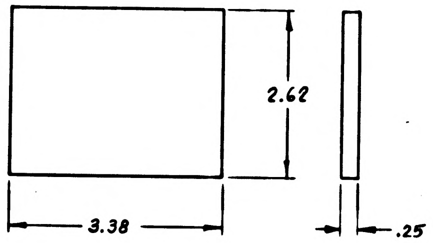
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEMS ⑨ AND ⑩ PER ND 1002151 WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
6. PIN HOLES .032 MAX DIA ARE ALLOWABLE ALONG SEAMS OF COVER TO FACILITATE FOAMING PROCESS. ALL HOLES TO BE FILLED WITH ADHESIVE PER NOTE 7.
7. FOAM FILL HOLES SHALL BE FILLED USING ITEM ⑮
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM ⑥, AND TO A DIAMETER OF APPROX. .080 DIA. TO PROVIDE A RETAINING LIP ON .620 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 7.



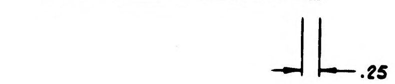
ITEM ①



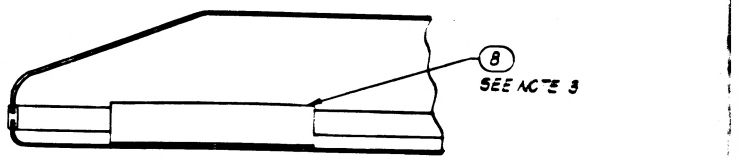
ITEM ②



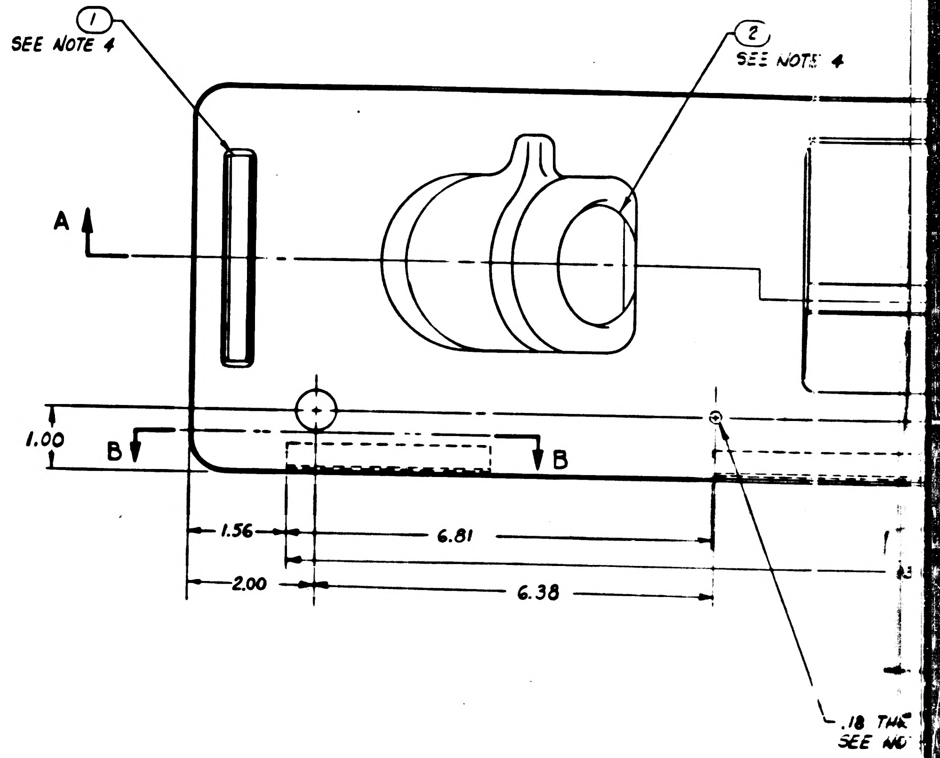
ITEM ③

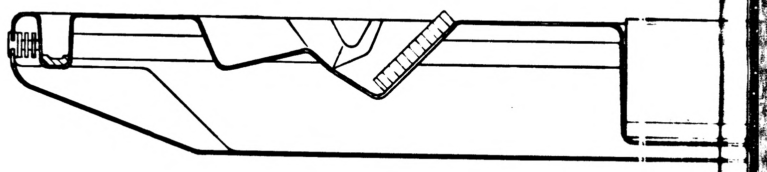


ITEM ④



PARTIAL SECTION B-B
3 PLACES



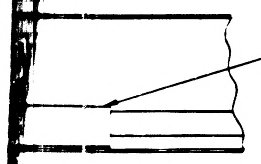


SECTION

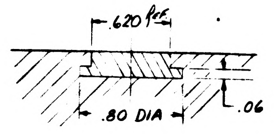
2010787 B SH 1

1/2010787

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		22 [illegible] 66	JK



AL SECTION B-B
PLACES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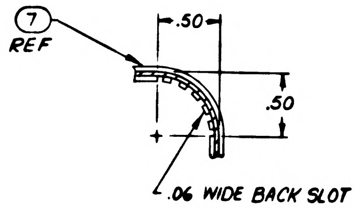
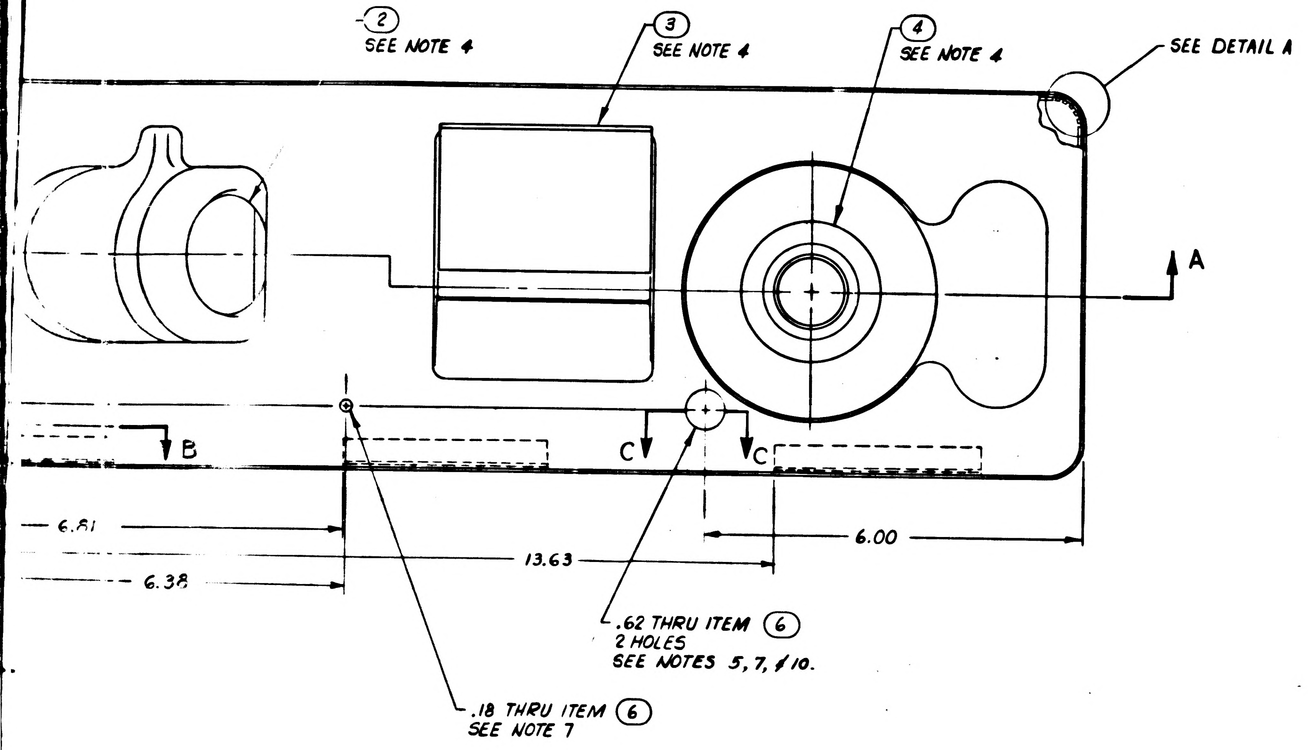
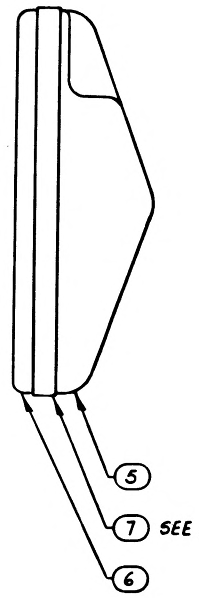
.80 DIA
.06

SECTION C-C
SEE NOTE 10


7
REF
.50
.50
.06 WIDE BACK SLOT

DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS


2
SEE NOTE 4
3
SEE NOTE 4
4
SEE NOTE 4
SEE DETAIL A
A
B
C
C
6.81
13.63
6.38
6.00
.62 THRU ITEM 6
2 HOLES
SEE NOTES 5, 7, & 10.
.18 THRU ITEM 6
SEE NOTE 7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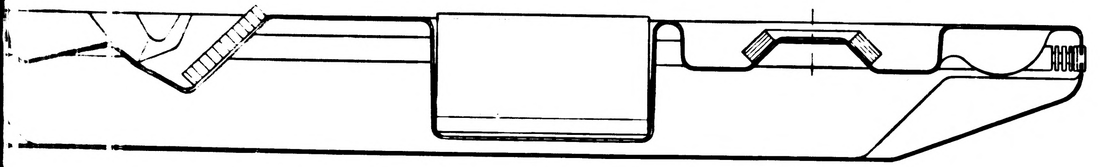
7 SEE NOTE 7
6



SECTION A-A

SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010671	ACTIVATOR, ADHESIVE
SEE NOTE 9	12	AR	1010864	PREPOLYMER, POLYURETHANE
	11	AR	1010863	RESIN, POLYURETHANE
	10	AR	MIL-A-25457	ADHESIVE, PRESSURE SENSITIVE
SEE NOTE 9	9	AR	1010718	PRIMER, ADHESIVE
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010769-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W. Diehl 16 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J2
CODE IDENT NO. 80230
2010787
SCALE FULL
SHEET 1 OF 1

2010787 B

010787 B SH 1

272010787

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BI MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEMS ⑨ AND ⑩ PER ND1002151 WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
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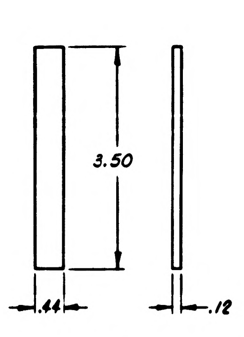
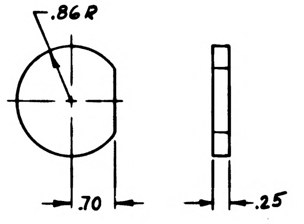
7. FOAM FILL HOLES SHALL BE FILLED USING ITEM ⑮

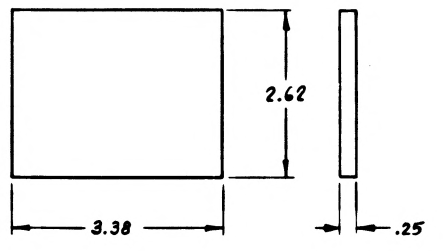
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM ⑥, AND TO A DIAMETER OF APPROX. .80 DIA. TO PROVIDE A RETAINING LIP ON .620 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 7.



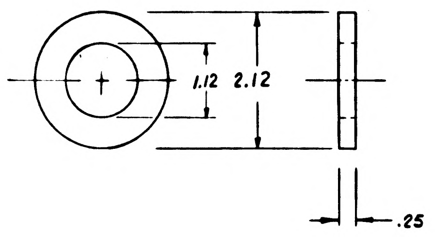
ITEM ①



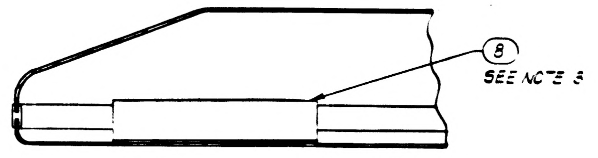
ITEM ②



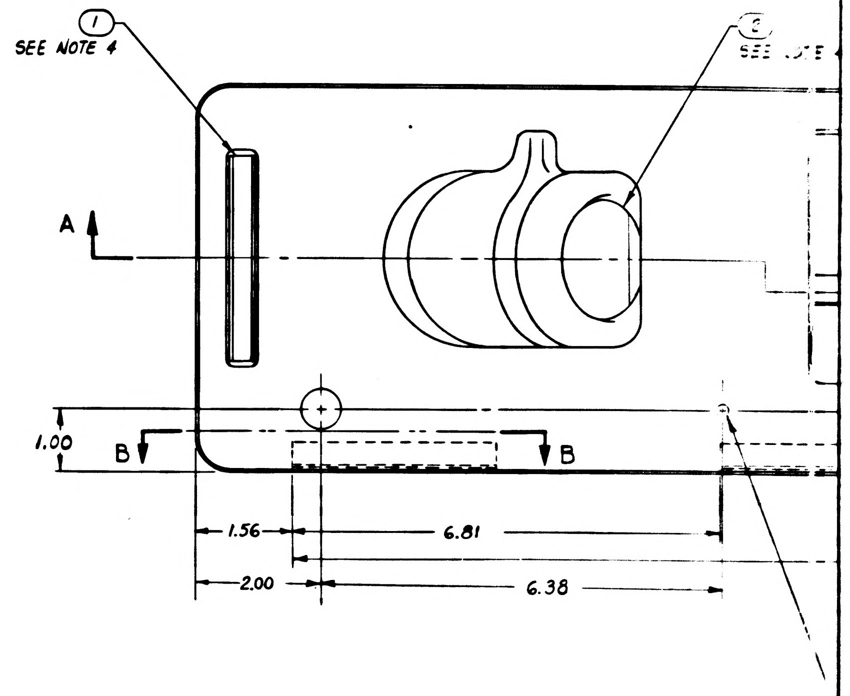
ITEM ③

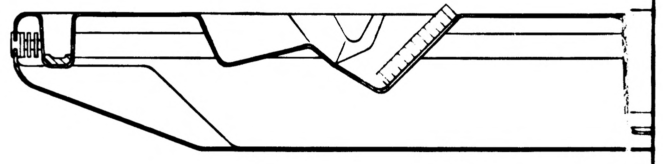


ITEM ④



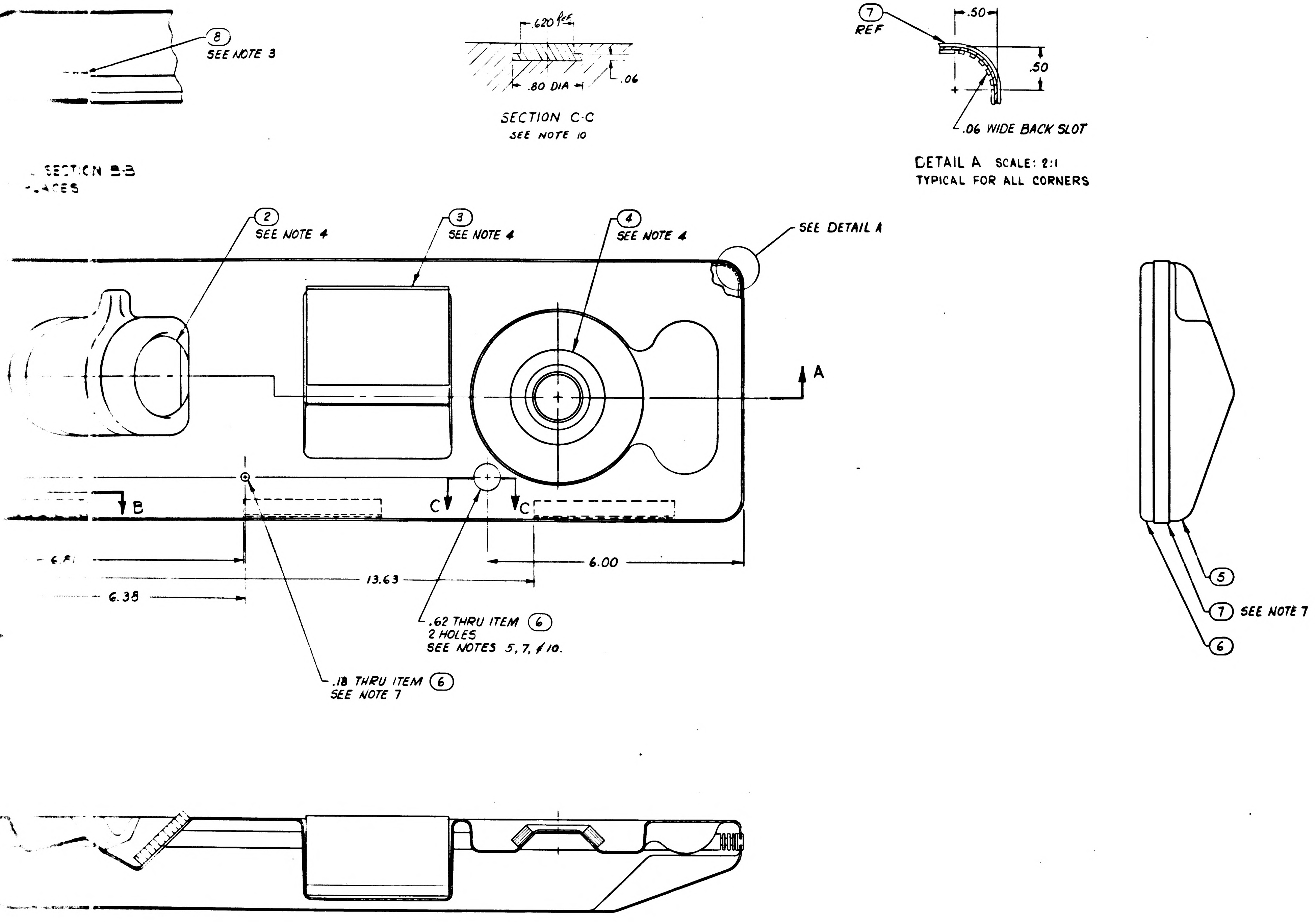
PARTIAL SECTION B-B
3 PLACES





2010787 C SH 1

1/2010787


8
SEE NOTE 3
.620 Ref
.80 DIA
.06
SECTION C-C
SEE NOTE 10
7
REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
SECTION B-B
2
SEE NOTE 4
3
SEE NOTE 4
4
SEE NOTE 4
SEE DETAIL A
A
B
C
C
6.00
13.63
6.38
.62 THRU ITEM 6
2 HOLES
SEE NOTES 5, 7, & 10.
.18 THRU ITEM 6
SEE NOTE 7
5
7
SEE NOTE 7
6

SECTION A-A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		22 Jul 66	JR
C		REVISED PER TDRR 31002		3 SEP 66	WB

SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
SEE NOTE 9	12	AR	1010864	PREPOLYMER, POLYURETHANE
	11	AR	1010863	RESIN, POLYURETHANE
SEE NOTE 9	10	AR	MIL-A-25457	ADHESIVE, PRESSURE SENSITIVE
	9	AR	1010718	PRIMER, ADHESIVE
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION
	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W. Dial 16 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

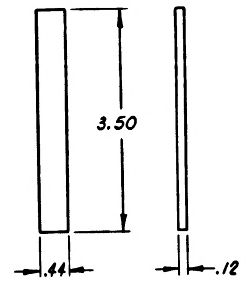
SIZE J2
CODE IDENT NO. 80230
2010787
SCALE —
SHEET 1 OF 1

2010787 C SH 1

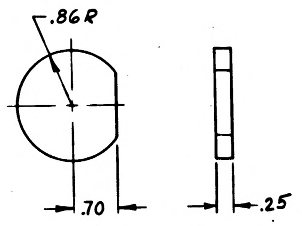
2/2010787

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEMS ⑨ AND ⑩ PER ND 1002151 WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
6. APPLY ITEM ⑮ .06 TO .12 THICK ON SURFACES AS INDICTED, AND CURE PRIOR TO FOAM FILLING.
7. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING AND AFTER APPLICATION OF ITEM ⑮.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. AFTER FOAM FILLING AND CURE, TRIM OFF ALL PROJECTING FOAM FLUSH WITH COVER. CLEAN BY BRUSHING WITH FREON TF AND APPLY ENAMEL, ⑯ OVER EXPOSED FOAM PER ND 100229I, TYPE I. OMIT PRIMER.



ITEM ①



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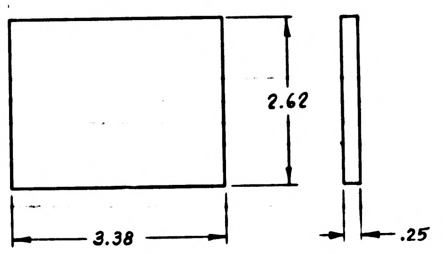
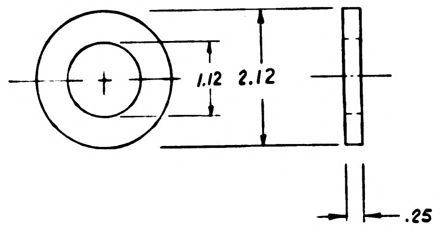
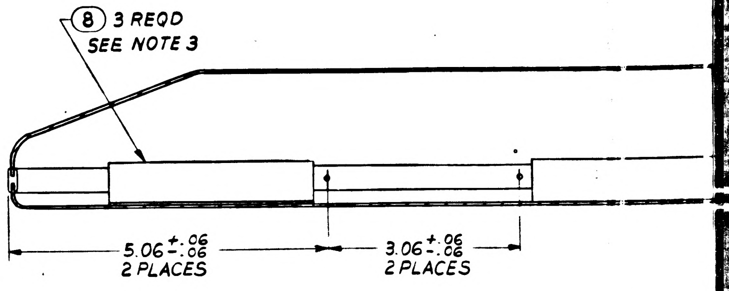


ITEM ③



ITEM ④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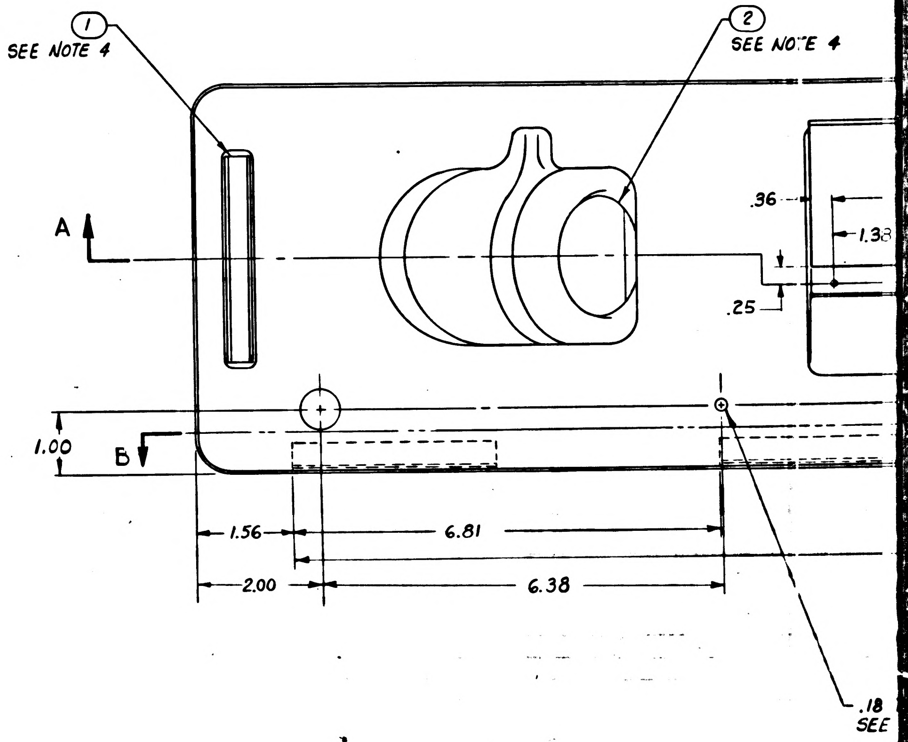
SEE NOTE 3
5.06 +.06 -.06
2 PLACES
3.06 +.06 -.06
2 PLACES

SECTION B-B


①
SEE NOTE 4
②
SEE NOTE 4
A
B
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.25
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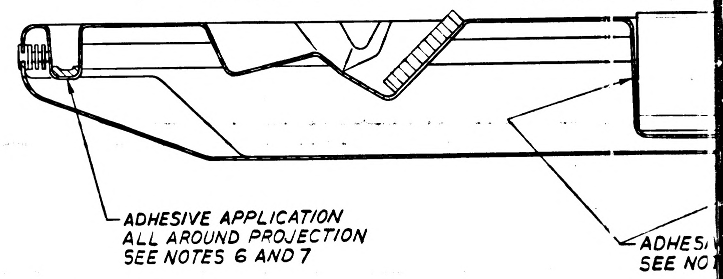
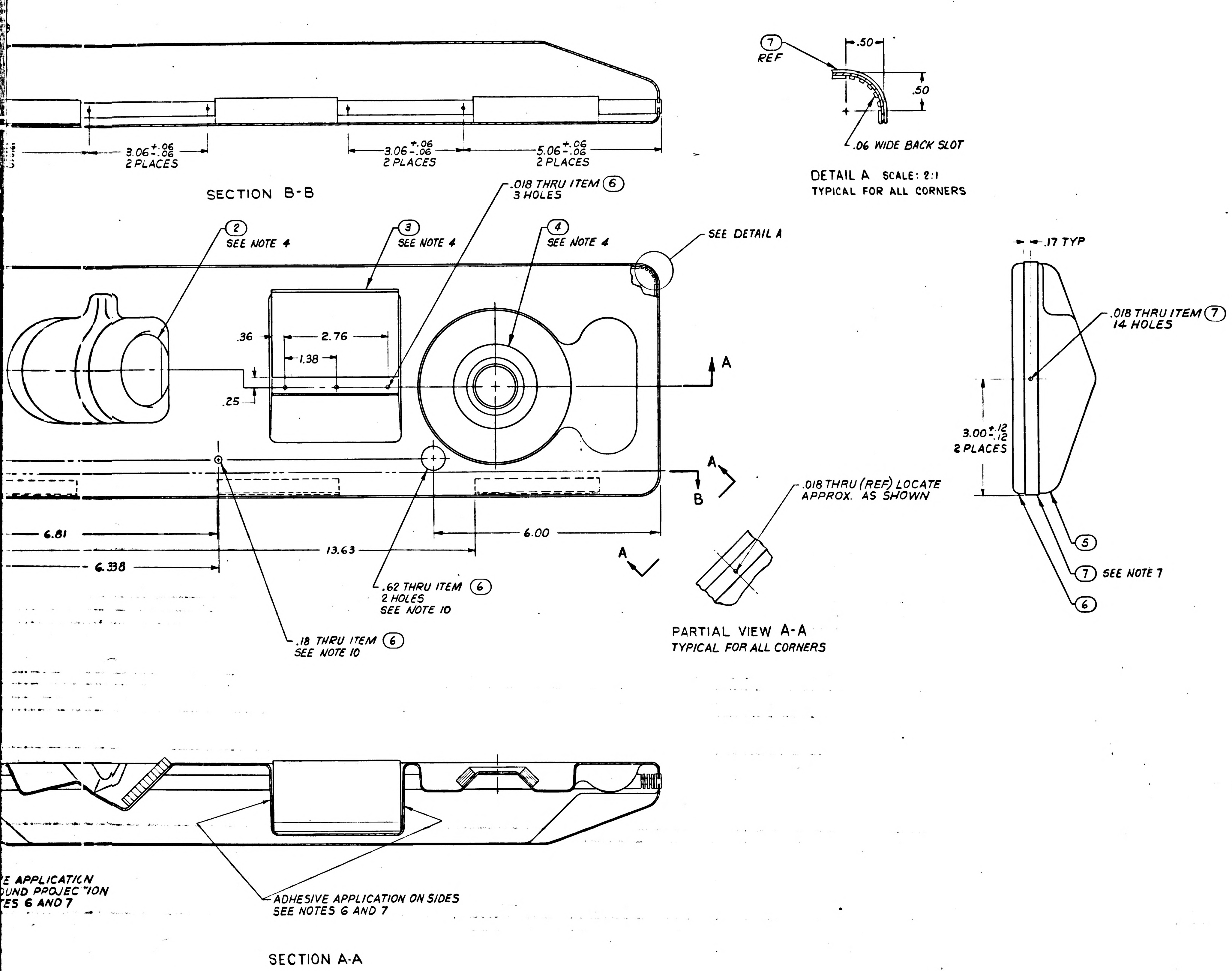
1.56
6.81
2.00
6.38
.18
SEE


ADHESIVE APPLICATION
ALL AROUND PROJECTION
SEE NOTES 6 AND 7
ADHESI
SEE NO

SECTI

2010787 D SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		29 JULY 66	JW
C		REVISED PER TDRR 31002		13 SEP 66	WB
D		REVISED PER TDRR 31721		7 NOV 66	JJJ



3.06 +.06 -.06 2 PLACES
3.06 +.06 -.06 2 PLACES
5.06 +.06 -.06 2 PLACES
SECTION B-B
7 REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
.018 THRU ITEM 6 3 HOLES
2 SEE NOTE 4
3 SEE NOTE 4
4 SEE NOTE 4
SEE DETAIL A
.17 TYP
.018 THRU ITEM 7 14 HOLES
.36
2.76
1.38
.25
A
A
B
3.00 +.12 -.12 2 PLACES
.018 THRU (REF) LOCATE APPROX. AS SHOWN
6.81
13.63
6.00
6.38
A
.62 THRU ITEM 6 2 HOLES SEE NOTE 10
.18 THRU ITEM 6 SEE NOTE 10
PARTIAL VIEW A-A
TYPICAL FOR ALL CORNERS
5
7 SEE NOTE 7
6
E APPLICATION
UND PROJECTION
TES 6 AND 7
ADHESIVE APPLICATION ON SIDES
SEE NOTES 6 AND 7
SECTION A-A

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	16	AR	1012543-003	ENAMEL
SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
	12	AR	1010864	PREPOLYMER, POLYURETHANE
SEE NOTE 9	11	AR	1010863	RESIN, POLYURETHANE
	10	AR	MIL-A-25457	ADHESIVE, PRESSURE SENSITIVE
SEE NOTE 9	9	AR	1010718	PRIMER, ADHESIVE
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W. Diehl 16 AUG 66
APPROVAL 16 NOV 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J2
CODE IDENT NO. 80230
2010787
SCALE FULL
SHEET 1 OF 1

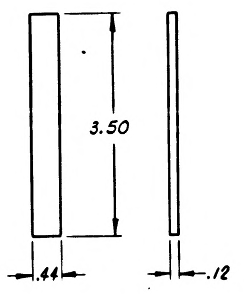
2010787 D SH 1

2010787 D

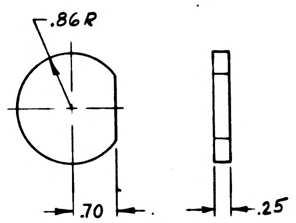
2 / 2010787

NOTES:

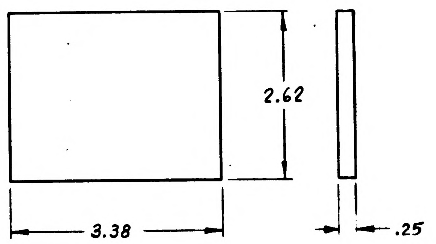
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEM ⑨ WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITV SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140°F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60°F PER HOUR.
6 APPLY ITEM ⑮ .06 TO .12 THICK ON SURFACES AS INDICTED, AND CURE PRIOR TO FOAM FILLING.
7 CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING AND AFTER APPLICATION OF ITEM ⑮.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. AFTER FOAM FILLING AND CURE, TRIM OFF ALL PROJECTING FOAM FLUSH WITH COVER. CLEAN BY BRUSHING WITH FREON TF AND APPLY ENAMEL, ⑯ OVER EXPOSED FOAM PER ND 1002291, TYPE I. OMIT PRIMER.



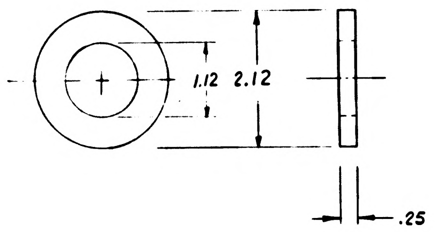
ITEM ①



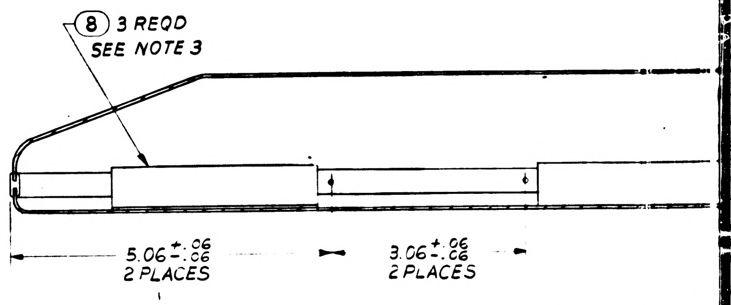
ITEM ②



ITEM ③



ITEM ④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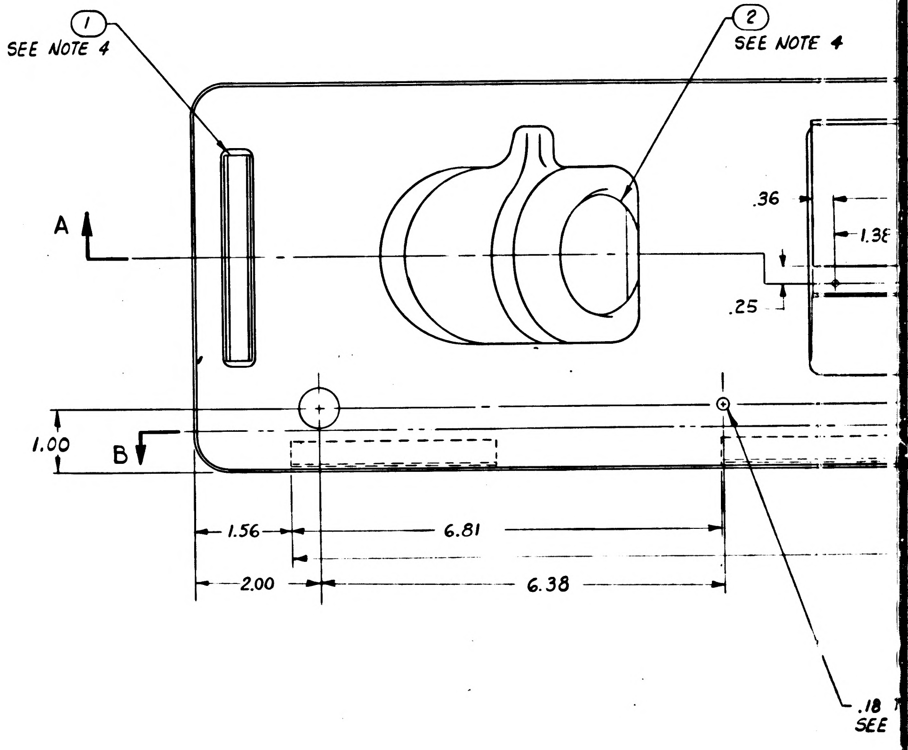
SEE NOTE 3
5.06 +.06 -.06
2 PLACES
3.06 +.06 -.06
2 PLACES

SECTION B-B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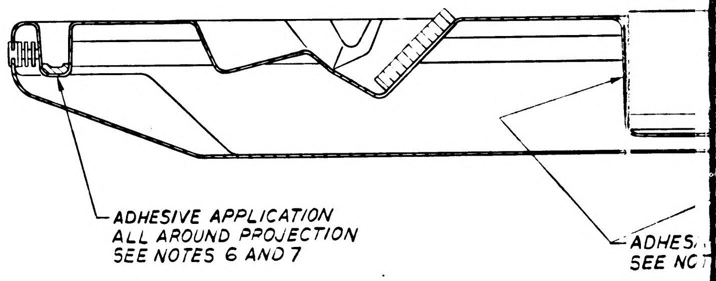
SEE NOTE 4
②
SEE NOTE 4
A
.36
1.38
.25
1.00
B
1.56
6.81
2.00
6.38
.18
SEE

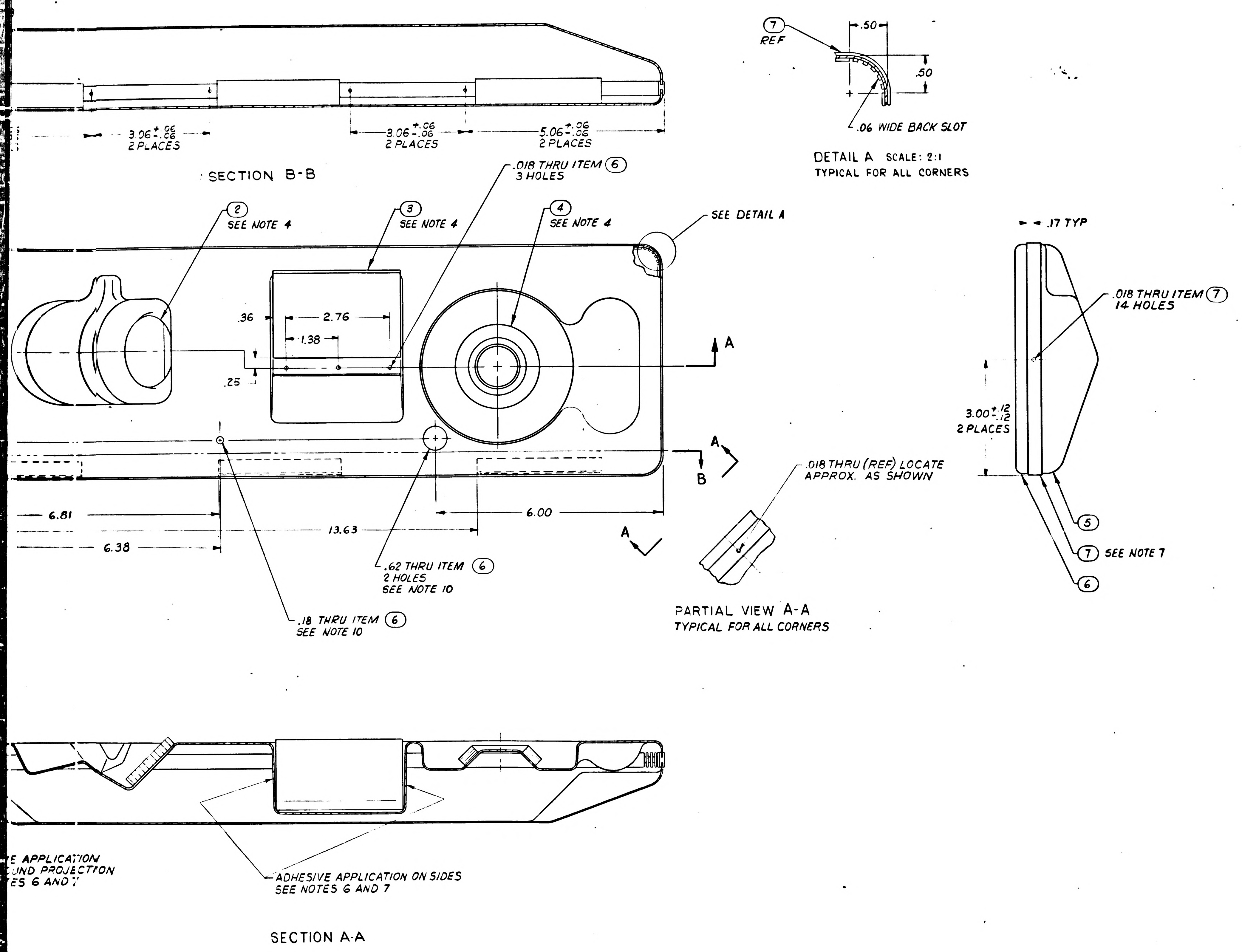

ADHESIVE APPLICATION
ALL AROUND PROJECTION
SEE NOTES 6 AND 7
ADHES.
SEE NO

SECTIO

2010787 E SH 1

1/2010787

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		29 JULY 66	JW
C		REVISED PER TDRR 31002		13 SEP 66	WB
D		REVISED PER TDRR 31721		7 NOV 66	JJJ
E		REVISED PER TDRR 31811		8 NOV 66	JRK



SECTION B-B
3.06 +.06 -.06 2 PLACES
3.06 +.06 -.06 2 PLACES
5.06 +.06 -.06 2 PLACES
⑦ REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
.018 THRU ITEM ⑥ 3 HOLES
② SEE NOTE 4
③ SEE NOTE 4
④ SEE NOTE 4
SEE DETAIL A
.36
2.76
1.38
.25
A
A
B
A
6.81
13.63
6.00
6.38
.62 THRU ITEM ⑥ 2 HOLES SEE NOTE 10
.18 THRU ITEM ⑥ SEE NOTE 10
.018 THRU (REF) LOCATE APPROX. AS SHOWN
PARTIAL VIEW A-A
TYPICAL FOR ALL CORNERS
.17 TYP
.018 THRU ITEM ⑦ 14 HOLES
3.00 +.12 -.12 2 PLACES
⑤
⑦ SEE NOTE 7
⑥
E APPLICATION
UND PROJECTION
ES 6 AND 7
ADHESIVE APPLICATION ON SIDES SEE NOTES 6 AND 7
SECTION A-A

	ITEM NO	NO REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	16	AR	1012543-003	ENAMEL
SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
	12	AR	1010864	PREPOLYMER, POLYURETHANE
SEE NOTE 9	11	AR	1010863	RESIN, POLYURETHANE
SEE NOTE 9	9	AR	1006338	ADHESIVE, SILICONE RUBBER
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021155-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± -
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

M.I.T.
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W Dieg 16 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

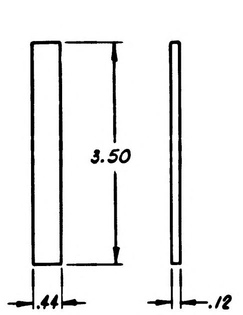
COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J2
CODE IDENT NO. 80230
2010787
SCALE
SHEET 1 OF 1

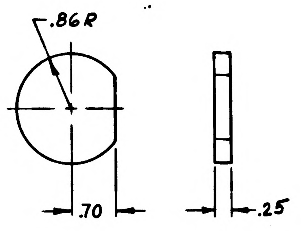
2010787 E SH 1

NOTES:

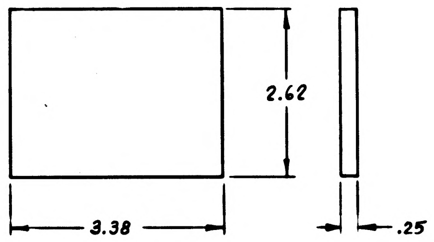
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEM ⑨ WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 7.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
6. APPLY ITEM ⑮ .06 TO .12 THICK ON SURFACES AS INDICTED, AND CURE PRIOR TO FOAM FILLING.
7. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING AND AFTER APPLICATION OF ITEM ⑮.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. AFTER FOAM FILLING AND CURE, TRIM OFF ALL PROJECTING FOAM FLUSH WITH COVER. CLEAN BY BRUSHING WITH FREON TF AND APPLY ENAMEL ⑯ OVER EXPOSED FOAM PER ND 1002231, TYPE I. OMIT PRIMER.



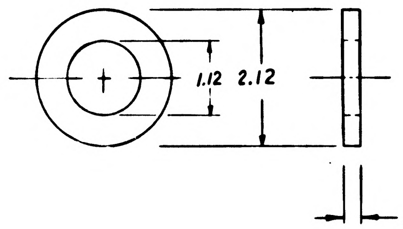
ITEM ①



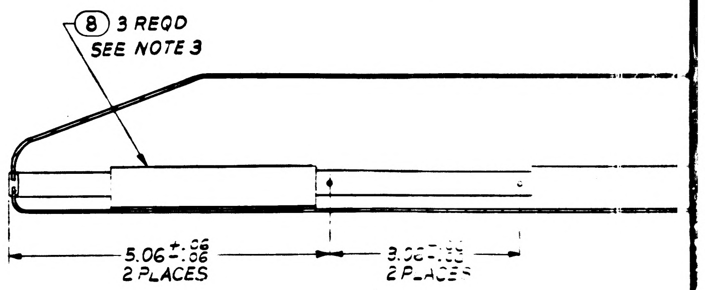
ITEM ②



ITEM ③



ITEM ④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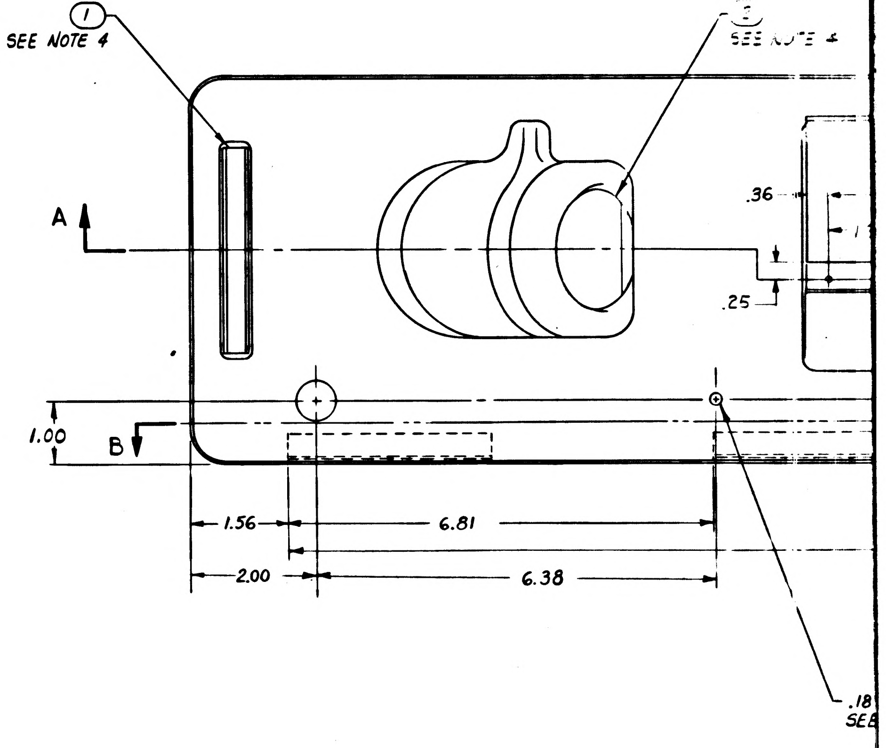
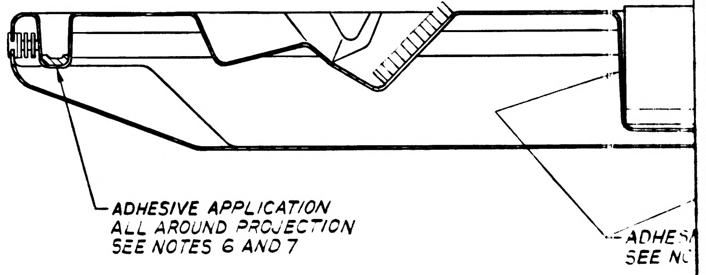
SEE NOTE 3
5.06 ±.06
2 PLACES
3.00 ±.06
2 PLACES

SECTION B-


①
SEE NOTE 4
SEE NOTE 4
A
B
.36
.25
1.00
1.56
6.81
2.00
6.38
.18
SEE

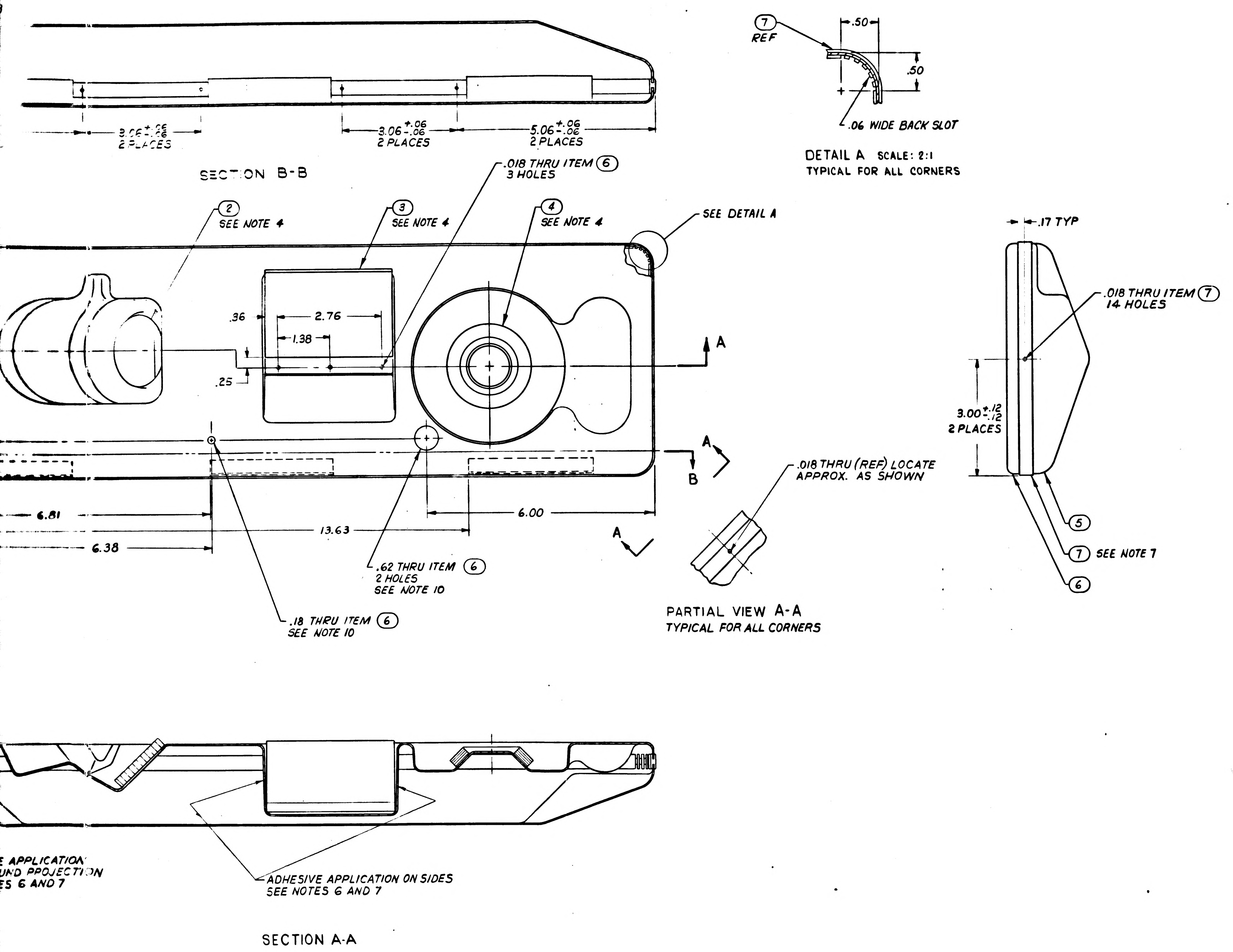

ADHESIVE APPLICATION
ALL AROUND PROJECTION
SEE NOTES 6 AND 7
ADHES
SEE NO

SECTI

2010787	F	SH 1

1/2010787

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		29 [illegible] 66	[illegible]
C		REVISED PER TDRR 31002		13 SEP 66	[illegible]
D		REVISED PER TDRR 31721		7 NOV 66	[illegible]
E		REVISED PER TDRR 31811		8 NOV 66	RK
F		REVISED PER TDRR 318‾9		15 [illegible] 66	[illegible]



3.06 +.06 -.06
2 PLACES
3.06 +.06 -.06
2 PLACES
5.06 +.06 -.06
2 PLACES
SECTION B-B
7
REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
.018 THRU ITEM 6
3 HOLES
2
SEE NOTE 4
3
SEE NOTE 4
4
SEE NOTE 4
SEE DETAIL A
.36
2.76
1.38
.25
A
A
B
6.81
13.63
6.00
6.38
A
.62 THRU ITEM 6
2 HOLES
SEE NOTE 10
.18 THRU ITEM 6
SEE NOTE 10
.018 THRU (REF) LOCATE
APPROX. AS SHOWN
PARTIAL VIEW A-A
TYPICAL FOR ALL CORNERS
.17 TYP
.018 THRU ITEM 7
14 HOLES
3.00 +.12 -.12
2 PLACES
5
7 SEE NOTE 7
6
E APPLICATION
UND PROJECTION
ES 6 AND 7
ADHESIVE APPLICATION ON SIDES
SEE NOTES 6 AND 7
SECTION A-A

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	16	AR	1012543-003	ENAMEL
SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
	12	AR	1010864	PREPOLYMER, POLYURETHANE
SEE NOTE 9	11	AR	1010863	RESIN, POLYURETHANE
SEE NOTE 9	9	AR	1006338	ADHESIVE, SILICONE RUBBER
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
Cambridge Mass
DWG NO
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W. Dickk 16 AUG 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

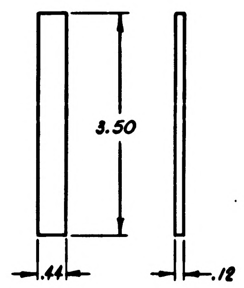
SIZE J2 CODE IDENT NO. 80230 2010787
SCALE FULL
SHEET 1 OF 1

2010787 F SH 1

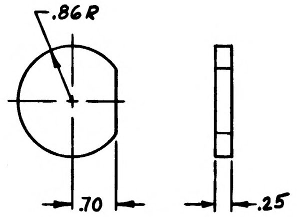
2-2010787

NOTES:

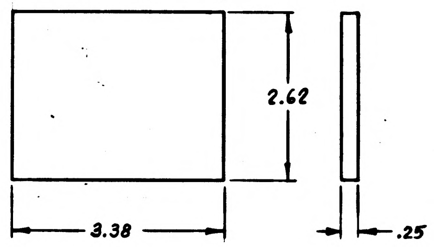
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEM ⑨ WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 7.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
6. APPLY ITEM ⑮ .06 TO .12 THICK ON SURFACES AS INDICTED, AND CURE PRIOR TO FOAM FILLING.
7. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING AND AFTER APPLICATION OF ITEM ⑮.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. ~~AFTER FOAM FILLING AND CURE, TRIM OFF ALL PROJECTING FOAM FLUSH WITH COVER. CLEAN BY BRUSHING WITH FREON TF AND APPLY ENAMEL, ⑯ OVER EXPOSED FOAM PER ND 100229I, TYPE I. OMIT PRIMER.~~
11. FOAM FILL HOLES SHALL BE SEALED USING ITEM ⑮ TO A MINIMUM THICKNESS OF .062 AND BLEND FLUSH WITH OUTER SURFACE.



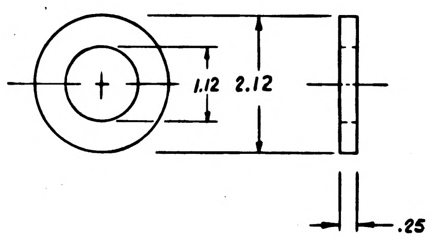
ITEM ①



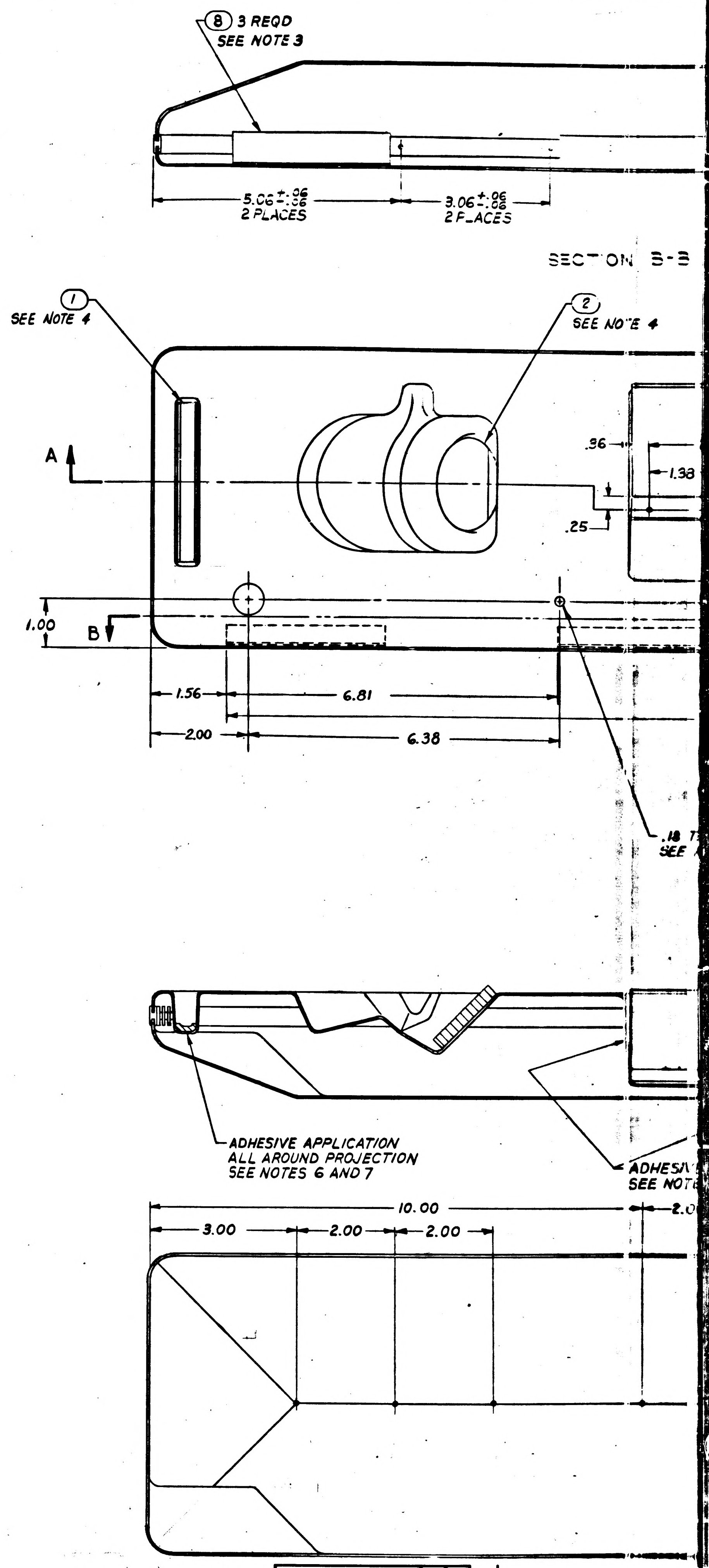
ITEM ②



ITEM ③



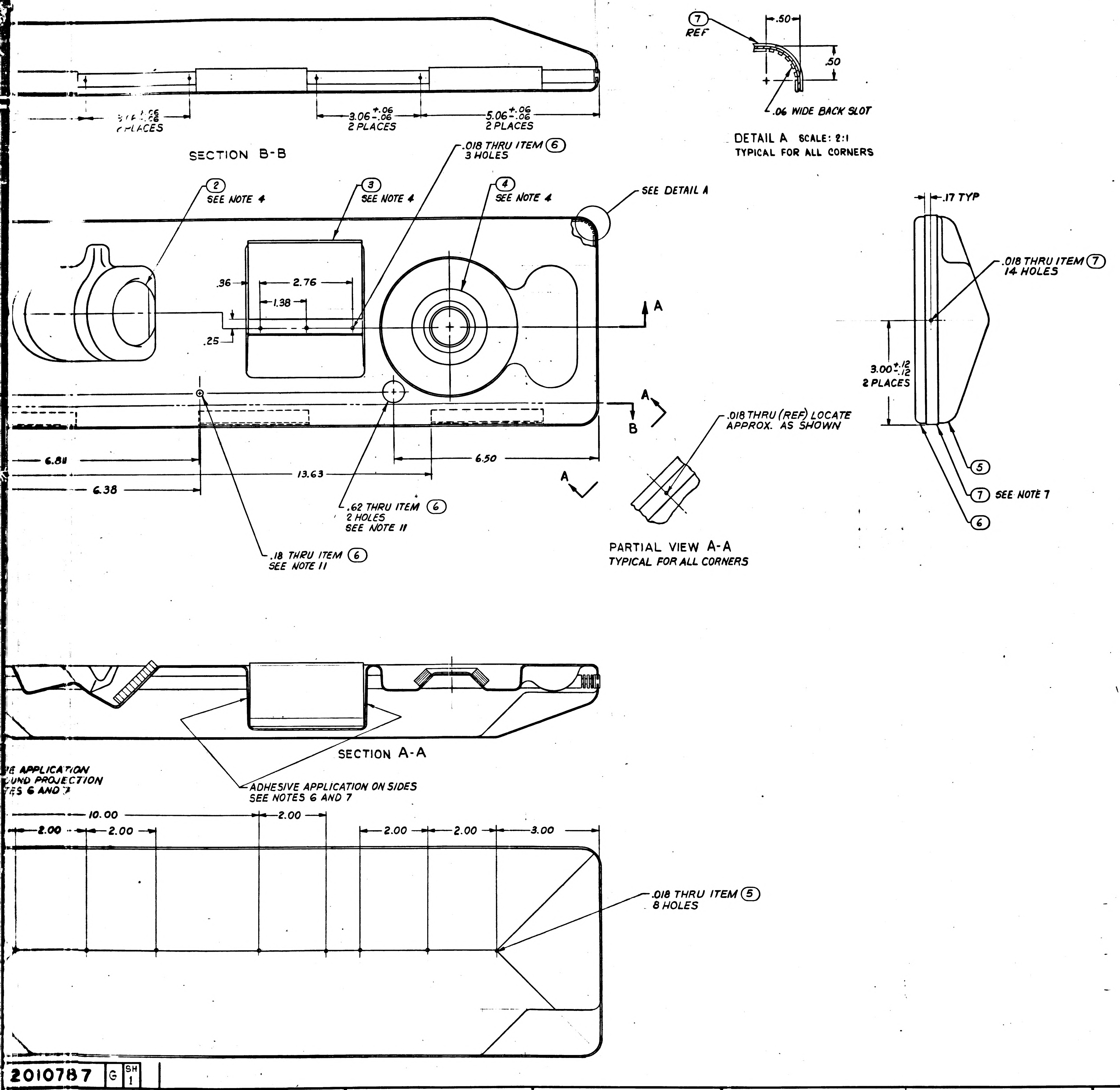
ITEM ④


⑧ 3 REQD
SEE NOTE 3
5.06 +.06 -.06
2 PLACES
3.06 +.06 -.06
2 PLACES
SECTION B-B
①
SEE NOTE 4
②
SEE NOTE 4
A
B
.36
1.38
.25
1.00
1.56
6.81
2.00
6.38
.18
SEE
ADHESIVE APPLICATION
ALL AROUND PROJECTION
SEE NOTES 6 AND 7
ADHESIVE
SEE NOTE
10.00
3.00
2.00
2.00
2.0

2010787 G SH 1

1/2010787

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		29 JULY 66	JW
C		REVISED PER TDRR 31002		13 SEP 66	JWB
D		REVISED PER TDRR 31721		7 NOV 66	JJJ PCK
E		REVISED PER TDRR 31811		8 NOV 66	RK PCR
F		REVISED PER TDRR 31879		15 NOV 66	DB
G		REVISED PER TDRR 32158		5 DEC 66	JJJ


SECTION B-B
3.06 +.06 -.06 2 PLACES
5.06 +.06 -.06 2 PLACES
2 PLACES
⑦ REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
.018 THRU ITEM ⑥ 3 HOLES
② SEE NOTE 4
③ SEE NOTE 4
④ SEE NOTE 4
SEE DETAIL A
.36
2.76
1.38
.25
A
A
B
6.81
6.38
13.63
6.50
.62 THRU ITEM ⑥ 2 HOLES SEE NOTE 11
.18 THRU ITEM ⑥ SEE NOTE 11
.018 THRU (REF) LOCATE APPROX. AS SHOWN
A
PARTIAL VIEW A-A
TYPICAL FOR ALL CORNERS
.17 TYP
.018 THRU ITEM ⑦ 14 HOLES
3.00 +.12 -.12 2 PLACES
⑤
⑦ SEE NOTE 7
⑥
SECTION A-A
ADHESIVE APPLICATION ON SIDES SEE NOTES 6 AND 7
10.00
2.00
2.00
2.00
2.00
2.00
2.00
3.00
.018 THRU ITEM ⑤ 8 HOLES

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	16	~~AR~~	~~1012543-003~~	~~ENAMEL~~
SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
	12	AR	1010864	PREPOLYMER, POLYURETHANE
SEE NOTE 9	11	AR	1010863	RESIN, POLYURETHANE
SEE NOTE 9	9	AR	1006338	ADHESIVE, SILICONE RUBBER
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787 -004	PAD, CUSHION
	3	1	2010787 -003	PAD, CUSHION
	2	1	2010787 -002	PAD, CUSHION
SEE NOTE 2	1	1	2010787 -001	PAD, CUSHION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.G. OLSON DATE 18 JULY 66
CHECKED W. Diehl 16 AUG 66
APPROVAL 16 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

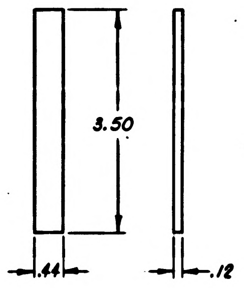
SIZE J2
CODE IDENT NO. 80230
2010787
SCALE FULL
SHEET 1 OF 1

2010787 G SH 1

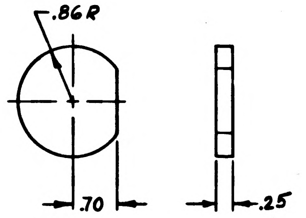
2/2010787

NOTES:

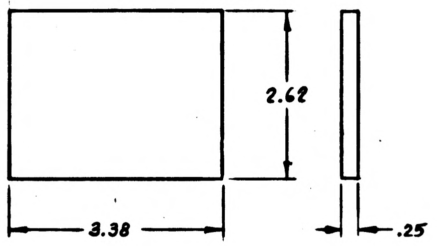
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: CELLULAR SILICONE SHEET PER 1010897.
3. BOND ITEMS ⑦ AND ⑧ TO ITEMS ⑤ AND ⑥ USING ITEMS ⑬ AND ⑭ PER ND1002167 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
4. BOND ITEMS ①, ②, ③, AND ④ TO ITEM ⑥ USING ITEM ⑨ WITH ROOM TEMPERATURE CURE.
5. COVER ASSEMBLY SHALL BE FOAM FILLED USING ITEMS ⑪ AND ⑫ PER ND 1002002 TYPE C, SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 7.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
6. APPLY ITEM ⑮ .06 TO .12 THICK ON SURFACES AS INDICTED, AND CURE PRIOR TO FOAM FILLING.
7. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING AND AFTER APPLICATION OF ITEM ⑮.
8. IDENTIFY USING DRAWING NUMBER PER ND 1002019.
9. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
10. ~~AFTER FOAM FILLING AND CURE, TRIM OFF ALL PROJECTING FOAM FLUSH WITH COVER. CLEAN BY BRUSHING WITH FREON TF AND APPLY ENAMEL, ⑯ OVER EXPOSED FOAM PER ND1002291, TYPE I. OMIT PRIMER.~~
11. FOAM FILL HOLES SHALL BE SEALED USING ITEM ⑮ TO A MINIMUM THICKNESS OF .062 AND BLEND FLUSH WITH OUTER SURFACE.
12. SEAL OPENING BETWEEN ITEMS ⑤ AND ⑥ WITH ITEM ⑮ AND BLEND FLUSH WITH ITEMS ⑤ AND ⑥.



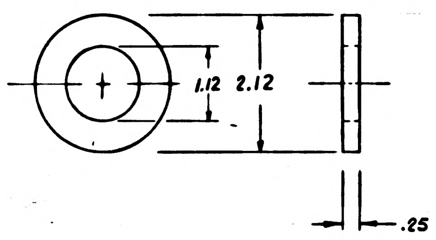
ITEM ①



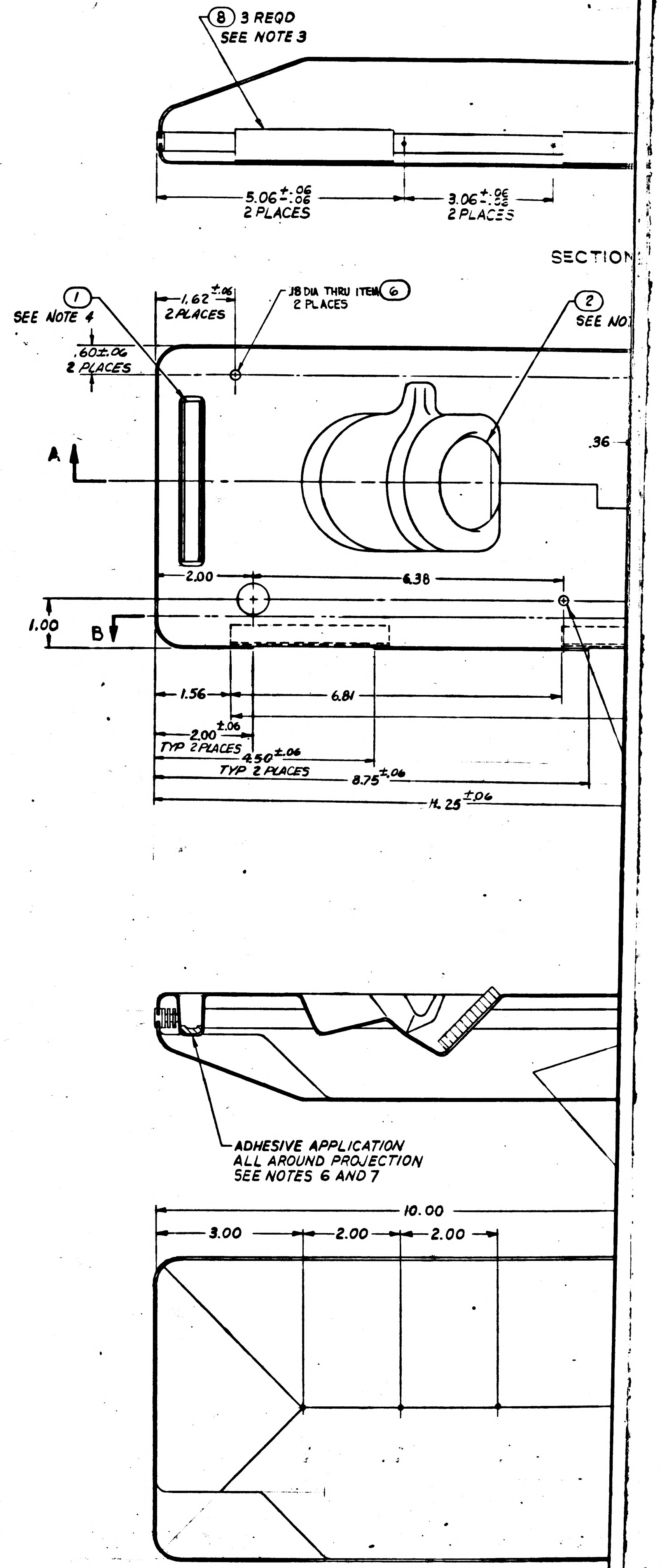
ITEM ②



ITEM ③

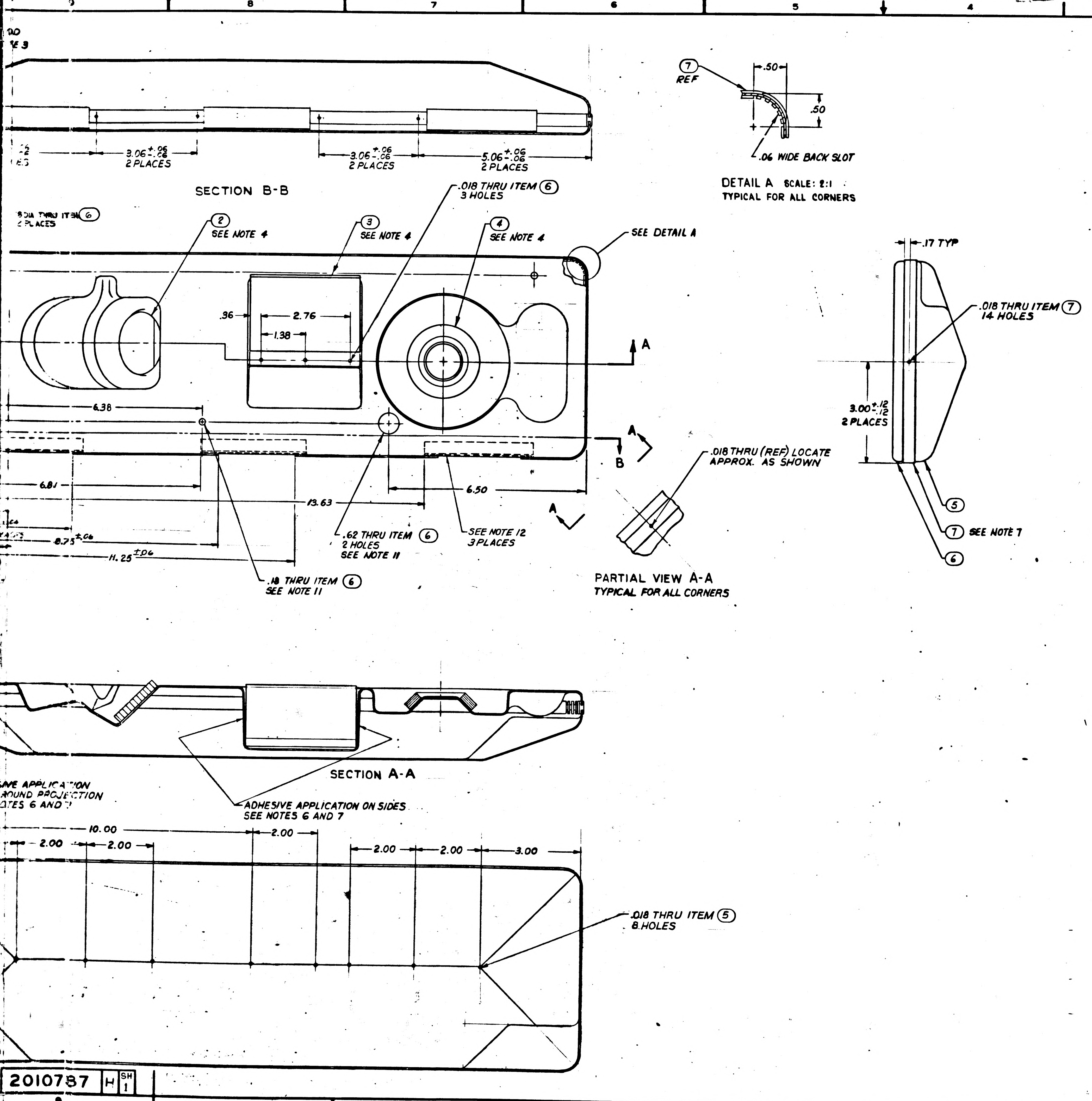


ITEM ④



⑧ 3 REQD
SEE NOTE 3
5.06 +.06 -.06
2 PLACES
3.06 +.06 -.06
2 PLACES
SECTION
①
SEE NOTE 4
1.62 ±.06
2 PLACES
.18 DIA THRU ITEM ⑥
2 PLACES
②
SEE NO
.60±.06
2 PLACES
A
.36
2.00
6.38
1.00
B
1.56
6.81
2.00 ±.06
TYP 2 PLACES
4.50 ±.06
TYP 2 PLACES
8.75 ±.06
11.25 ±.06
ADHESIVE APPLICATION
ALL AROUND PROJECTION
SEE NOTES 6 AND 7
10.00
3.00
2.00
2.00

2010787 H SH 1


SECTION B-B
3.06 +.06 −.06 2 PLACES
3.06 +.06 −.06 2 PLACES
5.06 +.06 −.06 2 PLACES
⑦ REF
.50
.50
.06 WIDE BACK SLOT
DETAIL A SCALE: 2:1
TYPICAL FOR ALL CORNERS
.018 THRU ITEM ⑥ 3 HOLES
② SEE NOTE 4
③ SEE NOTE 4
④ SEE NOTE 4
SEE DETAIL A
.96
2.76
1.38
A
6.38
A
B
6.81
13.63
6.50
8.75 ±.06
11.25 ±.06
.62 THRU ITEM ⑥ 2 HOLES SEE NOTE 11
SEE NOTE 12 3 PLACES
.18 THRU ITEM ⑥ SEE NOTE 11
.018 THRU (REF) LOCATE APPROX. AS SHOWN
A
PARTIAL VIEW A-A
TYPICAL FOR ALL CORNERS
.17 TYP
.018 THRU ITEM ⑦ 14 HOLES
3.00 +.12 −.12 2 PLACES
⑤
⑦ SEE NOTE 7
⑥
SECTION A-A
ADHESIVE APPLICATION ON SIDES SEE NOTES 6 AND 7
10.00
2.00
2.00
2.00
2.00
2.00
3.00
.018 THRU ITEM ⑤ 8 HOLES
2010787 H SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV (A) WITH CHANGE PER TDRR 30740		29 JULY 66	JW
C		REVISED PER TDRR 31002		13 SEP 66	WB
D		REVISED PER TDRR 31721		7 NOV 66	JJJ
E		REVISED PER TDRR 31811		8 NOV 66	JRK
F		REVISED PER TDRR 31879		15 NOV 66	DG
G		REVISED PER TDRR 32158		5 DEC 66	JJJ
H		REVISED PER TDRR 32848		4 FEB 67	ME

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	16	~~AR~~	~~1012543-003~~	~~ENAMEL~~
SEE NOTE 7	15	AR	1008898	ADHESIVE, EPOXY
SEE NOTE 9	14	AR	1010661	RESIN, ADHESIVE
	13	AR	1010679	ACTIVATOR, ADHESIVE
	12	AR	1010864	PREPOLYMER, POLYURETHANE
SEE NOTE 9	11	AR	1010863	RESIN, POLYURETHANE
SEE NOTE 9	9	AR	1006338	ADHESIVE, SILICONE RUBBER
	8	3	1021313	BRACKET, ANGLE HINGE
	7	1	2021212	SEAL, PLASTIC
	6	1	2021211	LINER, COVER
	5	1	2021207	COVER, CASE
SEE NOTE 2	4	1	2010787-004	PAD, CUSHION
	3	1	2010787-003	PAD, CUSHION
	2	1	2010787-002	PAD, CUSHION
SEE NOTE 2	1	1	2010787-001	PAD, CUSHION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± –
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R.G. OLSON 18 JULY 66 DATE
CHECKED W. Diehl 16 Aug 66
APPROVAL 16 Aug 66
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J2
CODE IDENT NO. 80230
2010787
SCALE FULL
SHEET 1 OF 1

2/2010787

2010788

NOTES :
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THIS IS AN INCOMPLETE DRAWING.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	

LIST OF PARTS AND MATERIALS

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR	2021210	SEAL, PLASTIC, "T" SECTION
	1	2021209	LINER-CASE
	1	2021208	CASE-STORAGE

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN Olson DATE 18 JUL 66
CHECKED Moya 20 JUL 66
APPROVAL 20 JUL 66
CONTRACT
NASA APPROVAL
MIT APPROVAL 8/11/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

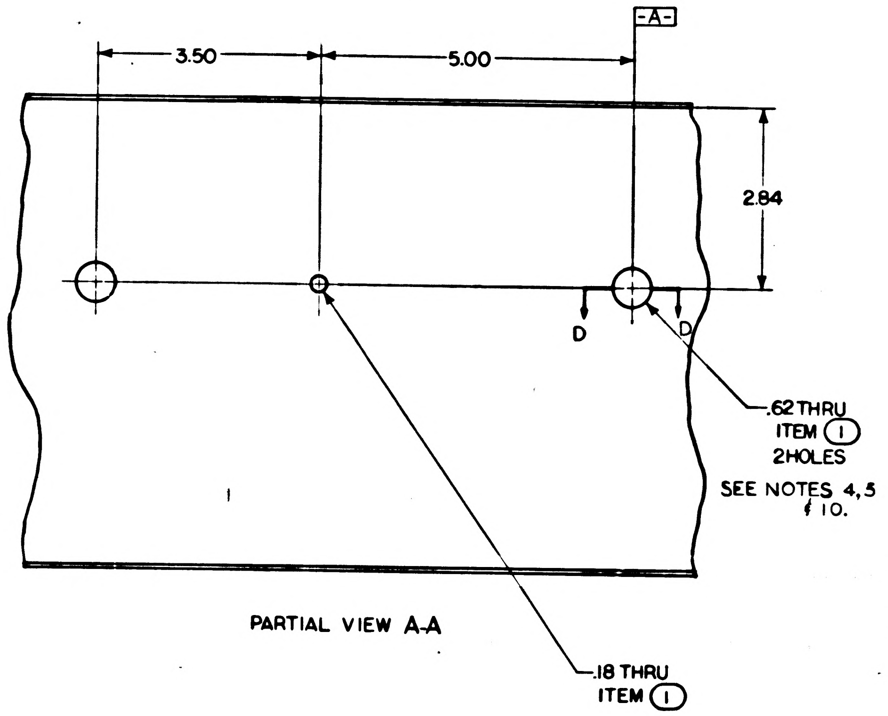
CASE - EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE C
CODE IDENT NO. 80230
2010788
SCALE —
SHEET 1 OF 1

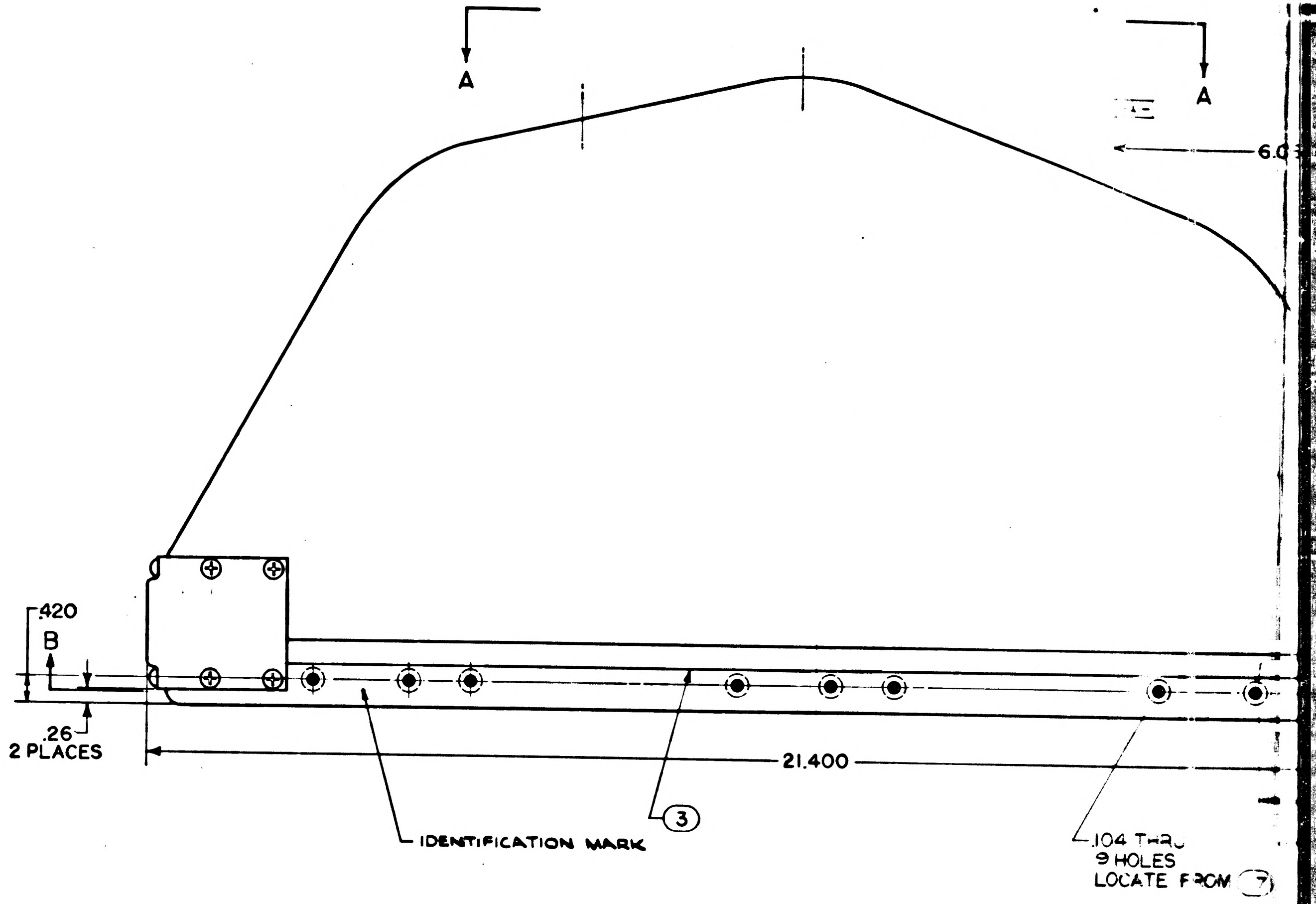
MIL-1082D D

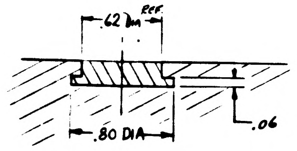
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND (3|4|5|7|8|9|12|14|17) TO (1|2) USING (20|23) PER ND.002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. (15|16) TO BE SHIMMED TO MEET DIMENSIONS AND TO ALIGN THE INSERTS OF (15|6) TO EACH OTHER WITHIN .010 TRUE POSITION.
4. CASE SHALL BE FOAM FILLED USING (21|22) PER ND1002002 TYPE C SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140°F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60°F PER HOUR.
5. FOAM FILL HOLES SHALL BE SEALED USING ITEM (24).
6. (11) TO BE INSTALLED INTO (10) SUCH THAT THE BALL EXTENDS BEYOND SURFACE OF (10) BY .020.
7. IDENTIFY USING DRAWING NUMBER PER ND1002019.
8. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
9. APPLY ADHESIVE, (20) AND (28) TO ALL SCREW THREADS (6) AND (13) PER ND1002187 TYPE II PRIOR TO FINAL ASSEMBLY.
10. *AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM (2) AND TO A DIA. OF APPROX. .80 DIA. TO PROVIDE A RETAINING LIP ON .62 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 5.*

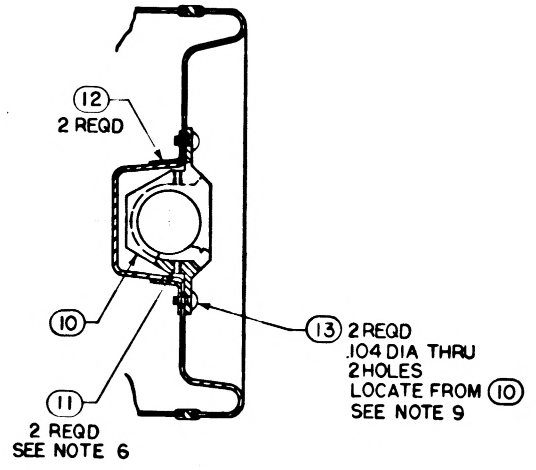

-A-
3.50
5.00
2.84
D
D
.62 THRU
ITEM (1)
2 HOLES
SEE NOTES 4, 5 & 10.
.18 THRU
ITEM (1)

PARTIAL VIEW A-A

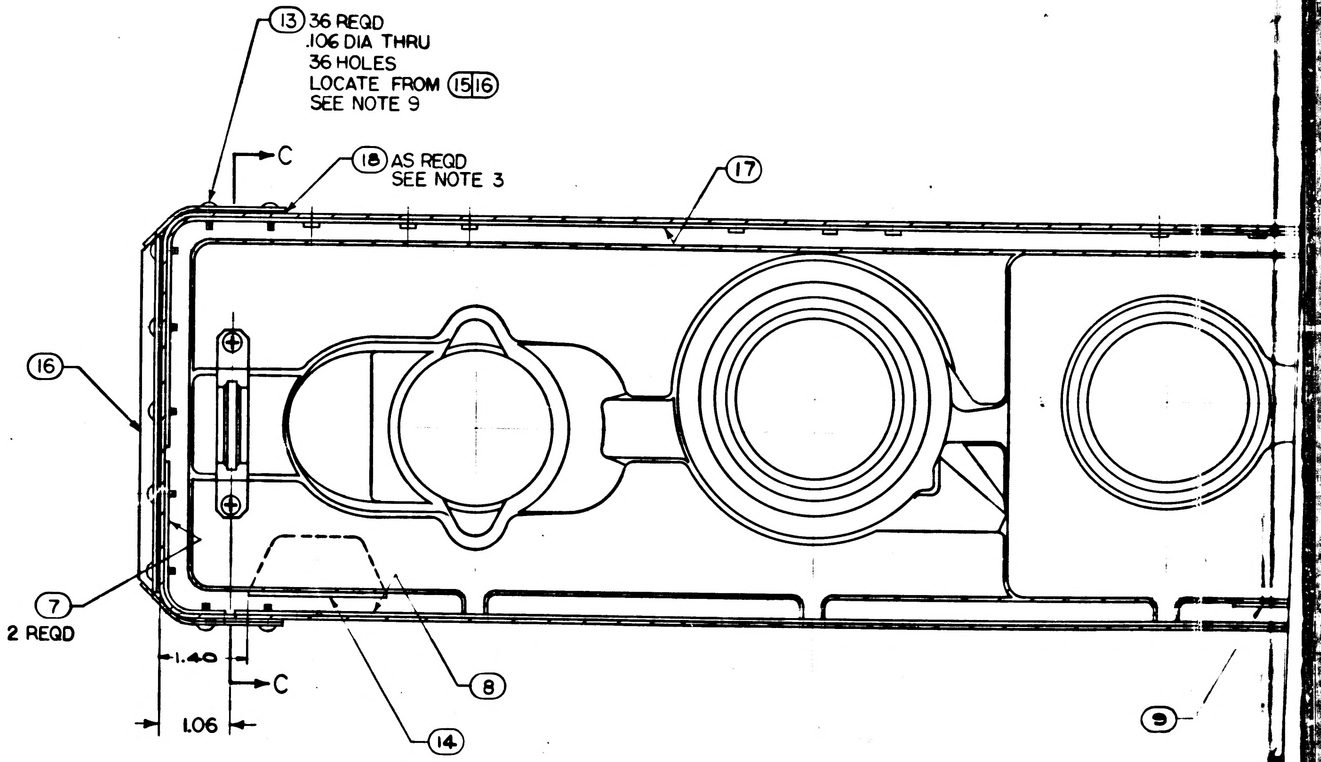

A
A
6.0
.420
B
.26
2 PLACES
21.400
IDENTIFICATION MARK
(3)
.104 THRU
9 HOLES
LOCATE FROM (7)


.62
REF
.80 DIA
.06

SECTION D-D
SEE NOTE 10


(12)
2 REQD
(10)
(11)
2 REQD
SEE NOTE 6
(13) 2 REQD
.104 DIA THRU
2 HOLES
LOCATE FROM (10)
SEE NOTE 9

SECTION C-C

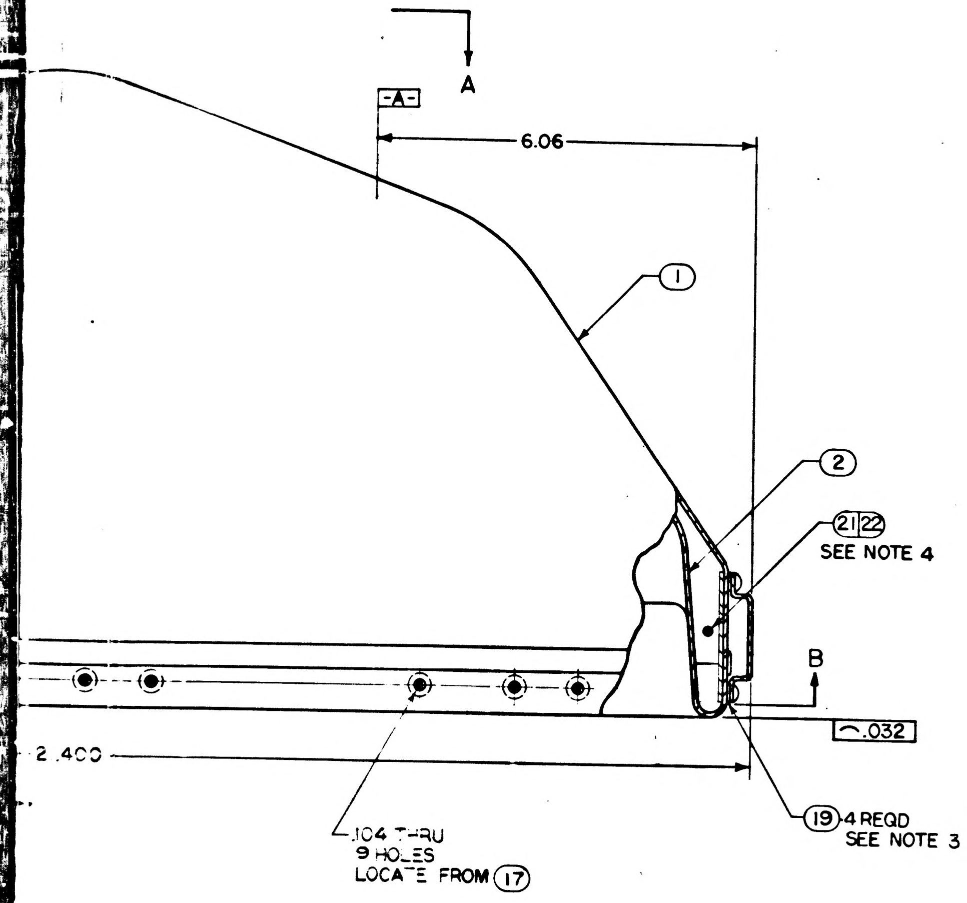

(13) 36 REQD
.106 DIA THRU
36 HOLES
LOCATE FROM (15|16)
SEE NOTE 9
C
(18) AS REQD
SEE NOTE 3
(17)
(16)
(7)
2 REQD
1.40
1.06
C
(8)
(14)
(9)

VIE

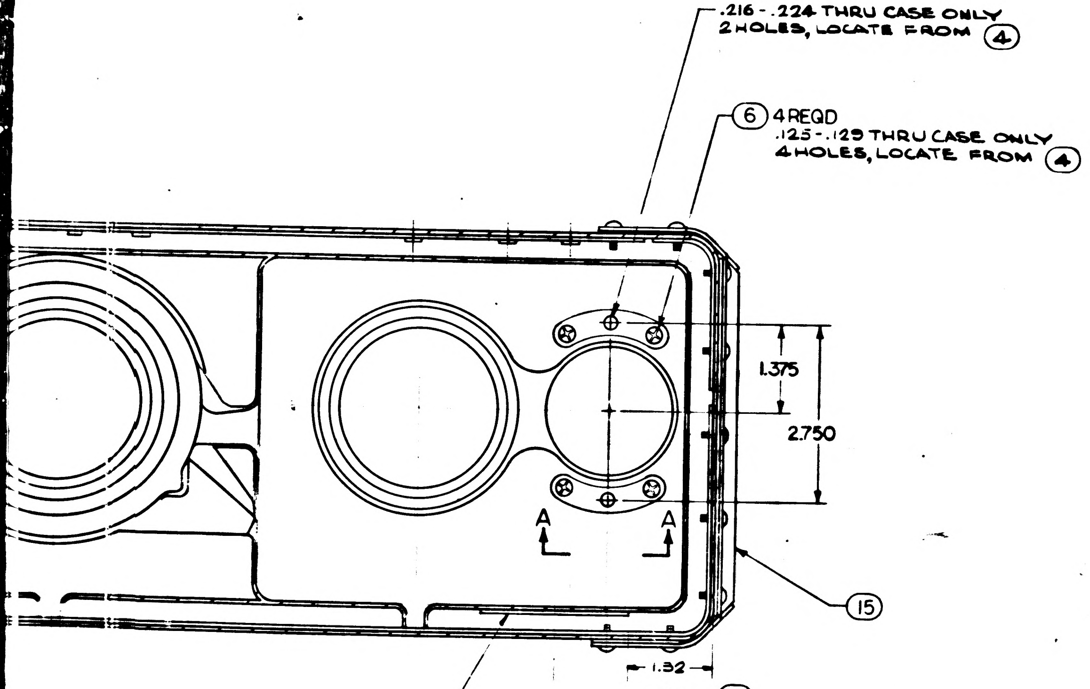
2010788	REV B	SH 1

1/2010788

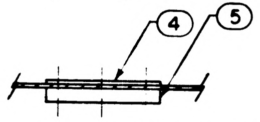
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION (A) WITH CHANGE TDRR 30739		5-AUG-66	GM



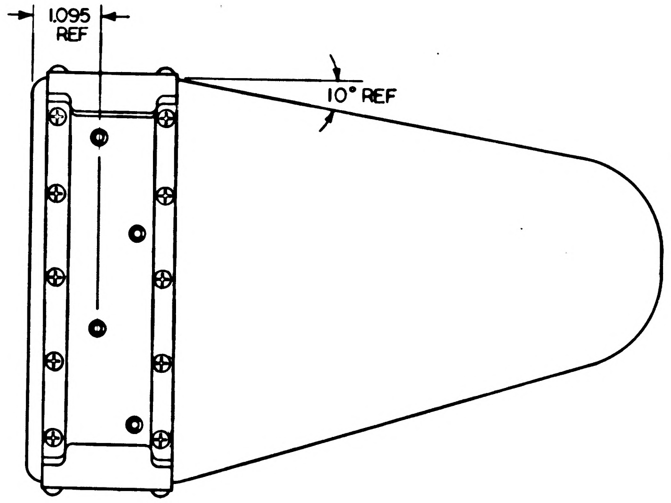
A
-A-
6.06
①
②
㉑㉒ SEE NOTE 4
B
.032
2.400
.104 THRU 9 HOLES LOCATE FROM ⑰
⑲ 4 REQD SEE NOTE 3



.216 - .224 THRU CASE ONLY 2 HOLES, LOCATE FROM ④
⑥ 4 REQD .125 - .129 THRU CASE ONLY 4 HOLES, LOCATE FROM ④
1.375
2.750
A
A
⑮
⑨
1.32



PARTIAL SECTION A-A
VIEW SHOWING INSTALLATION OF
ITEMS ④⑤



1.095 REF
10° REF

SEE NOTE 8

SEE NOTE 8

NO. REQD	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
AR	24	1008898	ADHESIVE, EPOXY
AR	23	1010679	ACTIVATOR, ADHESIVE
AR	22	1010864	PREPOLYMER, POLYURETHANE
AR	21	1010863	RESIN, POLYURETHANE
AR	20	1010661	RESIN, ADHESIVE
4	19	1008871-002	SHIM, LAMINATED
AR	18	1008871-001	SHIM, LAMINATED
1	17	2021227	BRACKET, ANGLE (INSEP ASSY)
1	16	1021259	SUPPORT, LEFT HAND (INSEP ASSY)
1	15	1021258	SUPPORT, RIGHT HAND (INSEP ASSY)
1	14	2021215	PLATE, BACK UP
38	13	MS24622-17	SCREW, TAPPING, PAN HEAD
2	12	1021279	BRACKET, ANGLE
2	11	1011288-1	PLUNGER, QUICK RELEASE
1	10	1021277	HOLDER, FILTER
1	9	2021214	PLATE, BACK UP
2	8	2021213	BRACKET, ANGLE, LOWER RIGHT
2	7	2021206	BRACKET, ANGLE
4	6	MS21207C4-6	SCREW, TAPPING, FLAT HEAD
2	5	2021203	HOLDER, EYEPIECE, LOWER
2	4	2021202	HOLDER, EYEPIECE, UPPER
AR	3	2021210	SEAL, PLASTIC
1	2	2021209	LINER, CASE
1	1	2021208	CASE, STORAGE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Diehl DATE 18-JUL-66
CHECKED Stelman 10 AUG 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE, EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

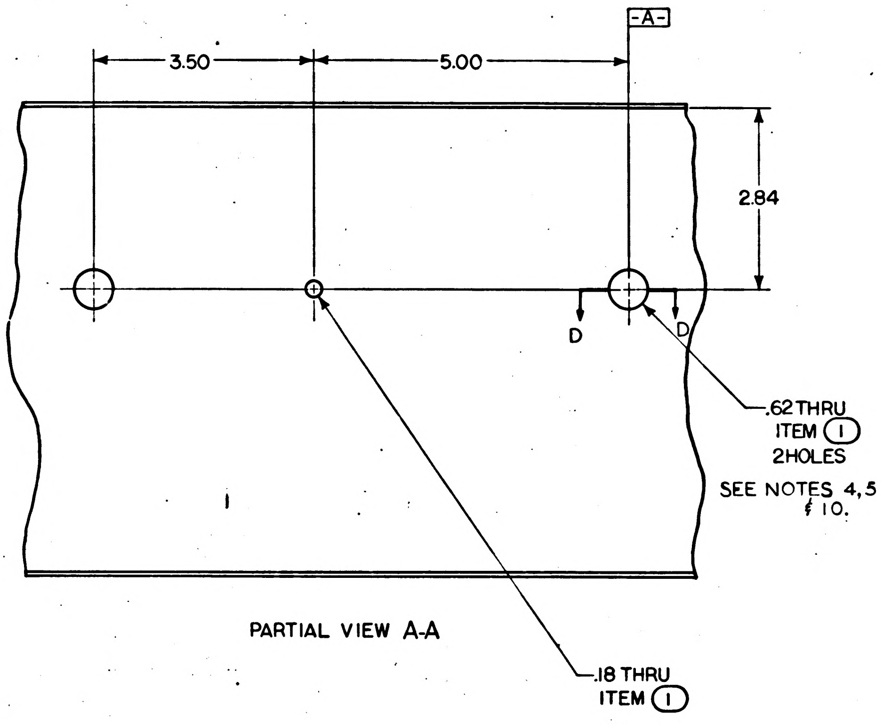
SIZE J2
CODE IDENT NO. 80230
2010788
SCALE FULL
SHEET 1 OF 1

2010788 REV B SH 1

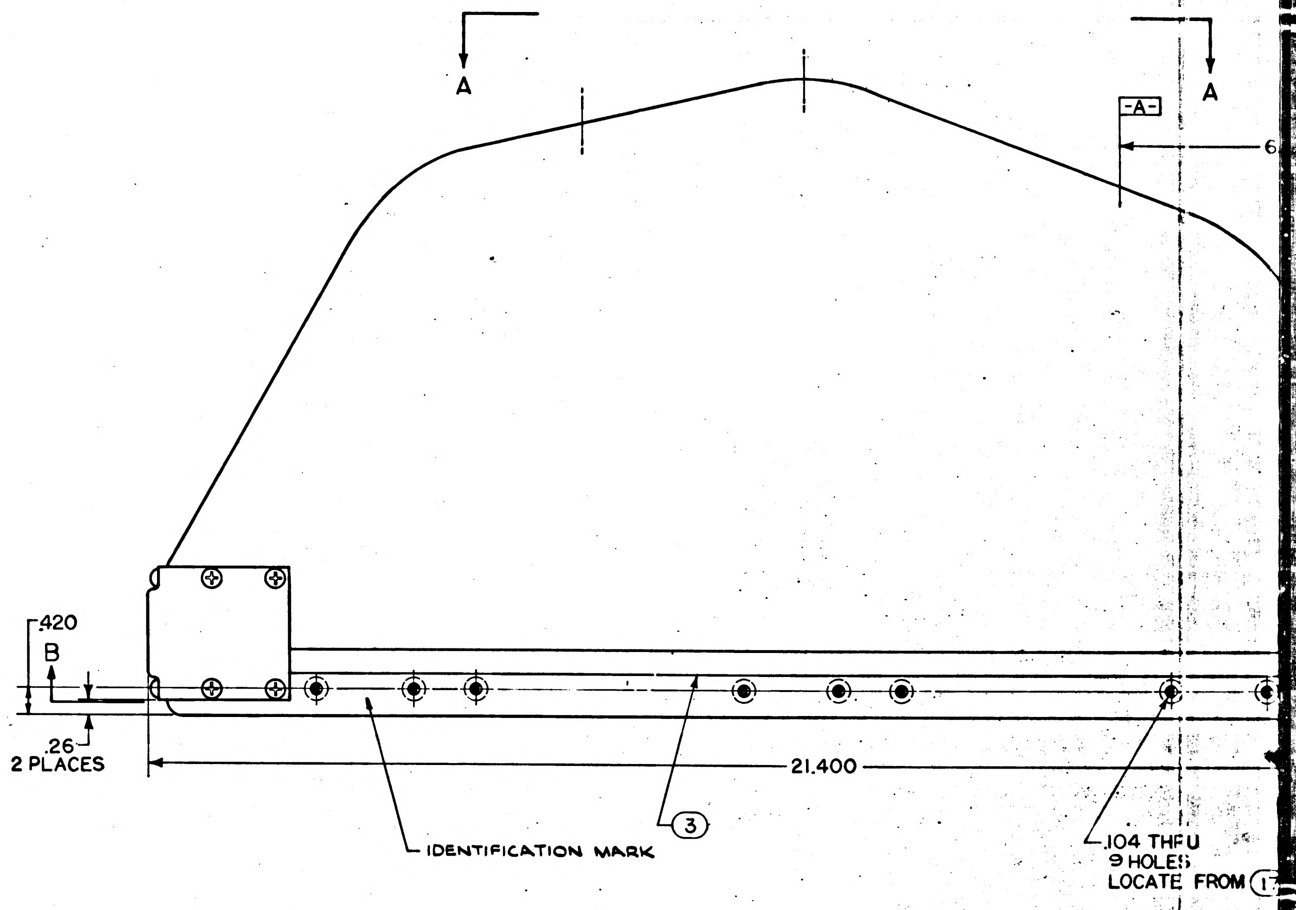
2/2010788

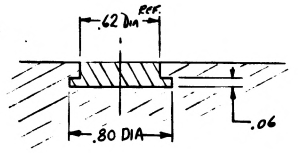
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND (3 ~~4~~ ~~5~~ 7 8 9 12 14 17 25 26 27 28 29) TO (1 2) USING (20 23) PER ND1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. (15 16) TO BE SHIMMED TO MEET DIMENSIONS AND TO ALIGN THE INSERTS OF (15 16) TO EACH OTHER WITHIN .010 TRUE POSITION.
4. CASE SHALL BE FOAM FILLED USING (21 22) PER ND1002002 TYPE C SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
5. FOAM FILL HOLES SHALL BE SEALED USING *ITEM* (24).
6. (11) TO BE INSTALLED INTO (10) SUCH THAT THE BALL EXTENDS BEYOND SURFACE OF (10) BY .020.
7. IDENTIFY USING DRAWING NUMBER PER ND1002019.
8. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
9. APPLY ADHESIVE, (20) AND (23) TO ALL SCREW THREADS ~~(6) AND~~ (13) PER ND1002187 *TYPE II PRIOR TO FINAL ASSEMBLY.*
10. *AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM (2) AND TO A DIA. OF APPROX. .80 DIA. TO. PROVIDE A RETAINING LIP ON .62 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 5.*

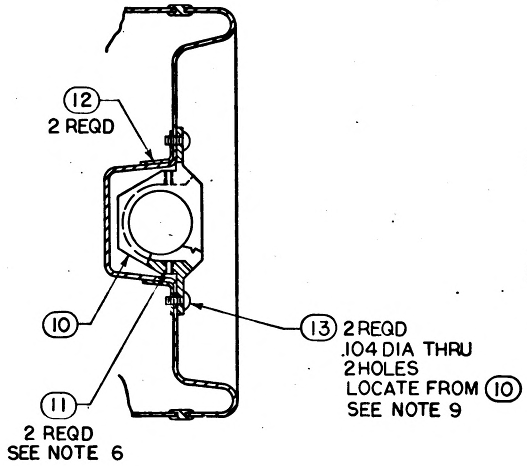

-A-
3.50
5.00
2.84
D
D
.62 THRU
ITEM (1)
2 HOLES
SEE NOTES 4, 5 & 10.
1
.18 THRU
ITEM (1)

PARTIAL VIEW A-A

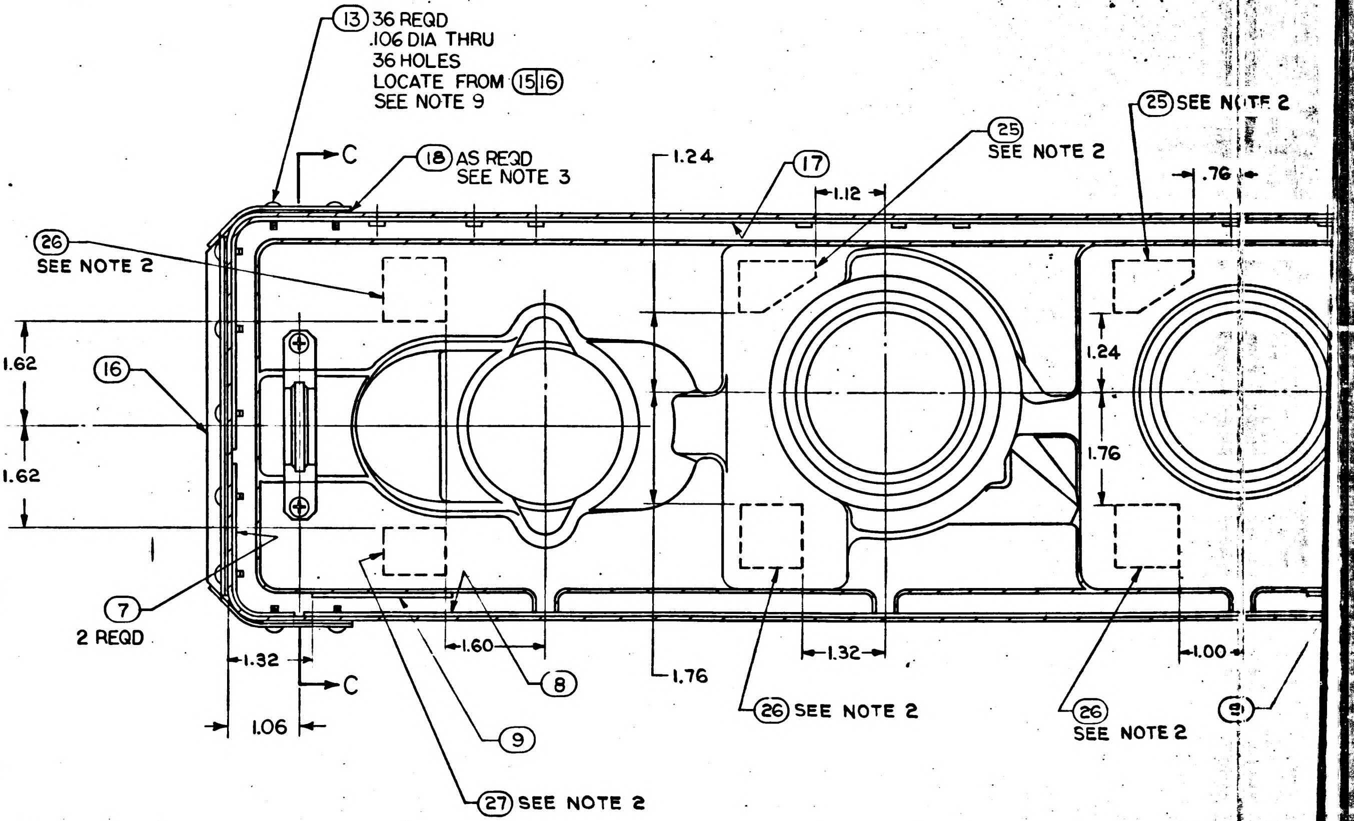

A
A
-A-
6
.420
B
.26
2 PLACES
21.400
(3)
IDENTIFICATION MARK
.104 THRU
9 HOLES
LOCATE FROM (17


.62 DIA REF.
.06
.80 DIA

SECTION D-D
SEE NOTE 10


(12)
2 REQD
(10)
(11)
2 REQD
SEE NOTE 6
(13) 2 REQD
.104 DIA THRU
2 HOLES
LOCATE FROM (10)
SEE NOTE 9

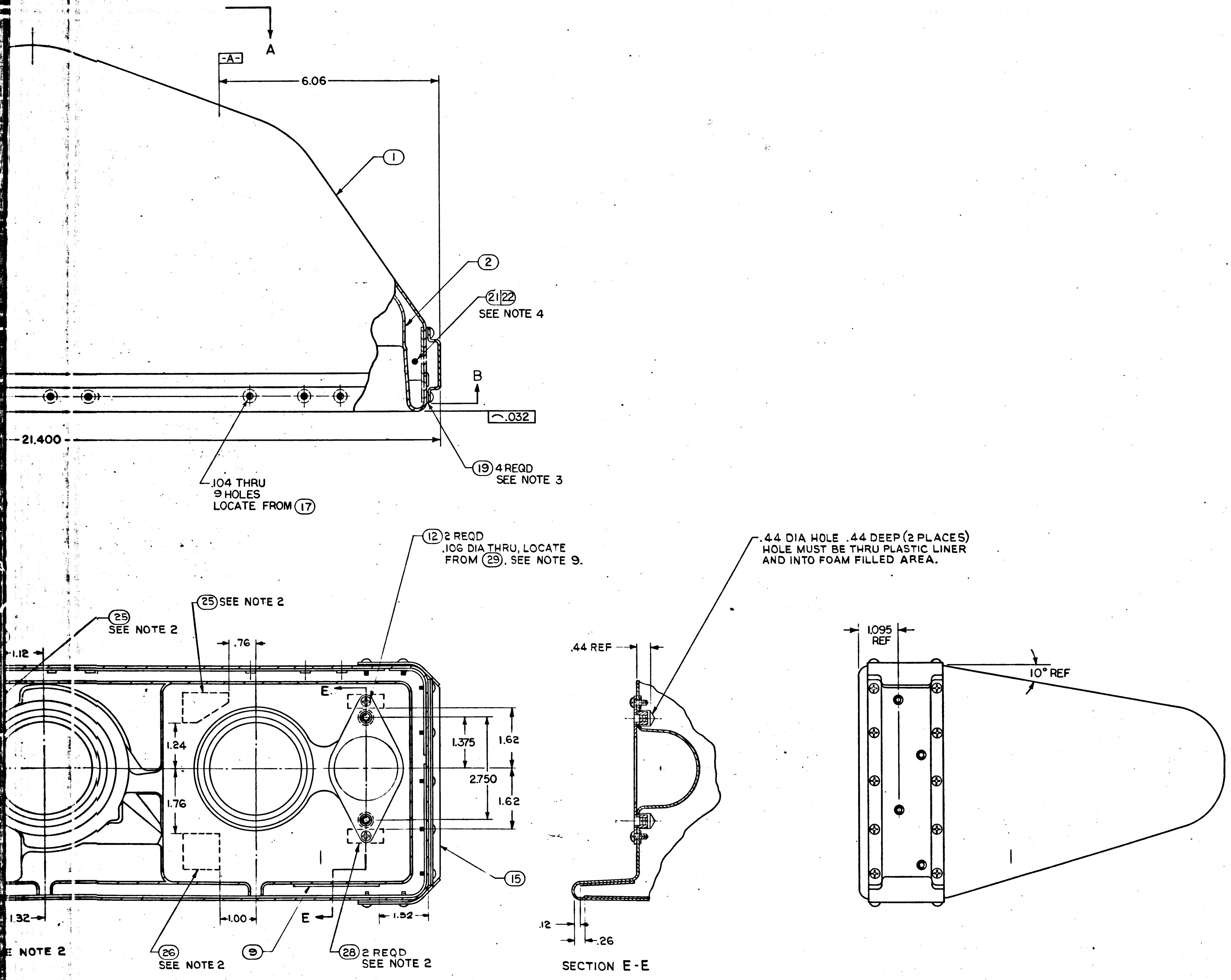
SECTION C-C


(13) 36 REQD
.106 DIA THRU
36 HOLES
LOCATE FROM (15 16)
SEE NOTE 9
C
(18) AS REQD
SEE NOTE 3
1.24
(17)
1.12
(25)
SEE NOTE 2
(25) SEE NOTE 2
.76
(26)
SEE NOTE 2
1.62
1.62
(16)
1.24
1.76
(7)
2 REQD
1.32
1.06
C
1.60
(8)
1.76
(9)
1.32
(26) SEE NOTE 2
1.00
(26)
SEE NOTE 2
(9)
(27) SEE NOTE 2

2010788 REV C SH 1

1/2010788

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION (A) WITH CHANGE TDRR 30739		5-AUG-66	GM
C		REVISED PER TDRR 31812		8 DEC 66	JJJ


A
-A-
6.06
①
②
㉑㉒ SEE NOTE 4
B
.032
21.400
⑲ 4 REQD SEE NOTE 3
.104 THRU 9 HOLES LOCATE FROM ⑰
⑫ 2 REQD .106 DIA THRU, LOCATE FROM ㉙. SEE NOTE 9.
.44 DIA HOLE .44 DEEP (2 PLACES) HOLE MUST BE THRU PLASTIC LINER AND INTO FOAM FILLED AREA.
㉕ SEE NOTE 2
㉕ SEE NOTE 2
1.12
.76
E
1.24
1.76
1.375
1.62
2.750
1.62
⑮
1.32
1.00
E
1.52
NOTE 2
㉖ SEE NOTE 2
⑨
㉘ 2 REQD SEE NOTE 2
.44 REF
.12
.26
SECTION E-E
1.095 REF
10° REF

SEE NOTE 8
SEE NOTE 8

NO. REQD	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	29	2021237	HOLDER, EYEPIECE
2	28	2021234-005	PLATE, BACKUP
1	27	2021234-002	PLATE, BACKUP
3	26	2021234-001	PLATE, BACKUP
2	25	2021235	PLATE, BACKUP
AR	24	1008898	ADHESIVE, EPOXY
AR	23	1010679	ACTIVATOR, ADHESIVE
AR	22	1010864	PREPOLYMER, POLYURETHANE
AR	21	1010863	RESIN, POLYURETHANE
AR	20	1010661	RESIN, ADHESIVE
4	19	1008871-002	SHIM, LAMINATED
AR	18	1008871-001	SHIM, LAMINATED
1	17	2021227	BRACKET, ANGLE (INSEP ASSY)
1	16	1021259	SUPPORT, LEFT HAND (INSEP ASSY)
1	15	1021258	SUPPORT, RIGHT HAND (INSEP ASSY)
~~1~~	14	~~2021215~~	~~PLATE, BACK UP~~
40	13	MS24622-17	SCREW, TAPPING, PAN HEAD
2	12	1021279	BRACKET, ANGLE
2	11	1011288-1	PLUNGER, QUICK RELEASE
1	10	1021277	HOLDER, FILTER
2	9	2021214	PLATE, BACK UP
2	8	2021213	BRACKET, ANGLE, LOWER RIGHT
2	7	2021206	BRACKET, ANGLE
~~4~~	6	~~MS21207C4-6~~	~~SCREW, TAPPING, FLAT HEAD~~
~~2~~	5	~~2021205~~	~~HOLDER, EYEPIECE, LOWER~~
~~2~~	4	~~2021202~~	~~HOLDER, EYEPIECE, UPPER~~
AR	3	2021210	SEAL, PLASTIC
1	2	2021209	LINER, CASE
1	1	2021208	CASE, STORAGE

LIST OF PARTS AND MATERIALS

2010789-011	2021255-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 18-JUL-66
CHECKED 16 AUG 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE, EYEPIECE STORAGE (INSEPARABLE ASSEMBLY)

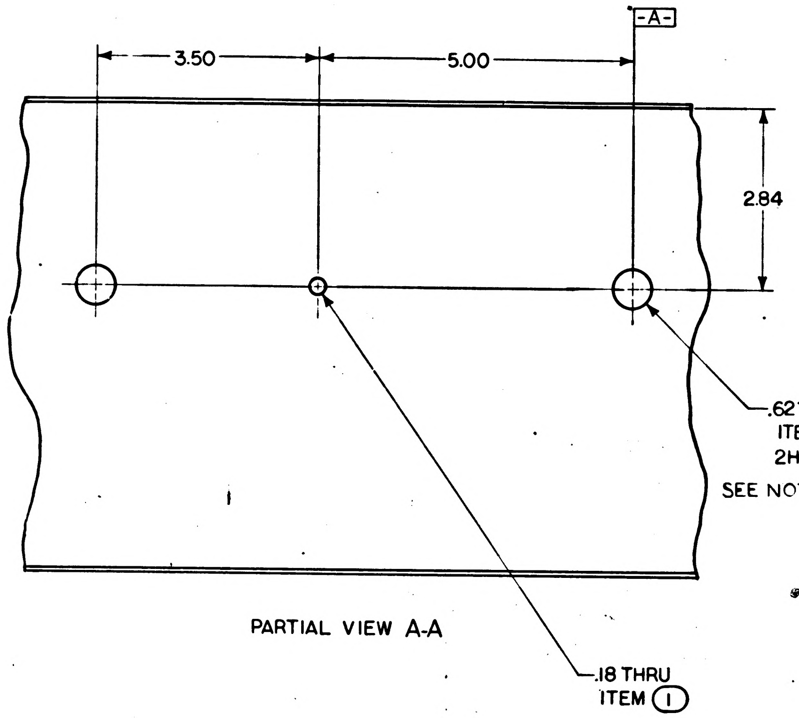
SIZE J2
CODE IDENT NO. 80230
2010788
SCALE FULL
SHEET 1 OF 1

2010788 REV C SH 1

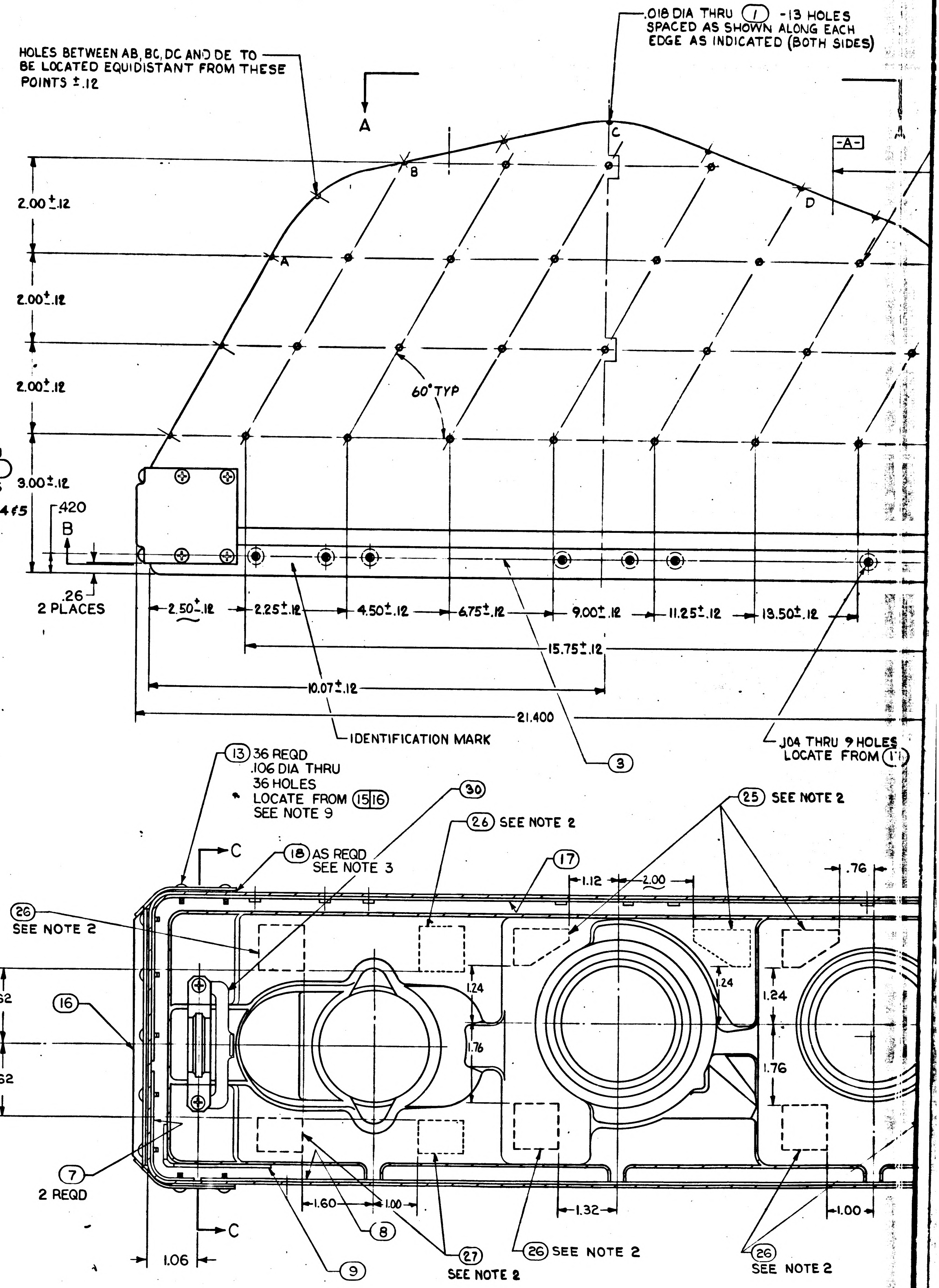
2/2010788

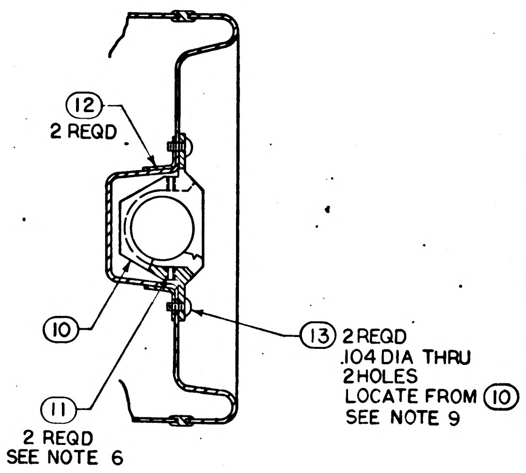
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND ③ ~~④ ⑤~~ ⑦ ⑧ ⑨ ⑫ ⑭ ⑰ ㉕ ㉖ ㉗ ㉘ ㉙ TO ① ② USING ⑳ ㉓ PER ND1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. ⑮ ⑯ TO BE SHIMMED TO MEET DIMENSIONS AND TO ALIGN THE INSERTS OF ⑮ ⑯ TO EACH OTHER WITHIN .010 TRUE POSITION.
4. CASE SHALL BE FOAM FILLED USING ㉑ ㉒ PER ND1002002 TYPE C SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140°F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60°F PER HOUR.
5. AFTER FOAM FILLING AND CURE TRIM OFF ALL PROJECTING FOAM FLUSH WITH CASE. CLEAN BY BRUSHING WITH FREON TF AND APPLY ITEM ㉛ OVER EXPOSED FOAM PER ND 1002291 TYPE I, OMIT PRIMER.
6. ⑪ TO BE INSTALLED INTO ⑩ SUCH THAT THE BALL EXTENDS BEYOND SURFACE OF ⑩ BY .020.
7. IDENTIFY USING DRAWING NUMBER PER ND1002019.
8. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
9. APPLY ADHESIVE, ⑳ AND ㉓ TO ALL SCREW THREADS ~~⑥ AND~~ ⑬ PER ND1002187 TYPE II PRIOR TO FINAL ASSEMBLY.
10. ~~AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM ② AND TO A DIA. OF APPROX. .80 DIA. TO PROVIDE A RETAINING LIP ON .62 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 5.~~
11. AFTER CURING OF CEMENT BONDING ITEMS ㉕ ㉖ ㉗ ⑫ ⑨ ㉘ APPLY A COATING OF ITEM ㉔ OVER THE SAME ITEMS, .06 TO .12 THICK AROUND THE PERIMETER .12 TO .25 WIDE.
12. ALL CONES TO BE COATED WITH ITEM ㉔ .06 TO .12 THICK FROM BASE TO TIP OF CONES ON CONVEX SIDE. AFTER CURING OF ITEM ㉔ MACHINE ALL HOLES .018 DIA THRU ITEM ㉔ AND ITEM ②. HOLES NOT TO EXTEND INTO FOAM DEEPER THAN .12 IF MACHINED AFTER FOAM FILLING. HOLES ON THE SAME CIRCUMFERENCE TO BE 90°±5° TO EACH OTHER.
13. AFTER FOAM FILLING AND CURE, FOAM MUST BE FLUSH OR BELOW THE EXTERNAL SURFACE OF ITEMS ① AND ②.
14. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING.


3.50
5.00
-A-
2.84
.62 THRU
ITEM ①
2 HOLES
SEE NOTES 4 & 5
.18 THRU
ITEM ①

PARTIAL VIEW A-A

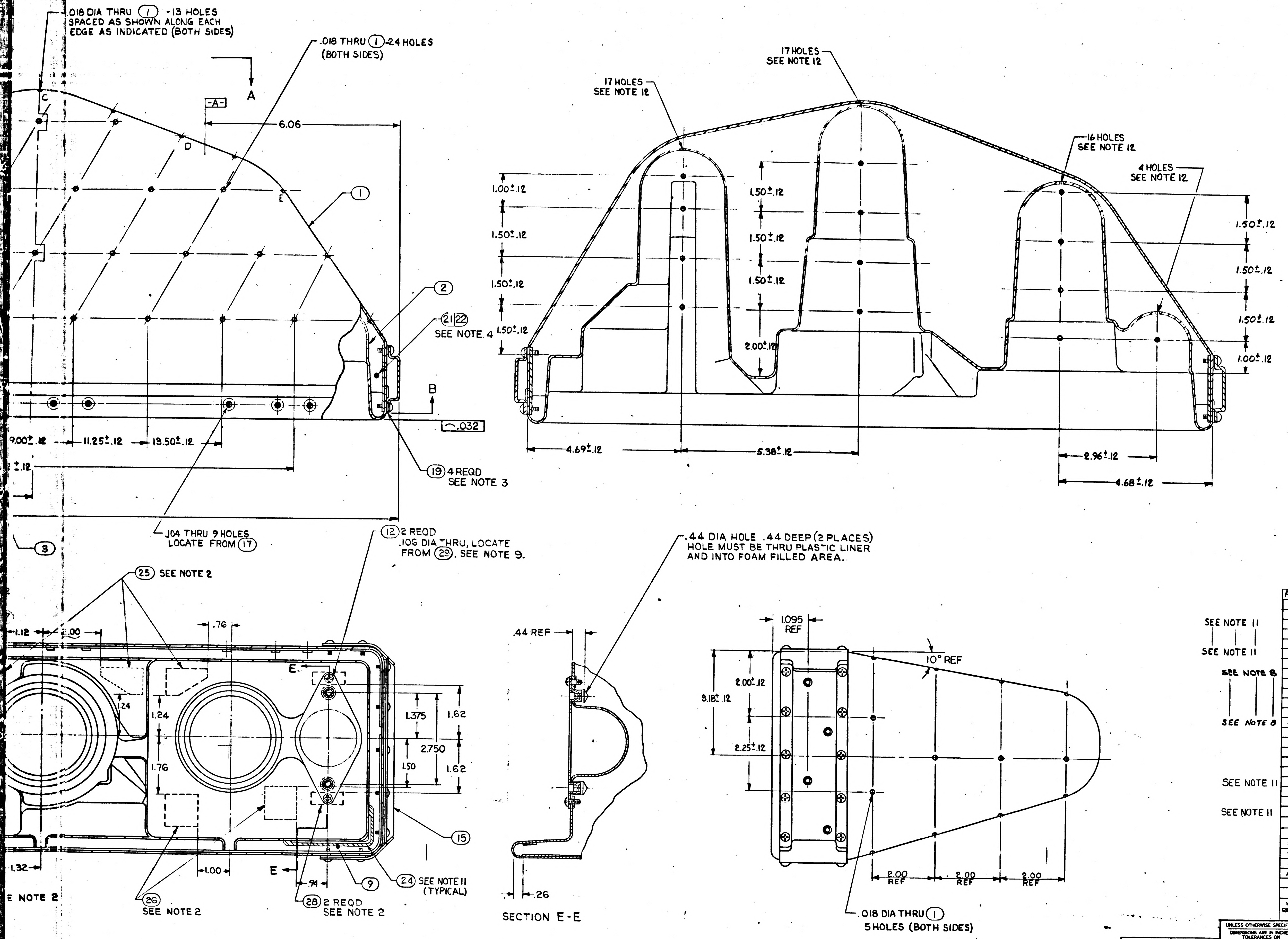

HOLES BETWEEN AB, BC, DC AND DE TO BE LOCATED EQUIDISTANT FROM THESE POINTS ±.12
.018 DIA THRU ① -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
A
A
B
C
D
-A-
2.00±.12
2.00±.12
2.00±.12
3.00±.12
60° TYP
.420
B
.26
2 PLACES
2.50±.12
2.25±.12
4.50±.12
6.75±.12
9.00±.12
11.25±.12
13.50±.12
15.75±.12
10.07±.12
21.400
IDENTIFICATION MARK
③
.104 THRU 9 HOLES LOCATE FROM ⑪
⑬ 36 REQD .106 DIA THRU 36 HOLES LOCATE FROM ⑮ ⑯ SEE NOTE 9
㉚
㉖ SEE NOTE 2
㉕ SEE NOTE 2
⑱ AS REQD SEE NOTE 3
⑰
C
C
㉖ SEE NOTE 2
1.12
2.00
.76
1.62
1.62
⑯
1.24
1.76
1.24
1.24
1.76
⑦
2 REQD
1.60
1.00
1.32
1.00
1.06
⑧
⑨
㉗ SEE NOTE 2
㉖ SEE NOTE 2
㉖ SEE NOTE 2


⑫
2 REQD
⑩
⑪
2 REQD
SEE NOTE 6
⑬ 2 REQD
.104 DIA THRU
2 HOLES
LOCATE FROM ⑩
SEE NOTE 9

SECTION C-C

2010788	REV D	SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION (A) WITH CHANGE TDRR 30739		5-AUG-66	GM
C		REVISED PER TDRR 31812		8 DEC 66	JJJ
D		REVISED PER TDRR 31722		29 DEC 66	WK J.E.G.



.018 DIA THRU ① -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
.018 THRU ① -24 HOLES (BOTH SIDES)
A
-A-
C
D
E
6.06
①
②
㉑㉒ SEE NOTE 4
B
.032
9.00±.12
11.25±.12
13.50±.12
±.12
⑲ 4 REQD SEE NOTE 3
.104 THRU 9 HOLES LOCATE FROM ⑰
③
17 HOLES SEE NOTE 12
17 HOLES SEE NOTE 12
16 HOLES SEE NOTE 12
4 HOLES SEE NOTE 12
1.00±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
2.00±.12
1.50±.12
1.50±.12
1.50±.12
1.00±.12
4.69±.12
5.38±.12
2.96±.12
4.68±.12
⑫ 2 REQD .106 DIA THRU, LOCATE FROM ㉙. SEE NOTE 9.
.44 DIA HOLE .44 DEEP (2 PLACES) HOLE MUST BE THRU PLASTIC LINER AND INTO FOAM FILLED AREA.
㉕ SEE NOTE 2
1.12
2.00
.76
.24
1.24
1.76
1.375
1.62
2.750
1.50
1.62
1.32
1.00
.94
E
E
⑮
⑨
㉔ SEE NOTE 11 (TYPICAL)
㉖ SEE NOTE 2
㉘ 2 REQD SEE NOTE 2
E NOTE 2
.44 REF
.26
SECTION E-E
1.095 REF
10° REF
2.00±.12
3.18±.12
2.25±.12
2.00 REF
2.00 REF
2.00 REF
.018 DIA THRU ① 5 HOLES (BOTH SIDES)

	NO. REQD	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR	31	1012543-003	ENAMEL (GREY)
	1	30	2021244	BRACKET
	1	29	2021237	HOLDER, EYEPIECE
SEE NOTE 11	2	28	2021234-005	PLATE, BACKUP
	2	27	2021234-002	PLATE, BACKUP
SEE NOTE 11	5	26	2021234-001	PLATE, BACKUP
	3	25	2021235	PLATE, BACKUP
	AR	24	1008898	ADHESIVE, EPOXY
SEE NOTE 8	AR	23	1010679	ACTIVATOR, ADHESIVE
	AR	22	1010864	PREPOLYMER, POLYURETHANE
	AR	21	1010863	RESIN, POLYURETHANE
	AR	20	1010661	RESIN, ADHESIVE
	4	19	1008871-002	SHIM, LAMINATED
SEE NOTE 8	AR	18	1008871-001	SHIM, LAMINATED
	1	17	2021227	BRACKET, ANGLE (INSEP ASSY)
	1	16	1021259	SUPPORT, LEFT HAND (INSEP ASSY)
	1	15	1021258	SUPPORT, RIGHT HAND (INSEP ASSY)
	~~1~~	14	~~2021215~~	PLATE, ~~BACK UP~~
	40	13	MS24622-17	SCREW, TAPPING, PAN HEAD
SEE NOTE 11	2	12	1021279	BRACKET, ANGLE
	2	11	1011288-1	PLUNGER, QUICK RELEASE
	1	10	1021277	HOLDER, FILTER
SEE NOTE 11	2	9	2021214	PLATE, BACK UP
	2	8	2021213	BRACKET, ANGLE, LOWER RIGHT
	2	7	2021206	BRACKET, ANGLE
	~~4~~	6	~~MS21207C4-6~~	~~SCREW, TAPPING, FLAT HEAD~~
	~~2~~	5	~~2021205~~	~~HOLDER, EYEPIECE, LOWER~~
	~~2~~	4	~~2021202~~	~~HOLDER, EYEPIECE, UPPER~~
	AR	3	2021210	SEAL, PLASTIC
	1	2	2021209	LINER, CASE
	1	1	2021208	CASE, STORAGE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02 3 PLACE DECIMALS ±.005 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 18-JUL-66
CHECKED Stelma 1 AUG 66
APPROVAL 1 Aug 66
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 8/2/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE, EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

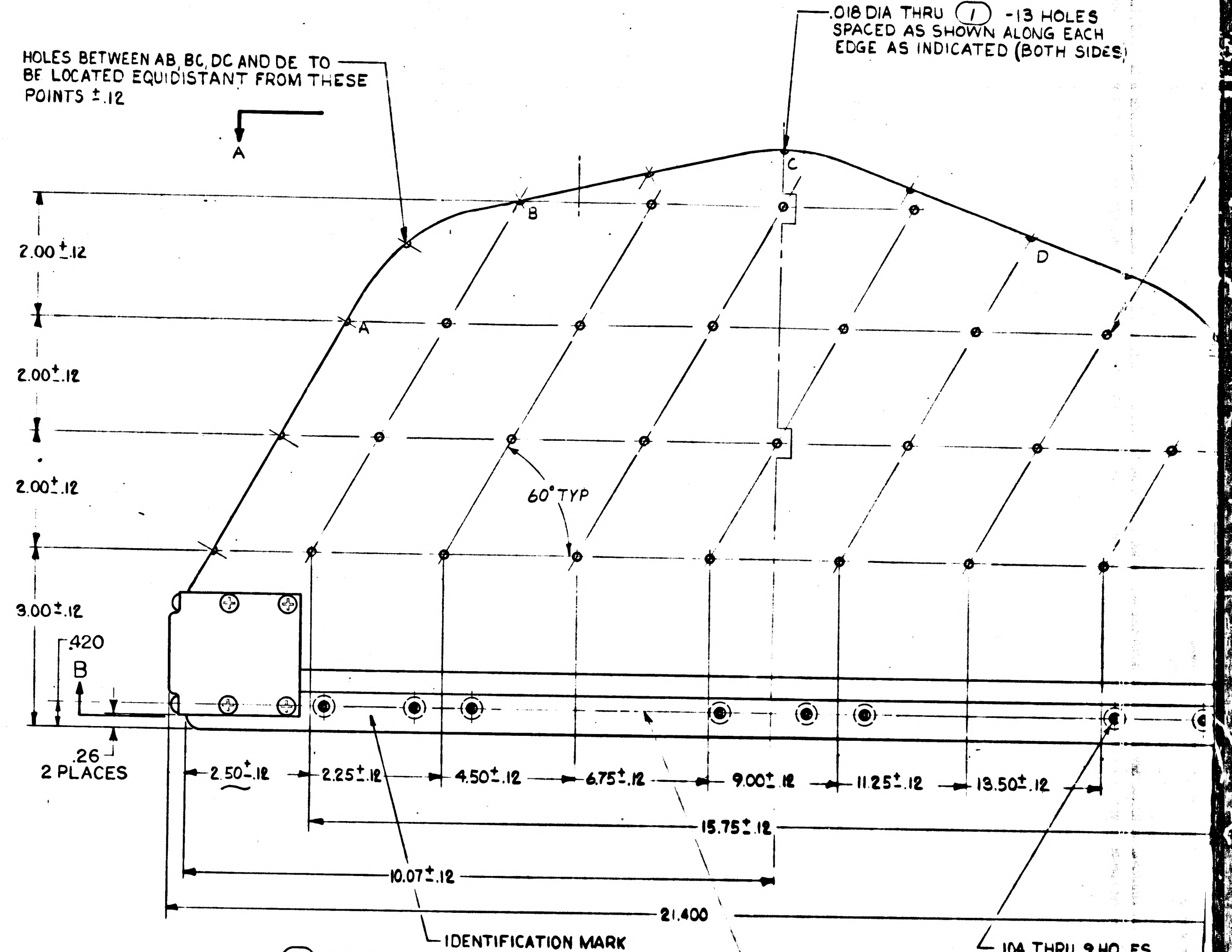
SIZE J2 CODE IDENT NO. 80230 2010788
SCALE FULL SHEET 1 OF 1

2010788 REV D SH 1

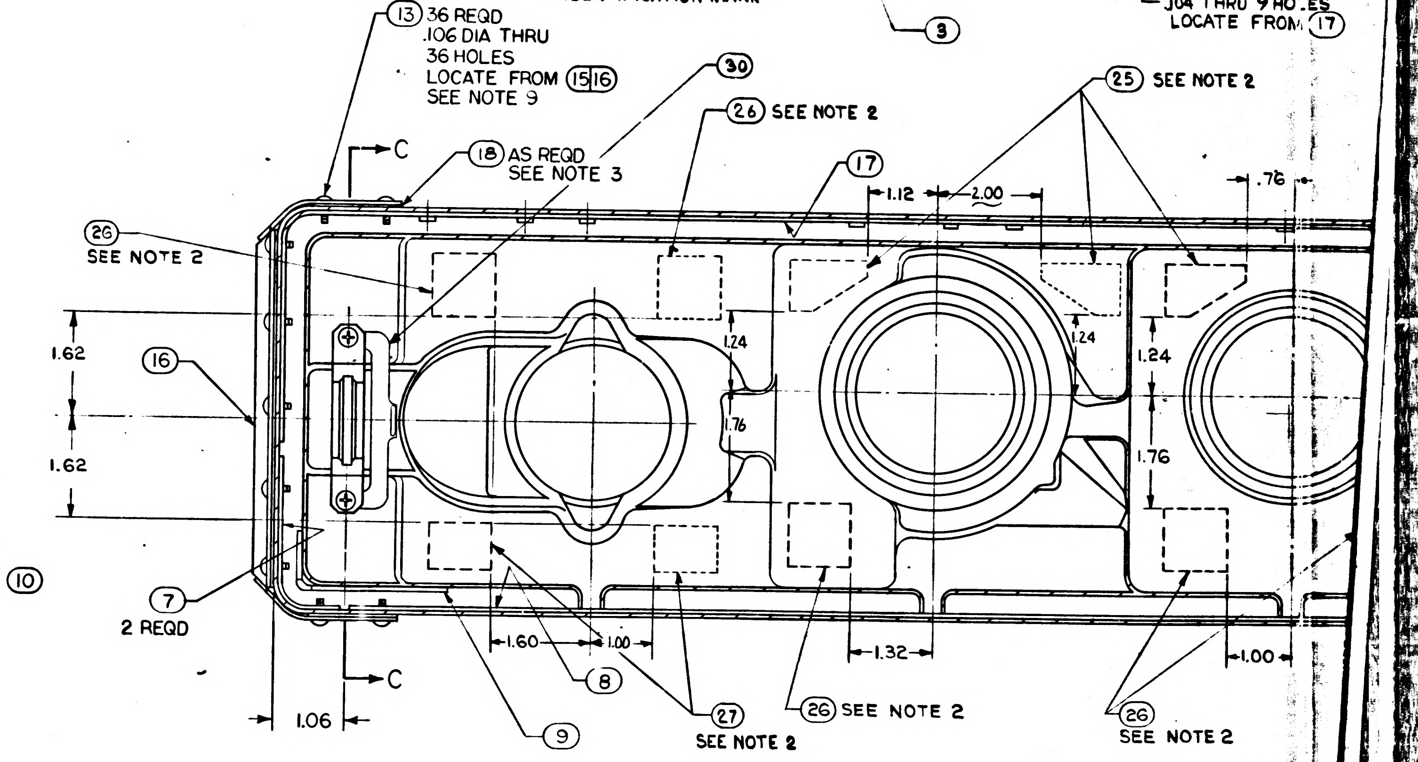
2/2010788

NOTES:

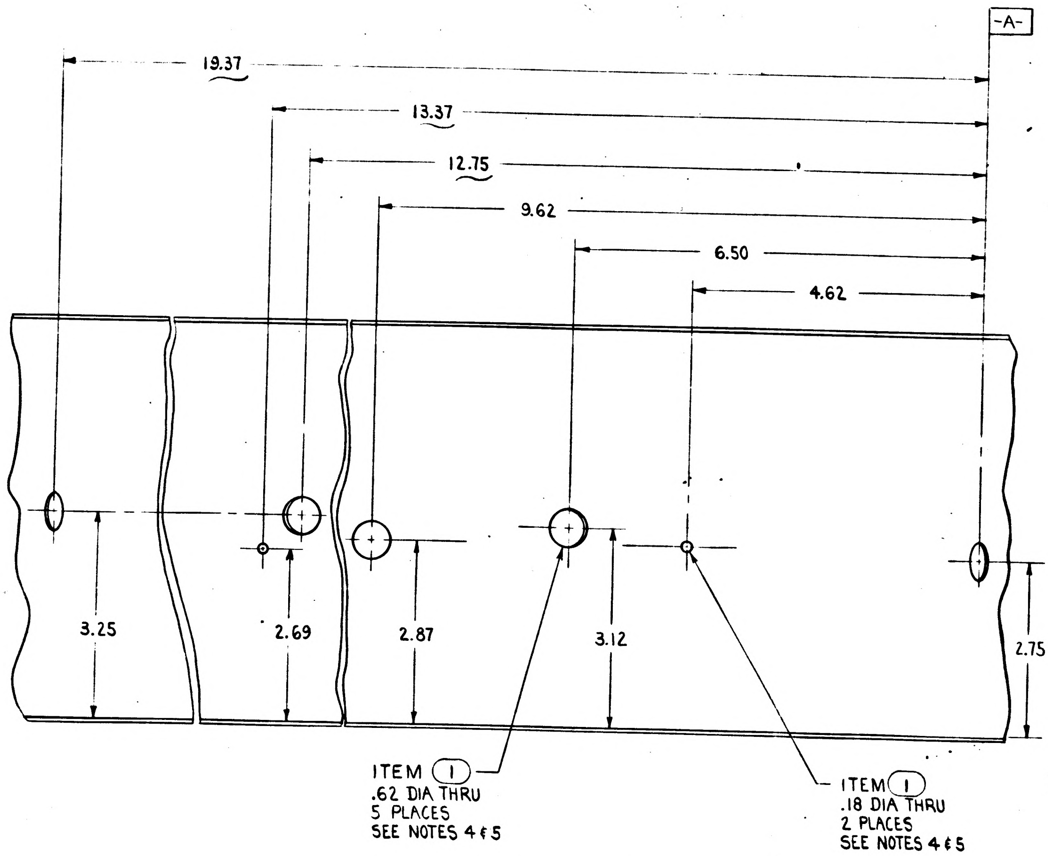
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND (3|4|5|7|8|9|12|14|17|25|26|27|28|29) TO (1|2) USING (20|23) PER ND1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. (15|16) TO BE SHIMMED TO MEET DIMENSIONS AND TO ALIGN THE INSERTS OF (15|16) TO EACH OTHER WITHIN .010 TRUE POSITION.
4. CASE SHALL BE FOAM FILLED USING (21|22) PER ND1002002 TYPE C SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140° F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60° F PER HOUR.
5. AFTER FOAM FILLING AND CURE TRIM OFF ALL PROJECTING FOAM FLUSH WITH CASE. CLEAN BY BRUSHING WITH FREON TF AND APPLY ITEM (31) OVER EXPOSED FOAM PER ND 1002291 TYPE I. OMIT PRIMER.
6. (11) TO BE INSTALLED INTO (10) SUCH THAT THE BALL EXTENDS BEYOND SURFACE OF (10) BY .020.
7. IDENTIFY USING DRAWING NUMBER PER ND1002019.
8. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
9. APPLY ADHESIVE, (20) AND (23) TO ALL SCREW THREADS (6) AND (13) PER ND1002187 *TYPE II PRIOR TO FINAL ASSEMBLY.*
10. ~~AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM (2) AND TO A DIA. OF APPROX. .80 DIA. TO PROVIDE A RETAINING LIP ON .62 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 5.~~
11. AFTER CURING OF CEMENT BONDING ITEMS (25|26|27|12|9|28) APPLY A COATING OF ITEM (24) OVER THE SAME ITEMS, .06 TO .12 THICK AROUND THE PERIMETER .12 TO .25 WIDE.
12. ALL CONES TO BE COATED WITH ITEM (24) .06 TO .12 THICK FROM BASE TO TIP OF CONES ON CONVEX SIDE. AFTER CURING OF ITEM (24) MACHINE ALL HOLES .018 DIA THRU ITEM (24) AND ITEM (2). HOLES NOT TO EXTEND INTO FOAM DEEPER THAN .12 IF MACHINED AFTER FOAM FILLING. HOLES ON THE SAME CIRCUMFERENCE TO BE 90°±5° TO EACH OTHER.
13. AFTER FOAM FILLING AND CURE, FOAM MUST BE FLUSH OR BELOW THE EXTERNAL SURFACE OF ITEMS (1) AND (2).
14. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING.



HOLES BETWEEN AB, BC, DC AND DE TO BE LOCATED EQUIDISTANT FROM THESE POINTS ±.12
.018 DIA THRU (1) -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
A
B
C
D
2.00±.12
2.00±.12
2.00±.12
3.00±.12
60° TYP
.420
B
.26
2 PLACES
2.50±.12
2.25±.12
4.50±.12
6.75±.12
9.00±.12
11.25±.12
13.50±.12
15.75±.12
10.07±.12
21.400
IDENTIFICATION MARK
(3)
.104 THRU 9 HOLES LOCATE FROM (17)

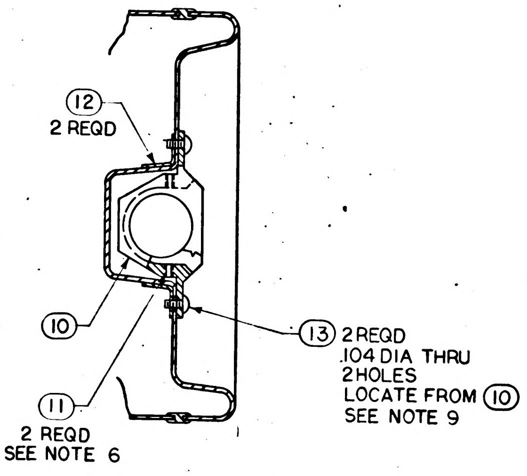


(13) 36 REQD .106 DIA THRU 36 HOLES LOCATE FROM (15|16) SEE NOTE 9
(30)
(25) SEE NOTE 2
(26) SEE NOTE 2
(18) AS REQD SEE NOTE 3
(17)
C
1.12
2.00
.76
(26) SEE NOTE 2
1.62
1.62
(16)
1.24
1.76
1.24
1.76
(7) 2 REQD
1.60
1.00
1.32
1.00
(8)
(9)
(27) SEE NOTE 2
(26) SEE NOTE 2
(26) SEE NOTE 2
1.06
C



-A-
19.37
13.37
12.75
9.62
6.50
4.62
3.25
2.69
2.87
3.12
2.75
ITEM (1) .62 DIA THRU 5 PLACES SEE NOTES 4 & 5
ITEM (1) .18 DIA THRU 2 PLACES SEE NOTES 4 & 5

PARTIAL VIEW A-A

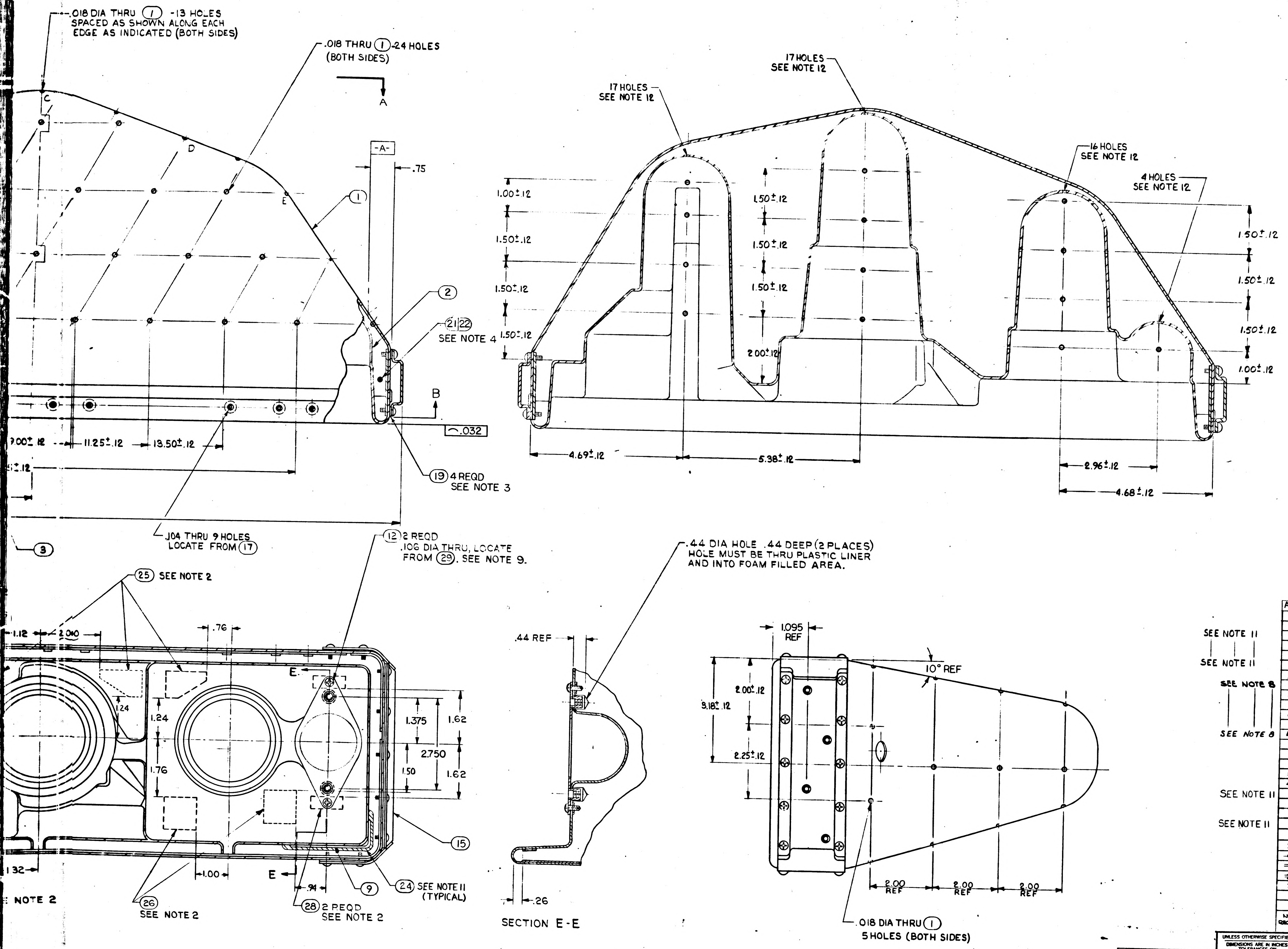


(12) 2 REQD
(10)
(11) 2 REQD SEE NOTE 6
(13) 2 REQD .104 DIA THRU 2 HOLES LOCATE FROM (10) SEE NOTE 9

SECTION C-C

2010788	REV E	SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION (A) WITH CHANGE TDRR 31737		5 AUG 66	GM
C		REVISED PER TDRR 31812		8 DEC 66	JJJ
D		REVISED PER TDRR 31722		29 DEC 66	WK J.E.G.
E		REVISED PER TDRR 32282		9 JAN 67	MIS PF


.018 DIA THRU ① -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
.018 THRU ① -24 HOLES (BOTH SIDES)
A
-A-
.75
C
D
E
①
②
㉑㉒ SEE NOTE 4
B
⌒.032
7.00±.12
11.25±.12
13.50±.12
⑲ 4 REQD SEE NOTE 3
.104 THRU 9 HOLES LOCATE FROM ⑰
③
17 HOLES SEE NOTE 12
17 HOLES SEE NOTE 12
16 HOLES SEE NOTE 12
4 HOLES SEE NOTE 12
1.00±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
2.00±.12
1.50±.12
1.50±.12
1.50±.12
1.00±.12
4.69±.12
5.38±.12
2.96±.12
4.68±.12
⑫ 2 REQD .106 DIA THRU, LOCATE FROM ㉙. SEE NOTE 9.
.44 DIA HOLE .44 DEEP (2 PLACES) HOLE MUST BE THRU PLASTIC LINER AND INTO FOAM FILLED AREA.
㉕ SEE NOTE 2
1.12
2.010
.76
E
1.24
1.24
1.76
1.375
1.62
2.750
1.50
1.62
⑮
1.32
1.00
E
.94
⑨
㉔ SEE NOTE 11 (TYPICAL)
NOTE 2
㉖ SEE NOTE 2
㉘ 2 REQD SEE NOTE 2
.44 REF
.26
SECTION E-E
1.095 REF
10° REF
3.18±.12
2.00±.12
2.25±.12
2.00 REF
2.00 REF
2.00 REF
.018 DIA THRU ① 5 HOLES (BOTH SIDES)
SEE NOTE 11
SEE NOTE 11
SEE NOTE 8
SEE NOTE 8
SEE NOTE 11
SEE NOTE 11

NO. REQD	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
AR	31	1012543-003	ENAMEL (GREY)
1	30	2021244	BRACKET
1	29	2021237	HOLDER, EYEPIECE
2	28	2021234-005	PLATE, BACKUP
2	27	2021234-002	PLATE, BACKUP
5	26	2021234-001	PLATE, BACKUP
3	25	2021235	PLATE, BACKUP
AR	24	1008898	ADHESIVE, EPOXY
AR	23	1010679	ACTIVATOR, ADHESIVE
AR	22	1010804	PREPOLYMER, POLYURETHANE
AR	21	1010863	RESIN, POLYURETHANE
AR	20	1010661	RESIN, ADHESIVE
4	19	1008871-002	SHIM, LAMINATED
AR	18	1008871-001	SHIM, LAMINATED
1	17	2021227	BRACKET, ANGLE (INSEP ASSY)
1	16	1021259	SUPPORT, LEFT HAND (INSEP ASSY)
1	15	1021258	SUPPORT, RIGHT HAND (INSEP ASSY)
~~1~~	14	~~2021215~~	PLATE, ~~BACK UP~~
40	13	MS24622-17	SCREW, TAPPING, PAN HEAD
2	12	1021279	BRACKET, ANGLE
2	11	1011288-1	PLUNGER, QUICK RELEASE
1	10	1021277	HOLDER, FILTER
2	9	202 214	PLATE, BACK UP
2	8	2021213	BRACKET, ANGLE, LOWER RIGHT
2	7	2021206	BRACKET, ANGLE
~~4~~	6	~~MS 21207C4-6~~	~~SCREW, TAPPING, FLAT HEAD~~
~~2~~	5	~~2021205~~	~~HOLDER, EYEPIECE, LOWER~~
~~2~~	4	~~2021202~~	~~HOLDER, EYEPIECE, UPPER~~
2	3	2021210	SEAL, PLASTIC
1	2	2021209	LINER, CASE
1	1	2021208	CASE, STORAGE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2010789-011	2021255-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Dahal DATE 18-JUL-66
CHECKED Stirma 12 AUG 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 8/22/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE, EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J2
CODE IDENT NO. 80230
2010788
SCALE FULL
SHEET 1 OF 1

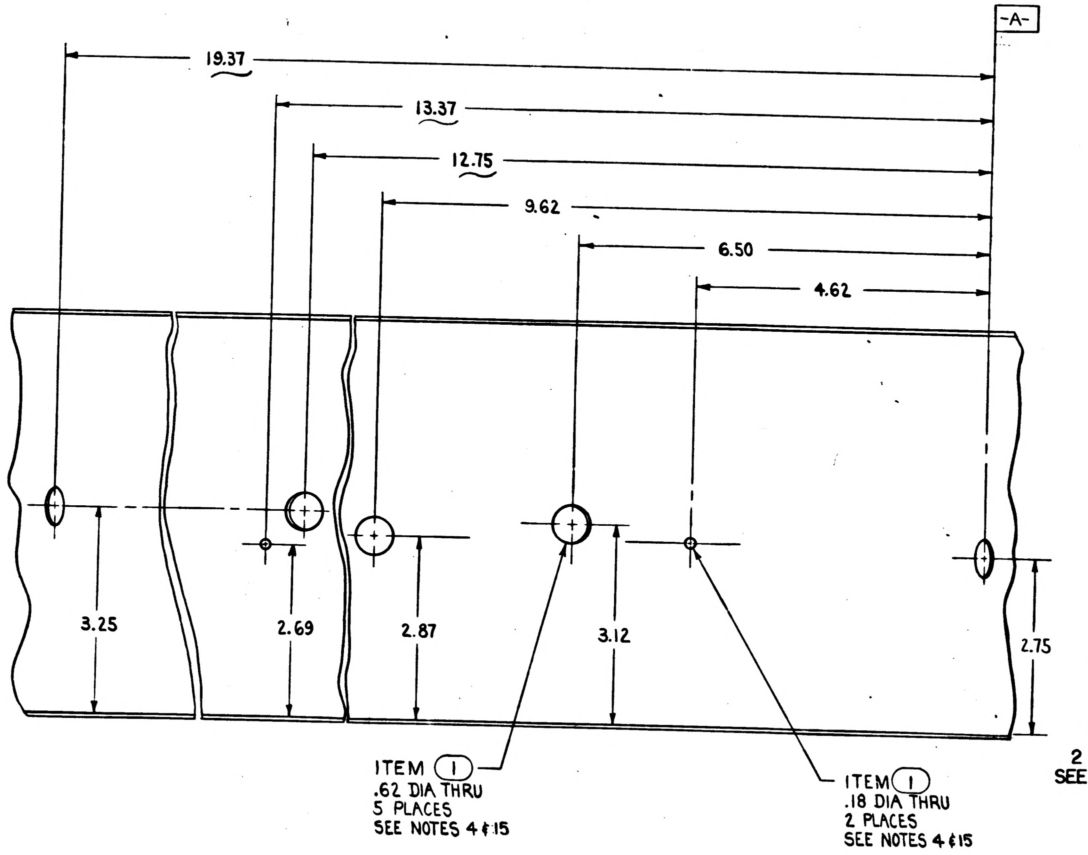
2010788 REV E SH 1

2010788

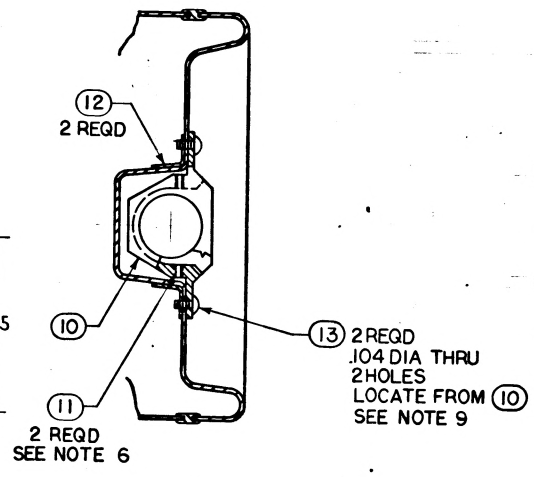
2720010788

NOTES:

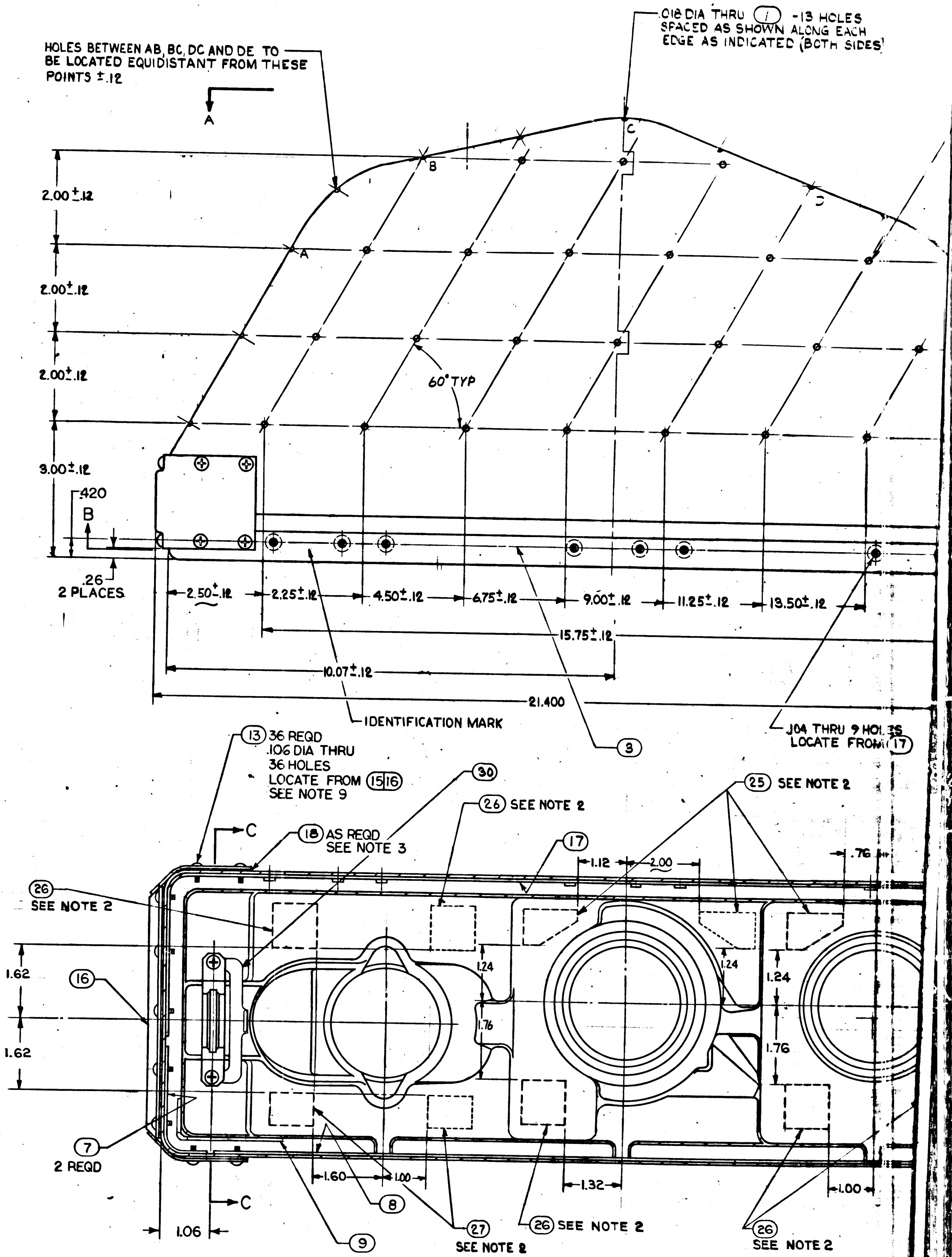
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND (3 ~~4~~ ~~5~~ 7 8 9 12 ~~14~~ 17 25 26 27 28 29) TO (1 2) USING (20 23) PER ND1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. (15 16) TO BE SHIMMED TO MEET DIMENSIONS AND TO ALIGN THE INSERTS OF (15 16) TO EACH OTHER WITHIN .010 TRUE POSITION.
4. CASE SHALL BE FOAM FILLED USING (21 22) PER ND1002002 TYPE C SUCH THAT THE AVERAGE CURED FOAM DENSITY SHALL BE 3.0 TO 4.0 LBS PER CUBIC FOOT. CURE SHALL BE 140°F FOR SIX HOURS WITH TEMPERATURE CHANGE NOT TO EXCEED 60°F PER HOUR.
5. ~~AFTER FOAM FILLING AND CURE TRIM OFF ALL PROJECTING FOAM FLUSH WITH CASE. CLEAN BY BRUSHING WITH FREON TF AND APPLY ITEM (3) OVER EXPOSED FOAM PER ND1002291 TYPE I, OMIT PRIMER.~~
6. (11) TO BE INSTALLED INTO (10) SUCH THAT THE BALL EXTENDS BEYOND SURFACE OF (10) BY .020.
7. IDENTIFY USING DRAWING NUMBER PER ND1002019.
8. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
9. APPLY ADHESIVE, (20) AND (23) TO ALL SCREW THREADS ~~(6) AND~~ (13) PER ND1002187 *TYPE II PRIOR TO FINAL ASSEMBLY.*
10. ~~*AFTER FOAM FILLING AND CURE, REMOVE FOAM TO A DEPTH OF APPROX. .06 BELOW ITEM (2) AND TO A DIA. OF APPROX. .80 DIA. TO PROVIDE A RETAINING LIP ON .62 DIA. FILL HOLES, PRIOR TO FILLING PER NOTE 5.*~~
11. AFTER CURING OF CEMENT BONDING ITEMS (25 26 27 12 9 28) APPLY A COATING OF ITEM (24) OVER THE SAME ITEMS, .06 TO .12 THICK AROUND THE PERIMETER .12 TO .25 WIDE.
12. ALL CONES TO BE COATED WITH ITEM (24) .06 TO .12 THICK FROM BASE TO TIP OF CONES ON CONVEX SIDE. AFTER CURING OF ITEM (24) MACHINE ALL HOLES .018 DIA THRU ITEM (24) AND ITEM (2) HOLES NOT TO EXTEND INTO FOAM DEEPER THAN .12 IF MACHINED AFTER FOAM FILLING. HOLES ON THE SAME CIRCUMFERENCE TO BE 90°±5° TO EACH OTHER.
13. ~~AFTER FOAM FILLING AND CURE FOAM MUST BE FLUSH OR BELOW THE EXTERNAL SURFACE OF ITEMS (1) AND (2).~~
14. CLEAN ALL FOAM CONTACT SURFACES WITH ISOPROPYL ALCOHOL AND FREON TF PRIOR TO FOAMING.
15. FOAM FILLING AND VENTING HOLES OF PARTIAL VIEW A-A SHALL BE SEALED WITH ITEM (24) TO A MINIMUM DEPTH OF .062 AND BLENDED FLUSH WITH OUTER SURFACE. ADD .018 DIA. HOLE THRU THE CENTER OF EACH FILL AND VENT HOLE AFTER (24) IS CURED.


-A-
19.37
13.37
12.75
9.62
6.50
4.62
3.25
2.69
2.87
3.12
2.75
ITEM (1)
.62 DIA THRU
5 PLACES
SEE NOTES 4 & 15
ITEM (1)
.18 DIA THRU
2 PLACES
SEE NOTES 4 & 15

PARTIAL VIEW A-A

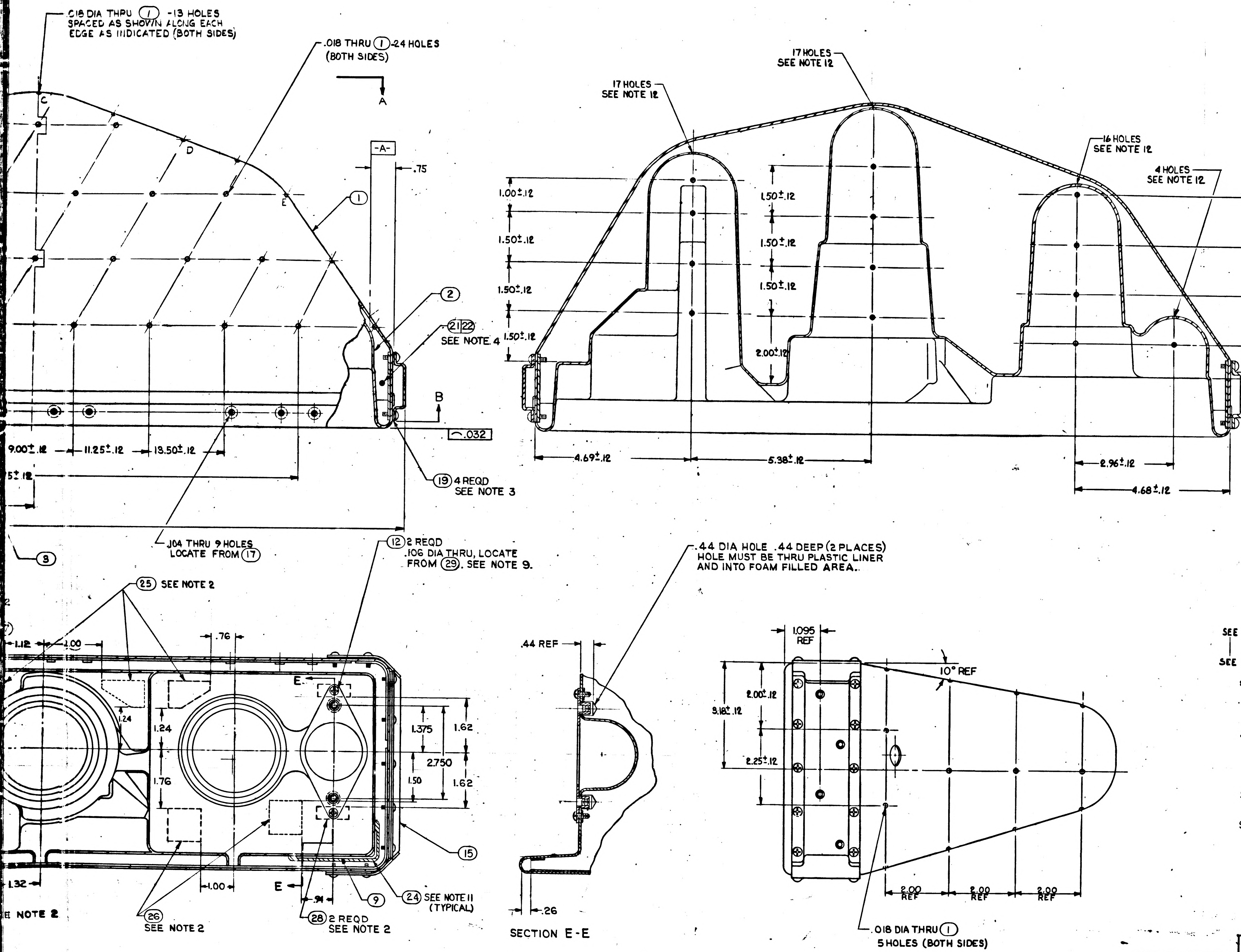

(12)
2 REQD
(10)
(11)
2 REQD
SEE NOTE 6
(13) 2 REQD
.104 DIA THRU
2 HOLES
LOCATE FROM (10)
SEE NOTE 9

SECTION C-C


HOLES BETWEEN AB, BC, DC AND DE TO BE LOCATED EQUIDISTANT FROM THESE POINTS ±.12
A
.018 DIA THRU (1) -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
A
B
C
D
60° TYP
2.00±.12
2.00±.12
2.00±.12
3.00±.12
.420
B
.26
2 PLACES
2.50±.12
2.25±.12
4.50±.12
6.75±.12
9.00±.12
11.25±.12
13.50±.12
15.75±.12
10.07±.12
21.400
IDENTIFICATION MARK
(3)
.104 THRU 9 HOLES
LOCATE FROM (17)
(13) 36 REQD
.106 DIA THRU
36 HOLES
LOCATE FROM (15 16)
SEE NOTE 9
(30)
(26) SEE NOTE 2
(25) SEE NOTE 2
C
(18) AS REQD
SEE NOTE 3
(17)
1.12
2.00
.76
(26)
SEE NOTE 2
1.62
1.62
(16)
1.24
1.76
1.24
1.24
1.76
(7)
2 REQD
1.60
1.00
1.32
1.00
(8)
C
1.06
(9)
(27)
SEE NOTE 2
(26) SEE NOTE 2
(26)
SEE NOTE 2

2010788	REV F	SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
(M) B		REPLACES REVISION (A) WITH CHANGE TDRR 30739		5-AUG 66	GM
C		REVISED PER TDRR 31812		8 DEC 66	J J J
D		REVISED PER TDRR 31722		20 DEC 66	WK J.E.S.
E		REVISED PER TDRR 32282		9 JAN '67	MLS PF
F		REVISED PER TDRR 32456		12 JAN 6	TR DW


.018 DIA THRU (1) -13 HOLES SPACED AS SHOWN ALONG EACH EDGE AS INDICATED (BOTH SIDES)
.018 THRU (1) -24 HOLES (BOTH SIDES)
A
-A-
.75
C
D
E
(1)
(2)
(21)(22) SEE NOTE 4
B
.032
9.00±.12
11.25±.12
13.50±.12
75±.12
(19) 4 REQD SEE NOTE 3
(3)
.104 THRU 9 HOLES LOCATE FROM (17)
17 HOLES SEE NOTE 12
17 HOLES SEE NOTE 12
16 HOLES SEE NOTE 12
4 HOLES SEE NOTE 12
1.00±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
1.50±.12
2.00±.12
1.50±.12
1.50±.12
1.50±.12
1.00±.12
4.69±.12
5.38±.12
2.96±.12
4.68±.12
(12) 2 REQD .106 DIA THRU, LOCATE FROM (29). SEE NOTE 9.
.44 DIA HOLE .44 DEEP (2 PLACES) HOLE MUST BE THRU PLASTIC LINER AND INTO FOAM FILLED AREA.
(25) SEE NOTE 2
1.12
1.00
.76
1.24
1.24
1.76
E
1.375
1.62
2.750
1.50
1.62
(15)
1.32
1.00
E
.91
(9)
(24) SEE NOTE 11 (TYPICAL)
(26) SEE NOTE 2
(28) 2 REQD SEE NOTE 2
E NOTE 2
.44 REF
.26
SECTION E-E
1.095 REF
10° REF
3.18±.12
2.00±.12
2.25±.12
2.00 REF
2.00 REF
2.00 REF
.018 DIA THRU (1) 5 HOLES (BOTH SIDES)

	NO. REQD	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	~~AR~~	~~31~~	~~1012543-003~~	~~ENAMEL (GREY)~~
	1	30	2021244	BRACKET
	1	29	2021237	HOLDER, EYEPIECE
SEE NOTE 11	2	28	2021234-005	PLATE, BACKUP
	2	27	2021234-002	PLATE, BACKUP
SEE NOTE 11	5	26	2021234-001	PLATE, BACKUP
	3	25	2021235	PLATE, BACKUP
	AR	24	1008898	ADHESIVE, EPOXY
SEE NOTE 8	AR	23	1010679	ACTIVATOR, ADHESIVE
	AR	22	1010864	PREPOLYMER, POLYURETHANE
	AR	21	1010863	RESIN, POLYURETHANE
	AR	20	1010661	RESIN, ADHESIVE
	4	19	1008871-002	SHIM, LAMINATED
SEE NOTE 8	AR	18	1008871-001	SHIM, LAMINATED
	1	17	2021227	BRACKET, ANGLE (INSEP ASSY)
	1	16	1021259	SUPPORT, LEFT HAND (INSEP ASSY)
	1	15	1021258	SUPPORT, RIGHT HAND (INSEP ASSY)
	~~1~~	14	~~2021215~~	~~PLATE, BACK UP~~
	40	13	MS24622-17	SCREW, TAPPING, PAN HEAD
SEE NOTE 11	2	12	1021279	BRACKET, ANGLE
	2	11	1011288-1	PLUNGER, QUICK RELEASE
	1	10	1021277	HOLDER, FILTER
SEE NOTE 11	2	9	2021214	PLATE, BACK UP
	2	8	2021213	BRACKET, ANGLE, LOWER RIGHT
	2	7	2021206	BRACKET, ANGLE
	~~4~~	6	~~MS21207C4-6~~	~~SCREW, TAPPING, FLAT HEAD~~
	~~2~~	5	~~2021205~~	~~HOLDER, EYEPIECE, LOWER~~
	~~2~~	4	~~2021202~~	~~HOLDER, EYEPIECE, UPPER~~
	2	3	2021210	SEAL, PLASTIC
	1	2	2021209	LINER, CASE
	1	1	2021208	CASE, STORAGE

LIST OF PARTS AND MATERIALS

2010789-011	2021255-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL 6 Aug 66

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 18-JUL-66
CHECKED 16 AUG 66
APPROVAL 7 Aug 66
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 8/12/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE, EYEPIECE STORAGE
(INSEPARABLE ASSEMBLY)

SIZE J_2
CODE IDENT NO. 80230
2010788
SCALE FULL
SHEET 1 OF 1

2010788
2010788

2010788	REV F	SH 1

27/2010788

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. THIS IS AN INCOMPLETE DRAWING.

2010789

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			2			1021311	STOP, COVER
			1			2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			1			2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)
			011				

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
-011	2021255-011	2021255-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + — −
3 PLACE DECIMALS + — −
ANGLES + — −

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT
DRAWN DATE 18 July 66
CHECKED 20 JUL 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY, EYEPIECE STORAGE

SIZE C
CODE IDENT NO. 80230
2010789
SCALE —
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	
	B	REVISED PER TDRR 30738		25AUG 66	WJ3 JI

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THIS IS AN INCOMPLETE DRAWING.

			3			1021265	HINGE, BUTT
			15			MS 24622-16	SCREW, PAN HD
			9			1010618-14	SCREW, BUTTON HD
			3			1008872-001	BUMPER, RUBBER
			1			2021216	RECEPTACLE, LOCK R.H. (INSEP. ASS'Y)
			1			2021218	RECEPTACLE, LOCK, L.H. (INSEP. ASS'Y)
			2			2021222	FASTENER LOCK (INSEP ASS'Y)
			3			1021311	STOP, COVER
			1			2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			1			2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

-011	2021255-011	2021255-011
APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN N.J. Fluder DATE 18 July 66
CHECKED Mokye 20 JUL 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY, EYEPIECE STORAGE

SIZE C
CODE IDENT NO. 80230
2010789
SCALE —
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. THIS IS AN INCOMPLETE DRAWING.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	
	B	REVISED PER TDRR 30738		25 AUG 66	JJB JI
	C	REVISED PER TDRR 31016		13 SEP 66	JJB J.W.

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED					EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				2			2021233-002	PLATE, INSTRUCTION
				2			2021233-001	PLATE, INSTRUCTION
				4			MS21045C04	NUT, SELF-LOCKING
				4			MS35216-12	SCREW, PAN HD., CROSS RECESS
				2			2021232	SHIM, LAMINATED
				2			2021217	RECEPTACLE, TURNLOCK FASTENER
				2			2021224	NUT, PLAIN HEX
				AR			1010679	ACTIVATOR, ADHESIVE
				AR			1010661	RESIN, ADHESIVE
				3			1021265	HINGE, BUTT
				21			MS 24622-17	SCREW, TAPPING
				9			NAS1190 C04-P6L	PAN HD. CROSS RECESS, SELF LOCKING
				3			1008872-001	BUMPER, RUBBER
				1			2021216	RECEPTACLE, LOCK R.H. (INSEP. ASS'Y)
				~~1~~			~~2021218~~	~~RECEPTACLE, LOCK L.H. (INSEP. ASS'Y)~~
				2			2021222	FASTENER LOCK (INSEP ASS'Y)
				3			1021311	STOP, COVER
				1			2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
				1			2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

APPLICABLE DASH NO.	NEXT ASSY	USED ON
-011	2021255-011	2021255-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN D. J. Fludr DATE 18 July 66
CHECKED M. Odye 20 JUL 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY, EYEPIECE STORAGE

SIZE C
CODE IDENT NO. 80230
2010789
SCALE —
SHEET 1 OF 1

MIL-1082D D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. THIS IS AN INCOMPLETE DRAWING.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 30614		11 AUG 66	
	B	REVISED PER TDRR 30738		25 AUG 66	JJB JI
	C	REVISED PER TDRR 31016		13 SEP 66	JJB J.W.
	D	REVISED PER TDRR 31711		4 NOV 66	JRK PBR

QUANTITY REQUIRED					EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				2			2021236	SPRING, TENSION
				2			2021233-002	PLATE, INSTRUCTION
				2			2021233-001	PLATE, INSTRUCTION
				4			MS21045C04	NUT, SELF-LOCKING
				4			MS35216-12	SCREW, PAN HD., CROSS RECESS
				2			2021232	SHIM, LAMINATED
				2			2021217	RECEPTACLE, TURNLOCK FASTENER
				2			2021224	NUT, PLAIN HEX
				AR			1010679	ACTIVATOR, ADHESIVE
				AR			1010661	RESIN, ADHESIVE
				3			1021265	HINGE, BUTT
				21			MS 24622-17	SCREW, TAPPING
				9			NAS1190 C04-P6L	PAN HD. CROSS RECESS, SELF LOCKING
				3			1008872-001	BUMPER, RUBBER
				1			2021216	RECEPTACLE, LOCK R.H. (INSEP. ASS'Y)
				~~1~~			~~2021218~~	~~RECEPTACLE, LOCK L.H. (INSEP. ASS'Y)~~
				2			2021222	FASTENER LOCK (INSEP ASS'Y)
				3			1021311	STOP, COVER
				1			2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
				1			2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
-011	2021255-011	2021255-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± ___ 3 PLACE DECIMALS ± ___ ANGLES ± ___

DO NOT SCALE THIS DRAWING

MATERIAL ———

APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE 18 July 66
CHECKED Moye 20 JUL 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
CCB APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

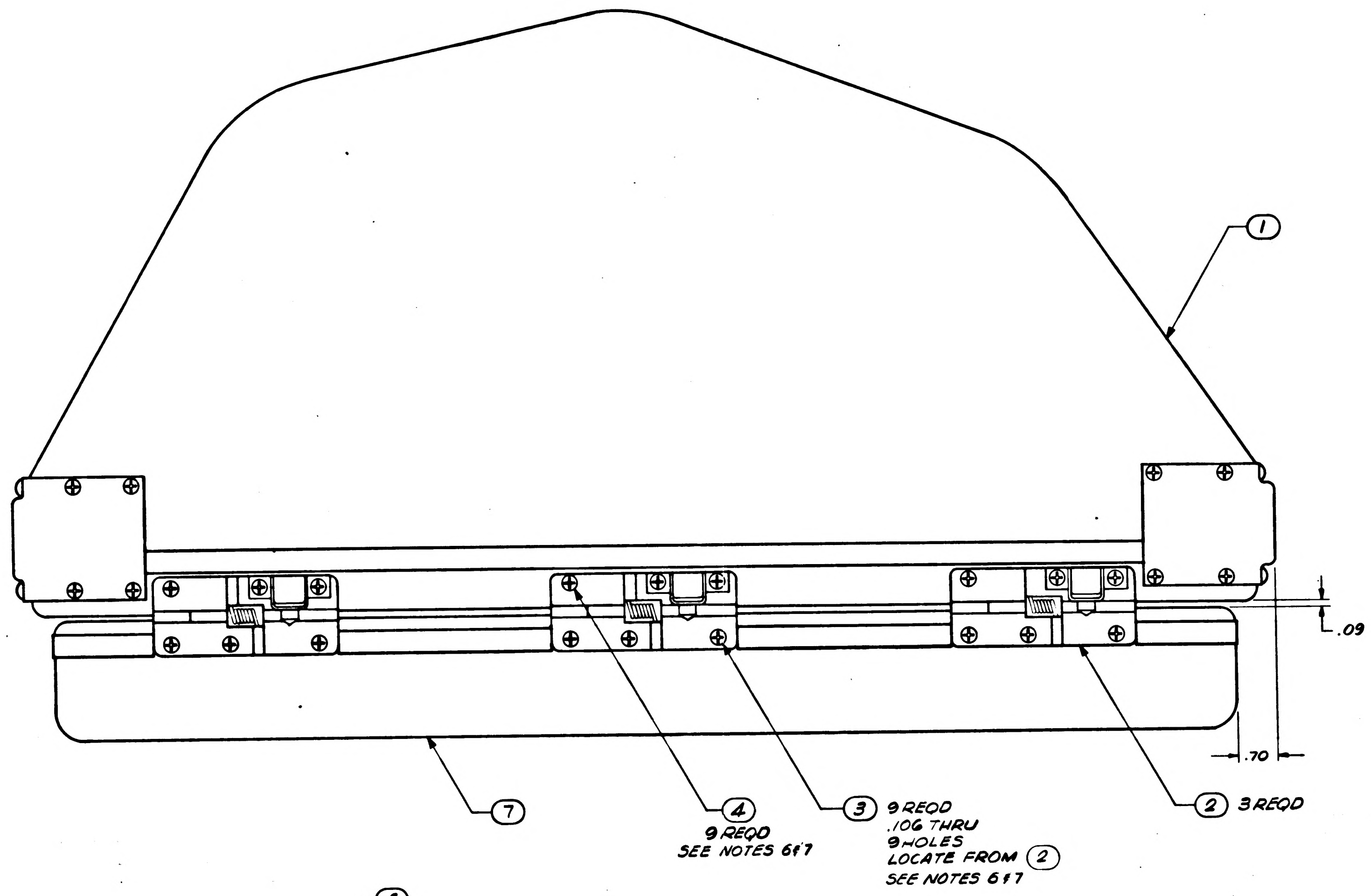
CASE AND COVER ASSEMBLY, EYEPIECE STORAGE

SIZE C
CODE IDENT NO. 80230
2010789
SCALE —
SHEET 1 OF 1

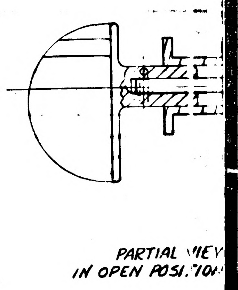
MIL-1082D D

NOTES:

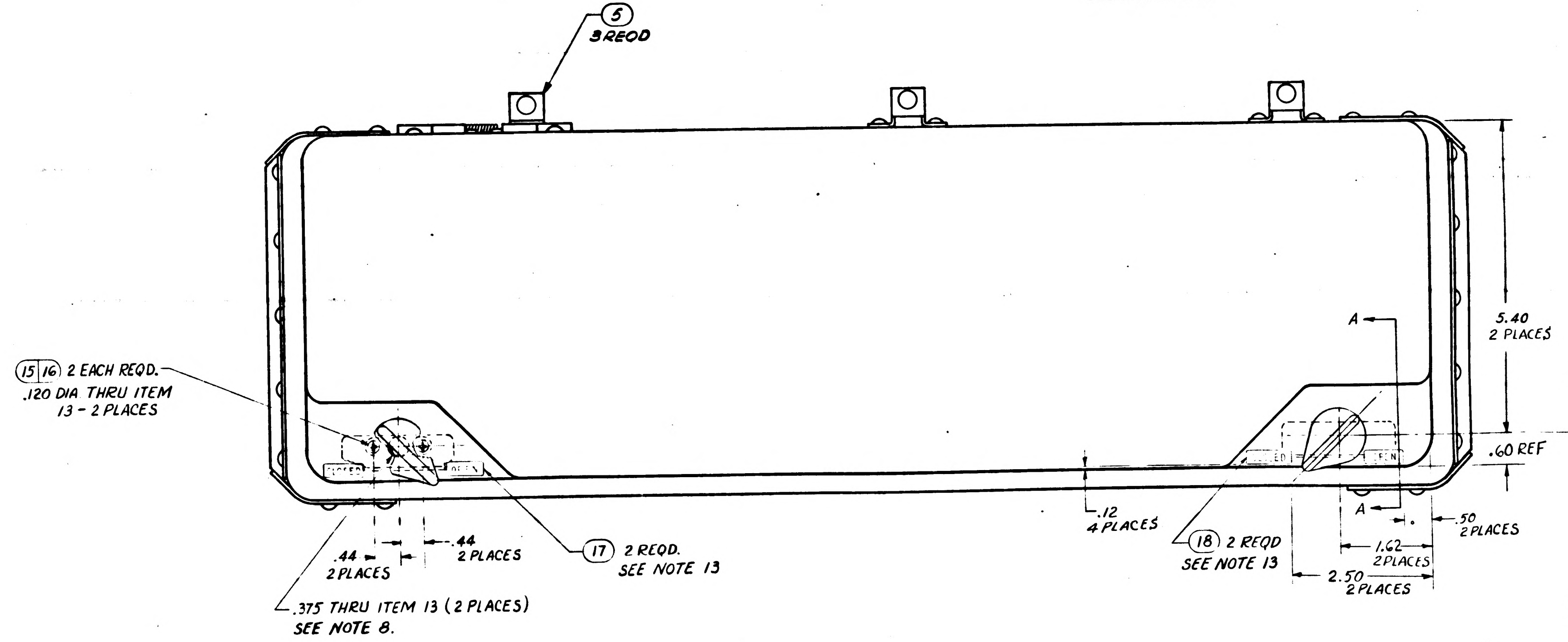
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. BOND ⑥ TO ⑤ USING (8|9) PER ND 1002187 TYPE II WITH ROOM TEMPERATURE CURE. ADHESIVE JOINT TO BE .002 TO .010 THICK.
3. ⑥ TO BE POSITIONED TO LIMIT COVER TRAVEL TO 80°
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE (8|9) TO ALL SCREW THREADS (3|4) PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦
9. BOND ITEMS (10|11) TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS (8 & 9).
10. BOND SHIM ITEM ⑭ TO ITEMS (7|11) USING ITEMS (8|9)
11. PEEL SHIM ITEM ⑭ TO GET SOLID HEIGHT FOR 1.14 DIM.
12. LOCATE ITEM ⑫ ON ITEM ⑬ FROM .438 DIA HOLE IN ITEM ⑦.
13. APPLY ITEMS (17|18) PER ND1002219, METHOD II. LOCATE AS SHOWN.



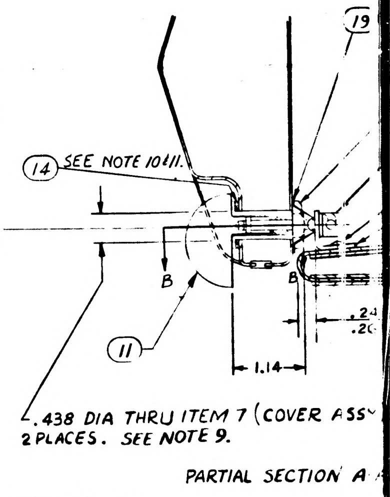
①
.09
.70
⑦
④ 9 REQD
SEE NOTES 6 & 7
③ 9 REQD
.106 THRU
9 HOLES
LOCATE FROM ②
SEE NOTES 6 & 7
② 3 REQD



PARTIAL VIEW
IN OPEN POSITION



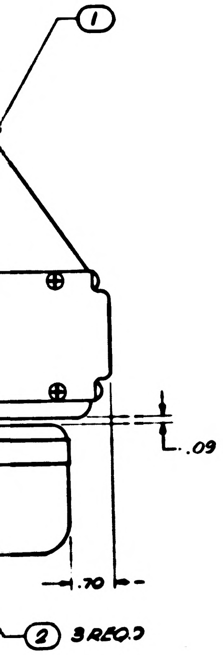
⑤ 3 REQD
(15|16) 2 EACH REQD.
.120 DIA THRU ITEM 13 - 2 PLACES
A
A
5.40
2 PLACES
.60 REF
.12
4 PLACES
.50
2 PLACES
1.62
2 PLACES
2.50
2 PLACES
⑱ 2 REQD
SEE NOTE 13
⑰ 2 REQD.
SEE NOTE 13
.44
2 PLACES
.44
2 PLACES
.375 THRU ITEM 13 (2 PLACES)
SEE NOTE 8.

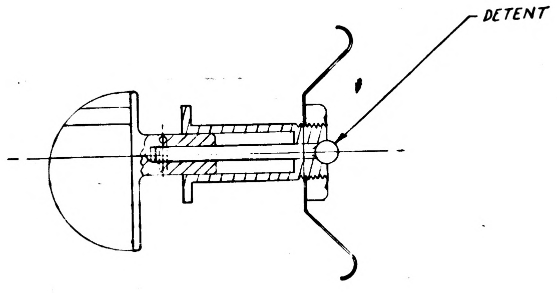


⑲
⑭ SEE NOTE 10/11.
B
B
⑪
1.14
.438 DIA THRU ITEM 7 (COVER ASS
2 PLACES. SEE NOTE 9.
PARTIAL SECTION A

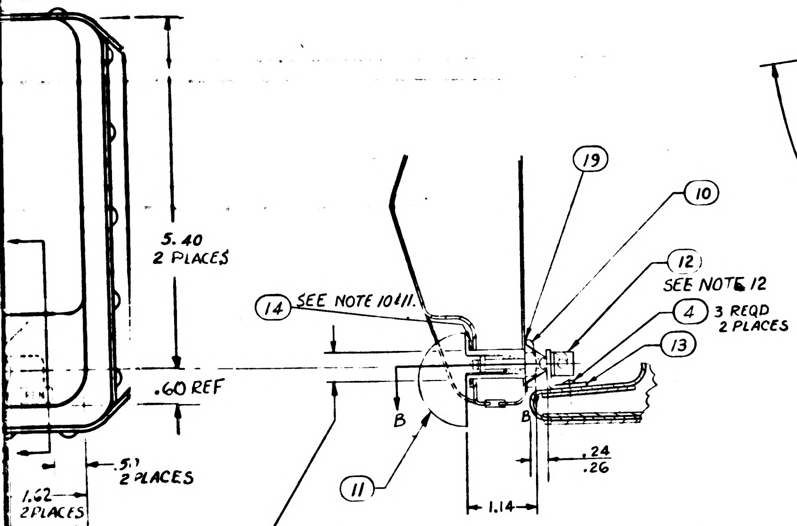
2010789 | REV E | SH. 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28



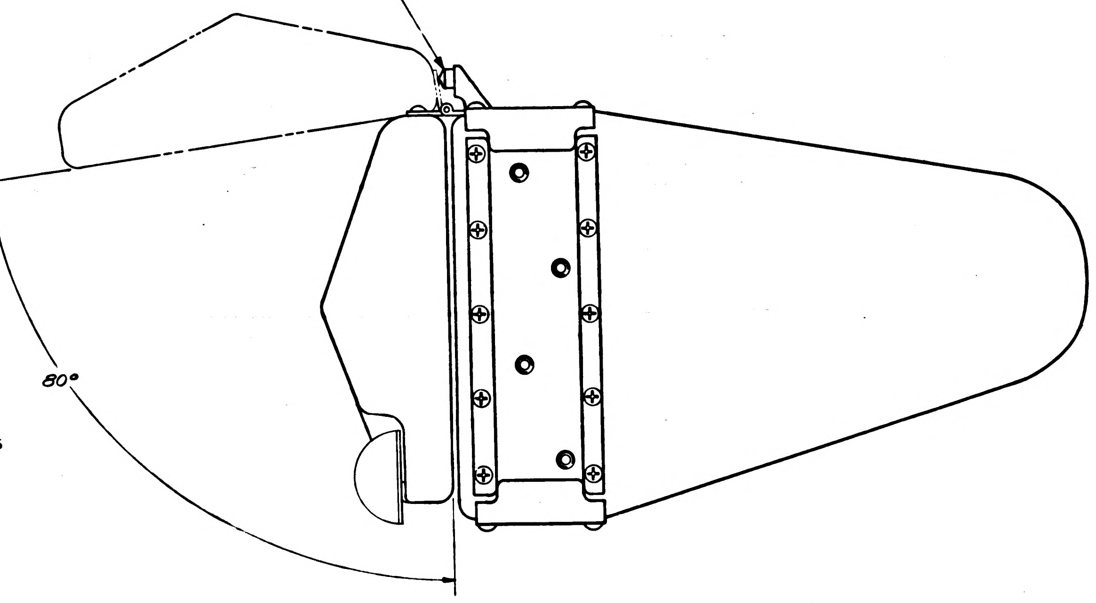


PARTIAL VIEW B-B SCALE 2:1
IN OPEN POSITION SHOWING POSITION OF DETENT.



.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN 2 PLACES. SEE NOTE 9.

PARTIAL SECTION A-A



				011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				2		19	2021236	SPRING, TENSION
				2		18	2021233-002	PLATE, INSTRUCTION
				2		17	2021233-001	PLATE, INSTRUCTION
				4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
				4		15	MS35216-12	SCREW, PAN HD
				2		14	2021232	SHIM, LAMINATED
				2		13	2021216	RECEPTACLE, LOCK - R H
				2		12	2021217	RECEPTACLE,
				2		11	2021222	STUD ASSY, TURNLOCK FASTENER
				2		10	2021224	NUT, PLAIN HEX
SEE NOTE 5				AR		9	1010679	ACTIVATOR, ADHESIVE
SEE NOTE 5				AR		8	1010661	RESIN, ADHESIVE
				1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
SEE NOTE 5				3		6	1008872-001	BUMPER, RUBBER
				3		5	1021311	STOP, COVER
SEE NOTE 5				9		4	NAS1190C04-P6L	(7875739-198) SCREW
				21		3	MS24622-17	SCREW, TAPPING
				3		2	1021265	HINGE, BUTT (INSEP ASSY)
				1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN DATE 18-Jul-66
CHECKED 20 Sep 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
APPROVAL 11/4/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

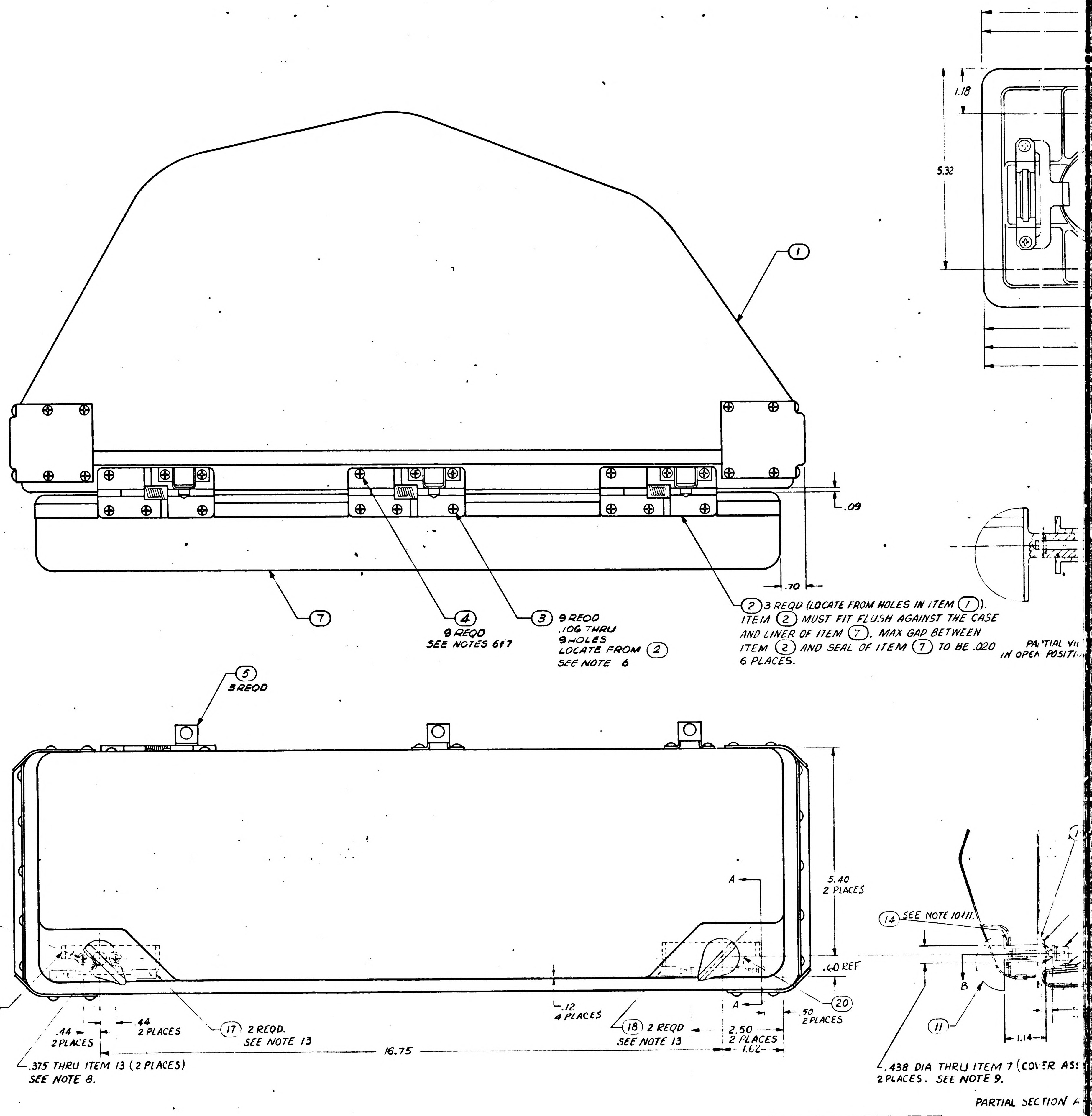
CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

SIZE J/2 | CODE IDENT NO. 80230 | 2010789
SCALE FULL | SHEET 1 OF 1

2010789 | REV E | SH. 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③④ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦
9. BOND ITEMS ⑩⑪ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS (8 & 9).
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨
11. PEEL SHIM ITEM ⑭ TO GET SOLID HEIGHT FOR 1.14 DIM.
12. LOCATE ITEM (12) ON ITEM ⑬ FROM .438 DIA HOLE IN ITEM ⑦.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II. LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3 PLACES) USING ⑧⑨ PER ND1002187 TYPE II.



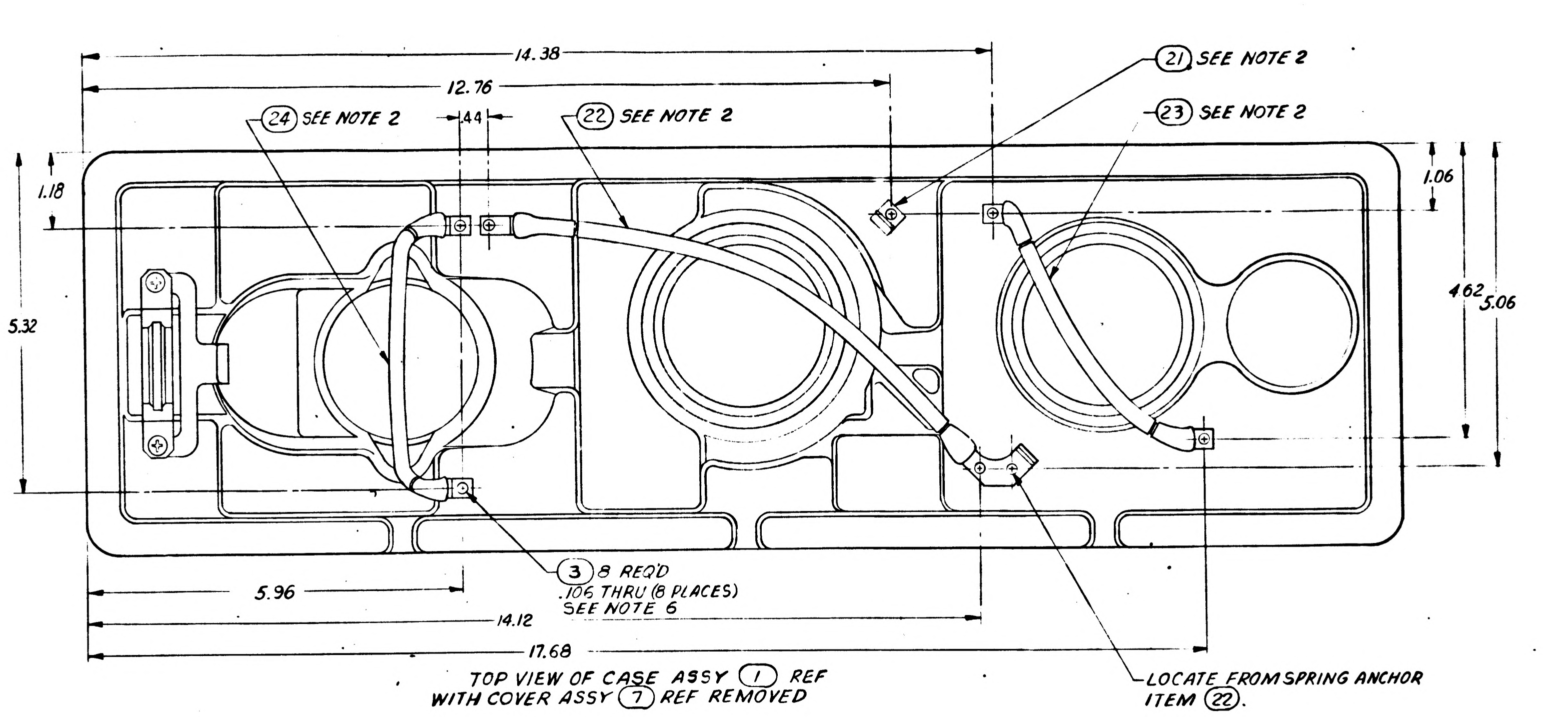
①
⑦
④ 9 REQD SEE NOTES 6 & 7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQD (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020 6 PLACES.
.09
.70
1.18
5.32
PARTIAL VI
IN OPEN POSITI
⑤ 3 REQD
⑮⑯ 2 EACH REQD. .120 DIA THRU ITEM 13 - 2 PLACES
⑬
.44 2 PLACES
.44 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.375 THRU ITEM 13 (2 PLACES) SEE NOTE 8.
16.75
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
2.50 2 PLACES
1.62
.50 2 PLACES
⑳
A
A
5.40 2 PLACES
.60 REF
⑭ SEE NOTE 10 & 11.
B
⑪
1.14
.438 DIA THRU ITEM 7 (COVER ASS
2 PLACES. SEE NOTE 9.
PARTIAL SECTION A

2010789 REV F SH. 1 OF 1

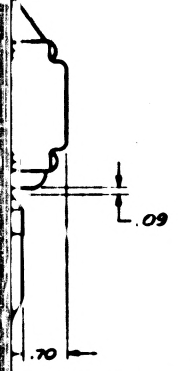
1/2010789

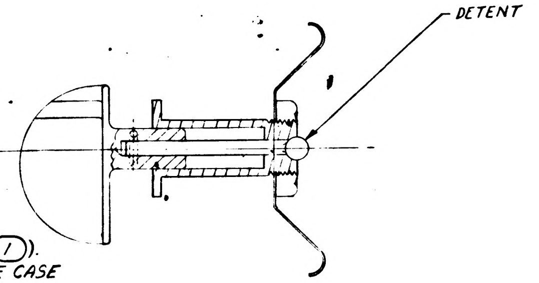
REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	JMP EF


14.38
12.76
.44
(24) SEE NOTE 2
(22) SEE NOTE 2
(21) SEE NOTE 2
(23) SEE NOTE 2
1.18
5.32
1.06
4.62
5.06
(3) 8 REQ'D
.106 THRU (8 PLACES)
SEE NOTE 6
5.96
14.12
17.68
LOCATE FROM SPRING ANCHOR ITEM (22).

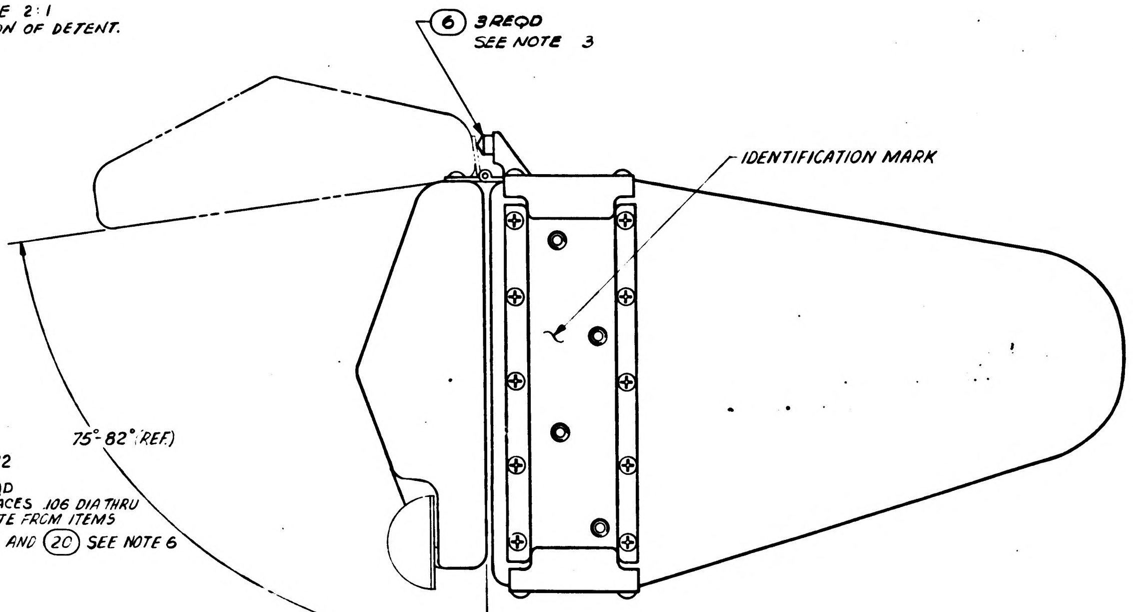
TOP VIEW OF CASE ASSY (1) REF
WITH COVER ASSY (7) REF REMOVED

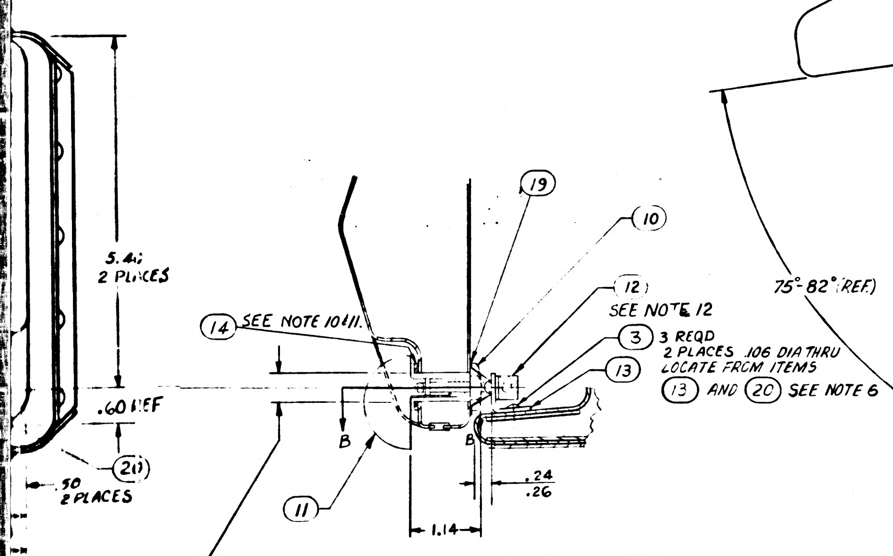




EQD (LOCATE FROM HOLES IN ITEM (1)).
(2) MUST FIT FLUSH AGAINST THE CASE
ER OF ITEM (7)). MAX GAP BETWEEN
(2) AND SEAL OF ITEM (7) TO BE .020
ES.

PARTIAL VIEW B-B SCALE 2:1
IN OPEN POSITION SHOWING POSITION OF DETENT.


(6) 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF)


5.4
2 PLACES
.60 REF
(21)
.50
2 PLACES
(14) SEE NOTE 10&11.
(19)
(10)
(12)
SEE NOTE 12
(3) 3 REQD
2 PLACES .106 DIA THRU
LOCATE FROM ITEMS
(13) AND (20) SEE NOTE 6
(13)
B
B
(11)
.24
.26
1.14

.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN
2 PLACES. SEE NOTE 9.

PARTIAL SECTION A-A

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
	1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
	1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
	1		21	2021257	ANCHOR, SPRING
	1		20	2021216-002	BRACKET-RECP LOCK FASTENER R.H.
	2		19	2021236	SPRING, TENSION
	2		18	2021233-002	PLATE, INSTRUCTION
	2		17	2021233-001	PLATE, INSTRUCTION
	4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
	4		15	MS35216-12	SCREW, PAN HD
	2		14	2021232	SHIM, LAMINATED
	1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
	2		12	2021217	RECEPTACLE,
	2		11	2021222	STUD ASSY, TURNLOCK FASTENER
	2		10	2021224	NUT, PLAIN HEX
SEE NOTE 5	AR		9	1010679	ACTIVATOR, ADHESIVE
SEE NOTE 5	AR		8	1010661	RESIN, ADHESIVE
	1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
SEE NOTE 5	3		6	1008872-001	BUMPER, RUBBER
	3		5	1021311	STOP, COVER
SEE NOTE 5	9		4	NAS1190C04-P6L	(7875739-198) SCREW
	23		3	MS24622-17	SCREW, TAPPING
	3		2	1021265	HINGE, BUTT (INSEP ASSY)
	1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN 18-Jul-66 DATE
CHECKED 20 Sep 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
APPROVAL 11/7/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

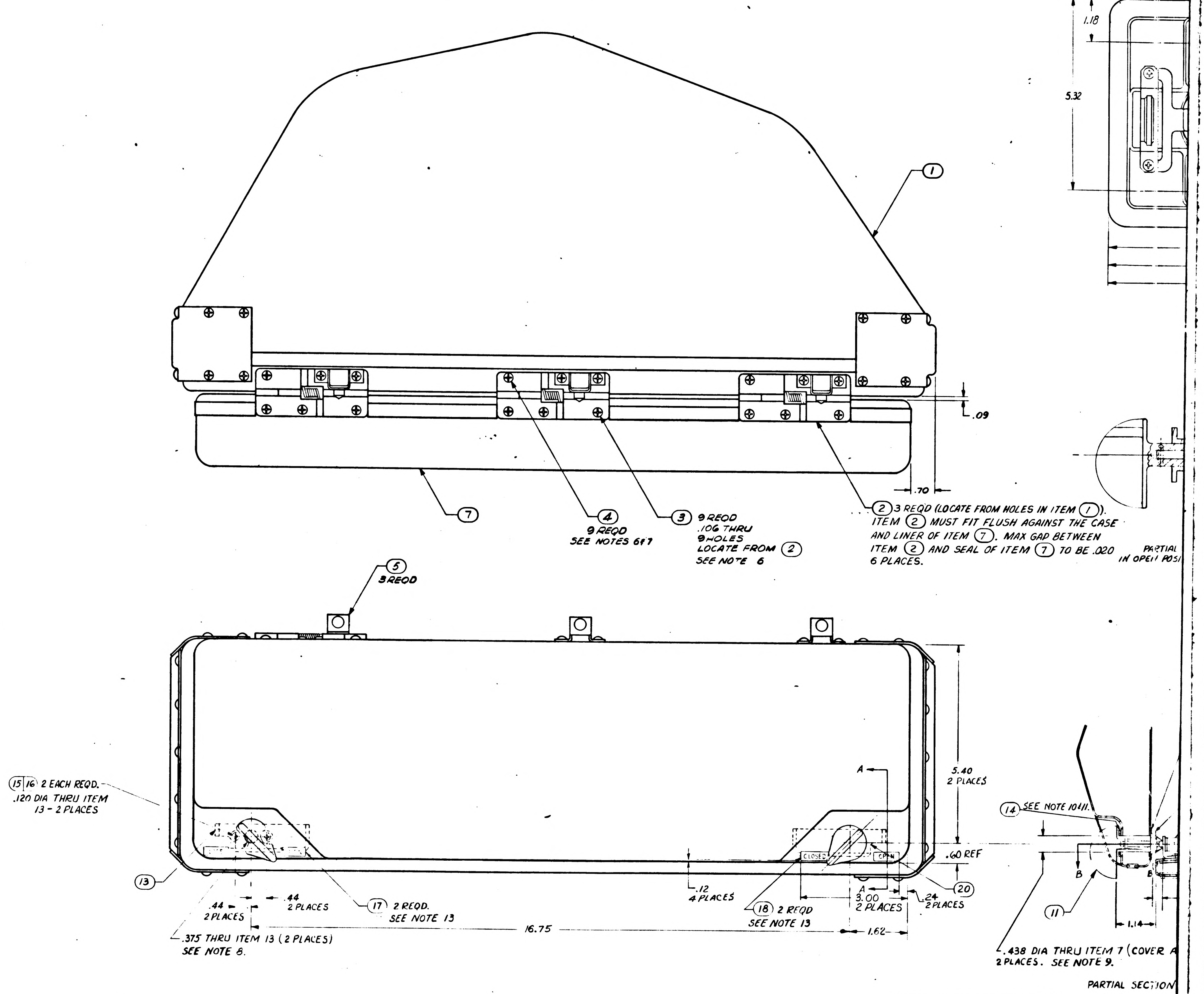
SIZE J/2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

2010789 REV F SH. 1 OF 1

2/2010789

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③④ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS (8 & 9).
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨
11. PEEL SHIM ITEM ⑭ TO GET SOLID HEIGHT FOR 1.14 DIM.
12. LOCATE ITEM (12) ON ITEM ⑬ FROM .438 DIA HOLE IN ITEM ⑦.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II. LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3 PLACES) USING ⑧⑨ PER ND1002187 TYPE II.

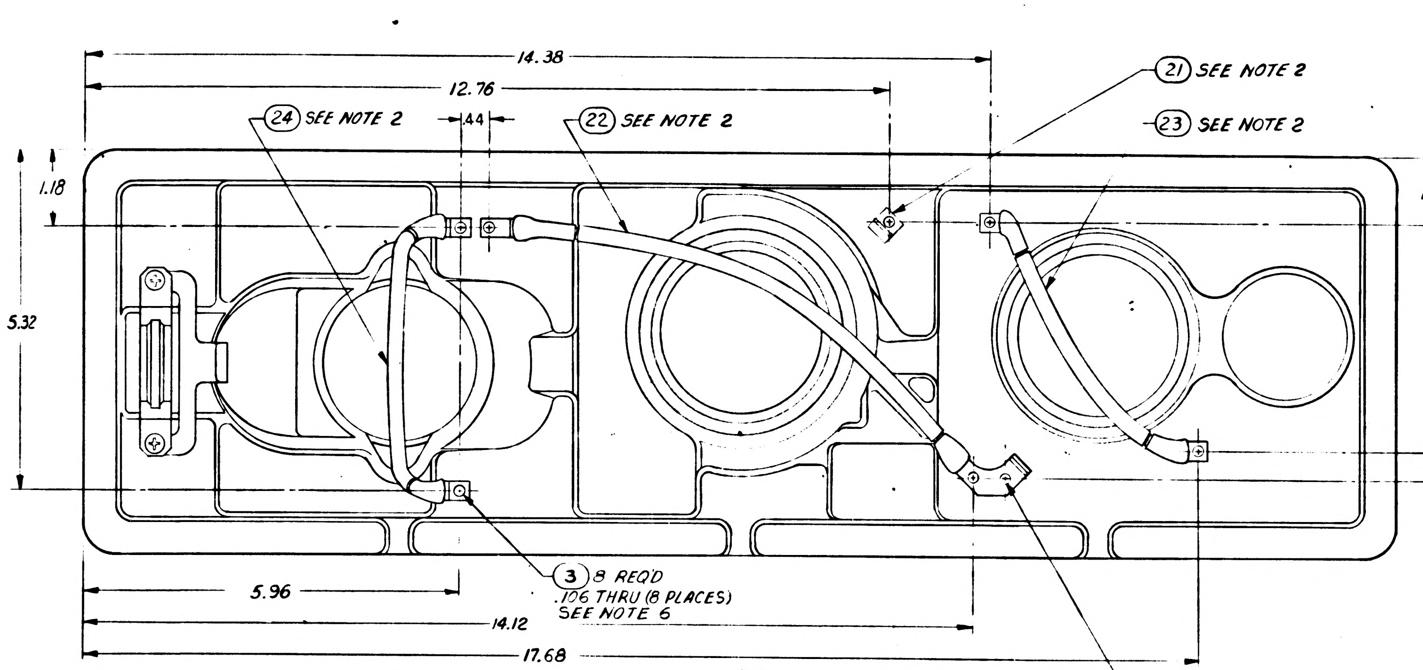


①
.09
.70
⑦
④ 9 REQD SEE NOTES 6 & 7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQD (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020 6 PLACES.
PARTIAL IN OPEN POSI
1.18
5.32
⑤ 3 REQD
⑮⑯ 2 EACH REQD. .120 DIA THRU ITEM 13 - 2 PLACES
⑬
.44 2 PLACES
.44 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.375 THRU ITEM 13 (2 PLACES) SEE NOTE 8.
16.75
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
CLOSED
OPEN
A
A
3.00 2 PLACES
.24 2 PLACES
1.62
⑳
5.40 2 PLACES
.60 REF
⑭ SEE NOTE 10 & 11.
B
B
⑪
1.14
.438 DIA THRU ITEM 7 (COVER A 2 PLACES. SEE NOTE 9.
PARTIAL SECTION

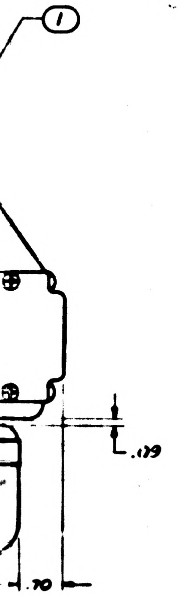
2010789 G 1 OF 1

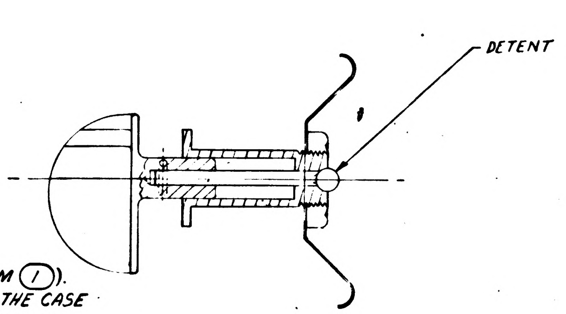
1/2010789

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	JMP E
G		REVISED PER TDRR 31874		18 NOV 66	DB E


14.38
12.76
.44
24 SEE NOTE 2
22 SEE NOTE 2
21 SEE NOTE 2
23 SEE NOTE 2
1.18
5.32
1.06
4.62
5.06
5.96
14.12
17.68
3 8 REQD .106 THRU (8 PLACES) SEE NOTE 6
LOCATE FROM SPRING ANCHOR ITEM 22.

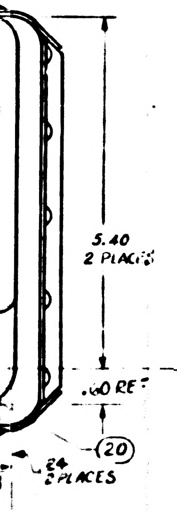
TOP VIEW OF CASE ASSY ① REF
WITH COVER ASSY ⑦ REF REMOVED

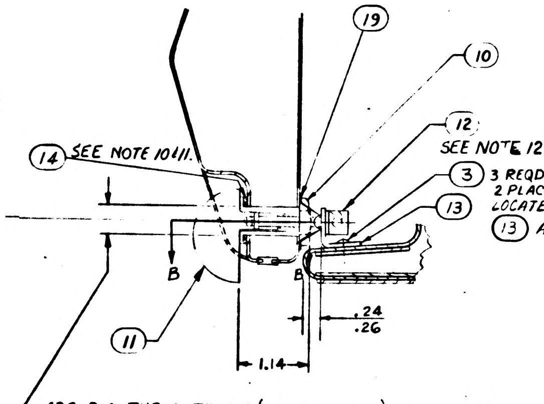




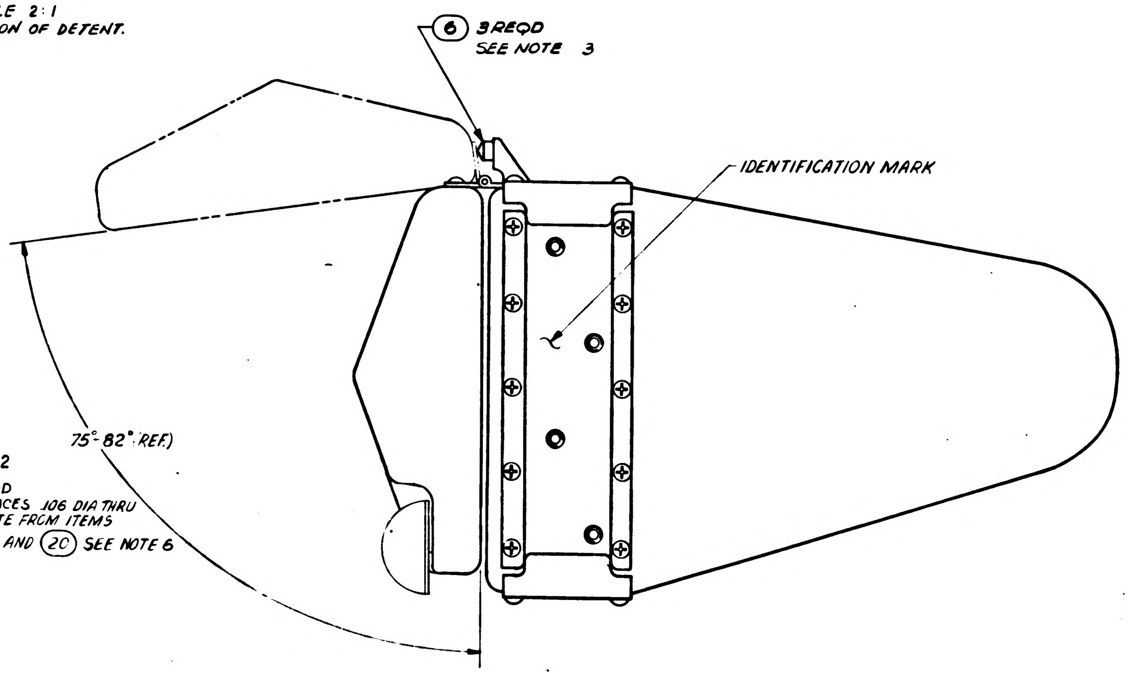
REQD (LOCATE FROM HOLES IN ITEM ①).
② MUST FIT FLUSH AGAINST THE CASE
INER OF ITEM (;). MAX GAP BETWEEN
② AND SEAL OF ITEM ⑦ TO BE .020
CES.

PARTIAL VIEW B-B SCALE 2:1
IN OPEN POSITION SHOWING POSITION OF DETENT.


5.40
2 PLACES
.60 REF
20
.24
2 PLACES


19
10
14 SEE NOTE 10&11.
12 SEE NOTE 12
3 3 REQD 2 PLACES .106 DIA THRU LOCATE FROM ITEMS 13 AND 20 SEE NOTE 6
13
B
B
11
1.14
.24
.26
.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN 2 PLACES. SEE NOTE 9.

PARTIAL SECTION A-A


6 3 REQD SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF)

SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
			1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
			1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
			1		21	2021257	ANCHOR, SPRING
			1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
			2		19	2021236	SPRING, TENSION
			2		18	2021233-002	PLATE, INSTRUCTION
			2		17	2021233-001	PLATE, INSTRUCTION
			4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
			4		15	MS35216-12	SCREW, PAN HD
			2		14	2021232	SHIM, LAMINATED
			1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
			2		12	2021217	RECEPTACLE,
			2		11	2021222	STUD ASSY, TURNLOCK FASTENER
			2		10	2021224	NUT, PLAIN HEX
			AR		9	1010679	ACTIVATOR, ADHESIVE
			AR		8	1010661	RESIN, ADHESIVE
			1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			3		6	1008872-001	BUMPER, RUBBER
			3		5	1021311	STOP, COVER
			9		4	NAS1190C04-P6L	(7875739-198) SCREW
			23		3	MS24622-17	SCREW, TAPPING
			3		2	1021265	HINGE, BUTT (INSEP ASSY)
			1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± .005
ANGLES ± 0

DO NOT SCALE THIS DRAWING

MATERIAL —

APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN 18 JUL 66 DATE
CHECKED 20 SEP 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

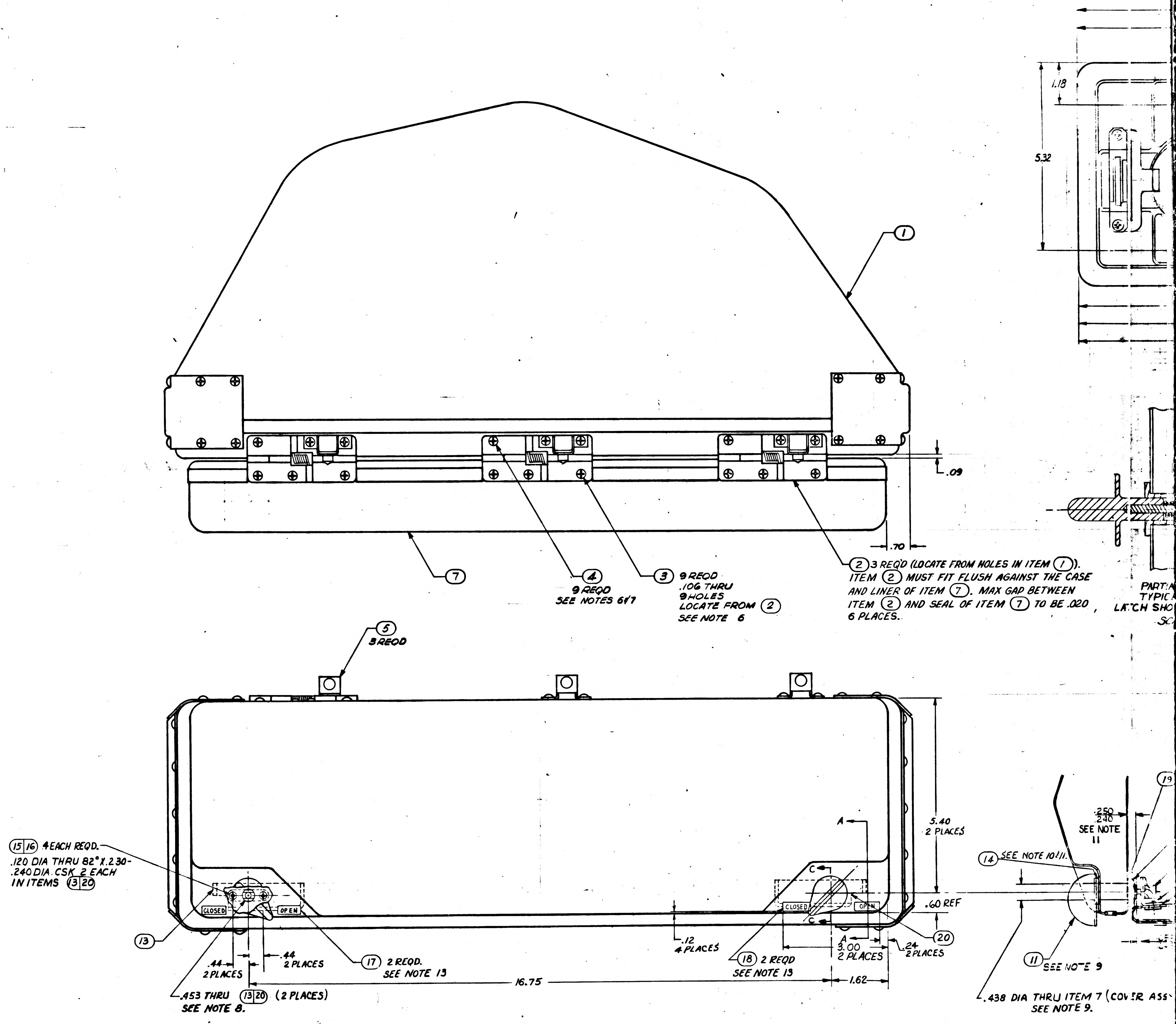
SIZE J2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

2010789 REV G SH. 1 OF 1

2-/-2010789

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③④ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪⑲ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS ⑧⑨.
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨.
11. ADJUST SHIM THICKNESS (ITEM ⑭) TO OBTAIN .240-.250 DIM. (FROM ITEM ⑦ TO EDGE OF ITEM ⑪).
12. LOCATE ⑫ ON ⑬ AND ⑳ SO THAT THE CENTER OF THE HELIX IN ⑫ IS CONCENTRIC WITHIN .005 WITH THE .438 DIA HOLE IN ⑦ AND THAT THE ℄ OF THE SLOT IN THE MOUNTING FLANGE OF ⑫ IS IN LINE, (HORIZONTALLY) WITH THE COUNTERSUNK HOLES IN ⑬ AND ⑳. BOND ⑫ TO ⑬ AND ⑳ USING ITEM ⑧ AND ⑨.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3PLACES) USING ⑧⑨ PER ND 1002187 TYPE II.

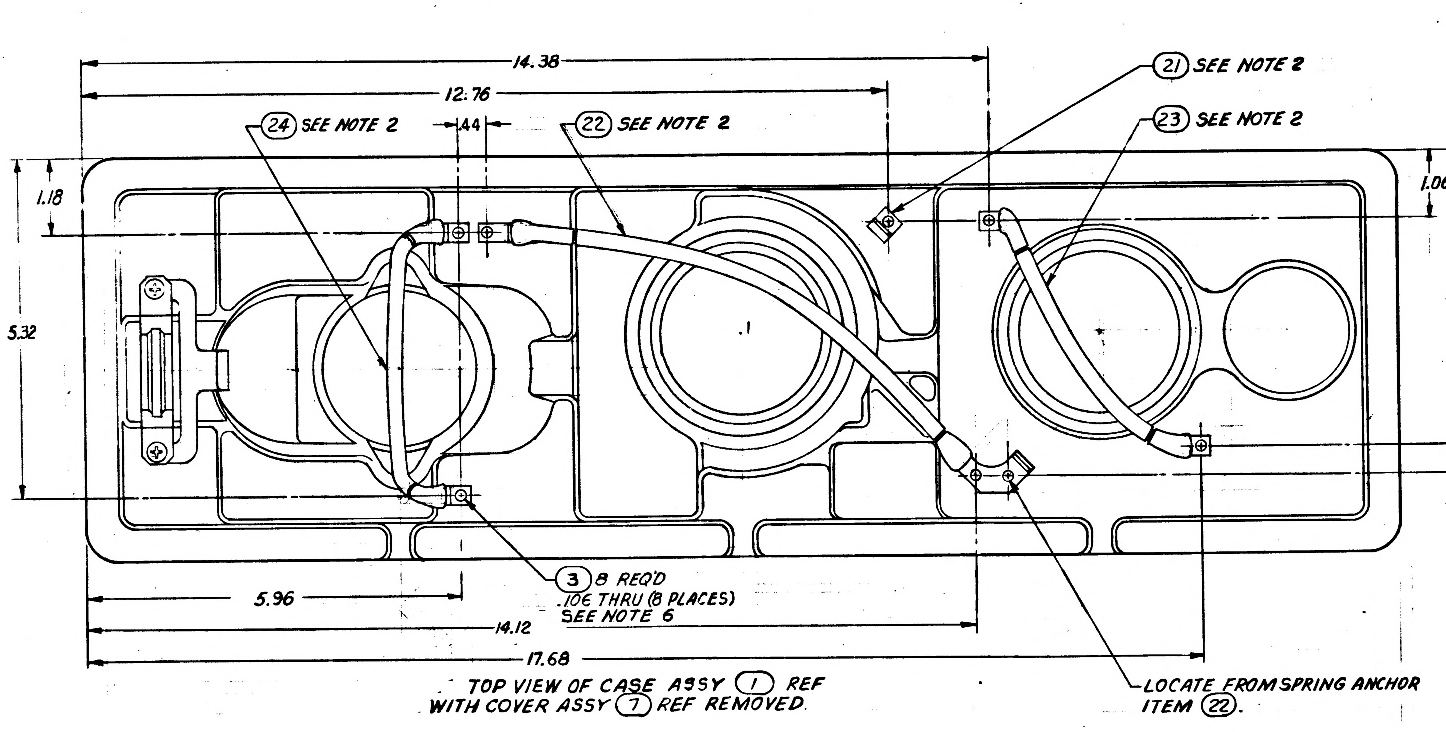


①
.09
.70
⑦
④ 9 REQD SEE NOTES 6&7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQ'D (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020, 6 PLACES.
⑤ 3 REQD
1.18
5.32
⑮⑯ 4 EACH REQD. .120 DIA THRU 82° X .230-.240 DIA. CSK 2 EACH IN ITEMS ⑬⑳
CLOSED
OPEN
⑬
.44 2 PLACES
.44 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.453 THRU ⑬⑳ (2 PLACES) SEE NOTE 8.
16.75
A
C
5.40 2 PLACES
.60 REF
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
3.00 2 PLACES
.24 2 PLACES
1.62
⑳
⑭ SEE NOTE 10&11.
.250 .240 SEE NOTE 11
⑲
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASS
SEE NOTE 9.

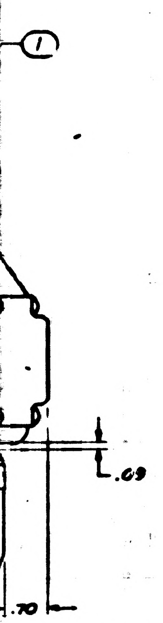
PARTIAL SECTION A-
TYPICAL 2 PLACES

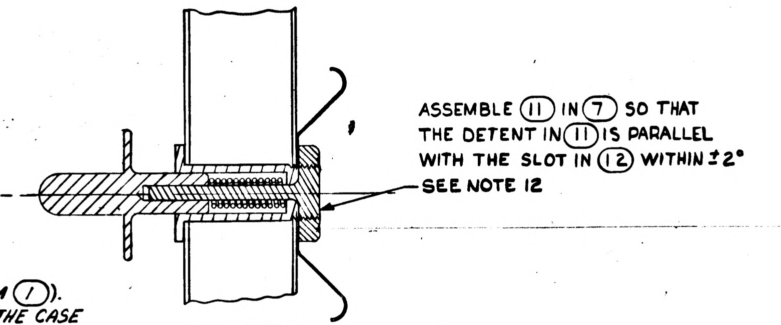
2010789	REV H	SH. 1 OF 1

1/2010789


14.38
12.76
.44
(24) SEE NOTE 2
(22) SEE NOTE 2
(21) SEE NOTE 2
(23) SEE NOTE 2
1.18
1.06
5.32
4.62
5.06
(3) 8 REQD
.106 THRU (8 PLACES)
SEE NOTE 6
5.96
14.12
17.68
LOCATE FROM SPRING ANCHOR ITEM (22).

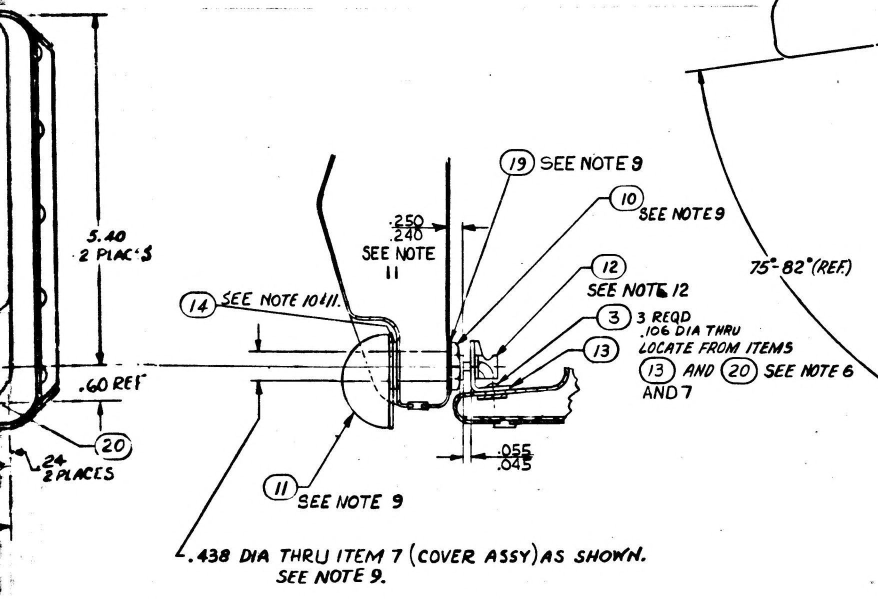
TOP VIEW OF CASE ASSY (1) REF
WITH COVER ASSY (7) REF REMOVED.



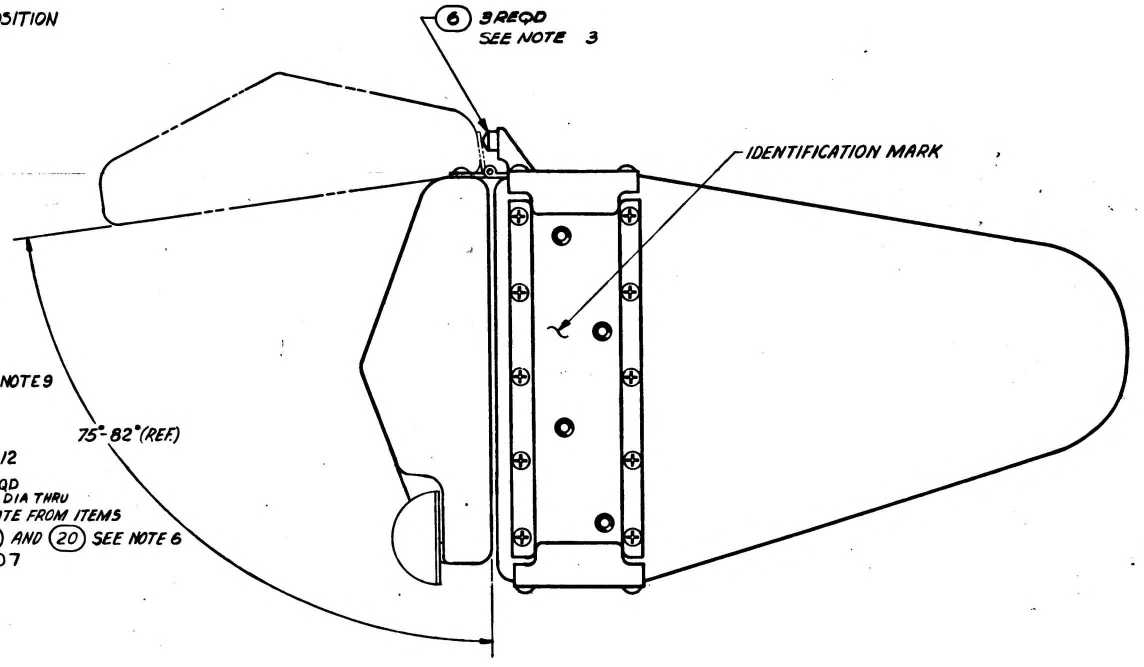

ASSEMBLE (11) IN (7) SO THAT
THE DETENT IN (11) IS PARALLEL
WITH THE SLOT IN (12) WITHIN ±2°
SEE NOTE 12

PARTIAL SECTION C-C
TYPICAL 2 PLACES
LATCH SHOWN IN OPEN POSITION
SCALE 2:1

REQ'D (LOCATE FROM HOLES IN ITEM (1)).
(2) MUST FIT FLUSH AGAINST THE CASE
HER OF ITEM ( ). MAX GAP BETWEEN
(2) AND SEAL OF ITEM (7) TO BE .020 ,
ES.


5.40
2 PLAC'S
.60 REF
.24
2 PLACES
(20)
(14) SEE NOTE 10&11.
(19) SEE NOTE 9
.250
.240
SEE NOTE 11
(10) SEE NOTE 9
(12) SEE NOTE 12
(3) 3 REQD
.106 DIA THRU
LOCATE FROM ITEMS
(13) AND (20) SEE NOTE 6
AND 7
(13)
.055
.045
(11) SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN.
SEE NOTE 9.

PARTIAL SECTION A-A
TYPICAL 2 PLACES


(6) 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF.)

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	JIMP EF
G		REVISED PER TDRR 31874		18 NOV 66	DB EF
H		REVISED PER TDRR 32010		1 DEC 66	WK CP

	QUANTITY REQUIRED				EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
				1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
				1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
				1		21	2021257	ANCHOR, SPRING
				1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
				2		19	2021236	SPRING, TENSION
				2		18	2021233-002	PLATE, INSTRUCTION
				2		17	2021233-001	PLATE, INSTRUCTION
				4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
				4		15	MS35200-13	SCREW, FLAT HD
				4		14	2021232	SHIM, LAMINATED
				1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
				2		12	2021217	RECEPTACLE,
				2		11	2021222	STUD ASSY, TURNLOCK FASTENER
				2		10	2021224	NUT, PLAIN HEX
SEE NOTE 5				AR		9	1010679	ACTIVATOR, ADHESIVE
SEE NOTE 5				AR		8	1010661	RESIN, ADHESIVE
				1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
SEE NOTE 5				3		6	1008872-001	BUMPER, RUBBER
				3		5	1021311	STOP, COVER
SEE NOTE 5				9		4	NAS1190C04-P6L	(7875739-198) SCREW
				23		3	MS24622-17	SCREW, TAPPING
				3		2	1021265	HINGE, BUTT (INSEP ASSY)
				1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 18-JUL-66
CHECKED W. Buhl 20 SEP 66
APPROVAL 21 Sept 66
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 11/4/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

SIZE J2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

H
2010789

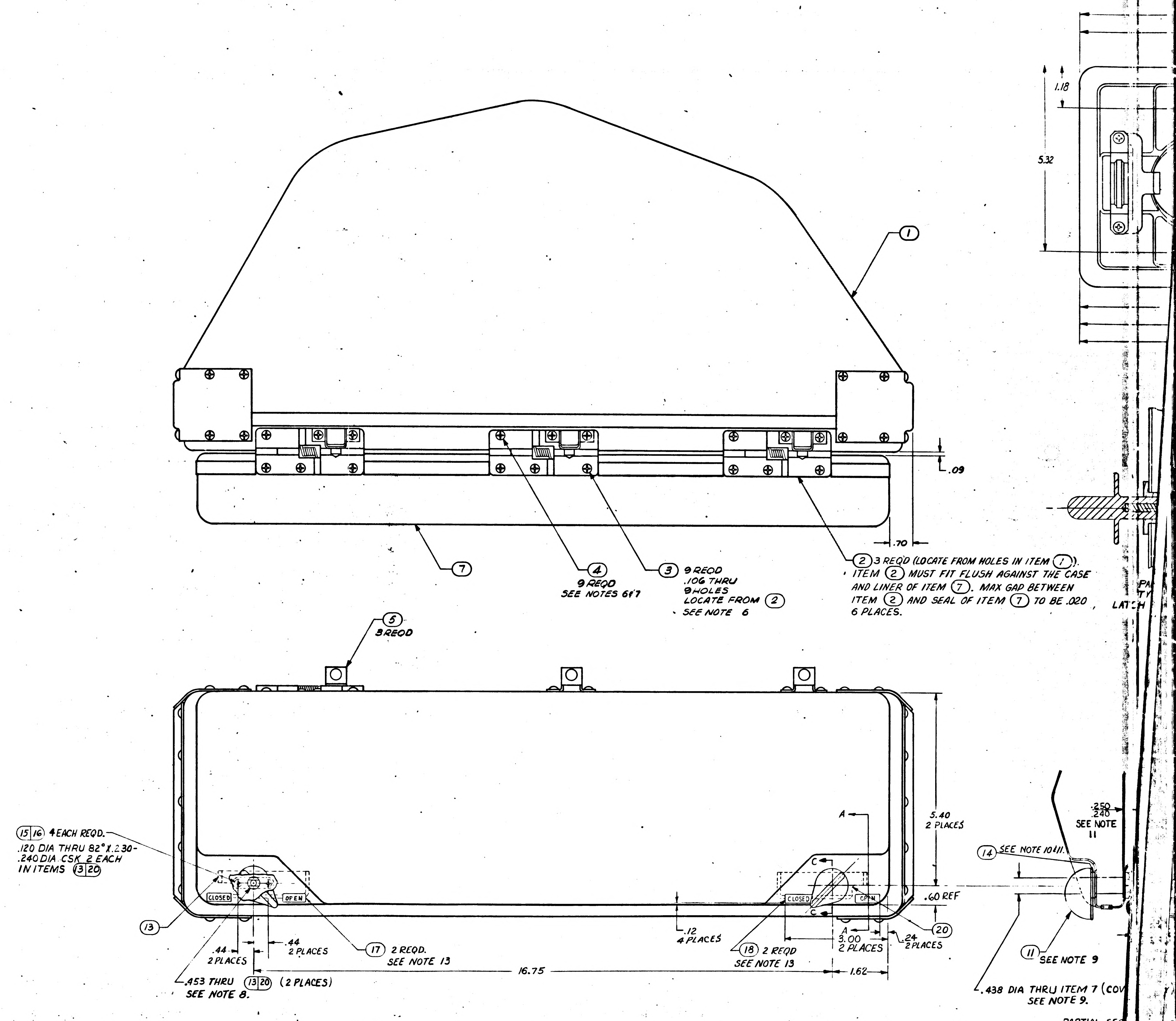
2010789

2010789	REV H	SH. 1 OF 1

242010789

NOTES:

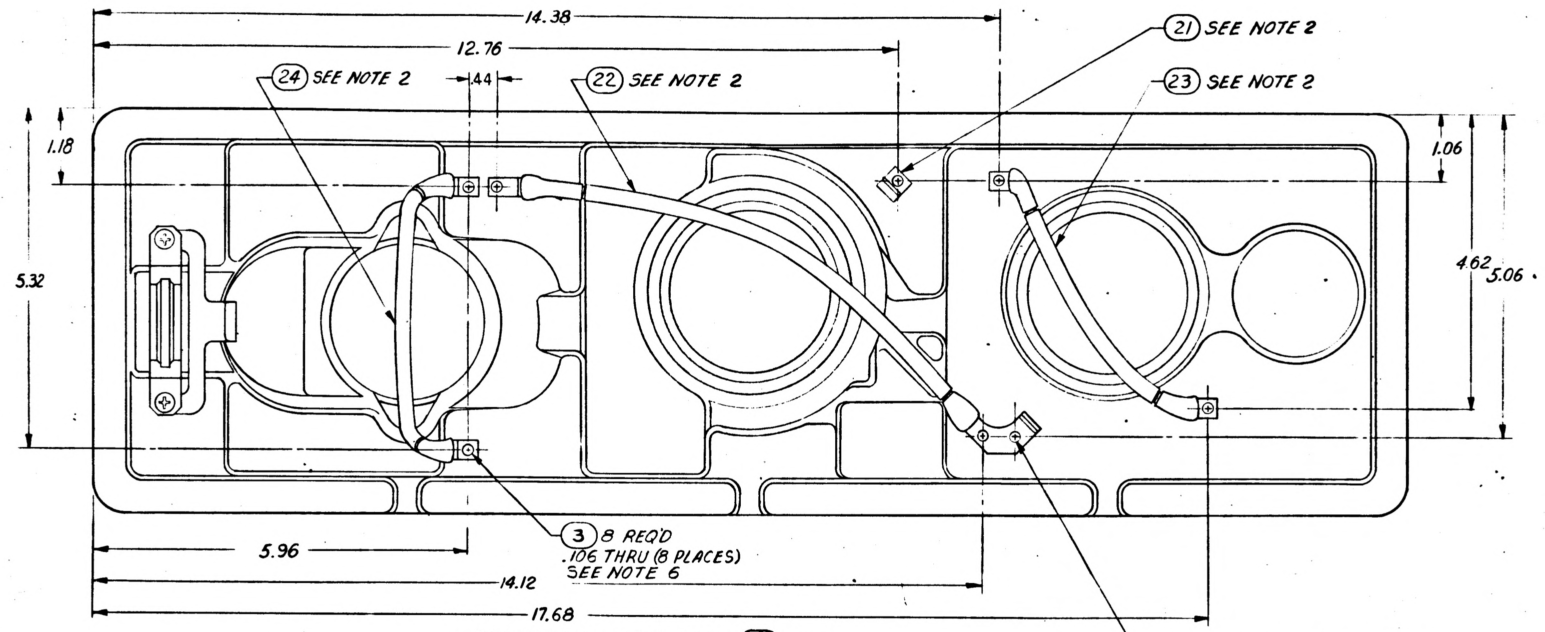
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③④ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪⑲ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS ⑧⑨.
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨.
11. ADJUST SHIM THICKNESS (ITEM ⑭) TO OBTAIN .240-.250 DIM. (FROM ITEM ⑦ TO EDGE OF ITEM ⑪.
12. LOCATE ⑫ ON ⑬ AND ⑳ SO THAT THE CENTER OF THE HELIX IN ⑫ IS CONCENTRIC WITHIN .005 WITH THE .438 DIA HOLE IN ⑦ AND THAT THE ℄ OF THE SLOT IN THE MOUNTING FLANGE OF ⑫ IS IN LINE, (HORIZONTALLY) WITH THE COUNTERSUNK HOLES IN ⑬ AND ⑳, BOND ⑫ TO ⑬ AND ⑳ USING ITEM ⑧ AND ⑨.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3PLACES) USING ⑧⑨ PER ND1002187 TYPE II.



①
1.18
5.32
.09
.70
⑦
④ 9 REQD SEE NOTES 6&7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQD (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020, 6 PLACES.
PA
TY
LATCH
⑤ 3 REQD
⑮⑯ 4 EACH REQD. .120 DIA THRU 82° X .230-.240 DIA CSK 2 EACH IN ITEMS ⑬⑳
CLOSED
OPEN
⑬
.44 2 PLACES
.44 2 PLACES
.453 THRU ⑬⑳ (2 PLACES) SEE NOTE 8.
⑰ 2 REQD. SEE NOTE 13
16.75
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
A
C
3.00 2 PLACES
.24 2 PLACES
1.62
⑳
5.40 2 PLACES
.60 REF
.250 .240 SEE NOTE 11
⑭ SEE NOTE 10&11.
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COV
SEE NOTE 9.
PARTIAL SEC
TYPICAL 2

2010789 | J | 1 OF 1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	JIMP EF
G		REVISED PER TDRR 31874		18 NOV -66	DB E
H		REVISED PER TDRR 32010		1 DEC 66	WK CP
J		REVISED PER TDRR 32319		22 DEC '66	TD EB

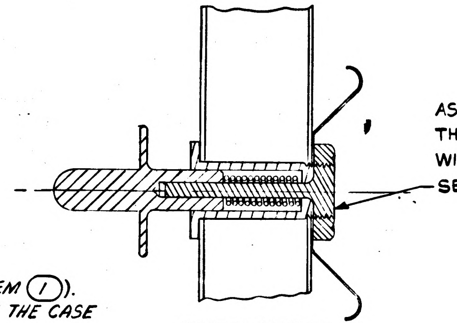

14.38
12.76
.44
(24) SEE NOTE 2
(22) SEE NOTE 2
(21) SEE NOTE 2
(23) SEE NOTE 2
1.18
1.06
5.32
4.62
5.06
(3) 8 REQ'D
.106 THRU (8 PLACES)
SEE NOTE 6
5.96
14.12
17.68

TOP VIEW OF CASE ASSY (1) REF
WITH COVER ASSY (7) REF REMOVED

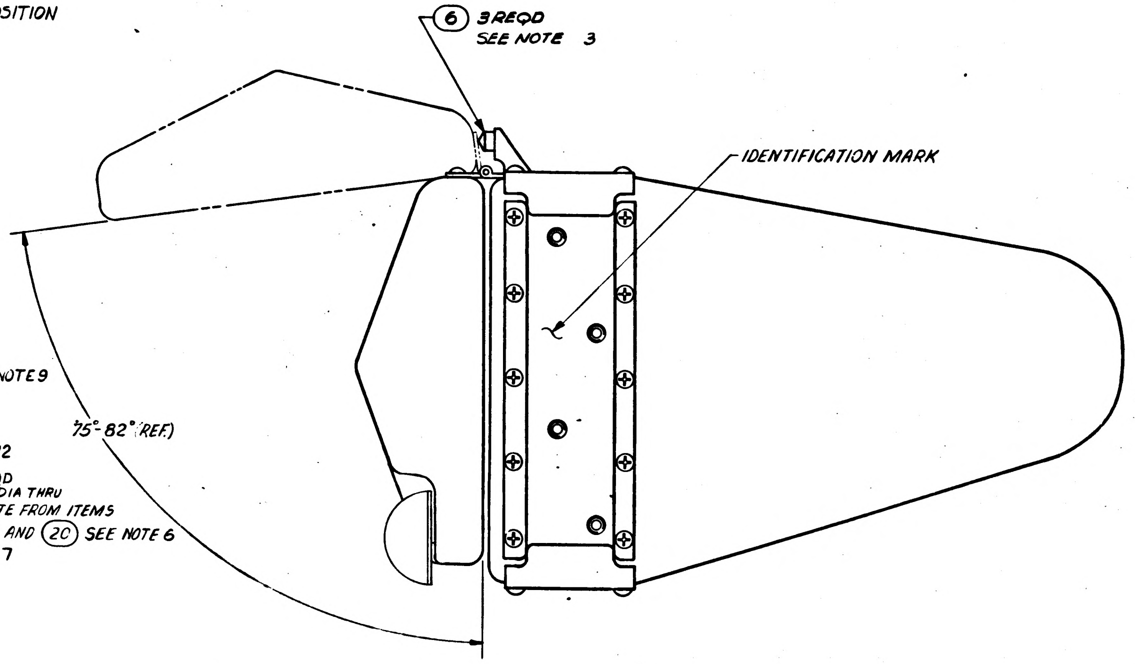
LOCATE FROM SPRING ANCHOR
ITEM (22).

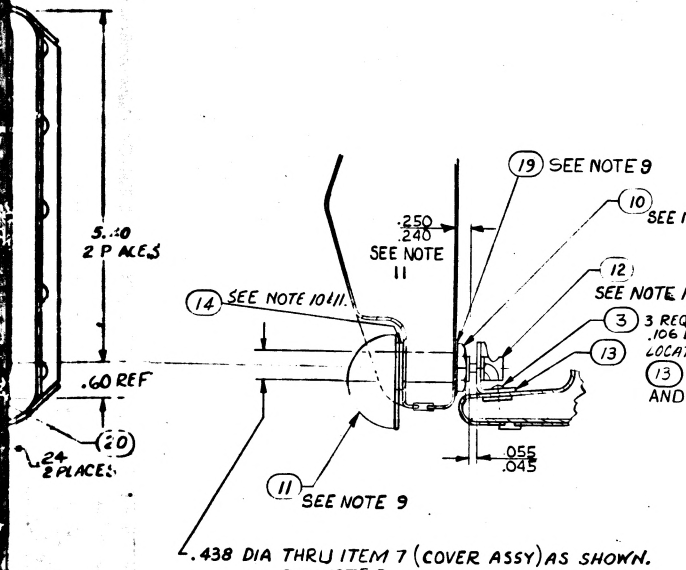
(1)

-QD (LOCATE FROM HOLES IN ITEM (1)).
2) MUST FIT FLUSH AGAINST THE CASE
R OF ITEM (7). MAX GAP BETWEEN
2) AND SEAL OF ITEM (7) TO BE .020 ,
S.


.0:9
70
ASSEMBLE (11) IN (7) SO THAT
THE DETENT IN (11) IS PARALLEL
WITH THE SLOT IN (12) WITHIN ±2°
SEE NOTE 12

PARTIAL SECTION C-C
TYPICAL 2 PLACES
LATCH SHOWN IN OPEN POSITION
SCALE 2:1


(6) 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF.)


5.40
2 PLACES
.60 REF
(20)
.24
2 PLACES
.250
.240
SEE NOTE 11
(14) SEE NOTE 10&11.
(19) SEE NOTE 9
(10) SEE NOTE 9
(12) SEE NOTE 12
(3) 3 REQD
.106 DIA THRU
LOCATE FROM ITEMS
(13) AND (20) SEE NOTE 6
AND 7
(13)
.055
.045
(11) SEE NOTE 9

.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN.
SEE NOTE 9.

PARTIAL SECTION A-A
TYPICAL 2 PLACES

SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
			1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
			1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
			1		21	2021257	ANCHOR, SPRING
			1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
			2		19	2021236	SPRING, TENSION
			2		18	2021233-002	PLATE, INSTRUCTION
			2		17	2021233-001	PLATE, INSTRUCTION
			4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
			4		15	MS 35200-13	SCREW, FLAT HD
			4		14	2021232	SHIM, LAMINATED
			1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
			2		12	2021217	RECEPTACLE,
			2		11	2021222	STUD ASSY, TURNLOCK FASTENER
			2		10	2021224	NUT, PLAIN HEX
			AR		9	1010679	ACTIVATOR, ADHESIVE
			AR		8	1010661	RESIN, ADHESIVE
			1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			3		6	1008872-001	BUMPER, RUBBER
			3		5	2021259	STOP, COVER
			9		4	NAS1190C04-P6L	(7875739-198) SCREW
			23		3	MS24622-17	SCREW, TAPPING
			3		2	1021265	HINGE, BUTT (INSEP ASSY)
			1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 18 Jul-66
CHECKED W. Diehl 20 Sep 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 7/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

SIZE J2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

2010789	REV J	SH. 1 OF 1

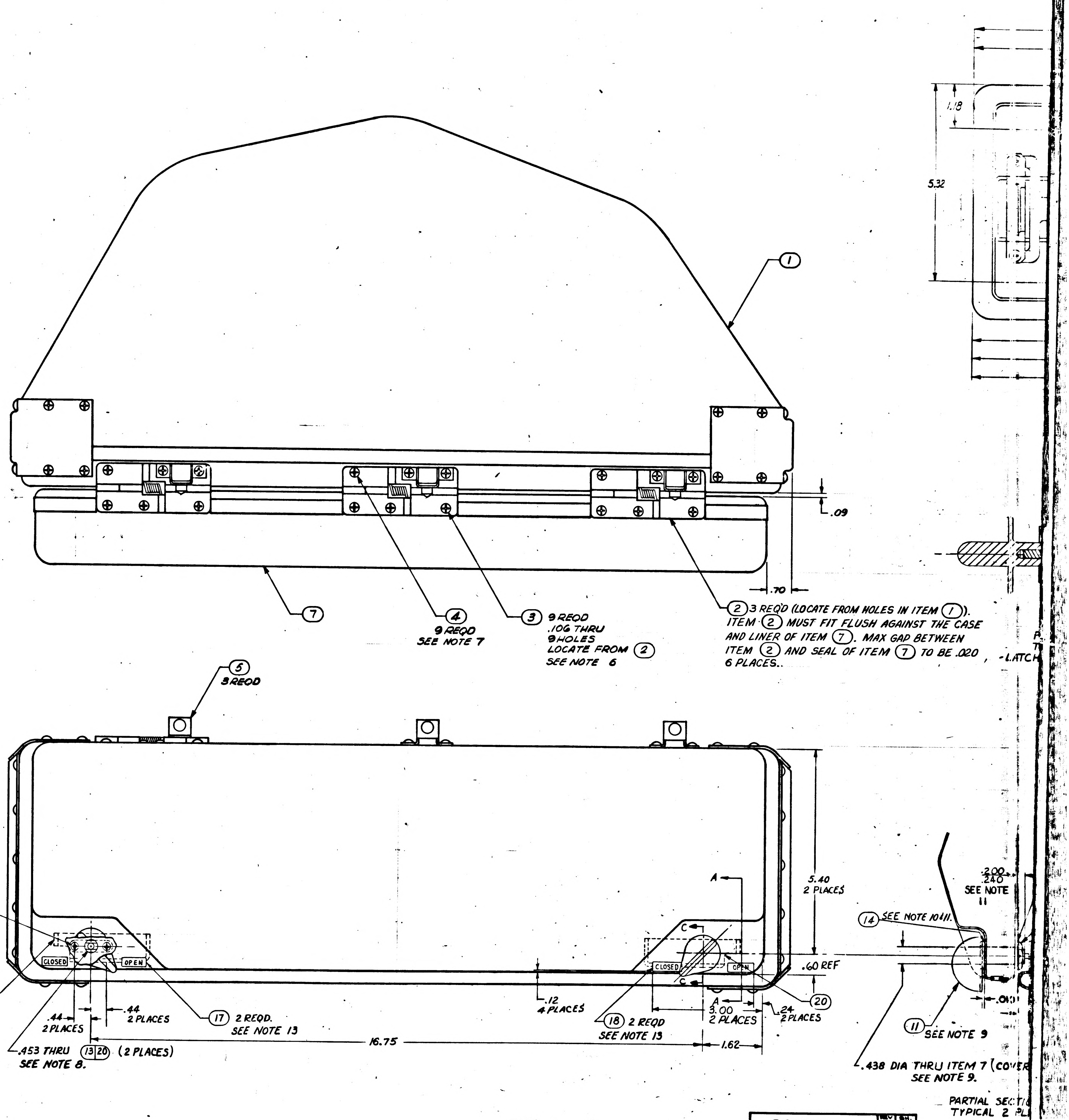
2010789

2010789

2/2010789

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③~~④~~ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪⑲ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS ⑧⑨.
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨.
11. ADJUST SHIM THICKNESS (ITEM ⑭) TO OBTAIN .200-.240 DIM. (FROM ITEM ⑦ TO EDGE OF ITEM ⑪).
12. LOCATE ⑫ ON ⑬ AND ⑳ SO THAT THE CENTER OF THE HELIX IN ⑫ IS CONCENTRIC WITHIN .005 WITH THE .438 DIA HOLE IN ⑦ AND THAT THE ℄ OF THE SLOT IN THE MOUNTING FLANGE OF ⑫ IS IN LINE, (HORIZONTALLY) WITH THE COUNTERSUNK HOLES IN ⑬ AND ⑳. BOND ⑫ TO ⑬ AND ⑳ USING ITEM ⑧ AND ⑨.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3PLACES) USING ⑧⑨ PER ND 1002187 TYPE II.

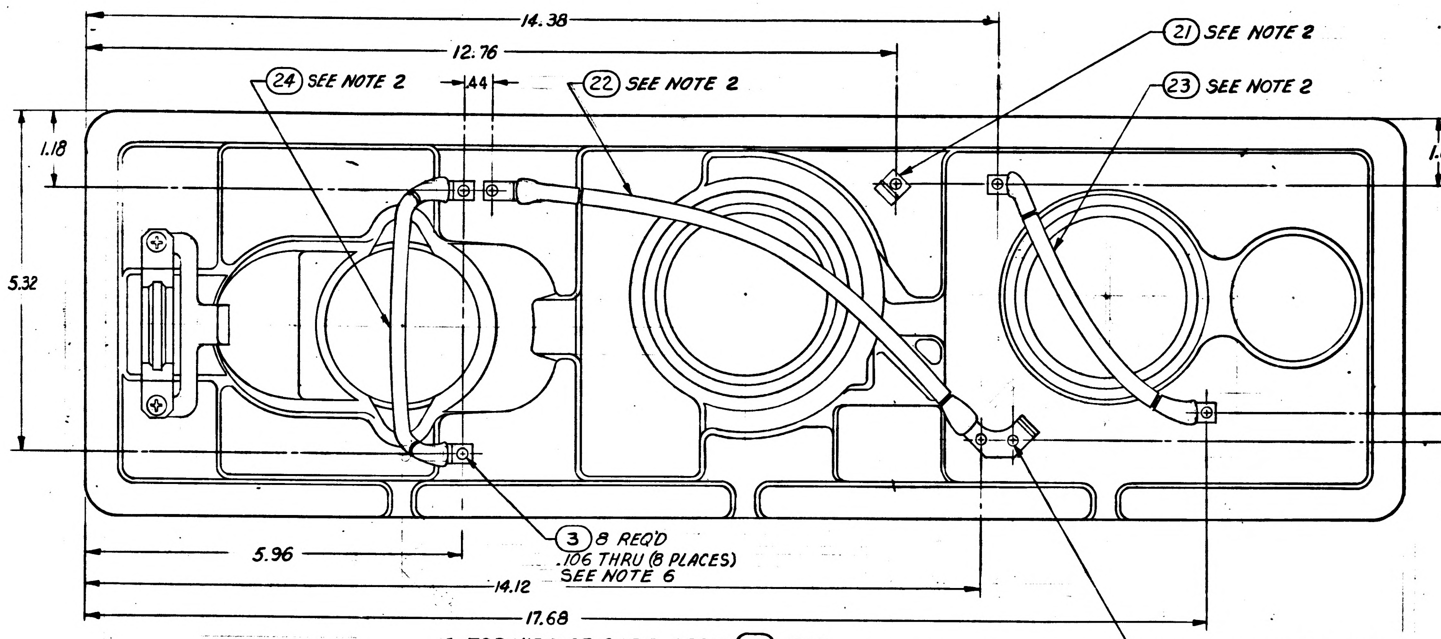


①
1.18
5.32
.09
.70
⑦
④ 9 REQD SEE NOTE 7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQ'D (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020, 6 PLACES..
-LATCH
⑤ 3 REQD
⑮⑯ 4 EACH REQD.
.120 DIA THRU 82° X .230-.240 DIA. CSK 2 EACH IN ITEMS ⑬⑳
CLOSED
OPEN
⑬
.44 2 PLACES
.44 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.453 THRU ⑬⑳ (2 PLACES) SEE NOTE 8.
16.75
A
C
5.40 2 PLACES
.60 REF
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
3.00 2 PLACES
.24 2 PLACES
1.62
⑳
.200 .240 SEE NOTE 11
⑭ SEE NOTE 10&11.
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER SEE NOTE 9.
PARTIAL SECTI
TYPICAL 2 PL

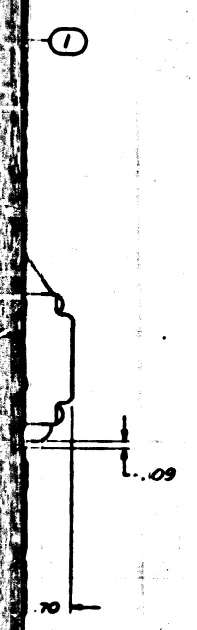
2010789 K 1 OF 1

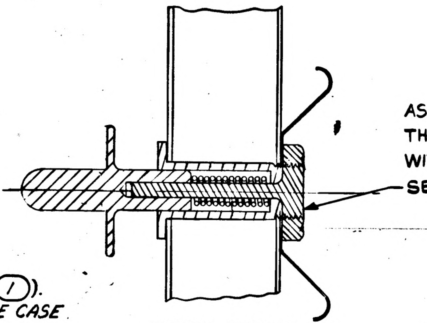
1/2010789

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	JIMP EF
G		REVISED PER TDRR 31874		18 NOV -66	DB EF
H		REVISED PER TDRR 32010		1 DEC 66	WK
J		REVISED PER TDRR 32319		22 DEC '66	TD EF
K		REVISED PER TDRR 32448		12 JAN 67	DR


14.38
12.76
.44
1.18
5.32
1.06
4.62
5.06
5.96
14.12
17.68
(24) SEE NOTE 2
(22) SEE NOTE 2
(21) SEE NOTE 2
(23) SEE NOTE 2
(3) 8 REQ'D
.106 THRU (8 PLACES)
SEE NOTE 6
LOCATE FROM SPRING ANCHOR ITEM (22).

TOP VIEW OF CASE ASSY (1) REF
WITH COVER ASSY (7) REF REMOVED



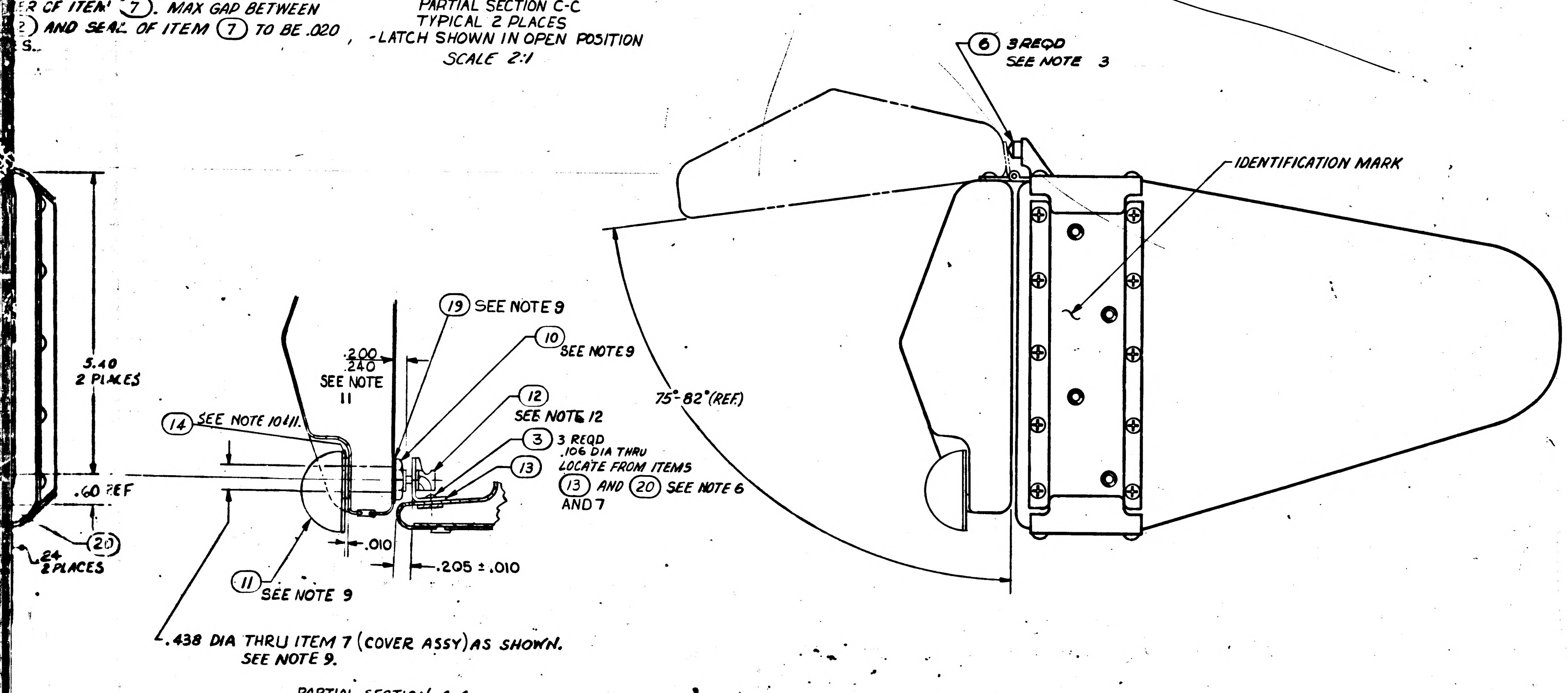


ASSEMBLE (11) IN (7) SO THAT THE DETENT IN (11) IS PARALLEL WITH THE SLOT IN (12) WITHIN ±2°

SEE NOTE 12

PARTIAL SECTION C-C
TYPICAL 2 PLACES
-LATCH SHOWN IN OPEN POSITION
SCALE 2:1

Q'D (LOCATE FROM HOLES IN ITEM (1)).
2) MUST FIT FLUSH AGAINST THE CASE
R OF ITEM (7). MAX GAP BETWEEN
2) AND SEAL OF ITEM (7) TO BE .020
S.


(6) 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF.)
5.40
2 PLACES
.60 REF
(20)
24
2 PLACES
(19) SEE NOTE 9
(10) SEE NOTE 9
.200
.240
SEE NOTE 11
(14) SEE NOTE 10 & 11
(12) SEE NOTE 12
(3) 3 REQD
.106 DIA THRU
LOCATE FROM ITEMS (13) AND (20) SEE NOTE 6 AND 7
(13)
.010
.205 ±.010
(11) SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN.
SEE NOTE 9.

PARTIAL SECTION A-A
TYPICAL 2 PLACES

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
			1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
			1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
			1		21	2021257	ANCHOR, SPRING
			1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
			2		19	2021236	SPRING, TENSION
			2		18	2021233-002	PLATE, INSTRUCTION
			2		17	2021233-001	PLATE, INSTRUCTION
			4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
			4		15	MS 35200-13	SCREW, FLAT HD
			4		14	2021232	SHIM, LAMINATED
			1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
			2		12	2021217	RECEPTACLE,
			2		11	2021222	STUD ASSY, TURNLOCK FASTENER
			2		10	2021224	NUT, PLAIN HEX
			AR		9	1010679	ACTIVATOR, ADHESIVE
			AR		8	1010661	RESIN, ADHESIVE
			1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			3		6	1008872-001	BUMPER, RUBBER
			3		5	2021259	STOP, COVER
			9		4	NAS1190C04-P6L	(7875739-198) SCREW
			23		3	MS24622-17	SCREW, TAPPING
			3		2	1021265	HINGE, BUTT (INSEP ASSY)
			1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 18-Jul-66 DATE
CHECKED 20 Sep 66
APPROVAL 21 Sept 66
CONTRACT NAS9-497
NASA APPROVAL
CCA APPROVAL 11/3/66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

SIZE J
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

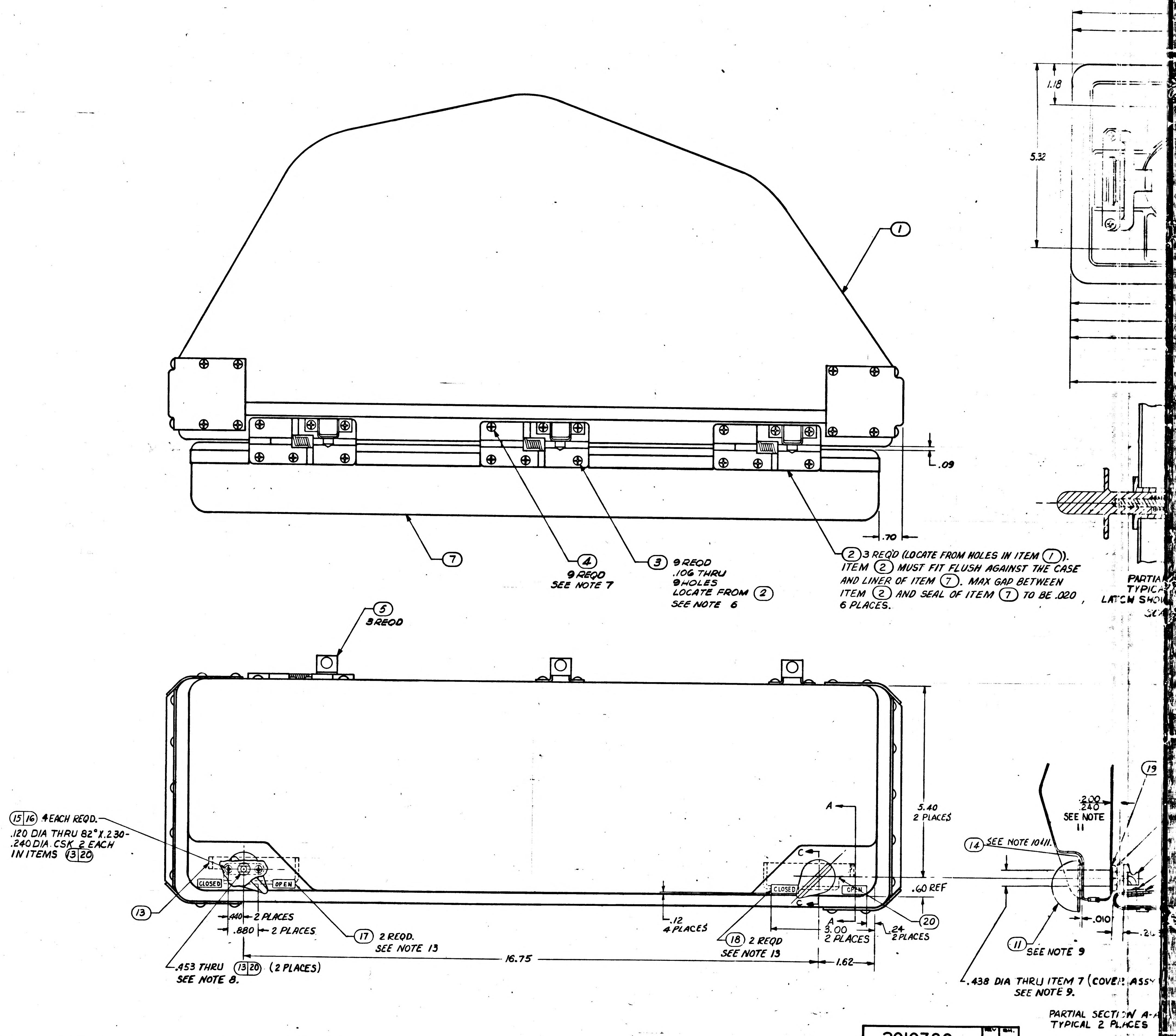
2010789

2010789 REV K SH. 1 of 1

2/2010789

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③~~④~~ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪⑲ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS ⑧⑨.
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨.
11. ADJUST SHIM THICKNESS (ITEM ⑭) TO OBTAIN .200-.240 DIM. (FROM ITEM ⑦ TO EDGE OF ITEM ⑪.
12. LOCATE ⑫ ON ⑬ AND ⑳ SO THAT THE CENTER OF THE HELIX IN ⑫ IS CONCENTRIC WITHIN .005 WITH THE .438 DIA HOLE IN ⑦ AND THAT THE ℄ OF THE SLOT IN THE MOUNTING FLANGE OF ⑫ IS IN LINE, (HORIZONTALLY) WITH THE COUNTERSUNK HOLES IN ⑬ AND ⑳. BOND ⑫ TO ⑬ AND ⑳ USING ITEM ⑧ AND ⑨.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3 PLACES) USING ⑧⑨ PER ND 1002187 TYPE II.
15. APPLY A .0005 TO .003 THICK COATING OF ITEMS ⑧ & ⑨ TO THE SURFACE OF ITEM ① PER ND1002187 TYPE I. AREA TO BE COATED SHALL EXCEED THE CONTACT LENGTH AND WIDTH OF ITEM ㉕ BY .06 TO .25. AFTER ITEMS ⑧ & ⑨ CURE, BOND ITEM ㉕ TO ITEM ① USING ITEM ㉖. AIR DRY ITEM ㉖ FOR 24 HOURS.

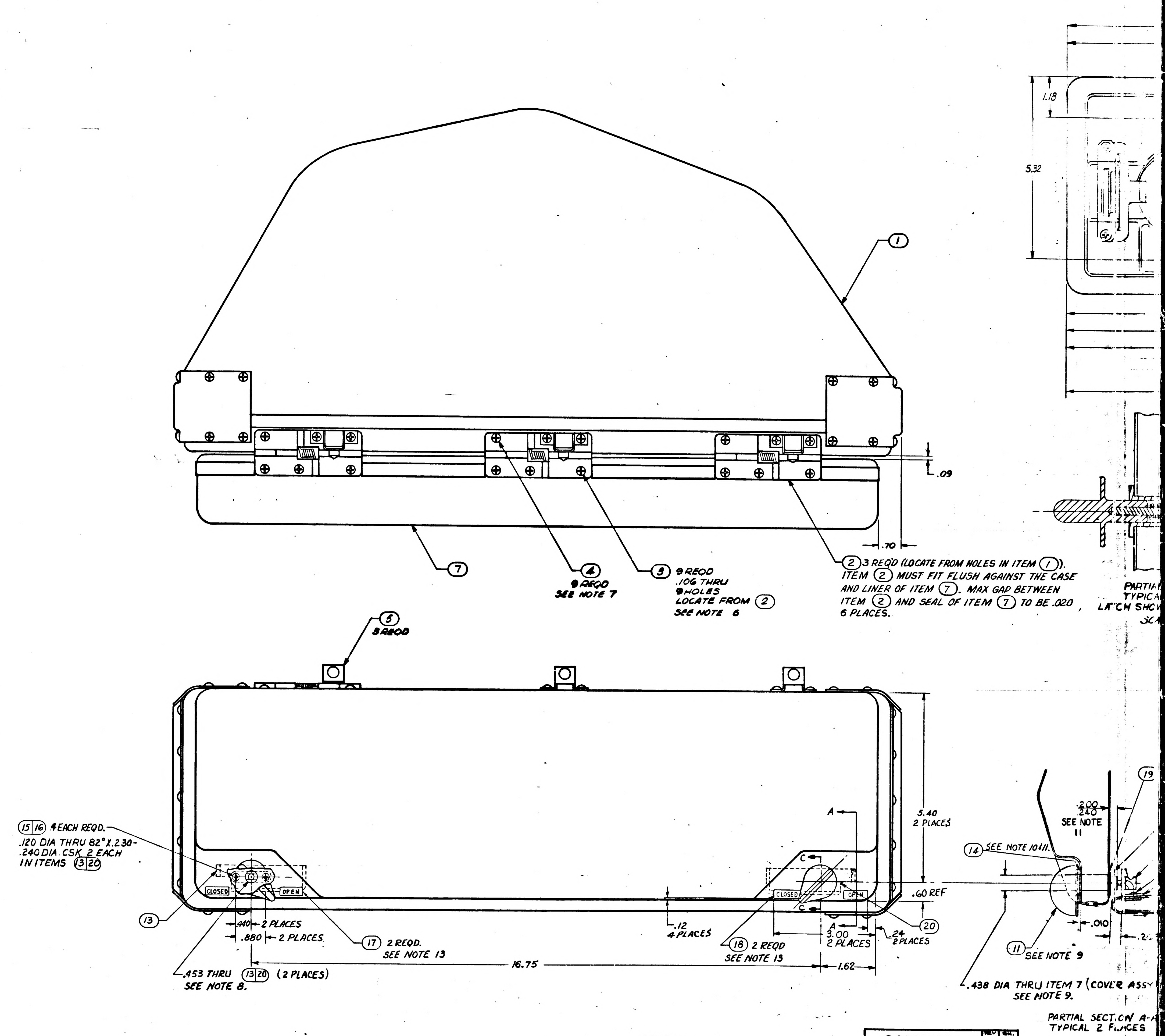

①
.09
.70
⑦
④ 9 REQD SEE NOTE 7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQ'D (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020, 6 PLACES.
1.18
5.32
⑤ 3 REQD
⑮⑯ 4 EACH REQD.
.120 DIA THRU 82° X .230-.240 DIA. CSK 2 EACH IN ITEMS ⑬⑳
CLOSED
OPEN
⑬
.440 2 PLACES
.880 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.453 THRU ⑬⑳ (2 PLACES) SEE NOTE 8.
16.75
A
C
5.40 2 PLACES
.60 REF
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
3.00 2 PLACES
.24 2 PLACES
1.62
⑳
⑲
.200 .240 SEE NOTE 11
⑭ SEE NOTE 10 & 11.
.010
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY
SEE NOTE 9.
PARTIAL SECTION A-A
TYPICAL 2 PLACES
PARTIA
TYPICA
LATCH SHO

2010789	REV L	SH 1 OF 1

1/2010789

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. APPLY ADHESIVE ⑧⑨ PER ND 1002187 TYPE II TO CONTACT SURFACES OF ㉑㉒㉓㉔ TO ① PRIOR TO INSTALLATION OF ③.
3. POSITION ⑥ (3 PLACES) TO LIMIT COVER TRAVEL TO 75° TO 82°.
4. IDENTIFY USING DRAWING NUMBER PER ND1002019.
5. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
6. APPLY ADHESIVE ⑧⑨ TO ALL SCREW THREADS ③~~④~~ PER ND1002187 TYPE II, PRIOR TO FINAL ASSEMBLY.
7. TORQUE TO 5.0-6.0 INCH POUNDS.
8. MUST BE CONCENTRIC WITHIN .005 WITH .438 DIA HOLE IN ITEM ⑦.
9. BOND ITEMS ⑩⑪⑲ TO EACH OTHER AND TO ITEM ⑦ (COVER ASSEMBLY) USING ITEMS ⑧⑨.
10. BOND SHIM ITEM ⑭ TO ITEMS ⑦⑪ USING ITEMS ⑧⑨.
11. ADJUST SHIM THICKNESS (ITEM ⑭) TO OBTAIN .200-.240 DIM. (FROM ITEM ⑦ TO EDGE OF ITEM ⑪).
12. LOCATE ⑫ ON ⑬ AND ⑳ SO THAT THE CENTER OF THE HELIX IN ⑫ IS CONCENTRIC WITHIN .005 WITH THE .438 DIA HOLE IN ⑦ AND THAT THE ℄ OF THE SLOT IN THE MOUNTING FLANGE OF ⑫ IS IN LINE, (HORIZONTALLY) WITH THE COUNTERSUNK HOLES IN ⑬ AND ⑳. BOND ⑫ TO ⑬ AND ⑳ USING ITEM ⑧ AND ⑨.
13. APPLY ITEMS ⑰⑱ PER ND1002219, METHOD II LOCATE AS SHOWN.
14. BOND ITEM ⑤ TO ITEM ② (3 PLACES) USING ⑧⑨ PER ND 1002187 TYPE II.
15 APPLY A .0005 TO .003 THICK COATING OF ITEMS ⑧ & ⑨ TO THE SURFACE OF ITEM ① PER ND1002187 TYPE I. AREA TO BE COATED SHALL EXCEED THE CONTACT LENGTH AND WIDTH OF ITEM ㉕ BY .06 TO .25. AFTER ITEMS ⑧ & ⑨ CURE, BOND ITEM ㉕ TO ITEM ① USING ITEM ㉖. AIR DRY ITEM ㉖ FOR 24 HOURS.


1.18
5.32
①
.09
.70
⑦
④ 9 REQD SEE NOTE 7
③ 9 REQD .106 THRU 9 HOLES LOCATE FROM ② SEE NOTE 6
② 3 REQ'D (LOCATE FROM HOLES IN ITEM ①). ITEM ② MUST FIT FLUSH AGAINST THE CASE AND LINER OF ITEM ⑦. MAX GAP BETWEEN ITEM ② AND SEAL OF ITEM ⑦ TO BE .020, 6 PLACES.
PARTIA
TYPICA
LA'CH SHO
SC
⑤ 3 REQD
⑮⑯ 4 EACH REQD.
.120 DIA THRU 82° X .230-.240 DIA. CSK 2 EACH IN ITEMS ⑬⑳
CLOSED
OPEN
⑬
.440 2 PLACES
.880 2 PLACES
⑰ 2 REQD. SEE NOTE 13
.453 THRU ⑬⑳ (2 PLACES) SEE NOTE 8.
16.75
A
C
5.40 2 PLACES
.60 REF
.12 4 PLACES
⑱ 2 REQD SEE NOTE 13
3.00 2 PLACES
.24 2 PLACES
⑳
1.62
⑲
.200 .240 SEE NOTE 11
⑭ SEE NOTE 10&11.
.010
.2
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY
SEE NOTE 9.

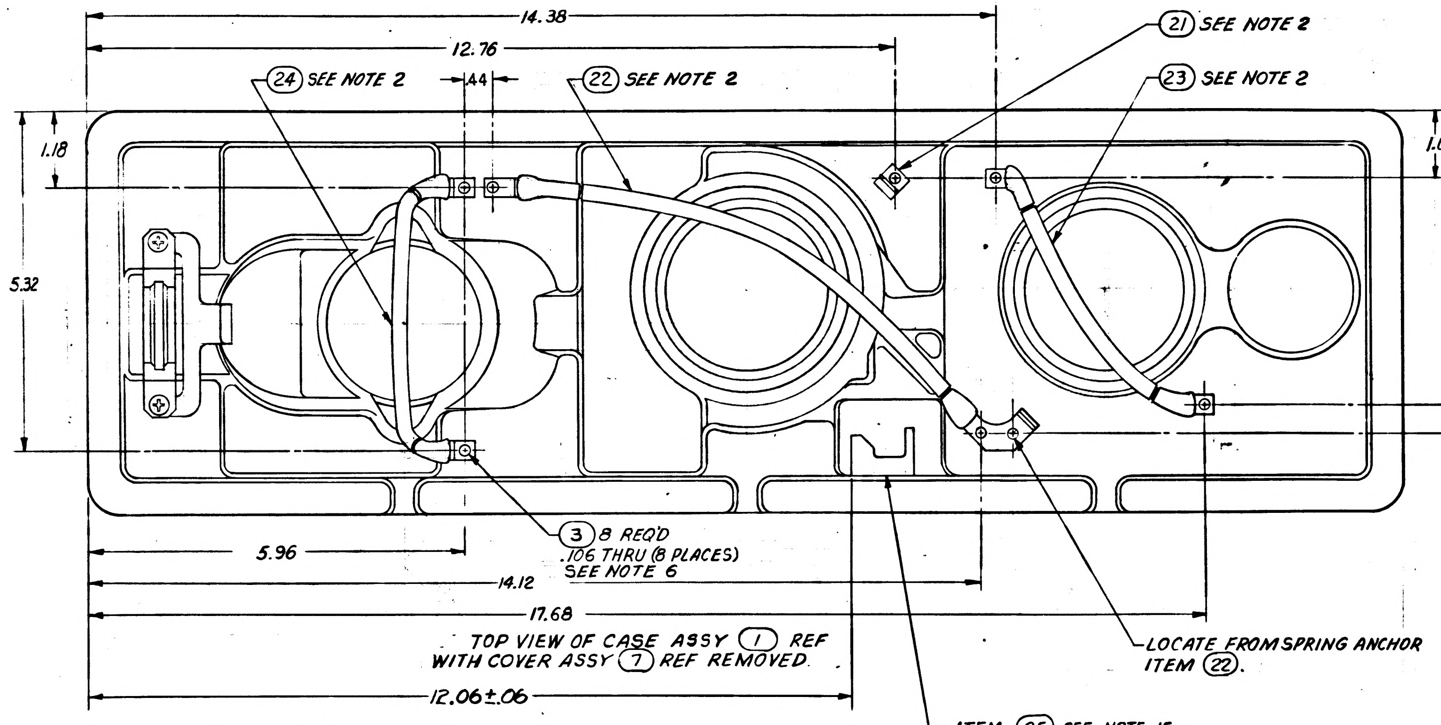
PARTIAL SECTION A-A
TYPICAL 2 PLACES

2010789 | REV L | SH. 1 OF 1

1/2010789

REVISIONS

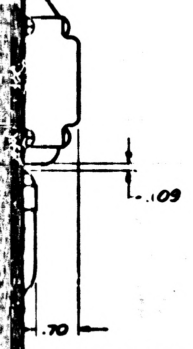
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER TDRR 31815		1/31/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	EF
G		REVISED PER TDRR 31874		18 NOV 66	DB EF
H		REVISED PER TDRR 32010		1 DEC 66	WK
J		REVISED PER TDRR 32319		22 DEC 66	
K		REVISED PER TDRR 32448		12 JAN	DR
L		REVISED PER TDRR 32946		16 FEB 67	AF



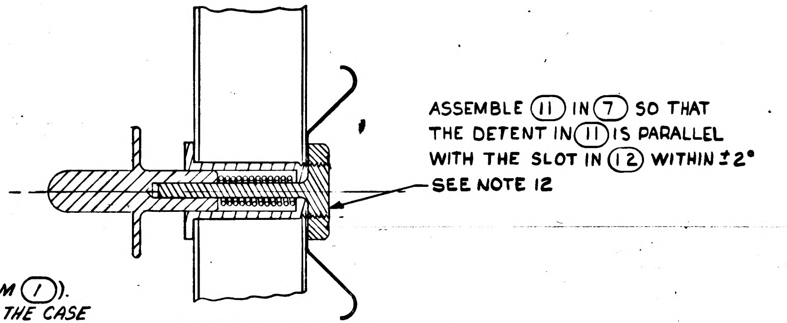
14.38
12.76
.44
(24) SEE NOTE 2
(22) SEE NOTE 2
(21) SEE NOTE 2
(23) SEE NOTE 2
1.18
1.06
5.32
4.62
5.06
(3) 8 REQ'D
.106 THRU (8 PLACES)
SEE NOTE 6
5.96
14.12
17.68
12.06±.06
LOCATE FROM SPRING ANCHOR ITEM (22).

TOP VIEW OF CASE ASSY (1) REF
WITH COVER ASSY (7) REF REMOVED.

ITEM (25) SEE NOTE 15
POSITION PART TO FIT UP
WITH ITEM (1) RADIUS

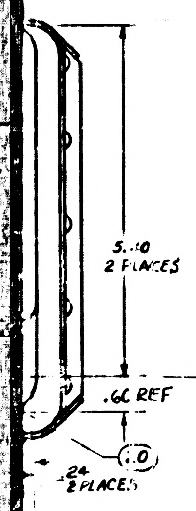


REQ'D (LOCATE FROM HOLES IN ITEM (1)).
(2) MUST FIT FLUSH AGAINST THE CASE
ER OF ITEM (7). MAX GAP BETWEEN
(2) AND SEAL OF ITEM (7) TO BE .020 ,
ES.

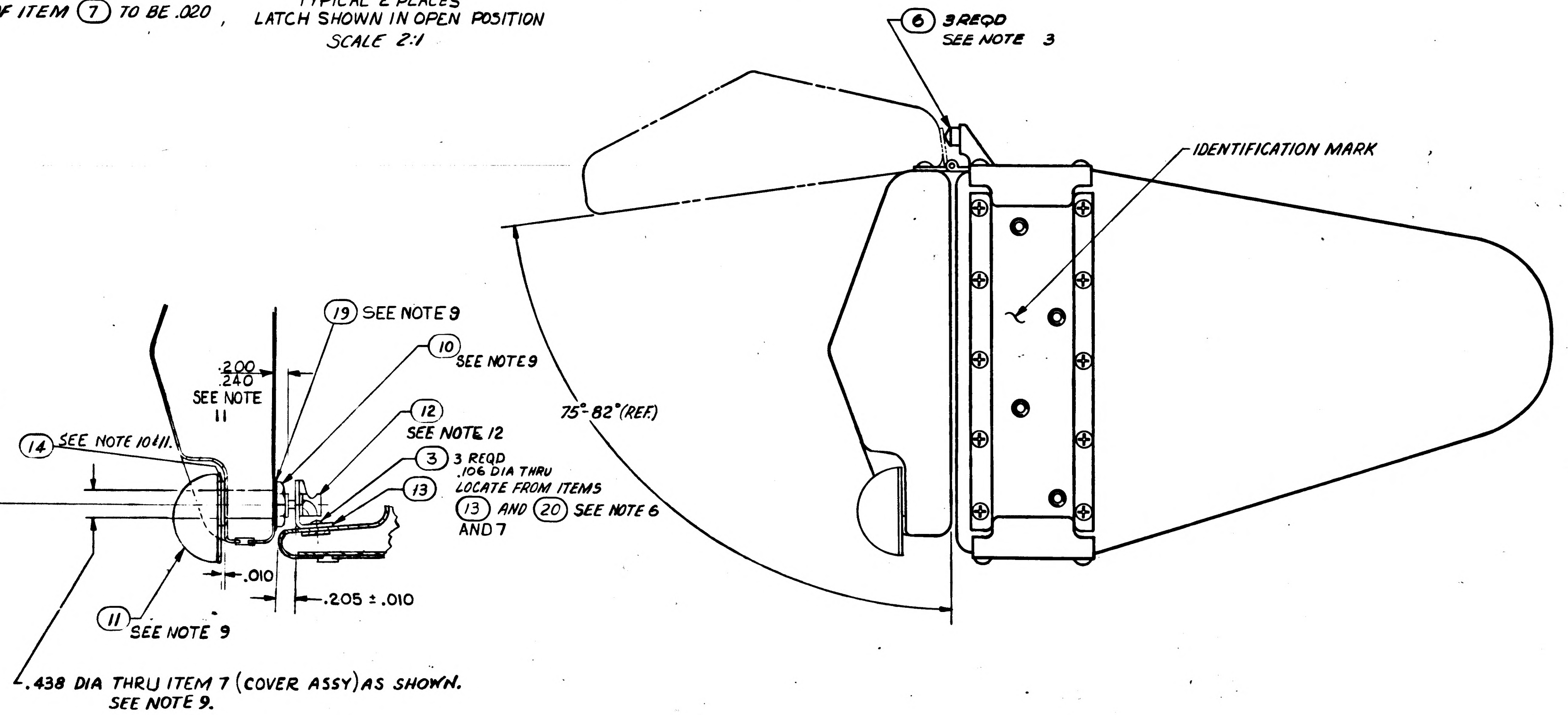


ASSEMBLE (11) IN (7) SO THAT
THE DETENT IN (11) IS PARALLEL
WITH THE SLOT IN (12) WITHIN ±2°
SEE NOTE 12

PARTIAL SECTION C-C
TYPICAL 2 PLACES
LATCH SHOWN IN OPEN POSITION
SCALE 2:1



5.10
2 PLACES
.60 REF
.24
2 PLACES



(6) 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF.)
(19) SEE NOTE 9
(10) SEE NOTE 9
.200
.240
SEE NOTE 11
(12) SEE NOTE 12
(14) SEE NOTE 10&11.
(3) 3 REQD
.106 DIA THRU
LOCATE FROM ITEMS
(13) AND (20) SEE NOTE 6
AND 7
(13)
.010
.205 ± .010
(11) SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN.
SEE NOTE 9.

PARTIAL SECTION A-A
TYPICAL 2 PLACES

				AR		26	MMM-A-181 TYPE I	ADHESIVE
				1		25	2021267	SUPPORT, EYEPIECE
				1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
				1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
				1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
				1		21	2021257	ANCHOR, SPRING
				1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
				2		19	2021236	SPRING, TENSION
				2		18	2021233-002	PLATE, INSTRUCTION
				2		17	2021233-001	PLATE, INSTRUCTION
				4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
				4		15	MS 35200-13	SCREW, FLAT HD
				4		14	2021232	SHIM, LAMINATED
				1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
				2		12	2021217	RECEPTACLE,
				2		11	2021222	STUD ASSY, TURNLOCK FASTENER
				2		10	2021224	NUT, PLAIN HEX
SEE NOTE 5				AR		9	1010679	ACTIVATOR, ADHESIVE
SEE NOTE 5				AR		8	1010661	RESIN, ADHESIVE
				1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
SEE NOTE 5				3		6	1008872-001	BUMPER, RUBBER
				3		5	2021259	STOP, COVER
SEE NOTE 5				9		4	NAS1190C04-P6L	(7875739-198) SCREW
				23		3	MS24622-17	SCREW, TAPPING
				3		2	1021265	HINGE, BUTT (INSEP ASSY)
				1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)
	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

2021255-011	2021255-011	-011
APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN DATE 18-Jul-66
CHECKED W. Diehl 20 SEP 66
APPROVAL 21 Sept
CONTRACT NAS9-497
NASA APPROVAL
CCA APPROVAL 7/7/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

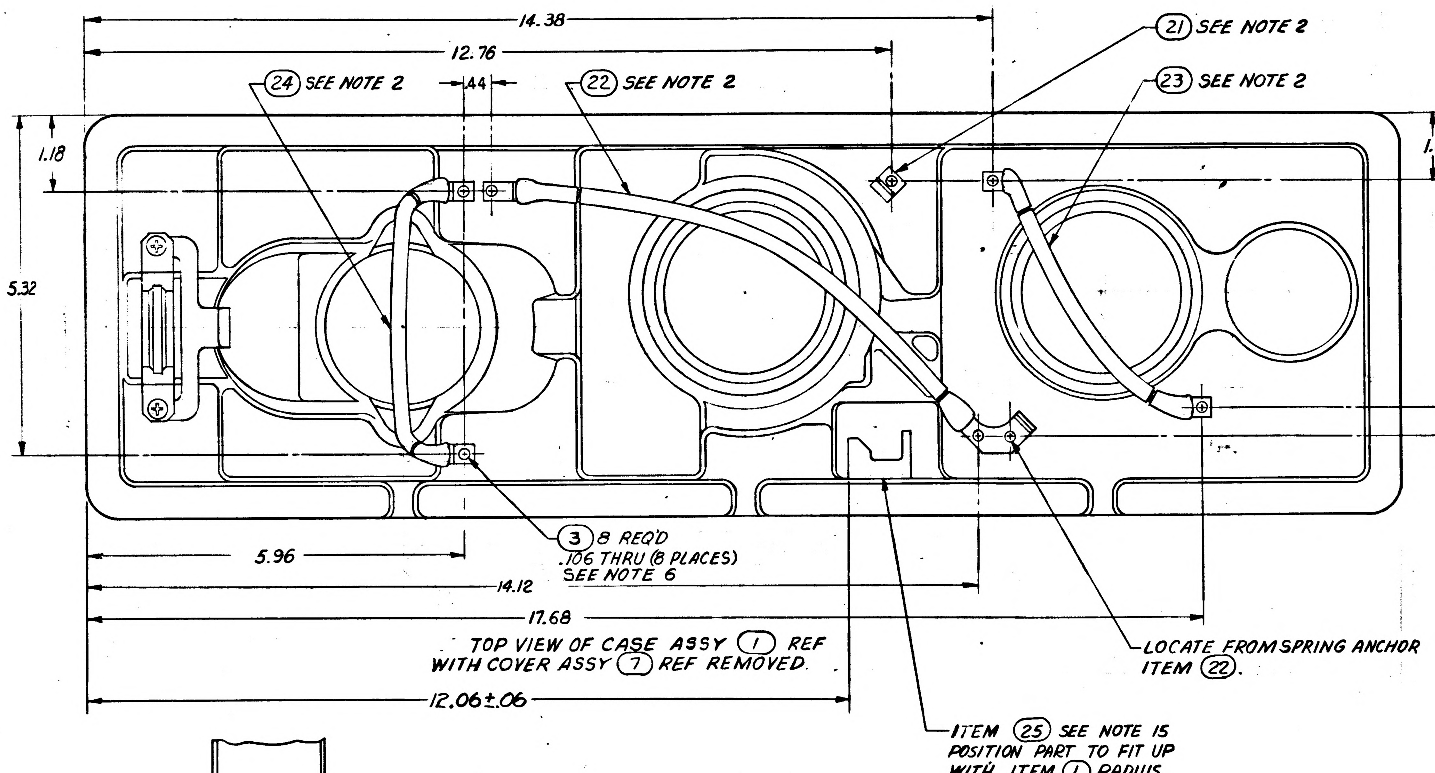
SIZE J/2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

2010789

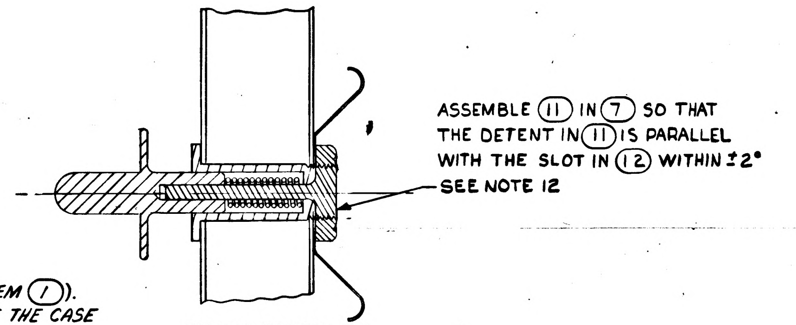
	REV	SH.
2010789	L	1 OF 1

2/2010789

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
E		REPLACES REV D WITH CHANGE PER TDRR 31815		11/3/66	9-28
F		REVISED PER TDRR 31817		15 NOV 66	EF
G		REVISED PER TDRR 31874		18 NOV 66	DB EF
H		REVISED PER TDRR 32010		1 DEC 66	
J		REVISED PER TDRR 32319		22 DEC 66	
K		REVISED PER TDRR 32448		12 JAN	TR
L		REVISED PER TDRR 32946		16 FEB 67	

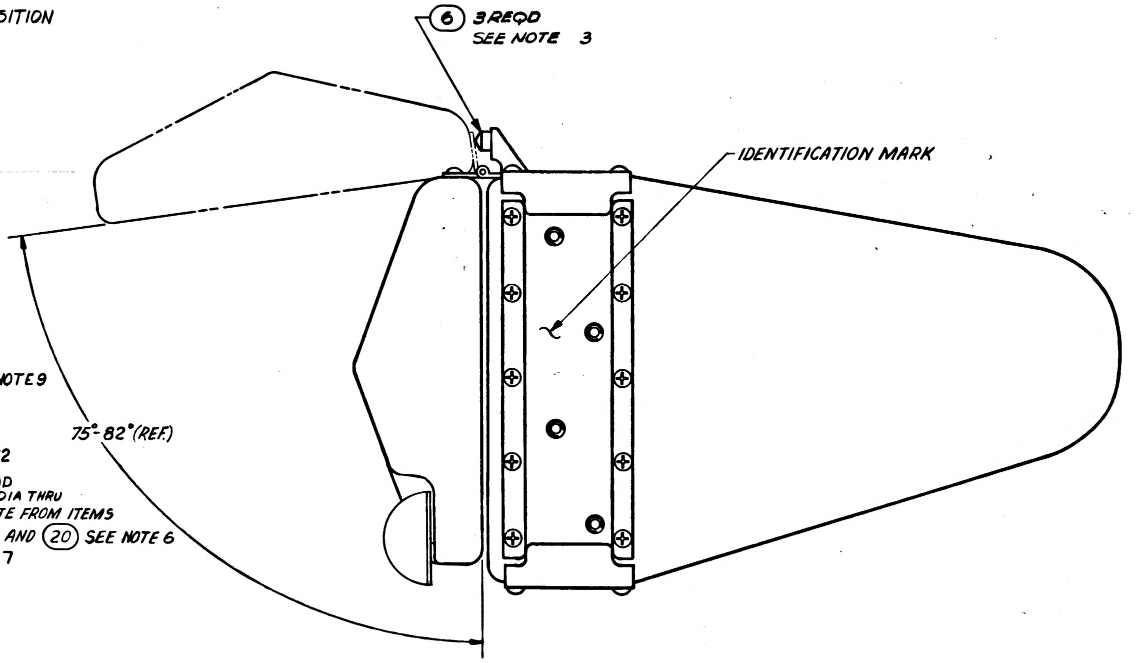

14.38
12.76
.44
㉔ SEE NOTE 2
㉒ SEE NOTE 2
㉑ SEE NOTE 2
㉓ SEE NOTE 2
1.18
1.06
5.32
4.62
5.06
③ 8 REQ'D
.106 THRU (8 PLACES)
SEE NOTE 6
5.96
14.12
17.68
12.06±.06
LOCATE FROM SPRING ANCHOR ITEM ㉒.
ITEM ㉕ SEE NOTE 15
POSITION PART TO FIT UP WITH ITEM ① RADIUS

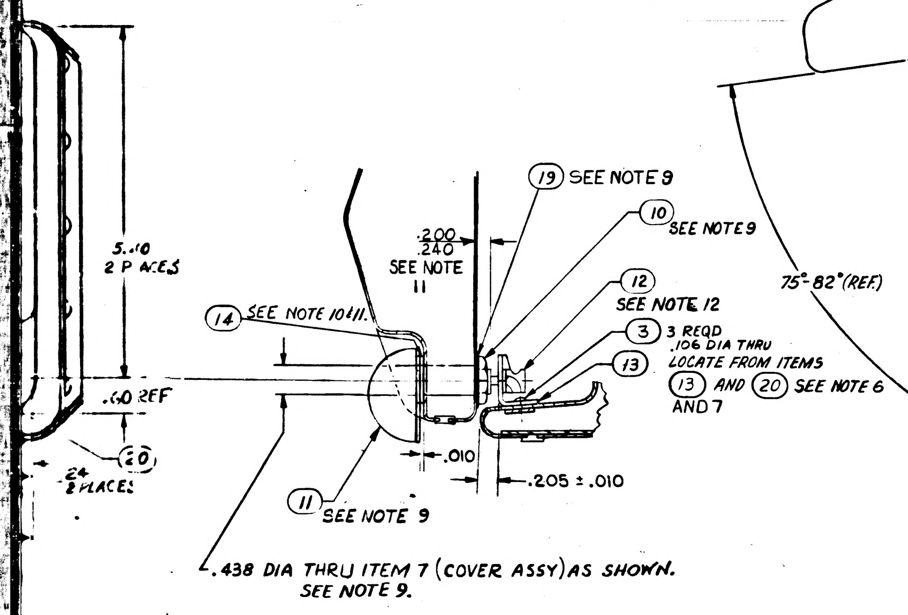
TOP VIEW OF CASE ASSY ① REF
WITH COVER ASSY ⑦ REF REMOVED.


ASSEMBLE ⑪ IN ⑦ SO THAT THE DETENT IN ⑪ IS PARALLEL WITH THE SLOT IN ⑫ WITHIN ±2°
SEE NOTE 12

PARTIAL SECTION C-C
TYPICAL 2 PLACES
LATCH SHOWN IN OPEN POSITION
SCALE 2:1

EQD (LOCATE FROM HOLES IN ITEM ①).
② MUST FIT FLUSH AGAINST THE CASE
ER OF ITEM ⑦. MAX GAP BETWEEN
② AND SEAL OF ITEM ⑦ TO BE .020 ,
ES.


⑥ 3 REQD
SEE NOTE 3
IDENTIFICATION MARK
75°-82° (REF.)


5.10
2 PLACES
.60 REF
⑳
.24
2 PLACES
.200
.240
SEE NOTE 11
⑭ SEE NOTE 10&11.
⑲ SEE NOTE 9
⑩ SEE NOTE 9
⑫ SEE NOTE 12
③ 3 REQD
.106 DIA THRU
LOCATE FROM ITEMS ⑬ AND ⑳ SEE NOTE 6 AND 7
⑬
.010
.205 ± .010
⑪ SEE NOTE 9
.438 DIA THRU ITEM 7 (COVER ASSY) AS SHOWN.
SEE NOTE 9.

PARTIAL SECTION A-A
TYPICAL 2 PLACES

SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5

			011	EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			AR		26	MMM-A-181 TYPE I	ADHESIVE
			1		25	2021267	SUPPORT, EYEPIECE
			1		24	2021258-031	SPRING AND ANCHOR ASSEMBLY
			1		23	2021258-021	SPRING AND ANCHOR ASSEMBLY
			1		22	2021258-011	SPRING AND ANCHOR ASSEMBLY
			1		21	2021257	ANCHOR, SPRING
			1		20	2021216-002	BRACKET-RECP LOCK FASTENER, R.H.
			2		19	2021236	SPRING, TENSION
			2		18	2021233-002	PLATE, INSTRUCTION
			2		17	2021233-001	PLATE, INSTRUCTION
			4		16	MS21045-C04	(7875739-026) NUT, SELF LOCK
			4		15	MS35200-13	SCREW, FLAT HD
			4		14	2021232	SHIM, LAMINATED
			1		13	2021216-001	BRACKET-RECP LOCK FASTENER, L.H.
			2		12	2021217	RECEPTACLE,
			2		11	2021222	STUD ASSY, TURNLOCK FASTENER
			2		10	2021224	NUT. PLAIN HEX
			AR		9	1010679	ACTIVATOR, ADHESIVE
			AR		8	1010661	RESIN, ADHESIVE
			1		7	2010787	COVER, EYEPIECE STORAGE (INSEP ASSY)
			3		6	1008872-001	BUMPER, RUBBER
			3		5	2021259	STOP, COVER
			9		4	NAS1190C04-P6L	(7875739-198) SCREW
			23		3	MS24622-17	SCREW, TAPPING
			3		2	1021265	HINGE, BUTT (INSEP ASSY)
			1		1	2010788	CASE, EYEPIECE STORAGE (INSEP ASSY)

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
2021255-011	2021255-011	-011
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN 18-Jul-66 DATE
CHECKED W. Diehl 20 Sep 66
APPROVAL
CONTRACT NAS9-497
NASA APPROVAL
CCB APPROVAL 7/4/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CASE AND COVER ASSEMBLY
EYEPIECE STORAGE

SIZE J2
CODE IDENT NO. 80230
2010789
SCALE FULL
SHEET 1 OF 1

2010789

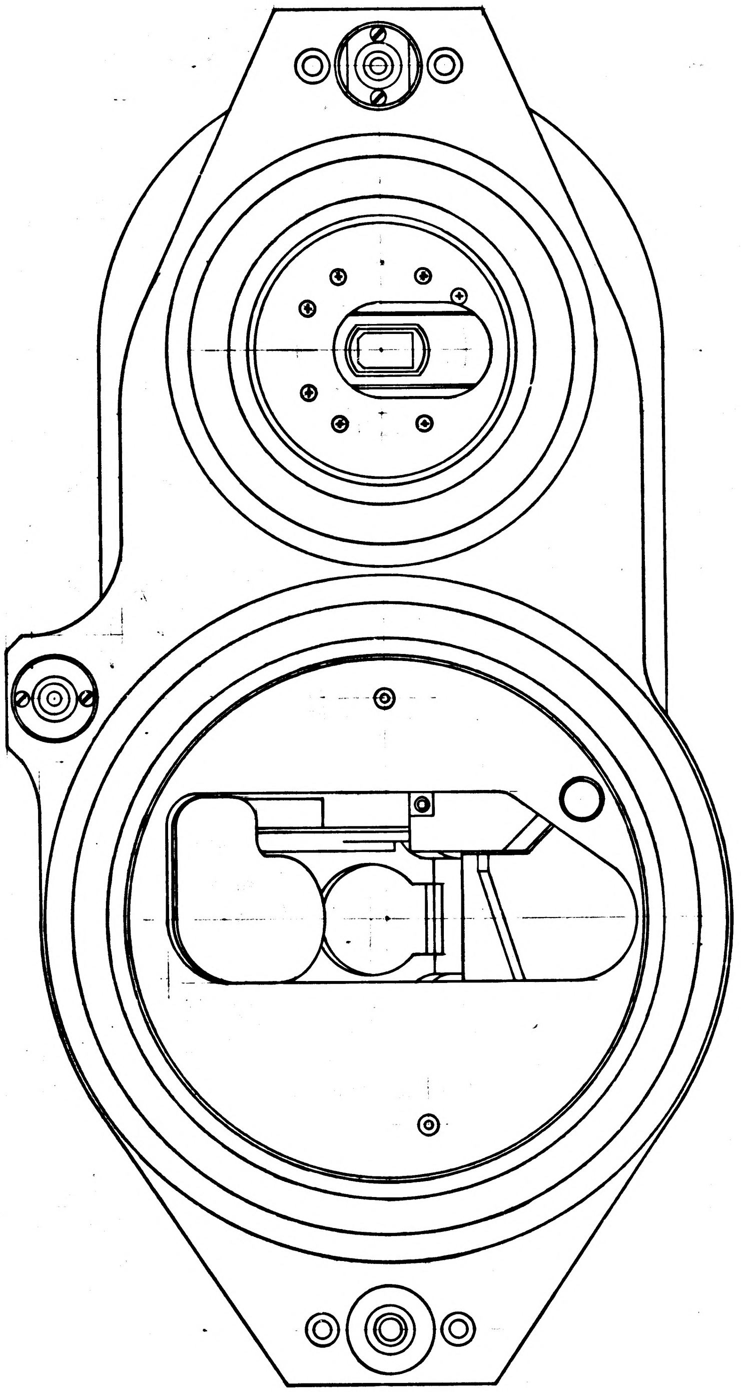
2010789

2010789	REV L	SH. 1 OF 1

2-/2010789

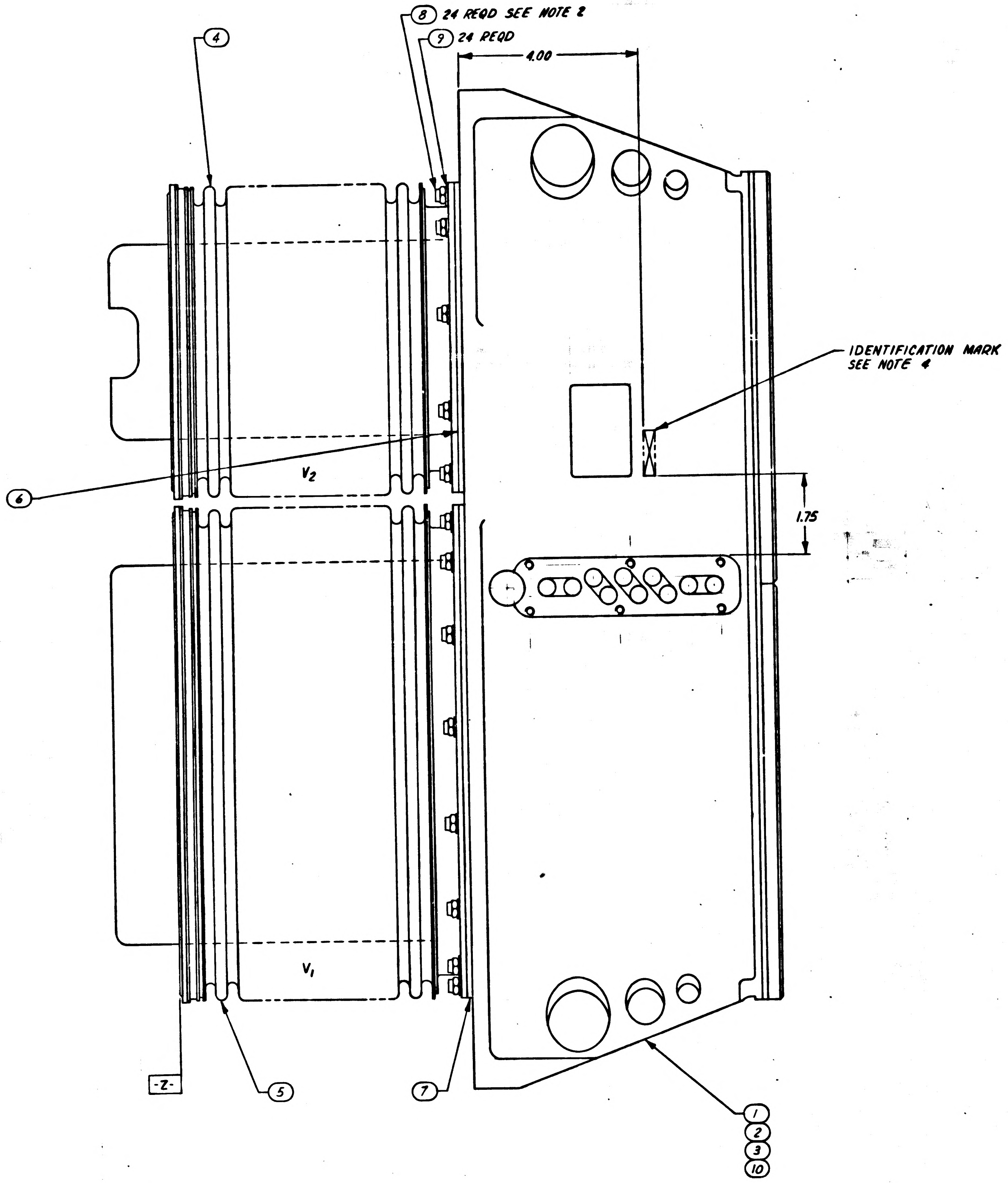
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEM ④ AND ITEM ⑤ ASSEMBLED TO ITEM ①, ITEM ②, ITEM ③ OR ITEM ⑩, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③ OR ⑩ SHALL NOT EXCEED 35 STD CC OF AIR PER MIN.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER" PER ND1002019.
5. SERIALIZE PER ND1002023.



2010790	REV LTR	SHEET
	A	1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		10/13/66	9-19



1					10	2011000-051	OPTICAL UNIT
24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
	1				3	2011000-041	OPTICAL UNIT
		1			2	2011000-034	OPTICAL UNIT
			1		1	2011000-035	OPTICAL UNIT
041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL ——
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Kjirnager DATE 8 AUG 66
CHECKED Ed Foster 10 AUG 66
APPROVAL 11 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL 10/13/66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

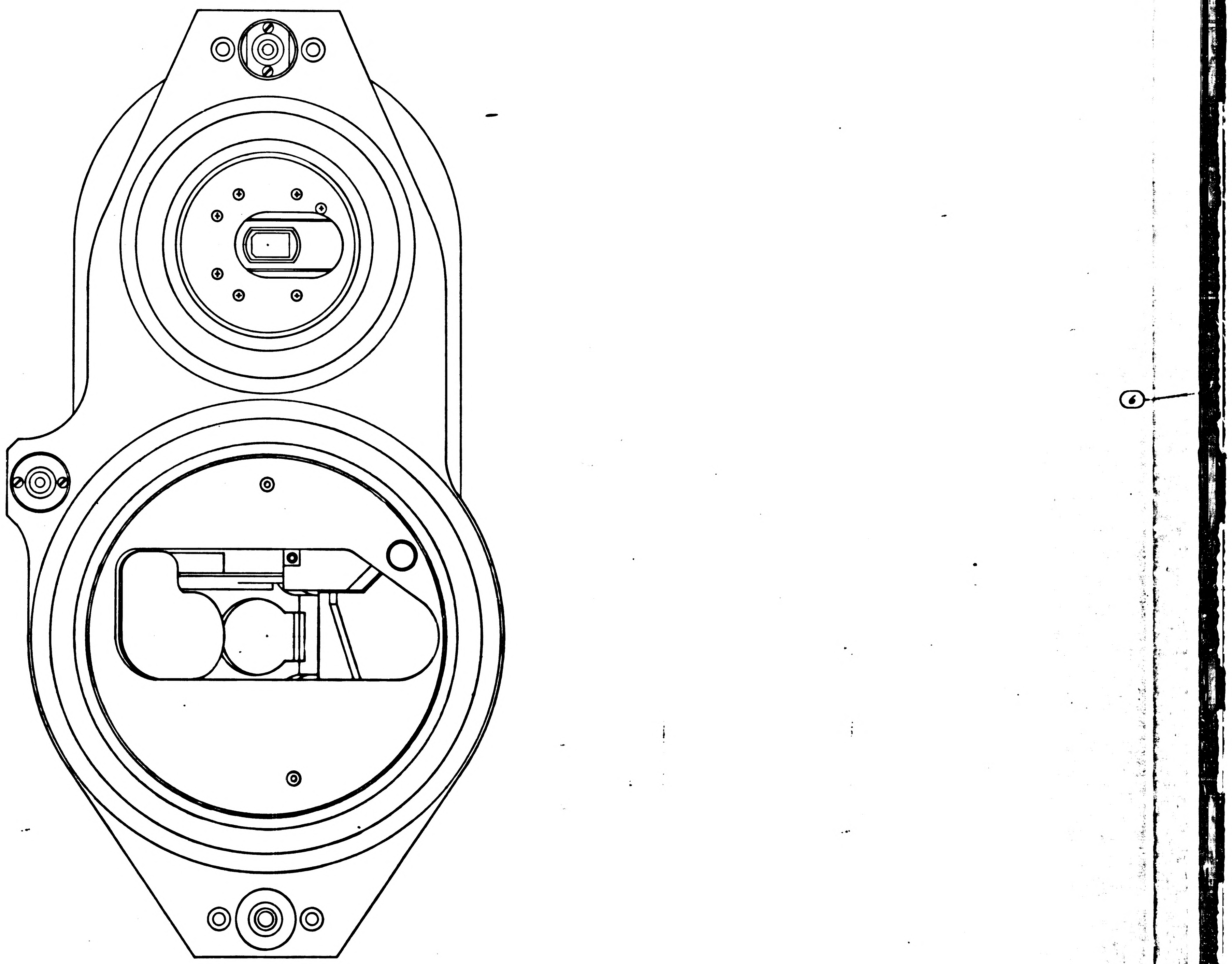
SIZE J_2
CODE IDENT NO. 80230
2010790
SCALE FUL.
SHEET 1 OF 1

2010790 A 1

2/2010790

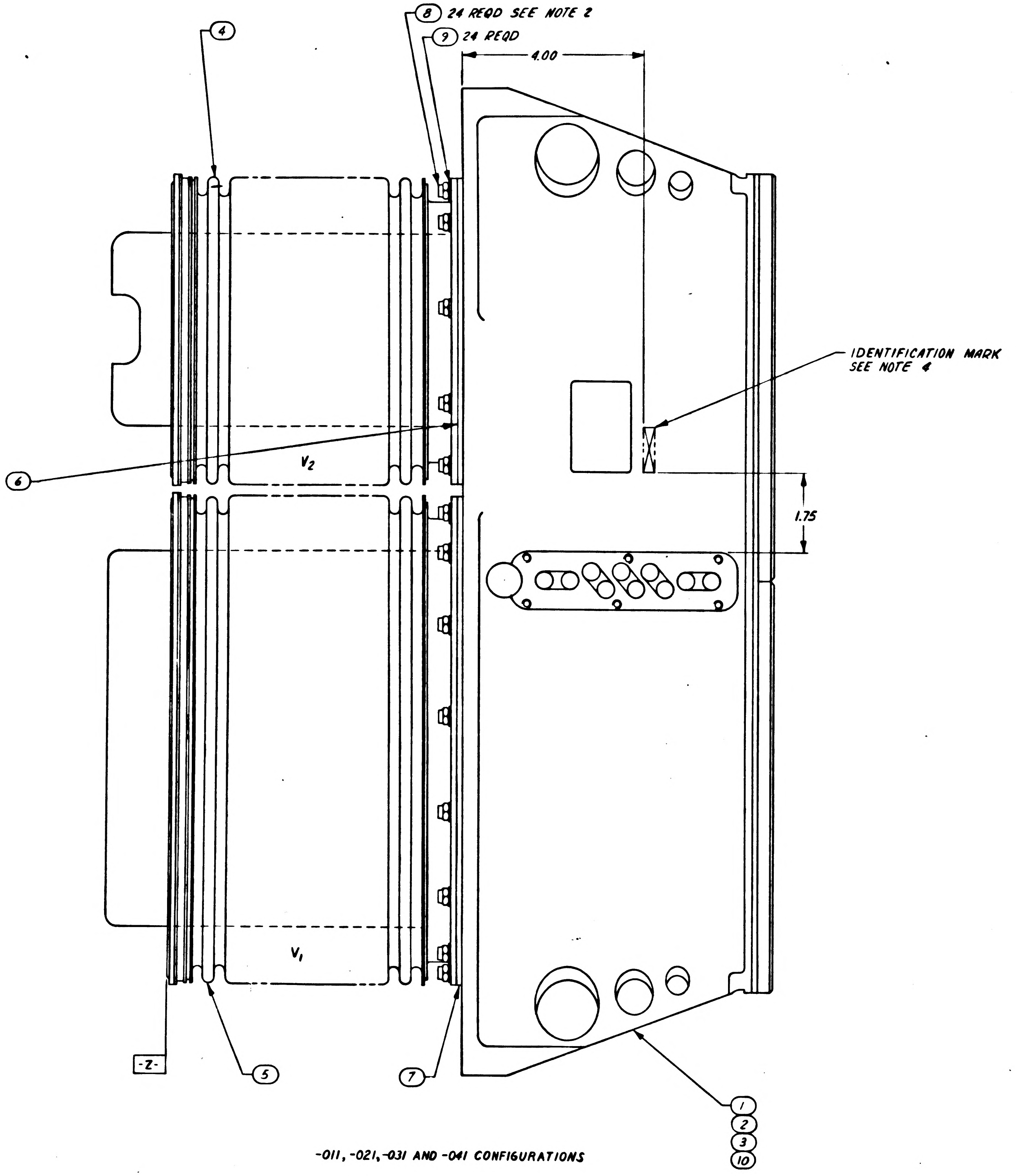
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEM ④ AND ITEM ⑤ ASSEMBLED TO ITEM ①, ITEM ②, ITEM ③ OR ITEM ⑩, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③ OR ⑩ SHALL NOT EXCEED 35 STD CC OF AIR PER MIN.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N2012547, AND NUTS, P/N2011602 FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
7. REMOVE EXISTING COVER, P/N2012675 OR 2011604, AND NUTS, P/N2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.



2010790	B	1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		10/11/66	
	B	REVISED PER TDRR 33014		7 MAR 67	



-011, -021, -031 AND -041 CONFIGURATIONS

081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
AR	AR	AR							20	1008903	ADHESIVE, EPOXY
4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX. SOC
4	4	4							18	1008484-000	SCREW, CAPTIVE
1	1	1							17	1008490-011	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1							11	1021382	SEAT, SEXTANT COVER
1				1					10	2011000-051	OPTICAL UNIT
				24	24	24	24		9	AN960C10L	WASHER, FLAT
				24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
				1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
				1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
				1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
				1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
	1				1				3	2011000-041	OPTICAL UNIT
		1				1			2	2011000-034	OPTICAL UNIT
							1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 8 AUG 66
CHECKED Ed Foster 10 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

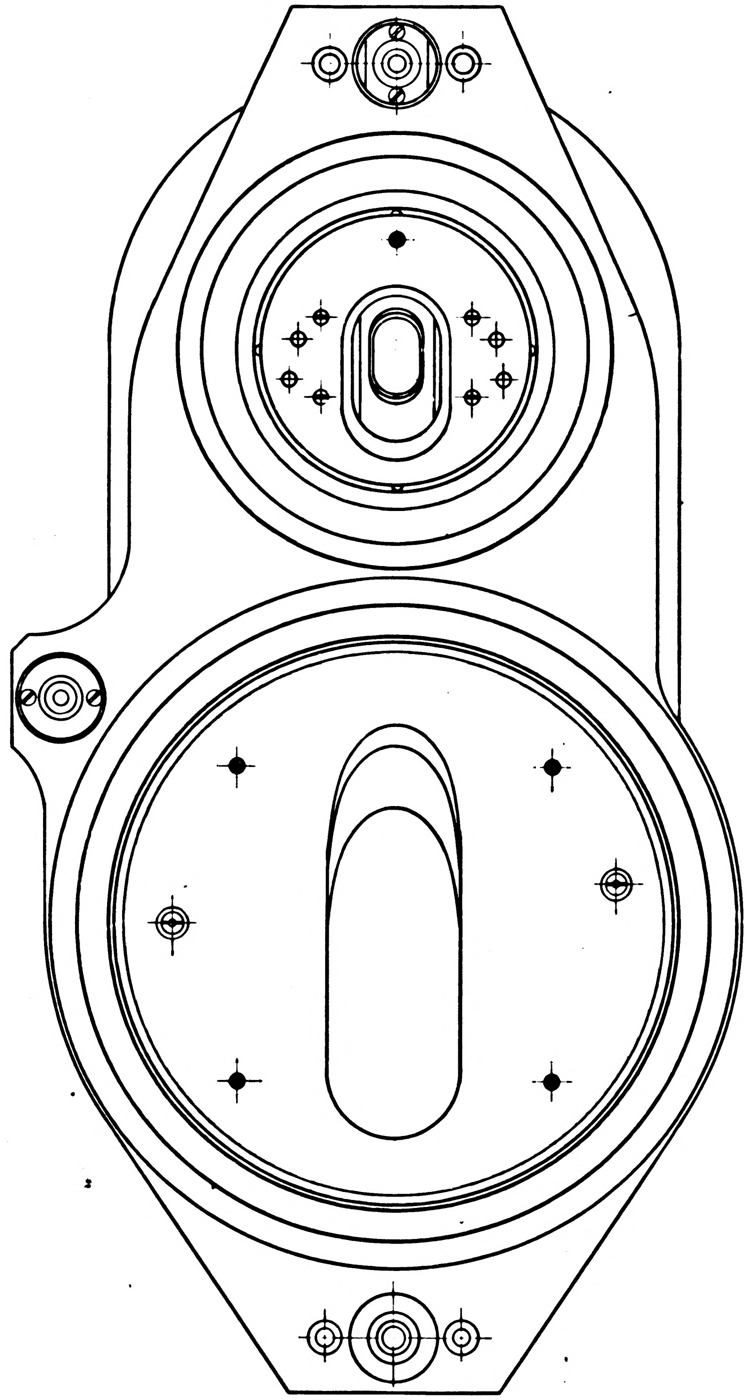
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

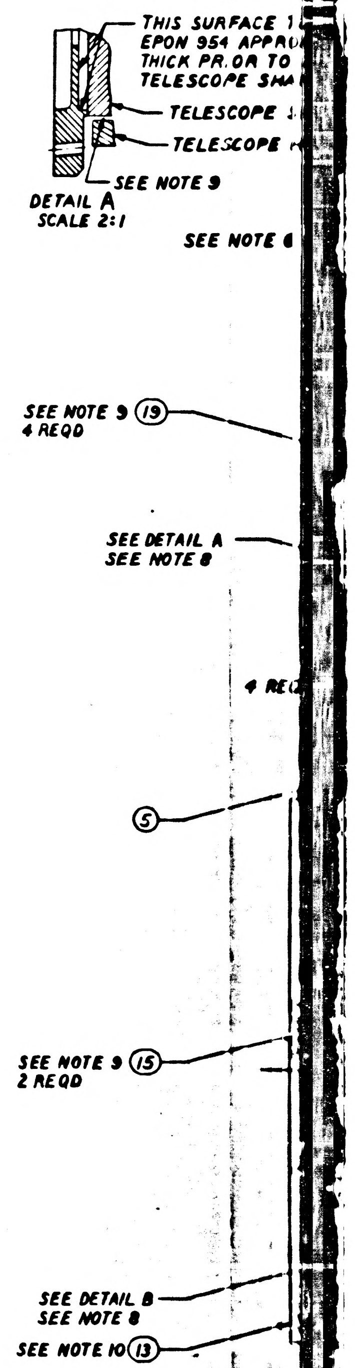
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

2010790

2/2010790



-061, -071, AND -081 CONFIGURATIONS

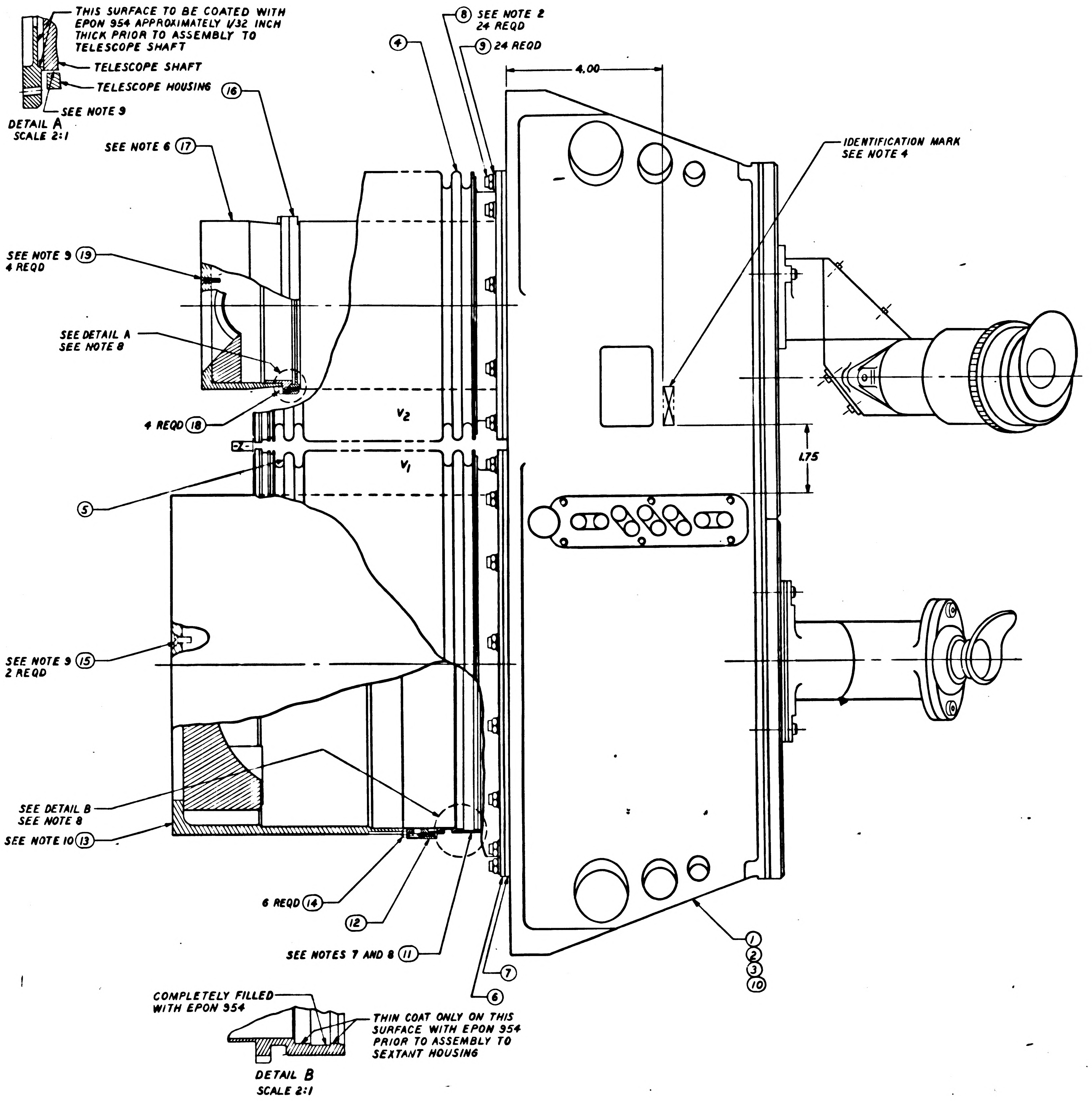

THIS SURFACE 1
EPON 954 APPRO
THICK PR. OR TO
TELESCOPE SHA
TELESCOPE
TELESCOPE
SEE NOTE 9
DETAIL A
SCALE 2:1
SEE NOTE 6
SEE NOTE 9 (19)
4 REQD
SEE DETAIL A
SEE NOTE 8
4 REQ
(5)
SEE NOTE 9 (15)
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 (13)

CON
WIT

2010790 B 2

1/2010790

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 33014	CHG NO	7 APR 67	WA



THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 9
DETAIL A
SCALE 2:1
⑯
SEE NOTE 6 ⑰
SEE NOTE 9 ⑲
4 REQD
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
⑤
SEE NOTE 9 ⑮
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪
⑦
⑥
④
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
4.00
V_2
V_1
1.75
IDENTIFICATION MARK
SEE NOTE 4
①
②
③
⑩
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

B THIS SHEET ADDED

QUANTITY REQUIRED				011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

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TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. KILMMER DATE 8 AUG 66
CHECKED ED FASTAR
APPROVAL F.S. NEWCZYK
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 B 2

2/2010790

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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3. WITH ITEM ④ AND ITEM ⑤ ASSEMBLED TO ITEM ①, ITEM ②, ITEM ③ OR ITEM ⑩, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③ OR ⑩ SHALL NOT EXCEED 35 STD CC OF AIR PER MIN.
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5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND NUTS, P/N 2011602 FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
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   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480.
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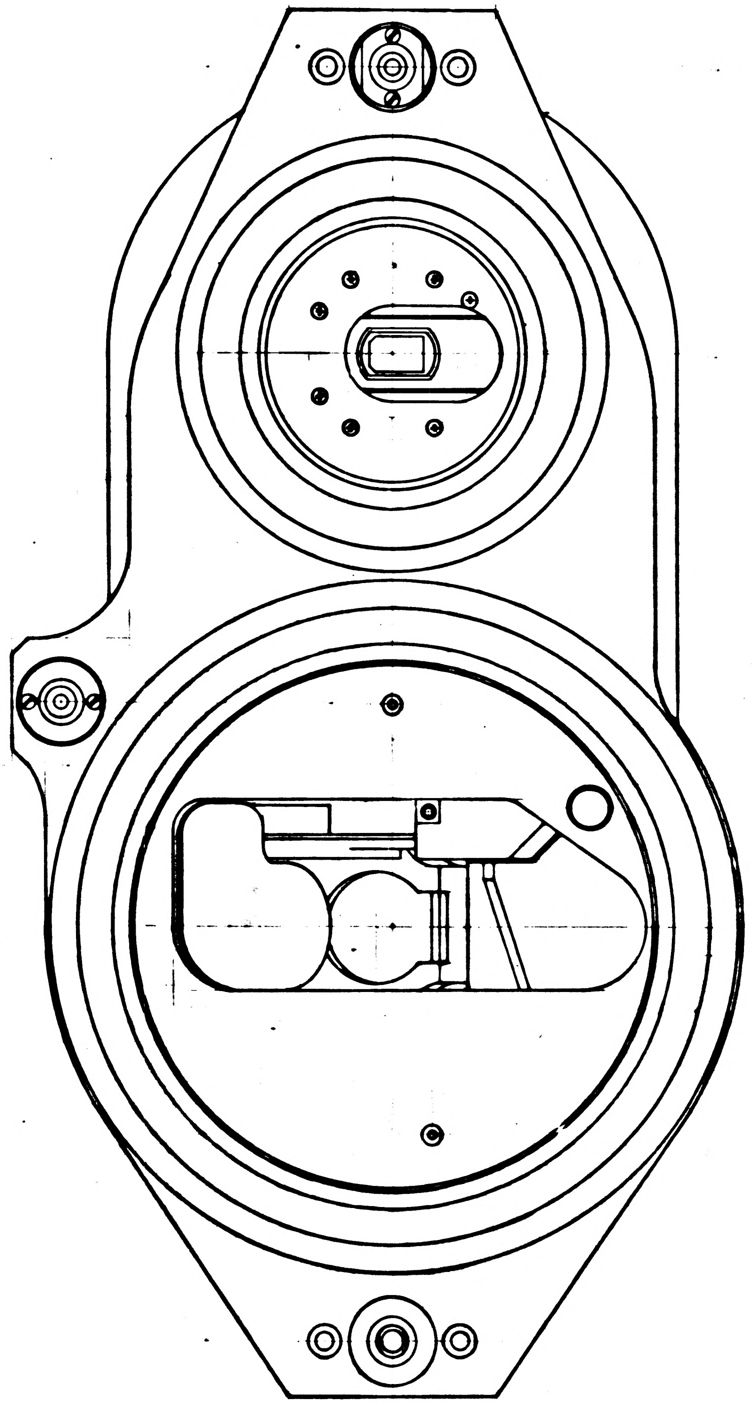

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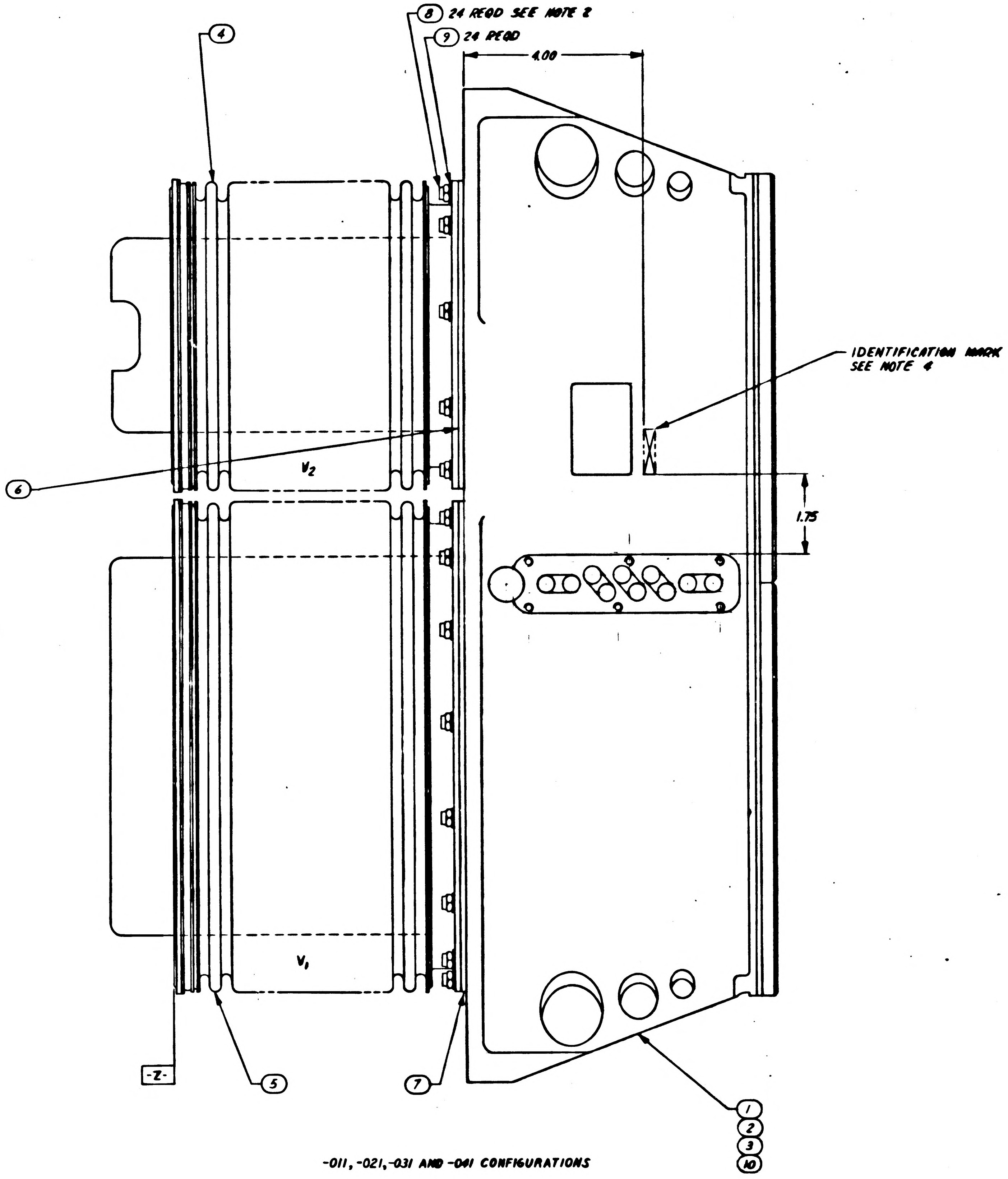
2010790 C 1

ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		10/12/66	
	B	REVISED PER TDRR 33014		7 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR	



-011, -021, -031 AND -041 CONFIGURATIONS

[illegible]	071	[illegible]	[illegible]	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
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4	4	4							18	1008484-000	SCREW, CAPTIVE
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1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6							14	1008484-001	SCREW, CAPTIVE
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1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1							11	1021382	SEAT, SEXTANT COVER
1				1					10	2011000-051	OPTICAL UNIT
				24	24	24	24		9	AN960C10L	WASHER, FLAT
				24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
				1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
				1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
				1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
				1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
	1				1				3	2011000-041	OPTICAL UNIT
		1				1			2	2011000-034	OPTICAL UNIT
							1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ———

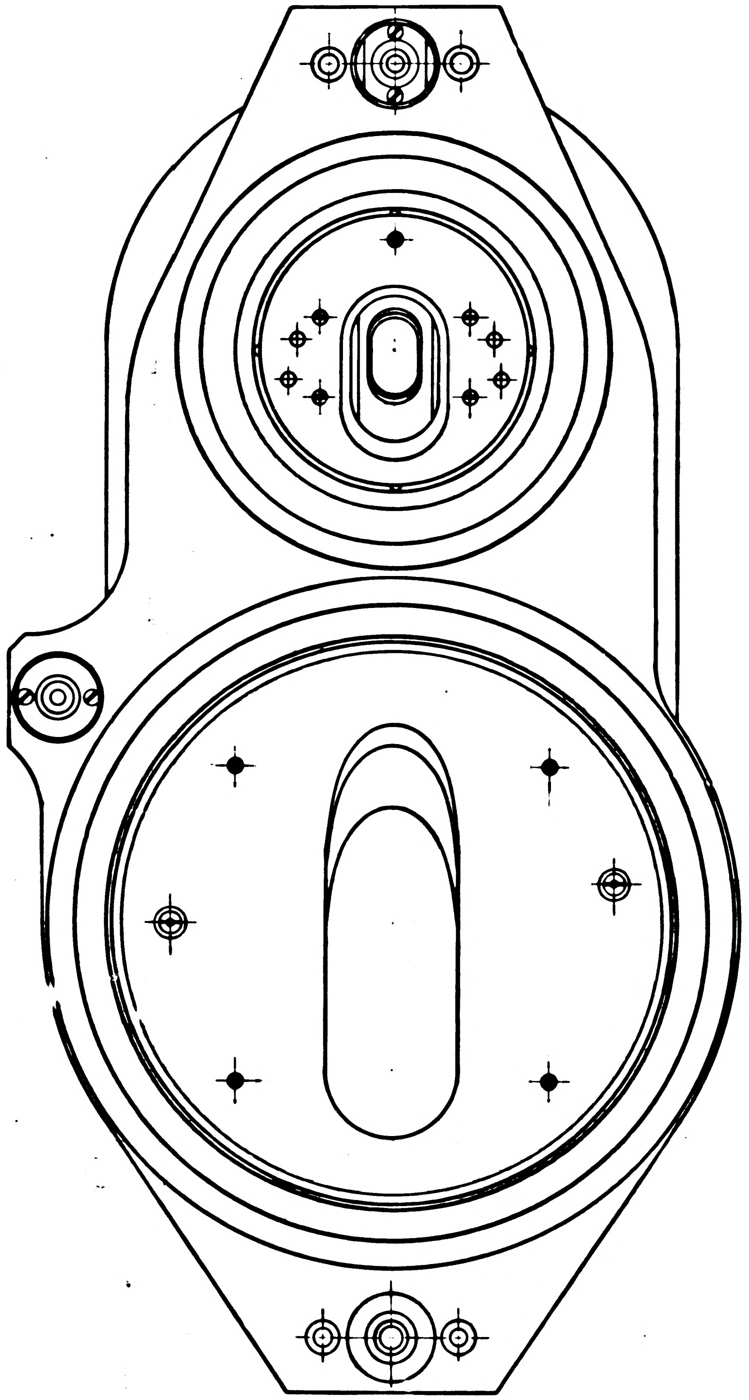
MIT
INSTRUMENTATION LAB
Cambridge, Mass
DRAWN [illegible] DATE
CHECKED G. Foster 10 Aug 66
APPROVED [illegible]
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

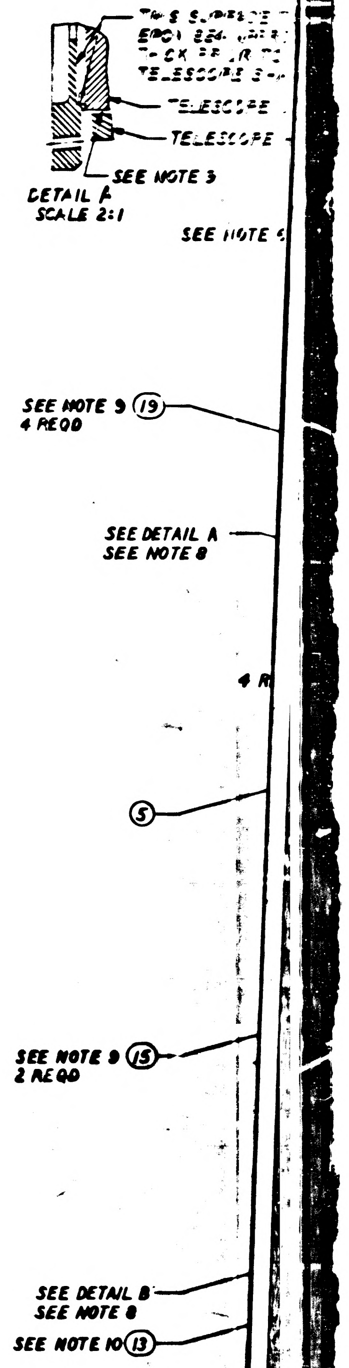
OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

2/2010790

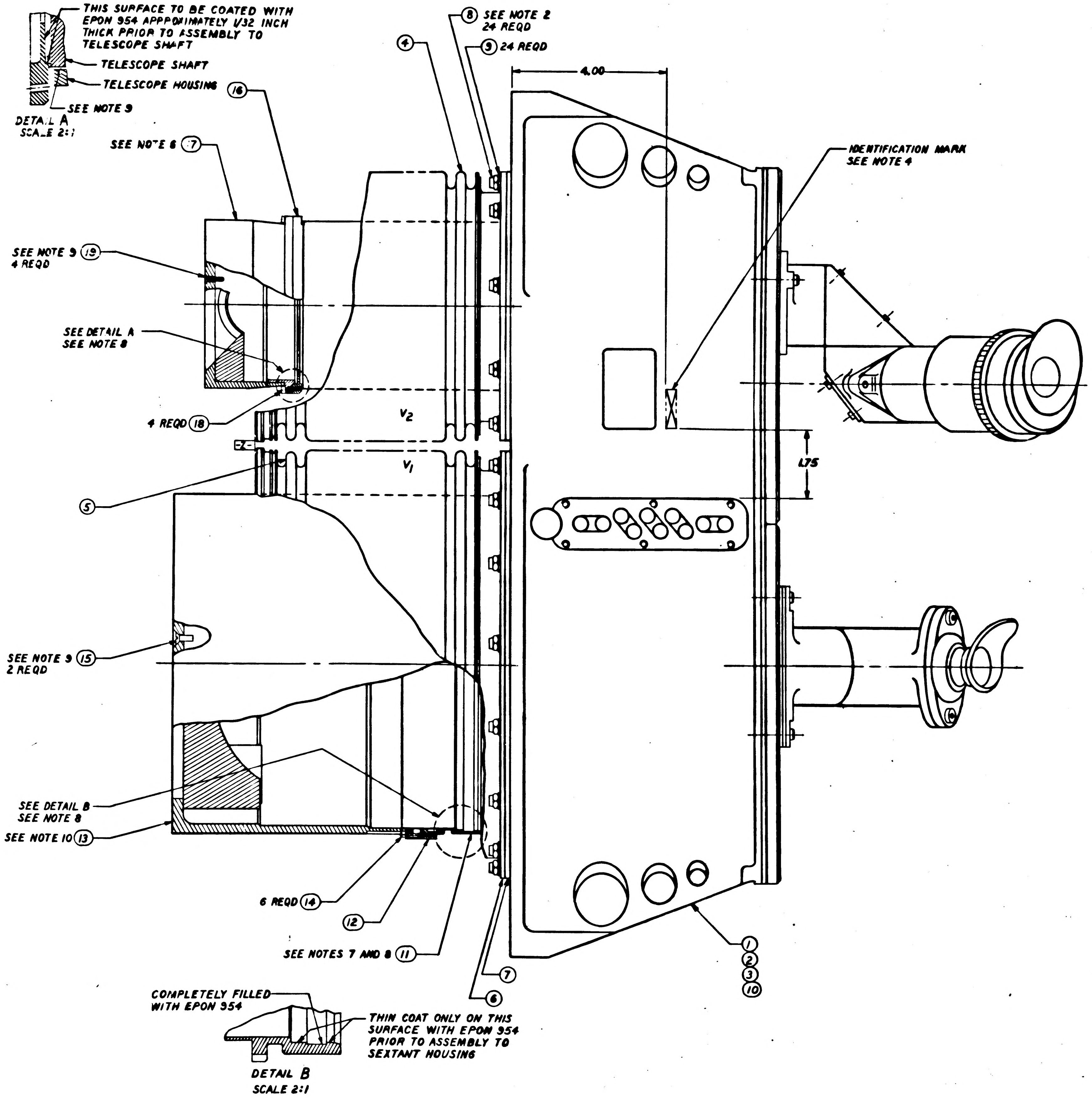


-061, -071, AND -081 CONFIGURATIONS



DETAIL A
SCALE 2:1
TELESCOPE
TELESCOPE
SEE NOTE 3
SEE NOTE 9 (19)
4 REQD
SEE DETAIL A
SEE NOTE 8
(5)
SEE NOTE 9 (15)
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 (13)

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 33814			
	C	REVISION STATUS CHANGED			


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 9
DETAIL A
SCALE 2:1
SEE NOTE 6 ⑰
⑯
④
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
4.00
IDENTIFICATION MARK
SEE NOTE 4
SEE NOTE 9 ⑲
4 REQD
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
V2
V1
.175
⑤
SEE NOTE 9 ⑮
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪
⑦
⑥
①
②
③
⑩
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

B THIS SHEET ADDED

				ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
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TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. KILMURRER DATE 8 AUG
CHECKED AR RUSTER
APPROVAL E. SMENCZYK
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 C 2

2/2010790

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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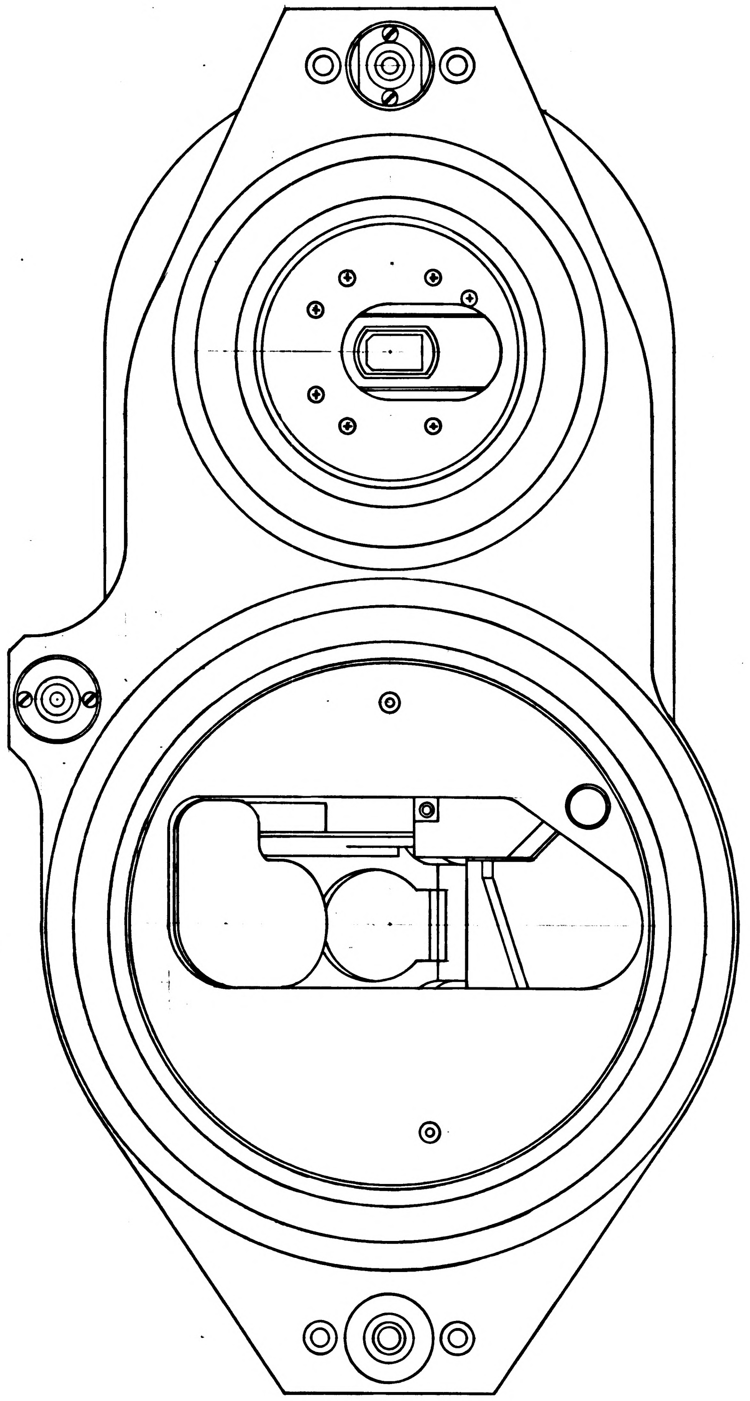
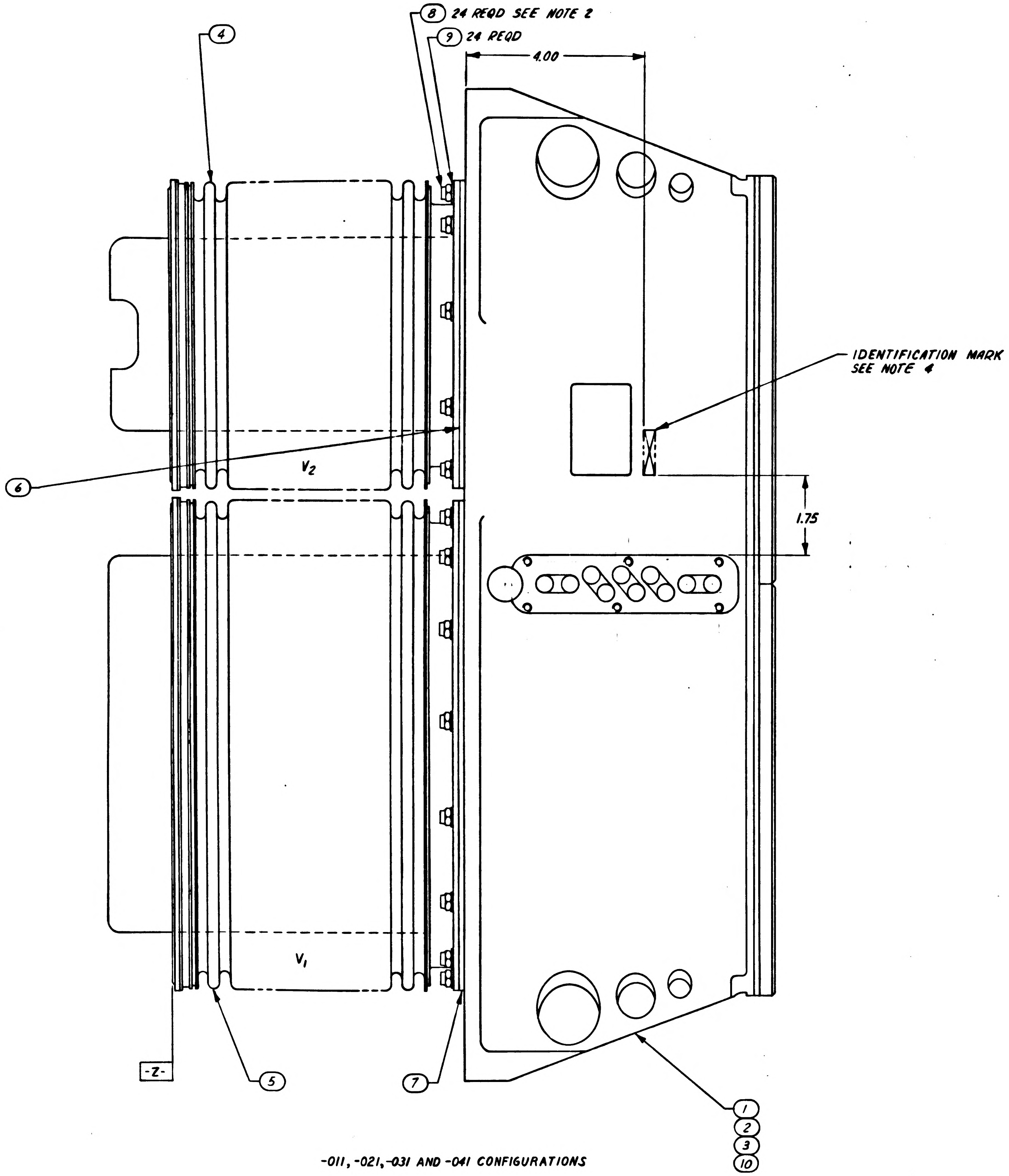


2010790	REV LTR	SHEET
	D	1

1 / 2010790

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557	CHG NO.	8/18/66	
	B	REVISED PER TDRR 33014		7 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR 67	
	D	REVISED PER TDRR 33653		26 APR 67	



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24	24	24		24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24		24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1		1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1		1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1		1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1		1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
	1				1				3	2011000-041	OPTICAL UNIT
		1				1			2	2011000-034	OPTICAL UNIT
							1		1	2011000-035	OPTICAL UNIT
QUANTITY REQUIRED									LIST OF PARTS AND MATERIALS		

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3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ———
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Kilmayer DATE 8 AUG 66
CHECKED Ed Foster 10 AUG 66
APPROVAL 11 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

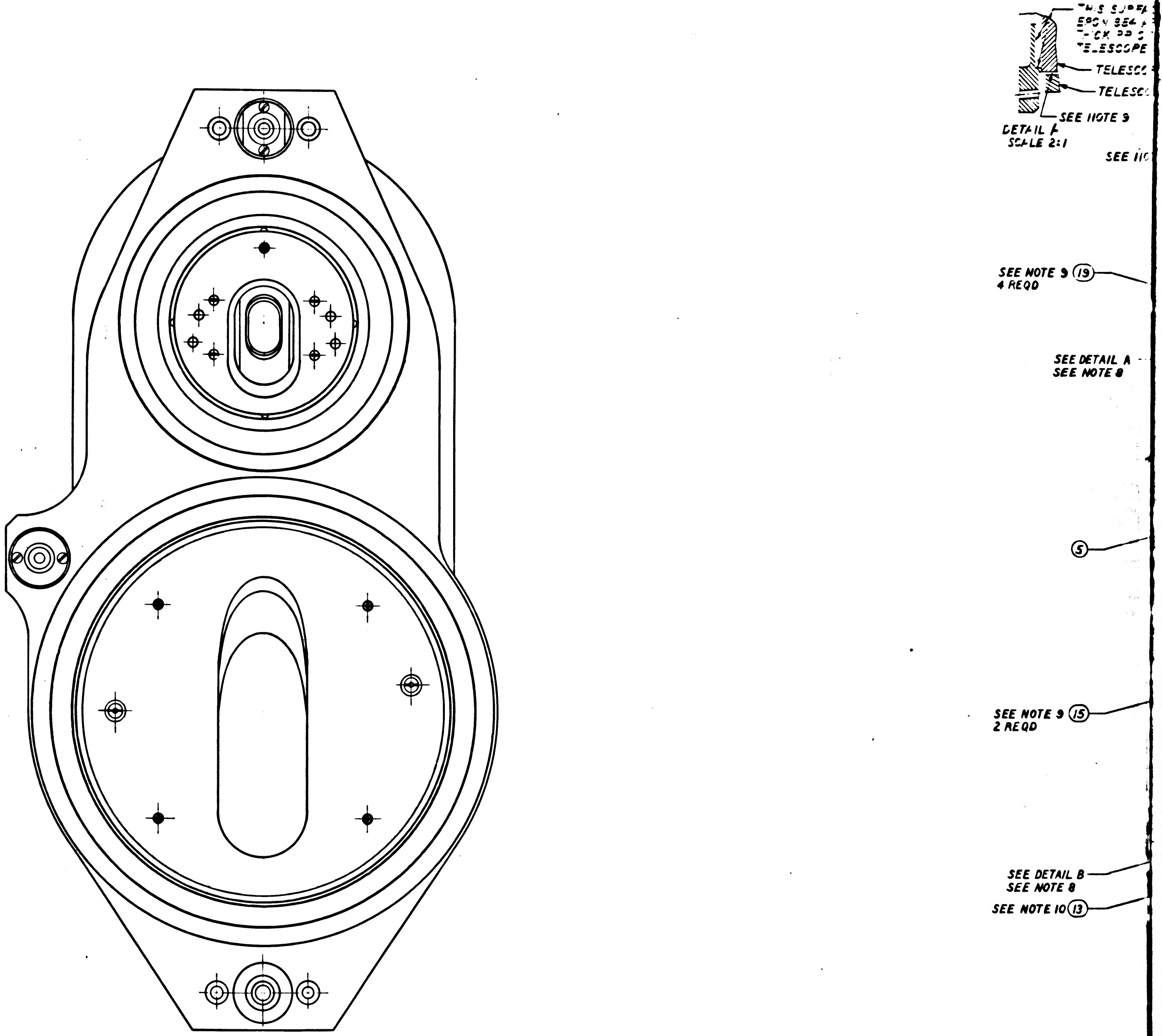
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

2010790 REV D SHEET 1

2/2010790

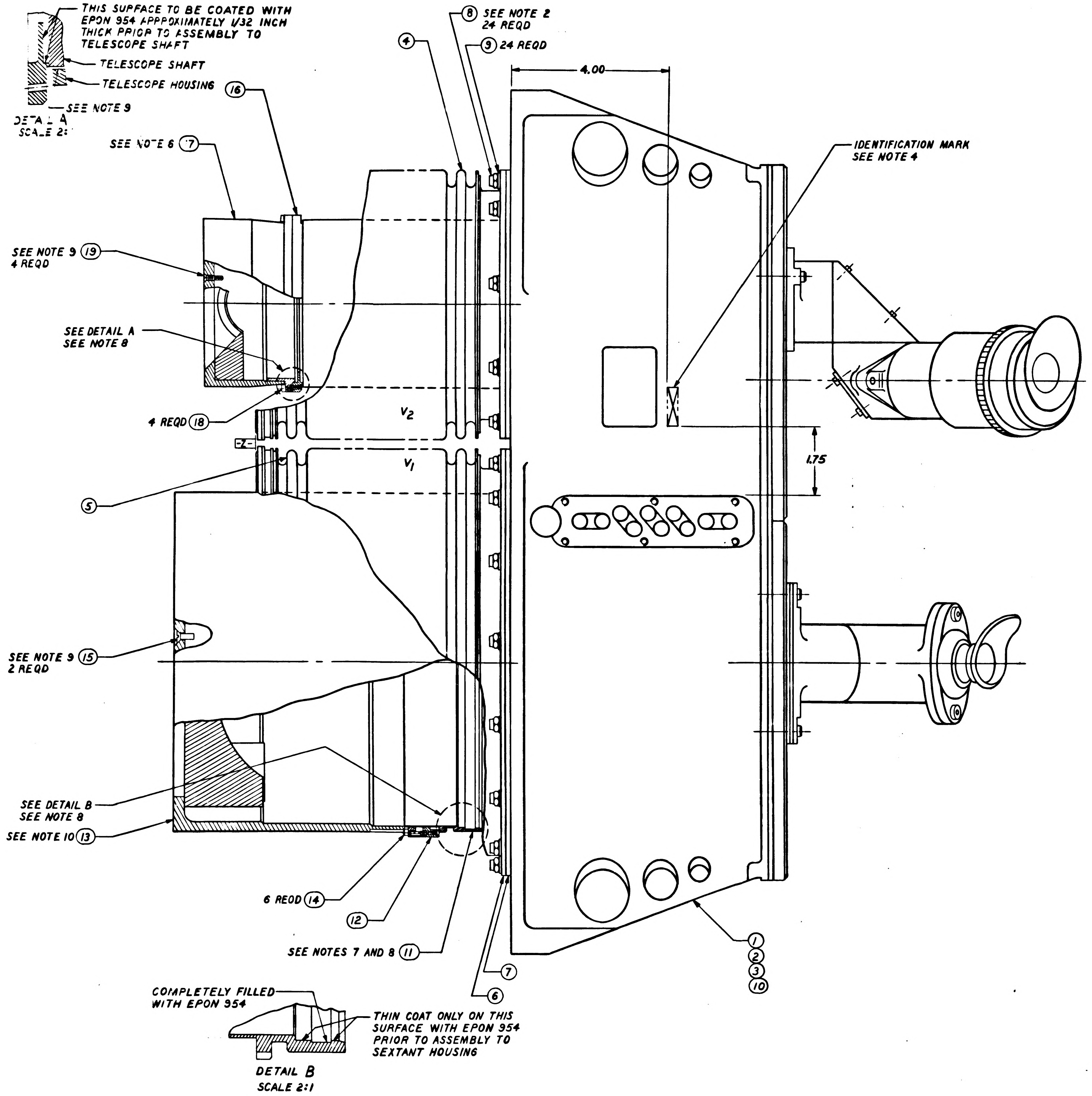

THIS SURFA
EPOXY 354
THICK
TELESCOPE
TELESCO
TELESCO
SEE NOTE 9
DETAIL A
SCALE 2:1
SEE NO
SEE NOTE 9 (19)
4 REQD
SEE DETAIL A
SEE NOTE 8
(5)
SEE NOTE 9 (15)
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 (13)

-061, -071, AND -081 CONFIGURATIONS

2010790		2

1-/-2010790

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 330 4	CHG NO.	[illegible]	[illegible]
	C	REVISION STATUS CHANGED		16 MAR 67	BCB
	D	REVISION STATUS CHANGED		26 [illegible] 67	[illegible]


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 9
DETAIL A
SCALE 2:1
⑯
SEE NOTE 6 ⑰
④
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
4.00
IDENTIFICATION MARK
SEE NOTE 4
SEE NOTE 9 ⑲
4 REQD
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
Z
V_2
V_1
1.75
⑤
SEE NOTE 9 ⑮
2 REQD
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪
⑦
⑥
①
②
③
⑩
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

B THIS SHEET ADDED

					ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
				011				
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. KILVINGER DATE 8 AUG 66
CHECKED ED FOSTER 10 AUG 66
APPROVAL E. SNEWCZYK [illegible]
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

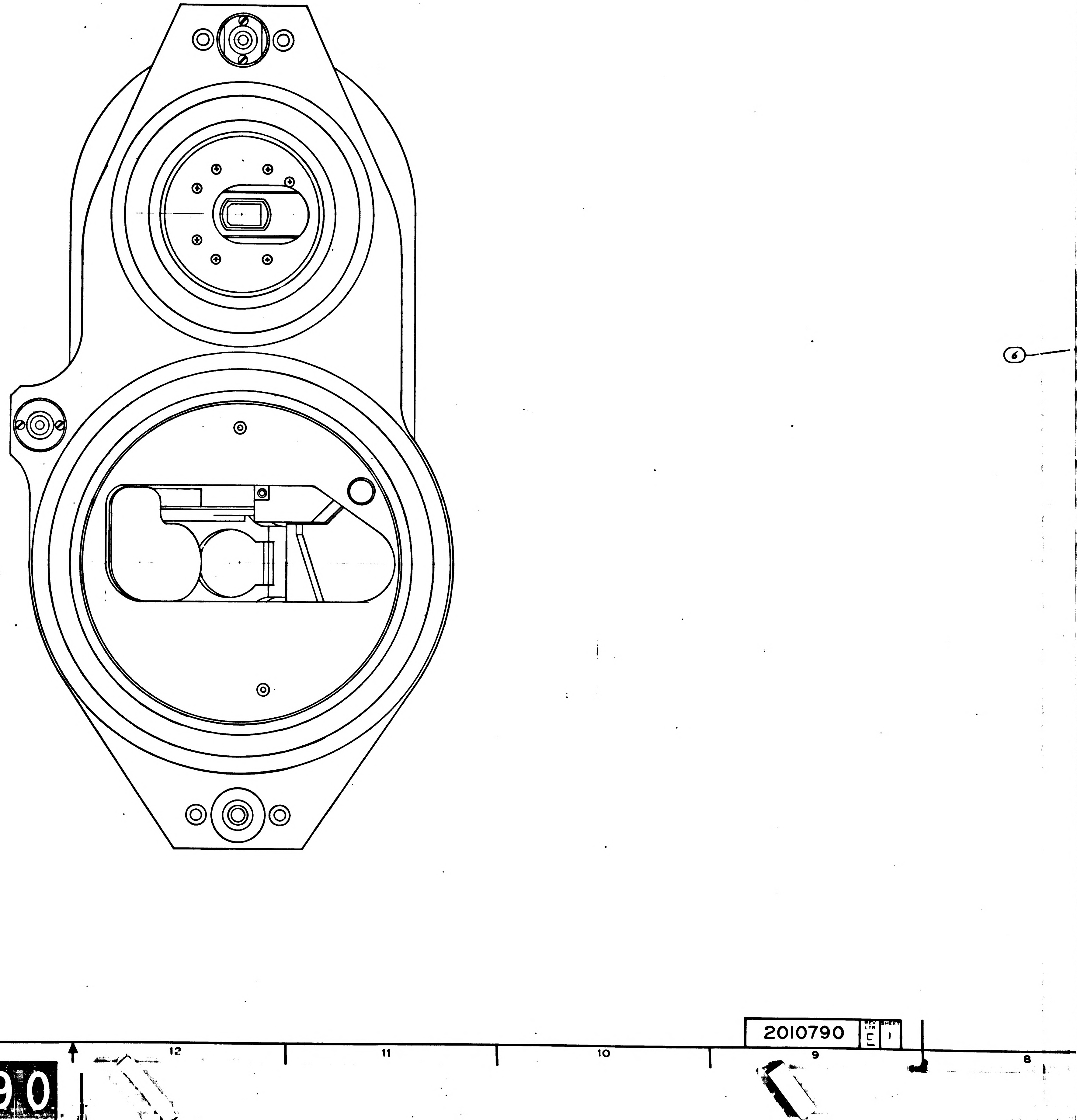
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 REV LTR D SHEET 2

2/2010790

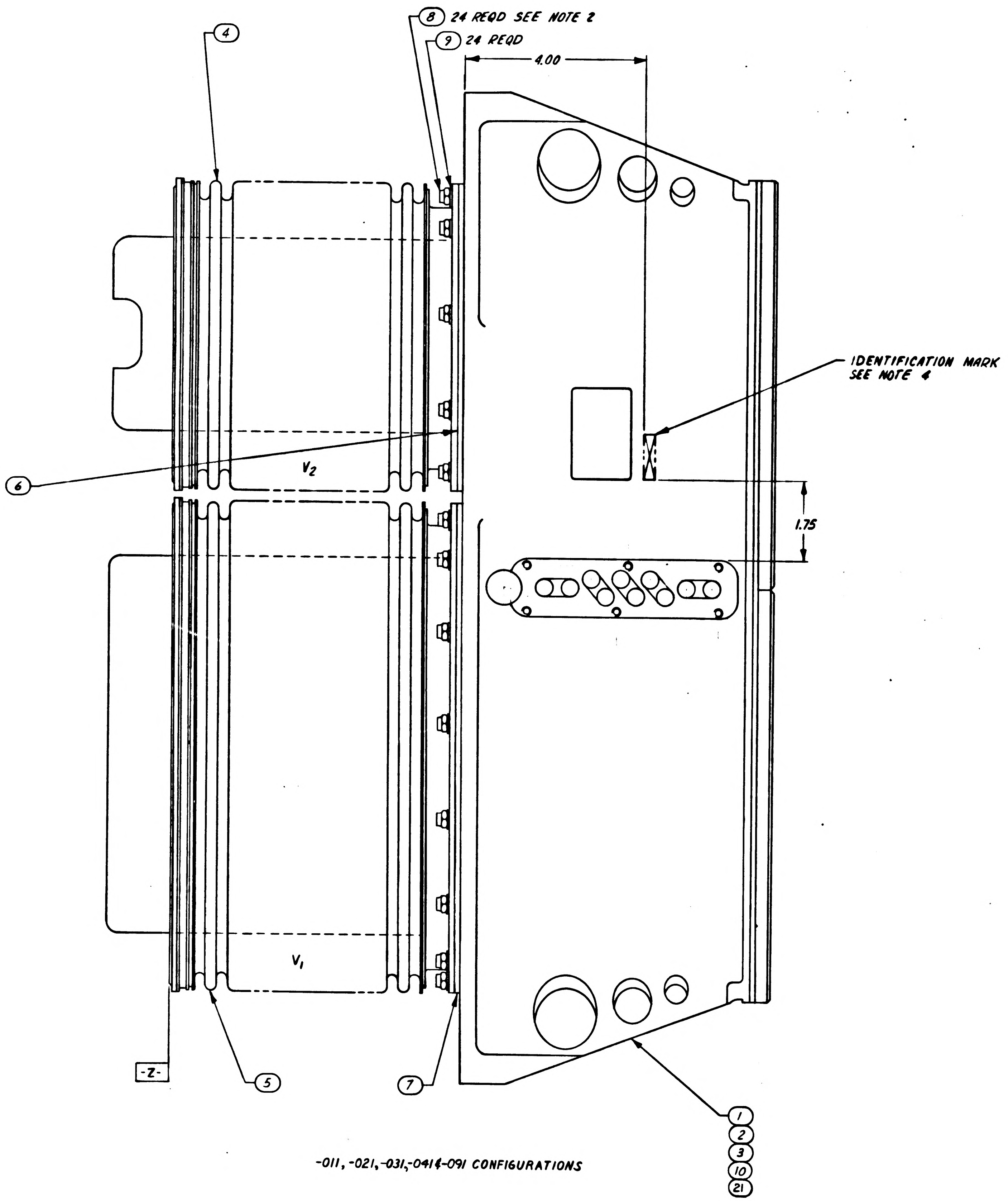
NOTES: (NOTES 1,2,3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011, -021, -031, -041, -051 AND -091)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081 AND -111)
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081 AND -111)

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩ OR ㉑, SURFACE $\boxed{-Z-}$ TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK RATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩ OR ㉑ SHALL NOT EXCEED 35 STD CC OF AIR PER MIN.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER" PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 20[illegible]602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.
11. TRANSFER SERIAL NUMBER FROM EXISTING NAMEPLATE TO NEW NAMEPLATE, ITEM 28, 30, 31 OR 32. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND 1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
    CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.



2010790	REV LTR	SHEET
	E	1

ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		5/16/66	
	B	REVISED PER TDRR 33014		7 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR 67	
	D	REVISED PER TDRR 35653		26 APR 67	VE
	E	REVISED PER TDRR 33976		7 AUG	R11



-011, -021, -031, -041 & -091 CONFIGURATIONS

111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1											32	1004260-553	NAMEPLATE
		1									31	1004260-552	NAMEPLATE
			1								30	1004260-551	NAMEPLATE
AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
				1							28	1004260-550	NAMEPLATE
					2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
					4						26	1010630-17	SCREW, FLAT HEAD
					2						25	1021323	INSERT
					1						24	1021321	SEAT, SEXTANT COVER
					1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
					1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
1	1										21	2011000-061	OPTICAL UNIT
AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX. SOC
4		4	4	4							18	1008484-000	SCREW, CAPTIVE
1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1		1	1	1							11	1021382	SEAT, SEXTANT COVER
		1		1		1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
			1				1				3	2011000-041	OPTICAL UNIT
				1				1			2	2011000-034	OPTICAL UNIT
					1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Kilmayer DATE 8 AUG 66
CHECKED Ed Foster 10 AUG 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

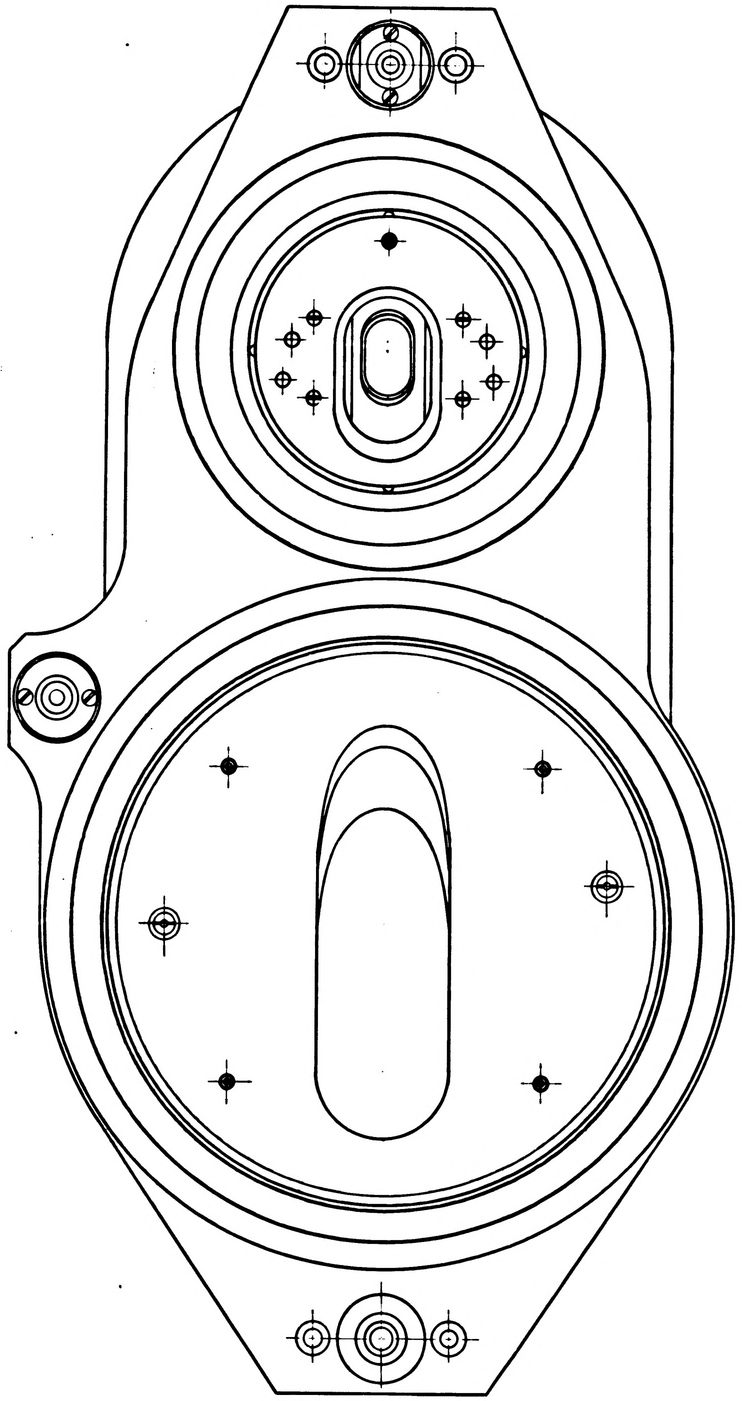
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

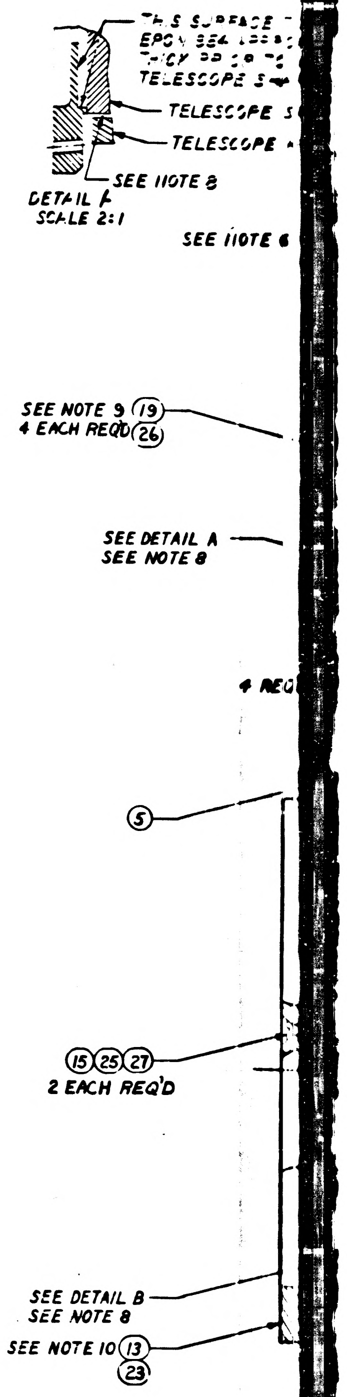
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

2010790 REV LTR E SHEET 1

2/2010790



-051, -061, -071, -081 AND -111 CONFIGURATIONS

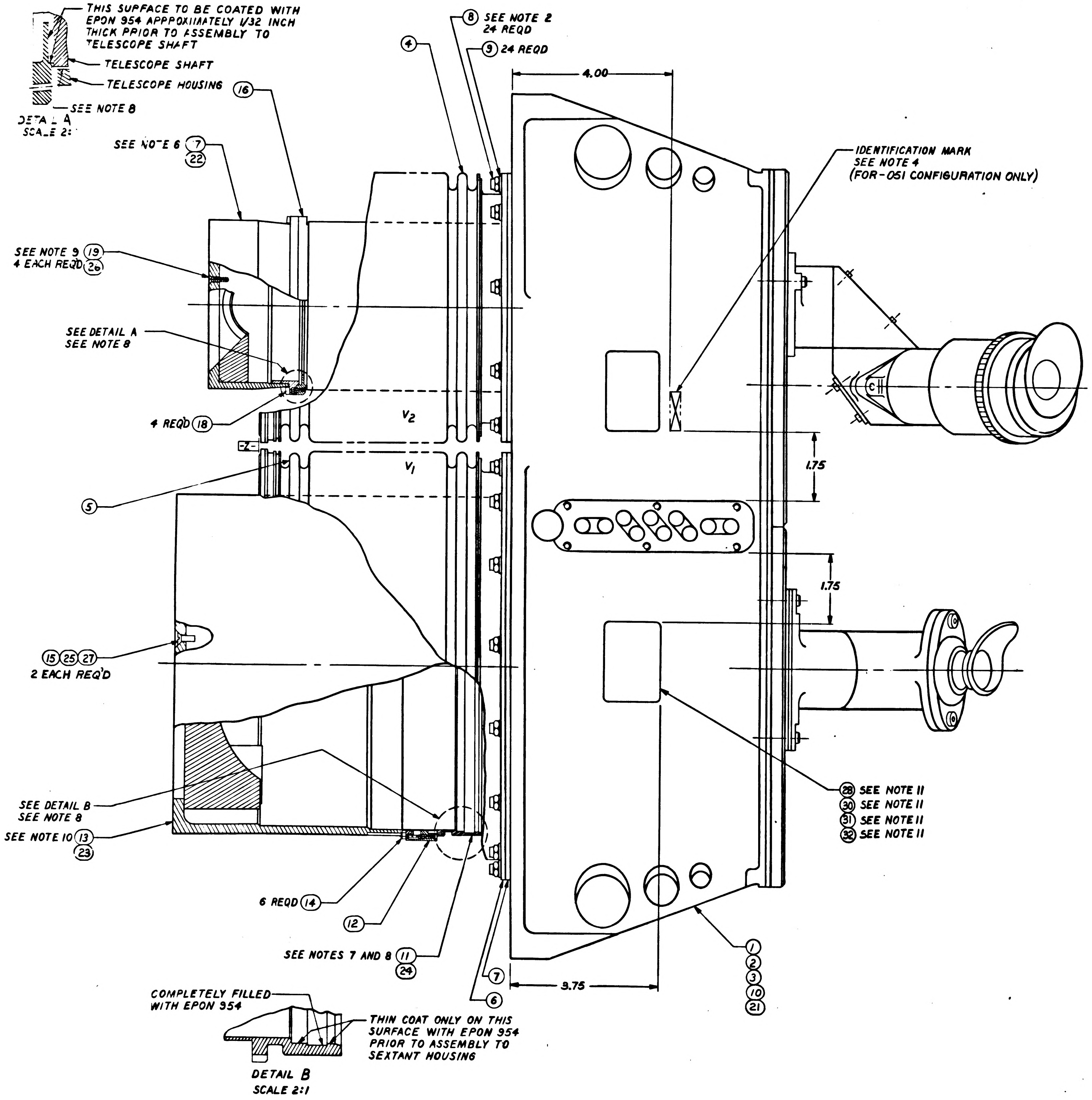

THIS SURFACE
EPON
TELESCOPE S
TELESCOPE S
TELESCOPE
SEE NOTE 8
DETAIL A
SCALE 2:1
SEE NOTE 6
SEE NOTE 9 (19)
4 EACH REQ'D (26)
SEE DETAIL A
SEE NOTE 8
4 REQ
⑤
⑮ ㉕ ㉗
2 EACH REQ'D
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬
㉓

COM
WITH

2010790	E	2

1/2010790

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 33014	CHG NO.	[illegible]	WA
	C	REVISION STATUS CHANGED		16 MAR 67	RCB
	D	REVISION STATUS CHANGED		26 APR 67	
	E	REVISED PER TDRR 33975		7 AUG 67	RWH



THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
SEE NOTE 6 ⑦ ㉒
⑯
④
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
4.00
IDENTIFICATION MARK
SEE NOTE 4
(FOR-051 CONFIGURATION ONLY)
SEE NOTE 9 ⑲ ⑳
4 EACH REQD
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
V2
V1
-Z-
⑤
1.75
1.75
⑮㉕㉗
2 EACH REQ'D
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬ ㉓
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪ ㉔
⑦
⑥
3.75
㉘ SEE NOTE 11
㉚ SEE NOTE 11
㉛ SEE NOTE 11
㉜ SEE NOTE 11
①
②
③
⑩
㉑
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

B THIS SHEET ADDED

			011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. KILVINGER DATE 8 AUG 66
CHECKED ED FOSTER 10 AUG 66
APPROVAL E. NEWCZYK 11 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND BELLOWS ASSEMBLY

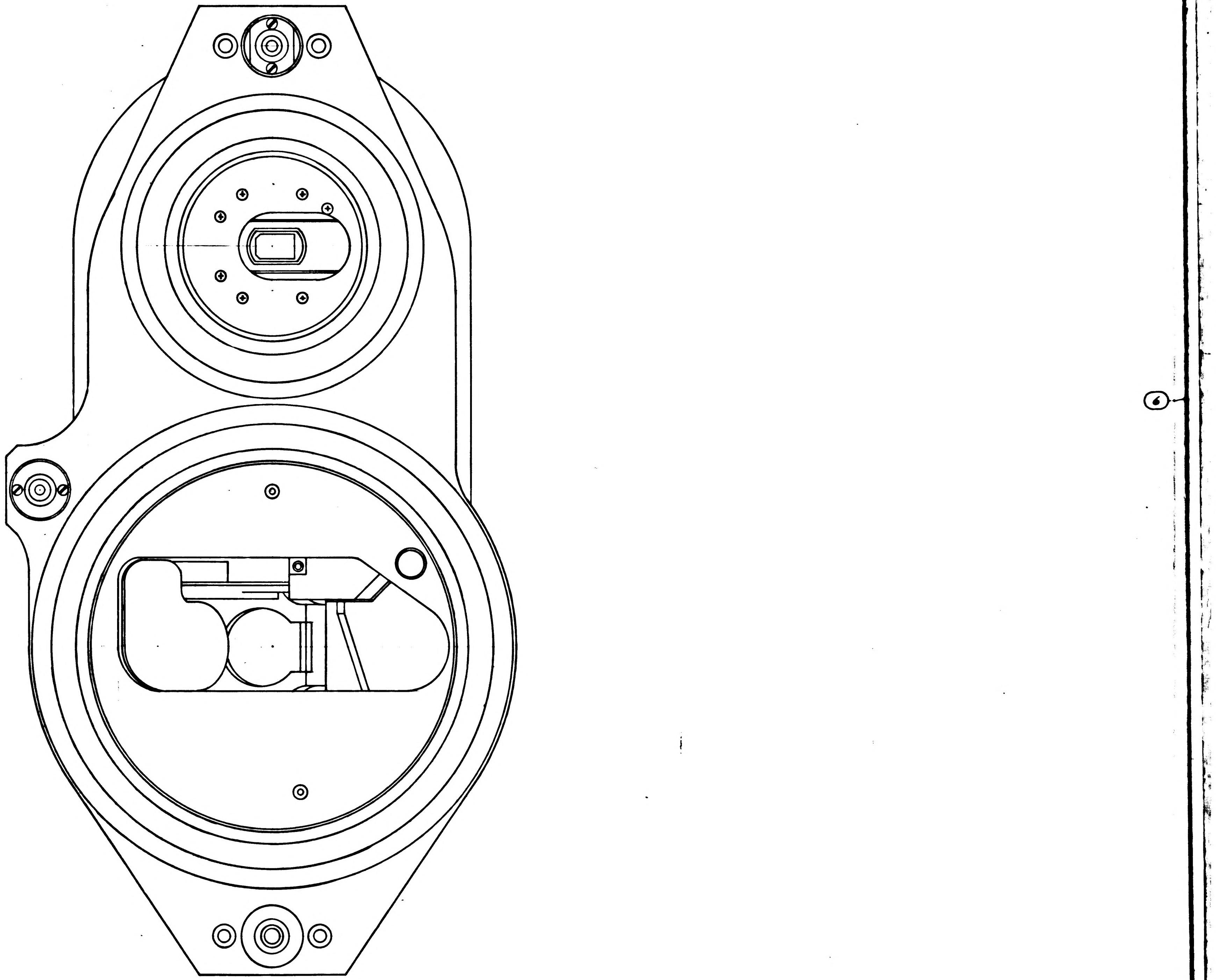
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 | E | 2

2/2010790

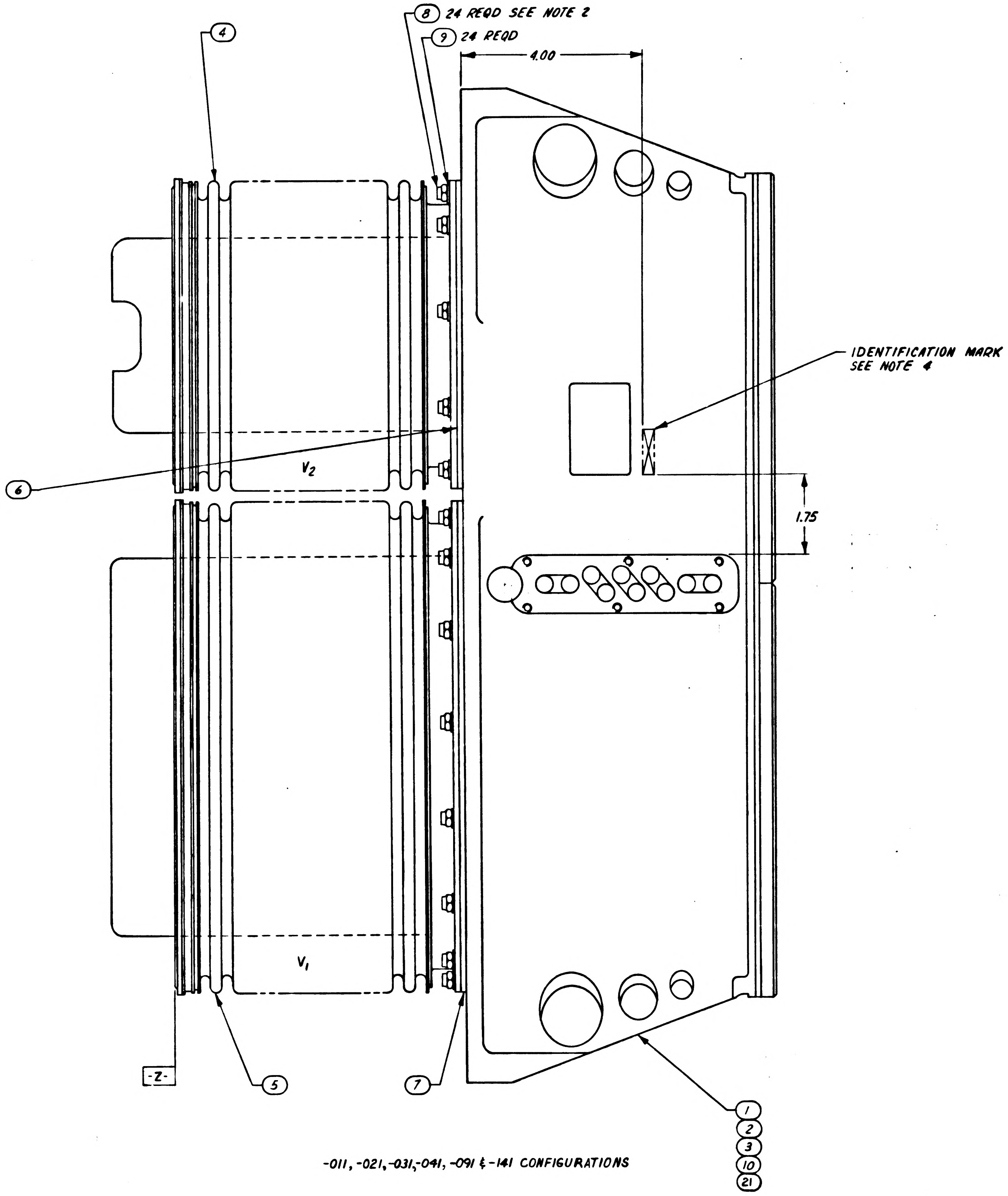
NOTES:
(NOTES 1, 2, 3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011. -021, -031, -041, -051 AND -091)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081, -111, -121 AND -131)
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081, -111, -121, -131 AND -141)

1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩, ㉑, ㉝ OR ㉞, SURFACE $\boxed{-Z-}$ TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK RATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩, ㉑, ㉝ OR ㉞ SHALL NOT EXCEED 35 STD CC OF AIR PER MIN.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER" PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.
11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28, 30, 31 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
    CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.



2010790 | 1

ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		6/18/66	
	B	REVISED PER TDRR 33014		MAR 67	
	C	REVISED PER TDRR 33024		13 MAR 67	
	D	REVISED PER TDRR 33653		26 APR 67	
	E	REVISED PER TDRR 33975			R11
	F	REVISED PER TDRR 34373		24 JUL 67	



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	1												35	1004260-570	NAMEPLATE
1	1													34	2011000-071	OPTICAL UNIT
		1												33	2011000-062	OPTICAL UNIT
			1											32	1004260-553	NAMEPLATE
					1									31	1004260-552	NAMEPLATE
						1								30	1004260-551	NAMEPLATE
	AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
							1							28	1004260-550	NAMEPLATE
								2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
								4						26	1010630-17	SCREW, FLAT HEAD
								2						25	1021323	INSERT
								1						24	1021321	SEAT, SEXTANT COVER
								1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
								1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
			1	1										21	2011000-061	OPTICAL UNIT
	AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
	4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX. SOC
	4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
	1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
	1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
	2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
	6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
	1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
	1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
	1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
					1		1		1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
						1				1				3	2011000-041	OPTICAL UNIT
							1				1			2	2011000-034	OPTICAL UNIT
								1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN [illegible] DATE 8 AUG 66
CHECKED Ed Foster 10 Aug 66
APPROVAL [illegible]
CONTRACT NAS 9-497
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

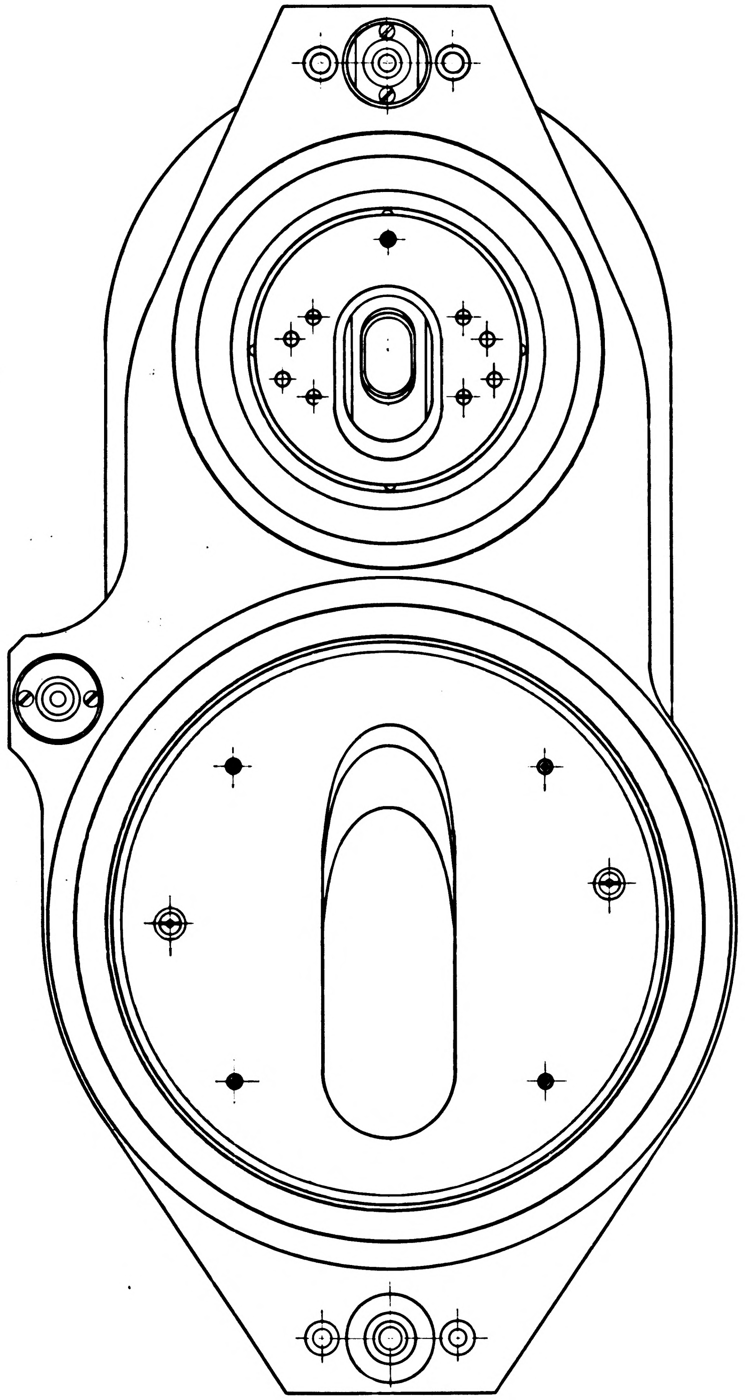
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

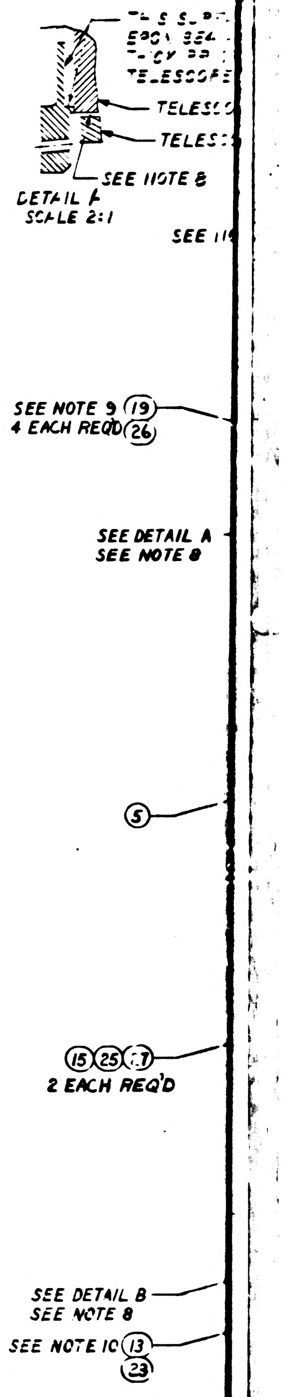
OPTICAL UNIT AND BELLOWS ASSEMBLY

SIZE J_2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

010790 REV F SHEET 1

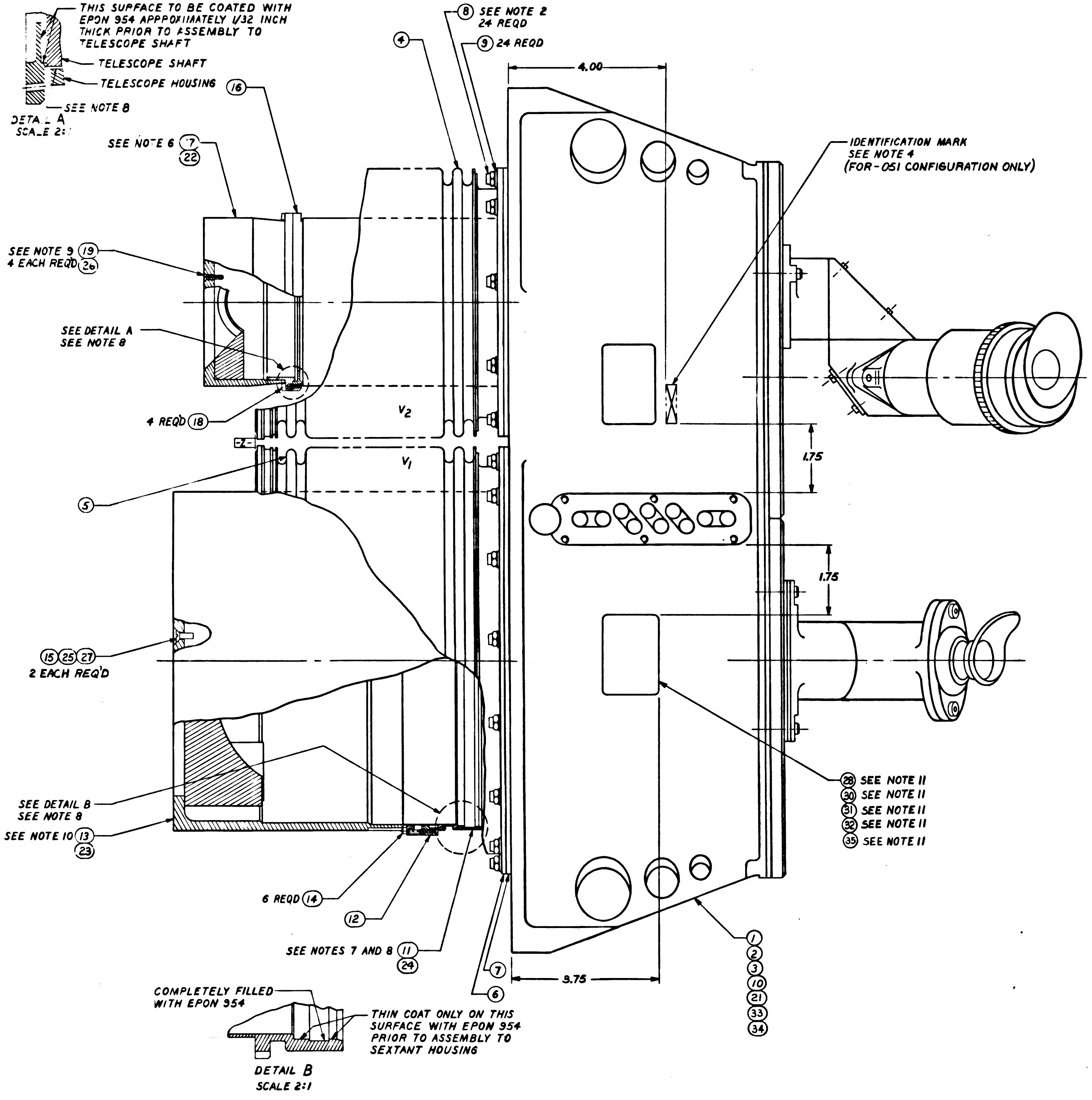
2/2010790




TELESCOPE
TELESC
TELESC
SEE NOTE 8
DETAIL A
SCALE 2:1
SEE N
SEE NOTE 9 (19) (26)
4 EACH REQ'D
SEE DETAIL A
SEE NOTE 8
⑤
⑮ ㉕ ㉗
2 EACH REQ'D
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬ ㉓

-051, -061, -071, -081, -111, -121 AND -131 CONFIGURATIONS

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 33014	CHG NO		
	C	REVISION STATUS CHANGED		16 MAR 65	RCB
	D	REVISION STATUS CHANGED			
	E	REVISED PER TDRR 35975		AUG 67	RWH
	F	REVISED		24 AUG 6	



THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
④
⑯
4.00
SEE NOTE 6 ⑦ ㉒
IDENTIFICATION MARK
SEE NOTE 4
(FOR -051 CONFIGURATION ONLY)
SEE NOTE 9 ⑲
4 EACH REQD ㉖
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
V_2
-Z-
V_1
1.75
⑤
1.75
⑮㉕㉗
2 EACH REQ'D
㉘ SEE NOTE 11
㉚ SEE NOTE 11
㉛ SEE NOTE 11
㉜ SEE NOTE 11
㉟ SEE NOTE 11
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬ ㉓
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪ ㉔
⑦
⑥
3.75
①
②
③
⑩
㉑
㉝
㉞
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

IONS

B THIS SHEET ADDED

			011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±.02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN J. KILVINGER DATE 8 AUG 66
CHECKED ED FOSTER 11 AUG 66
APPROVAL F. NEWCZYK
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

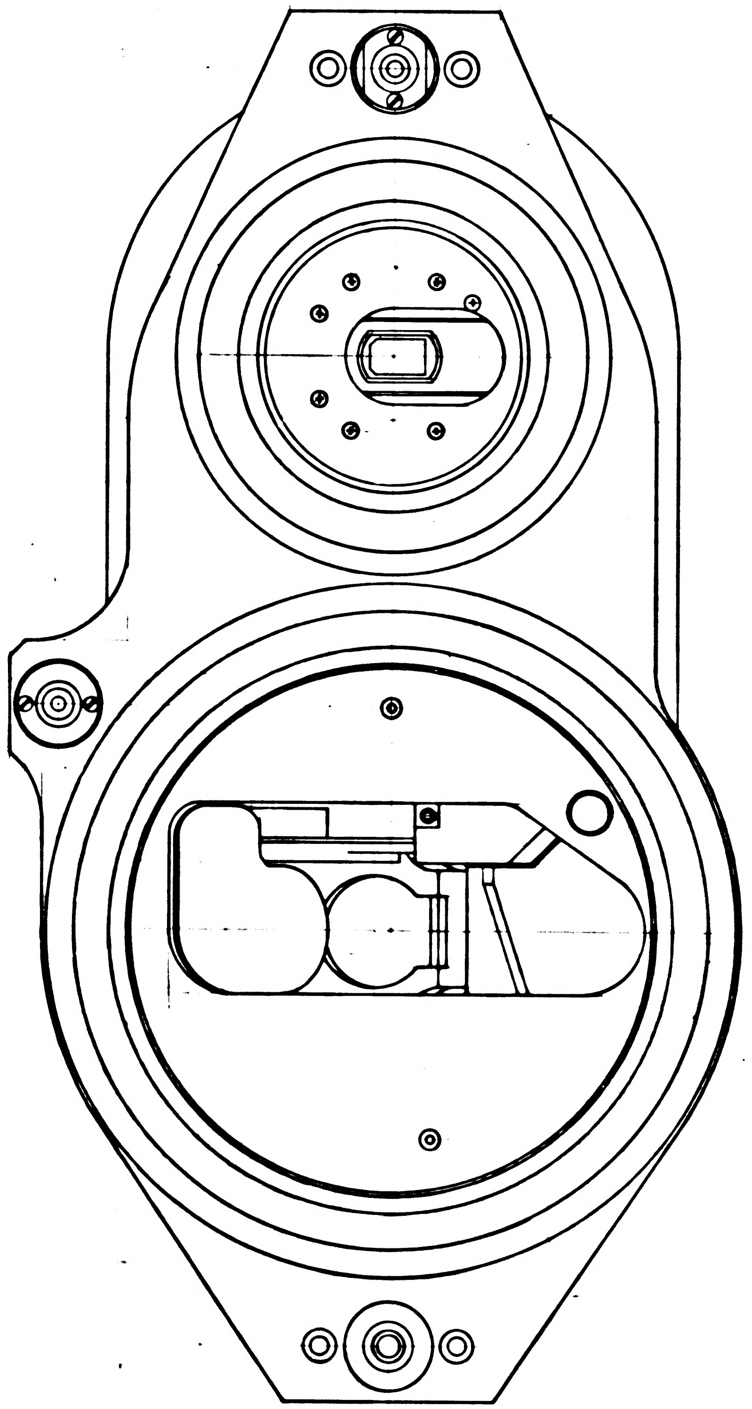
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

010790 | REV LTR - | SHEET 2

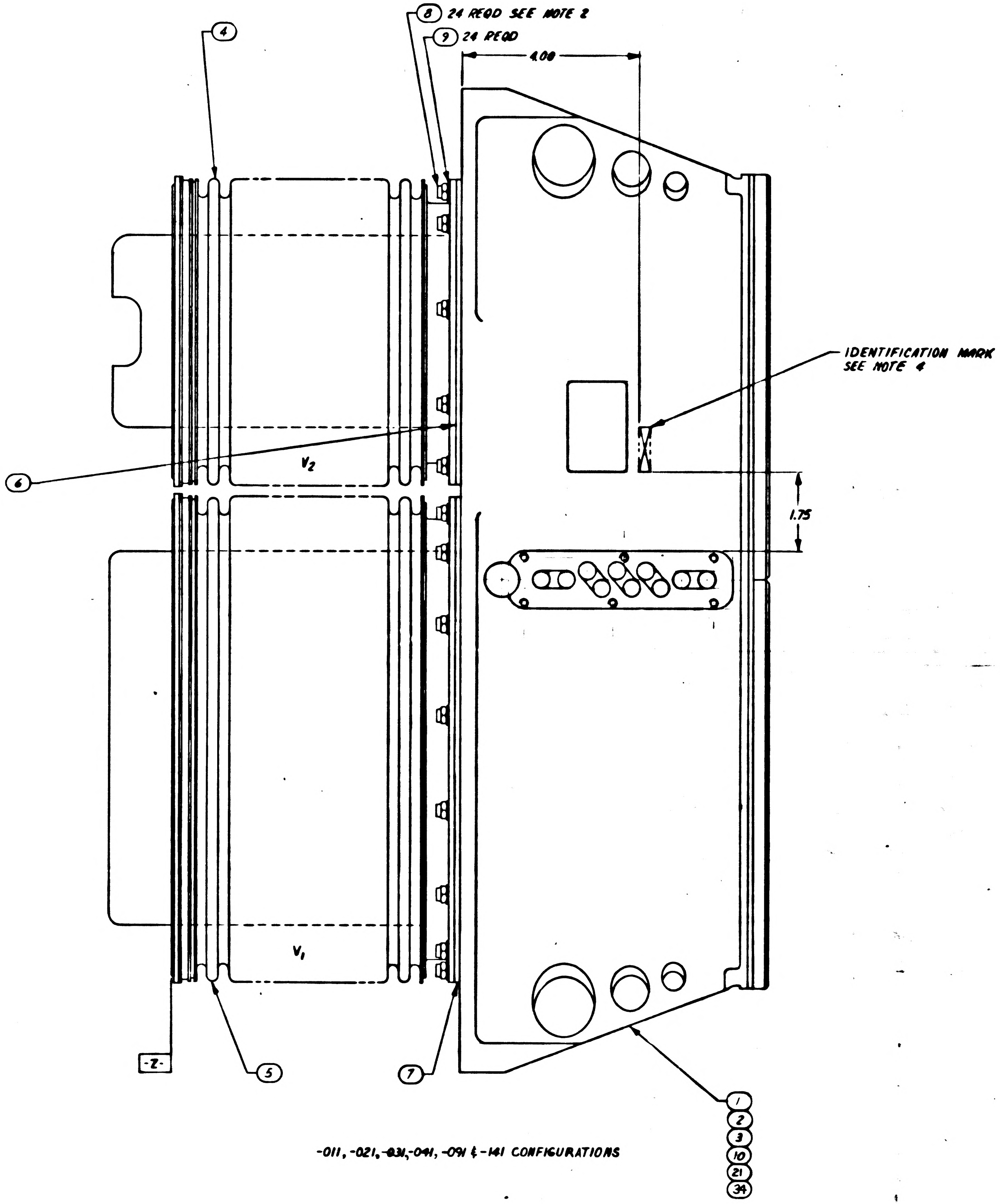
2/2010790

NOTES:
(NOTES 1, 2, 3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011, -021, -031, -041, -051, -091, AND -141)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081, -111, -121, -131, -151, AND -161)
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081, -111, -121, -131, -151 AND -161)

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩, ㉑ ㉝, ㉞, ㊱ OR ㊲, SURFACE $\boxed{-Z-}$ TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩, ㉑, ㉝ ㉞ ㊱ OR ㊲ SHALL NOT EXCEED 35 STD CC OF AIR PER MINUTE.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY
7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.
11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28, 30, 31 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219 METHOD II TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
    CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.



ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		10/14/66	
	B	REVISED PER TDRR 33014		9 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR 67	
	D	REVISED PER TDRR 33693		26 APR 67	VE
	E	REVISED PER TDRR 33976		7 AUG 67	RW
	F	REVISED PER TDRR 34373		24 AUG 67	
	G	REVISED PER TDRR 34913		7 NOV 67	



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

161	151	141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1																37	2011000-042	OPTICAL UNIT
	1															36	2011000-038	OPTICAL UNIT
1	1		1	1												35	1004260-570	NAMEPLATE
		1	1													34	2011000-071	OPTICAL UNIT
				1												33	2011000-062	OPTICAL UNIT
					1											32	1004260-553	NAMEPLATE
							1									31	1004260-552	NAMEPLATE
								1								30	1004260-551	NAMEPLATE
AR	AR		AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
									1							28	1004260-550	NAMEPLATE
										2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
										4						26	1010630-17	SCREW, FLAT HEAD
										2						25	1021323	INSERT
										1						24	1021321	SEAT, SEXTANT COVER
										1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
										1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
					1	1										21	2011000-061	OPTICAL UNIT
AR	AR		AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4	4		4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX SOC
4	4		4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
1	1		1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1		1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2		2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6		6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1		1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP ASSY)
1	1		1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1		1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
							1				1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
								1				1				3	2011000-041	OPTICAL UNIT
									1				1			2	2011000-034	OPTICAL UNIT
										1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

M.I.T.
INSTRUMENTATION LAB
Cambridge Mass
DRAWN
DATE
CHECKED
APPROVED
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

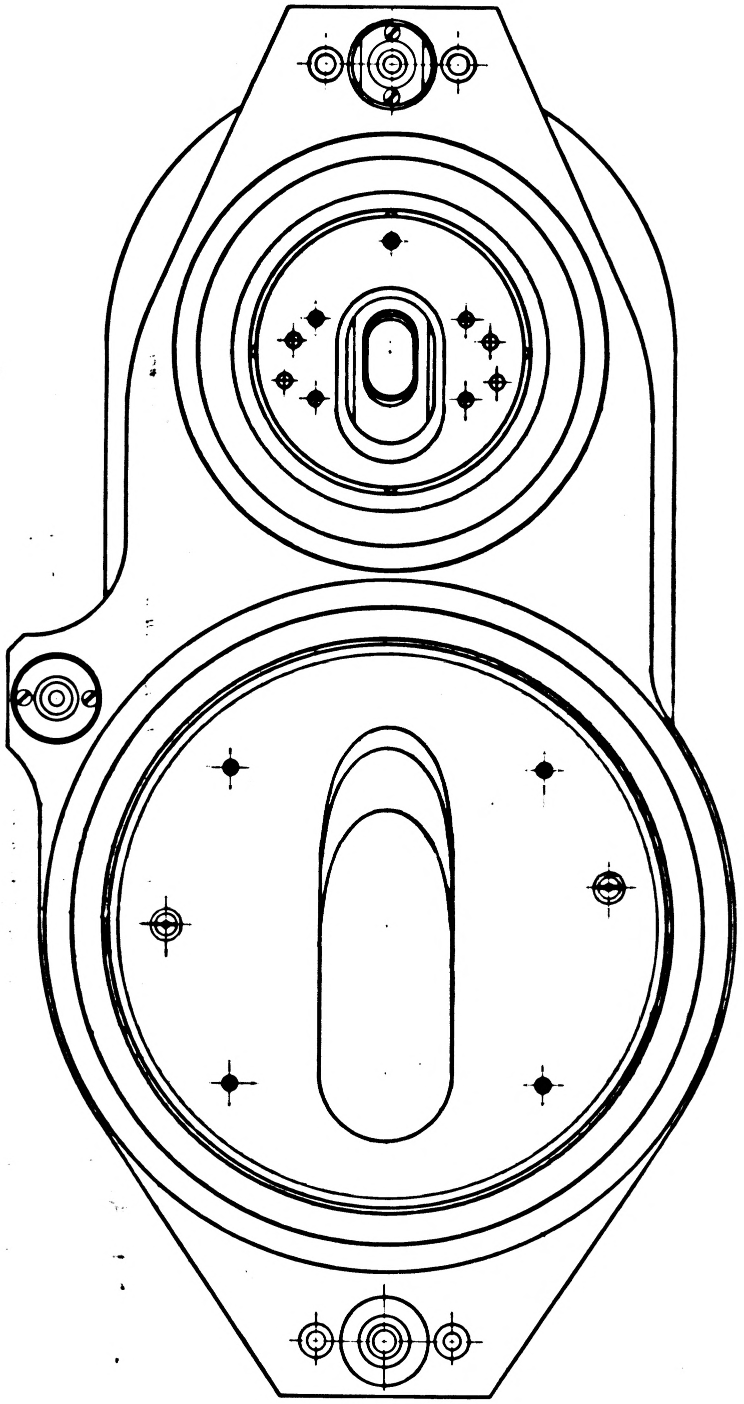
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

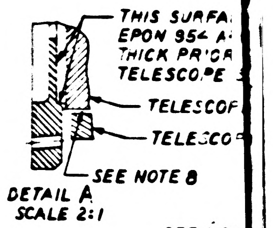
OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE F/S
SHEET 1 OF 2

010790 E 1

2/2010790




THIS SURFA
EPON 954 A
THICK PRIOR
TELESCOPE
TELESCOP
TELESCO
SEE NOTE 8
DETAIL A
SCALE 2:1

SEE NOT

SEE NOTE 9 (19) 4 EACH REQ'D (26)

SEE DETAIL A
SEE NOTE 8

(5)

(15)(25)(27)
2 EACH REQ'D

SEE DETAIL B
SEE NOTE 8

SEE NOTE 10 (13) (23)

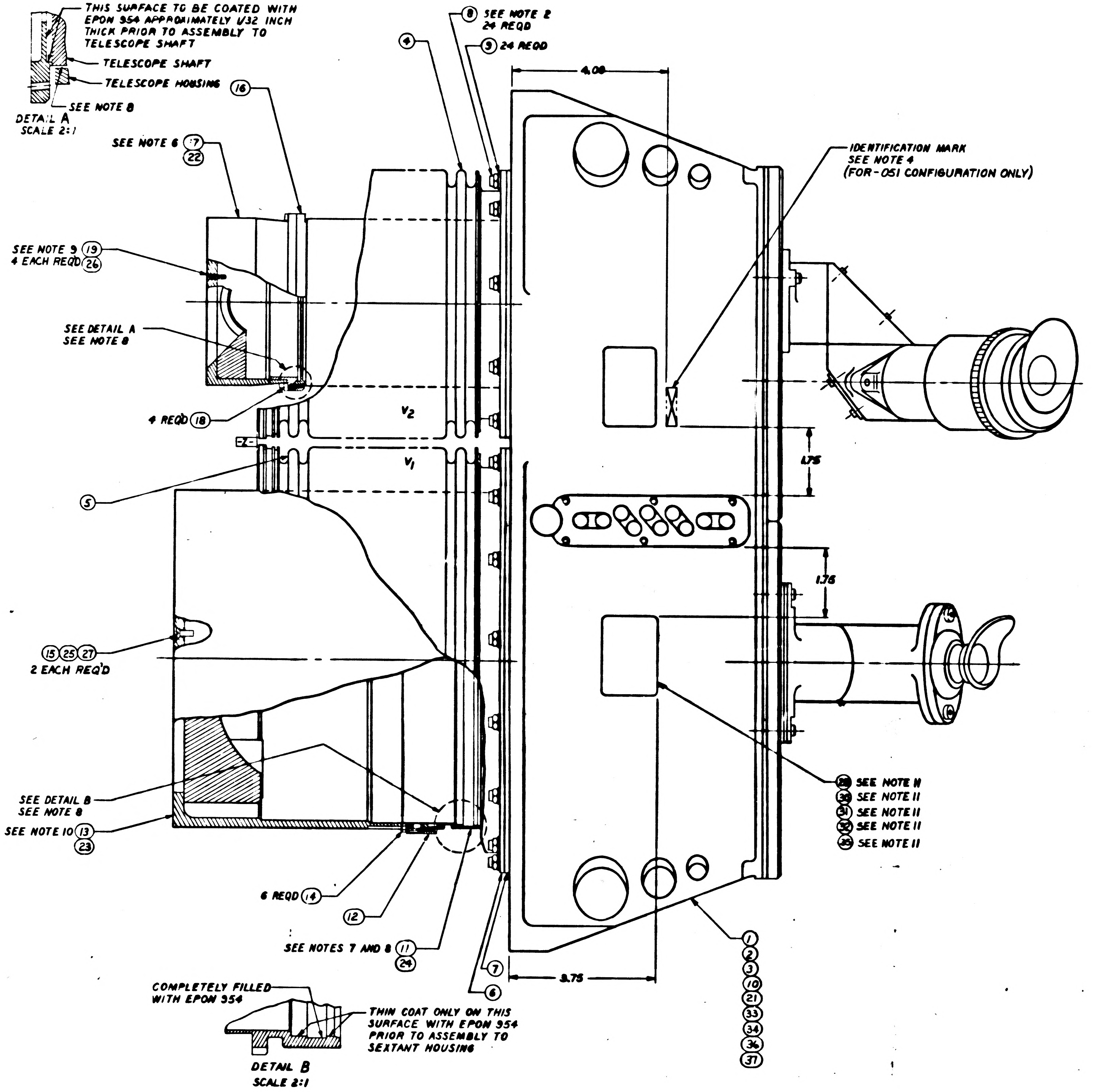
-051, -061, -071, -081, -111, -121, -131, -151, AND -161 CONFIGURATIONS

CON
WIT

2010790 | 6 | 2

1/2010790

REVISIONS					
LTR	DESCRIPTION	CHG NO	DATE	APPROVED	
B	THIS SHEET ADDED PER TDRR 33814		7 MAR 67		
C	REVISION STATUS CHANGED		16 MAR 67		
D	REVISION STATUS CHANGED		21 APR 67		
E	REVISED PER TDRR 38976		7 AUG 67	RK.	RWH
F	REVISED		24 AUG 67		
G	REVISED PER TDRR 34913		7 NOV 67		RWH


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
SEE NOTE 6 ⑦ ㉒
⑯
④
⑧ SEE NOTE 2 24 REQD
⑨ 24 REQD
4.08
IDENTIFICATION MARK SEE NOTE 4 (FOR-051 CONFIGURATION ONLY)
SEE NOTE 9 ⑲ ㉖ 4 EACH REQD
SEE DETAIL A SEE NOTE 8
4 REQD ⑱
V_2
V_1
1.75
⑤
1.76
⑮ ㉕ ㉗ 2 EACH REQ'D
㉙ SEE NOTE 11
㉚ SEE NOTE 11
㉛ SEE NOTE 11
㉜ SEE NOTE 11
㉟ SEE NOTE 11
SEE DETAIL B SEE NOTE 8
SEE NOTE 10 ⑬ ㉓
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪ ㉔
⑦
⑥
3.75
① ② ③ ⑩ ㉑ ㉝ ㉞ ㊲
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

CONFIGURATIONS

▲ THIS SHEET ADDED

QTY			001	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. KILMINSTER DATE 8 AUG 66
CHECKED
APPROVED E. KEMERYK
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND BELLOWS ASSEMBLY

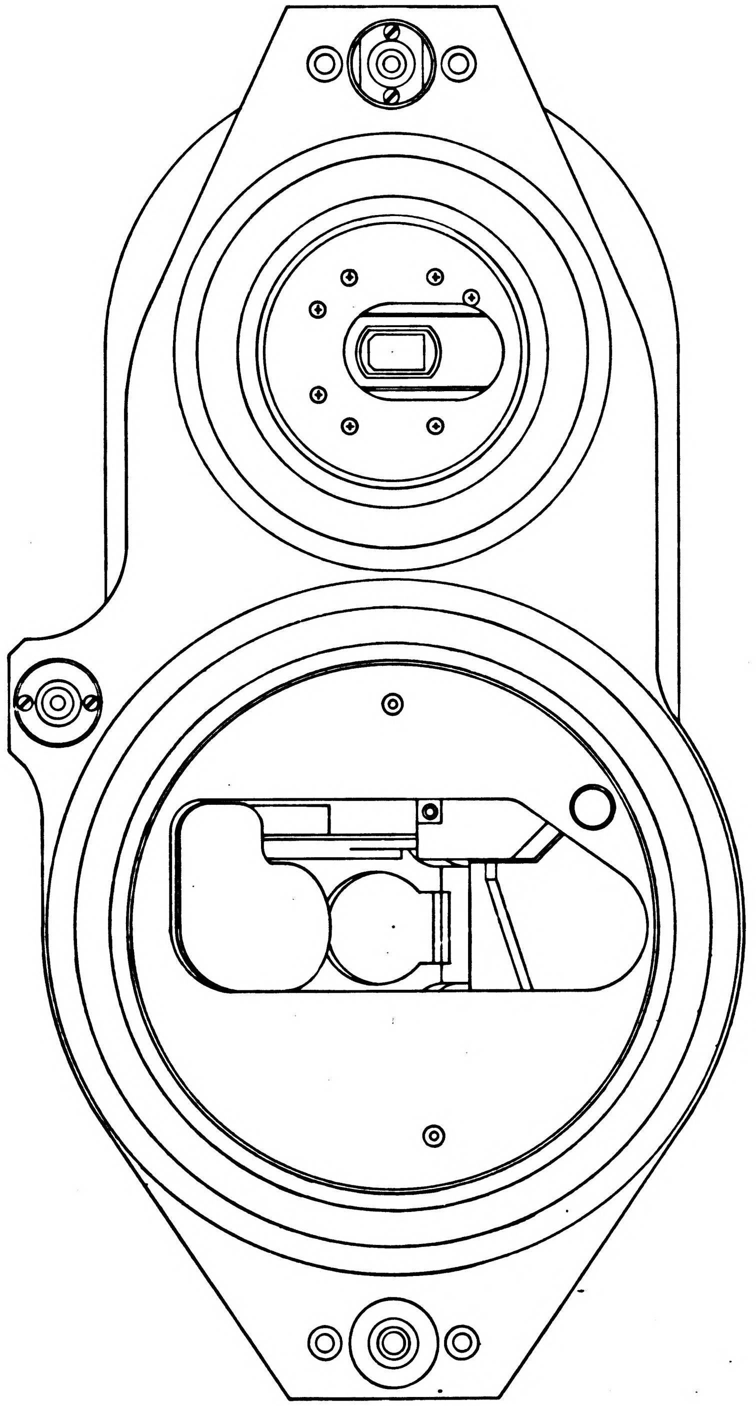
SIZE J2 CODE IDENT NO. 80230 2010790
SCALE FUL. SHEET 2 OF 2

2010790 | REV LTR G | SHEET 2

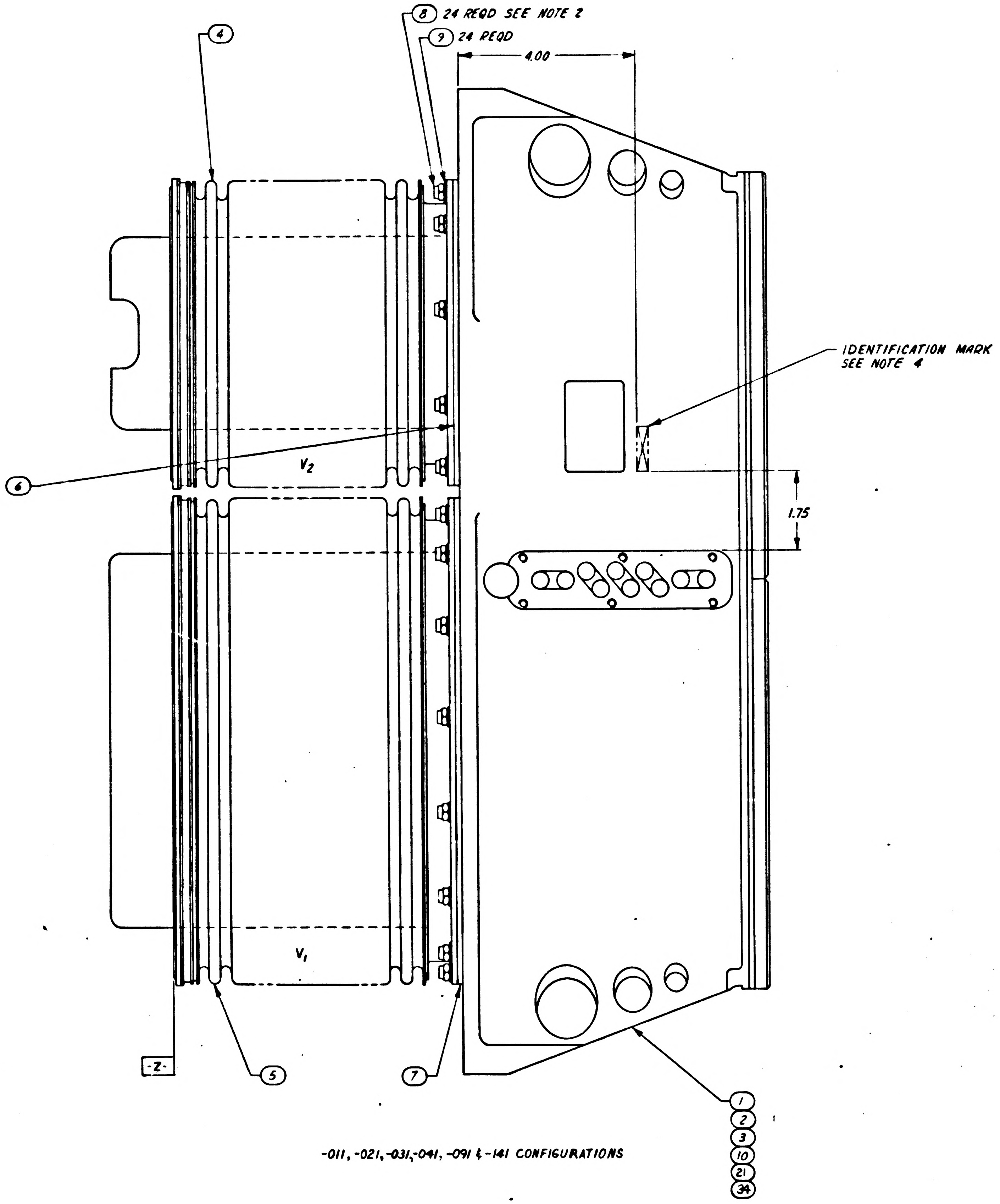
2/2010790

NOTES: (NOTES 1, 2, 3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011, -021, -031, -041, -051, -091, AND -141)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081, -111, -121, -131, -151, -161, AND -171).
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081, -111, -121, -131, -151, -161, AND -171).

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩, ㉑ ㉝, ㉞, ㊱ OR ㊲, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩, ㉑, ㉝ ㉞ ㊱ OR ㊲ SHALL NOT EXCEED 35 STD CC OF AIR PER MINUTE.
4. IDENTIFICATION MARK IN LOCATION SHOWN " ASSY 2010790 WITH APPLICABLE DASH NUMBER PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY
7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.
11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28 30, 31 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
    CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.



ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		10/13/66	
	B	REVISED PER TDRR 33014		7 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR	
	D	REVISED PER TDRR 33693		26 APR 67	
	E	REVISED PER TDRR 33978		7 AUG 67	RW
	F	REVISED PER TDRR 34373		24 AUG 67	
	G	REVISED PER TDRR 34913		7 NOV 67	
	H	REVISED PER TDRR 36539		22 JUL 68	



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

171	161	151	141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1																	38	1008490-011	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
	1																37	2011000-042	OPTICAL UNIT
		1															36	2011000-038	OPTICAL UNIT
1	1	1		1	1												35	1004260-570	NAMEPLATE
			1	1													34	2011000-071	OPTICAL UNIT
1					1												33	2011000-062	OPTICAL UNIT
						1											32	1004260-553	NAMEPLATE
								1									31	1004260-552	NAMEPLATE
									1								30	1004260-551	NAMEPLATE
AR	AR	AR		AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
										1							28	1004260-550	NAMEPLATE
											2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
											4						26	1010630-17	SCREW, FLAT HEAD
											2						25	1021323	INSERT
											1						24	1021321	SEAT, SEXTANT COVER
											1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
											1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP ASSY.)
						1	1										21	2011000-061	OPTICAL UNIT
AR	AR	AR		AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4	4	4		4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX. SOC
4	4	4		4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
	1	1		1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1	1		1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2		2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6		6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1	1		1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1	1	1		1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1		1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
								1				1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
									1				1				3	2011000-041	OPTICAL UNIT
										1				1			2	2011000-034	OPTICAL UNIT
											1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 8 AUG 66
CHECKED Ed Foster 10 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

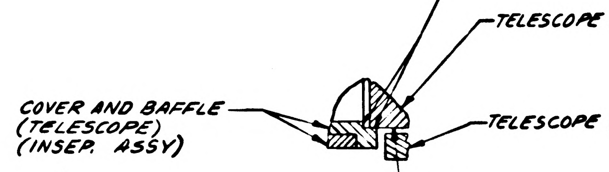
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

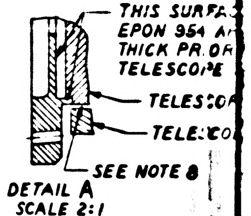
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

10790 REV LTR H SHEET 1

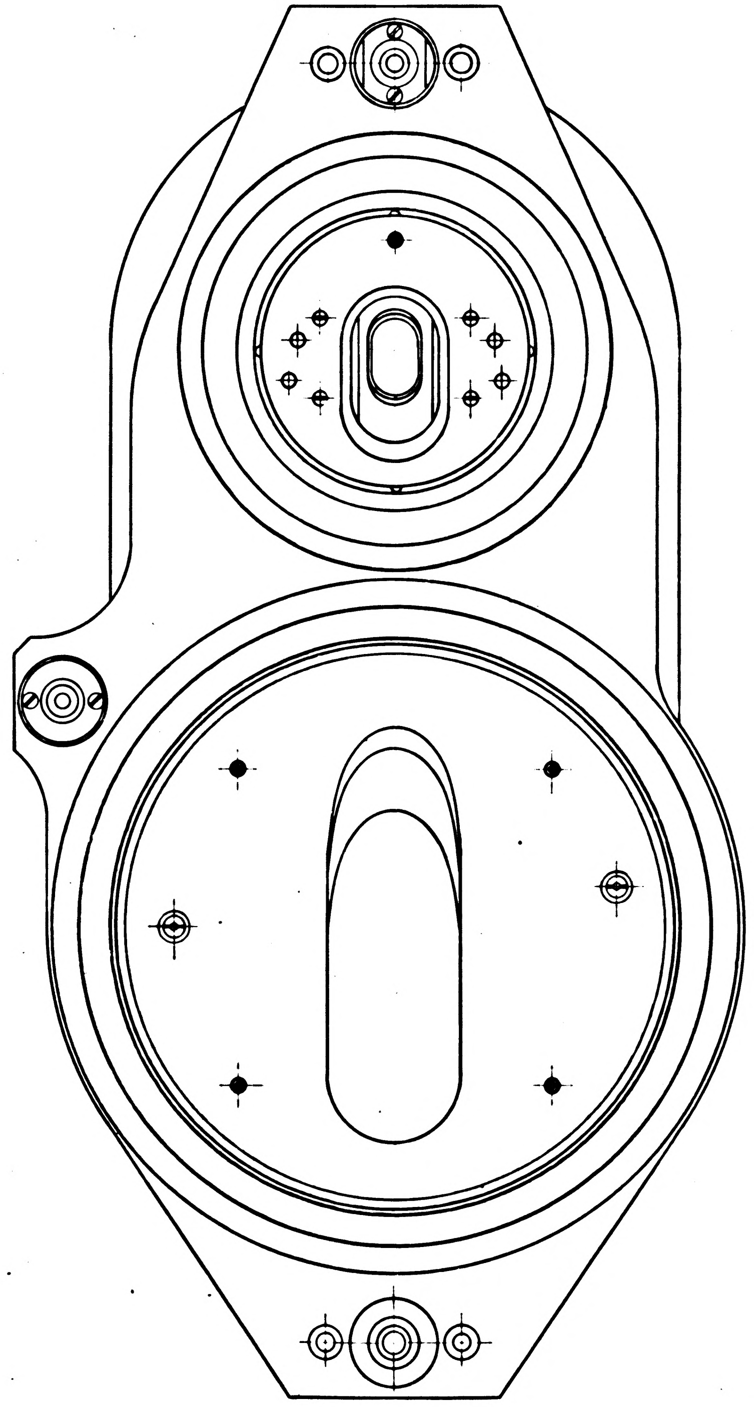
2/2010790


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT.
TELESCOPE SHAFT
COVER AND BAFFLE (TELESCOPE) (INSEP. ASSY)
TELESCOPE HOUSING
SEE NOTE 8

DETAIL A
SCALE: 2:1
(-051 CONFIGURATION)


THIS SURFA
EPON 954 A
THICK PRIOR
TELESCOPE
TELESCOP
TELESCO
SEE NOTE 8

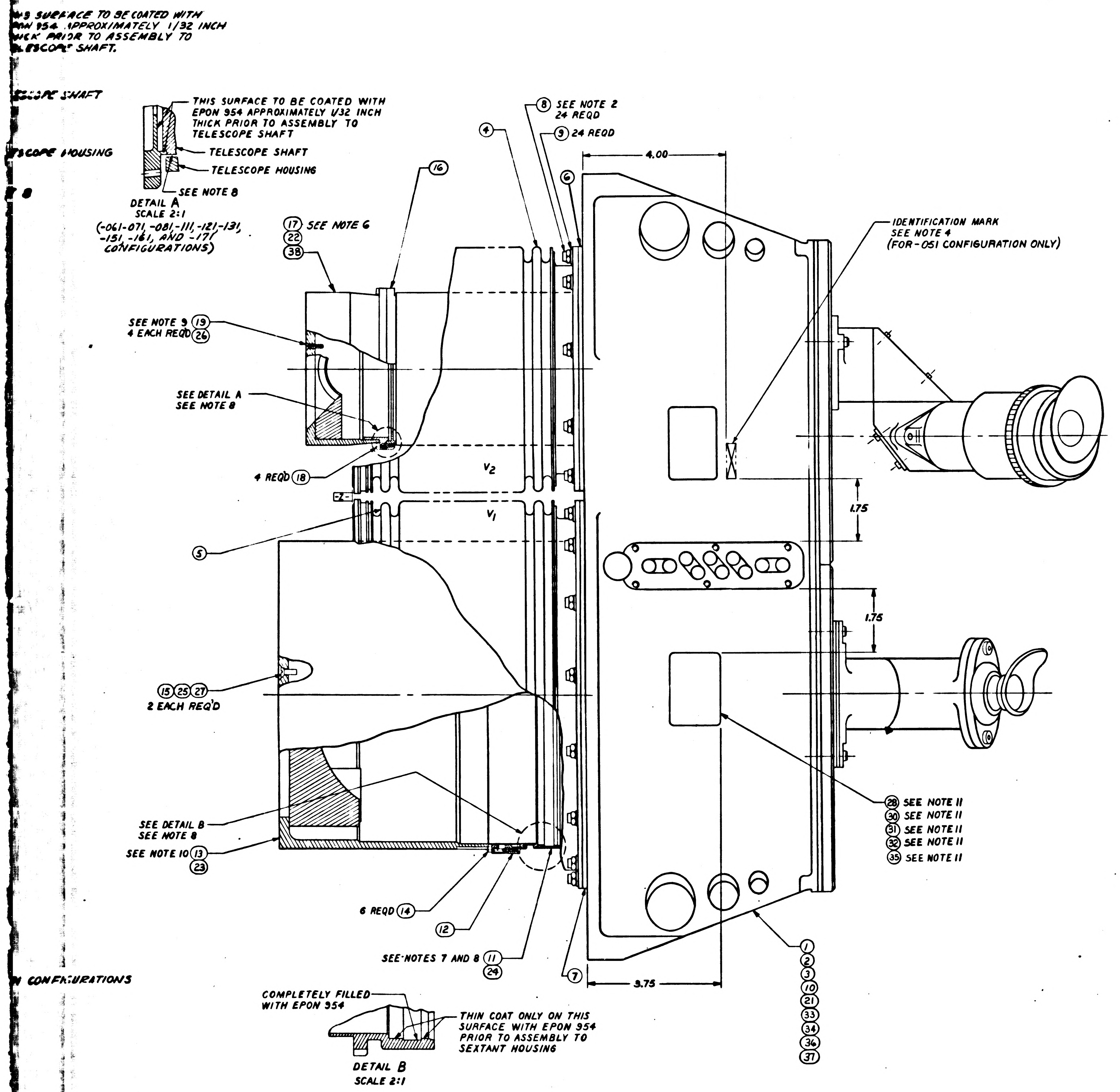
DETAIL A
SCALE 2:1
(-061-071, -081, -111, -121-131,
-151 -161, AND -171
CONFIGURATIONS)


SEE NOTE 9 (19)
4 EACH REQ'D (26)
SEE DETAIL A
SEE NOTE 8
(5)
(15)(25)(27)
2 EACH REQ'D
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 (13)
(23)

-051, -061, -071, -081, -111, -121, -131, -151, -161, AND -171 CONFIGURATIONS

2010790 H 2

1/2010790


S SURFACE TO BE COATED WITH
ON 954 APPROXIMATELY 1/32 INCH
ICK PRIOR TO ASSEMBLY TO
LESCOPE SHAFT.
SCOPE SHAFT
SCOPE HOUSING
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
(-061-071, -081-111, -121-131, -151, -161, AND -171 CONFIGURATIONS)
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
④
⑥
⑯
4.00
⑰ SEE NOTE 6
㉒
㊳
SEE NOTE 9 ⑲
4 EACH REQD ㉖
SEE DETAIL A
SEE NOTE 8
4 REQD ⑱
Z
V_2
V_1
⑤
IDENTIFICATION MARK
SEE NOTE 4
(FOR -051 CONFIGURATION ONLY)
1.75
1.75
⑮㉕㉗
2 EACH REQ'D
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬
㉓
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪
㉔
⑦
3.75
㉘ SEE NOTE 11
㉚ SEE NOTE 11
㉛ SEE NOTE 11
㉜ SEE NOTE 11
㉟ SEE NOTE 11
①
②
③
⑩
㉑
㉝
㉞
㊲
N CONFIGURATIONS
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

REVISIONS

ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 33814	CHG NO	9 MAR 67	
	C	REVISION STATUS CHANGED		16 MAR 67	
	D	REVISION STATUS CHANGED		26 APR 67	
	E	REVISED PER TDRR 33976		7 AUG 67	R.W. RWH
	F	REVISED		24 AUG 67	
	G	REVISED PER TDRR 34913		9 NOV 67	RWH
	H	REVISED PER TDRR 36539		22 JUL 68	

B THIS SHEET ADDED

				011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J KAVANBER DATE 6 AUG 66
CHECKED ED FOSTER
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

010790 H 2

2/2010790

NOTES: (NOTES 1, 2, 3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011, -021, -031, -041, -051, -091, AND -141)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081, -111, -121, -131, -151, -161, 171, AND -181)
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081, -111, -121, -131, -151, -161, 171, AND -181)

1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.

3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩, ㉑ ㉝, ㉞, ㊱, ㊲ OR ㊴, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK DATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩, ㉑, ㉝ ㉞ ㊱ ㊲ OR ㊴ SHALL NOT EXCEED 35 STD CC OF AIR PER MINUTE.

4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER PER ND1002019.

5. SERIALIZE PER ND1002023.

6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.

7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.

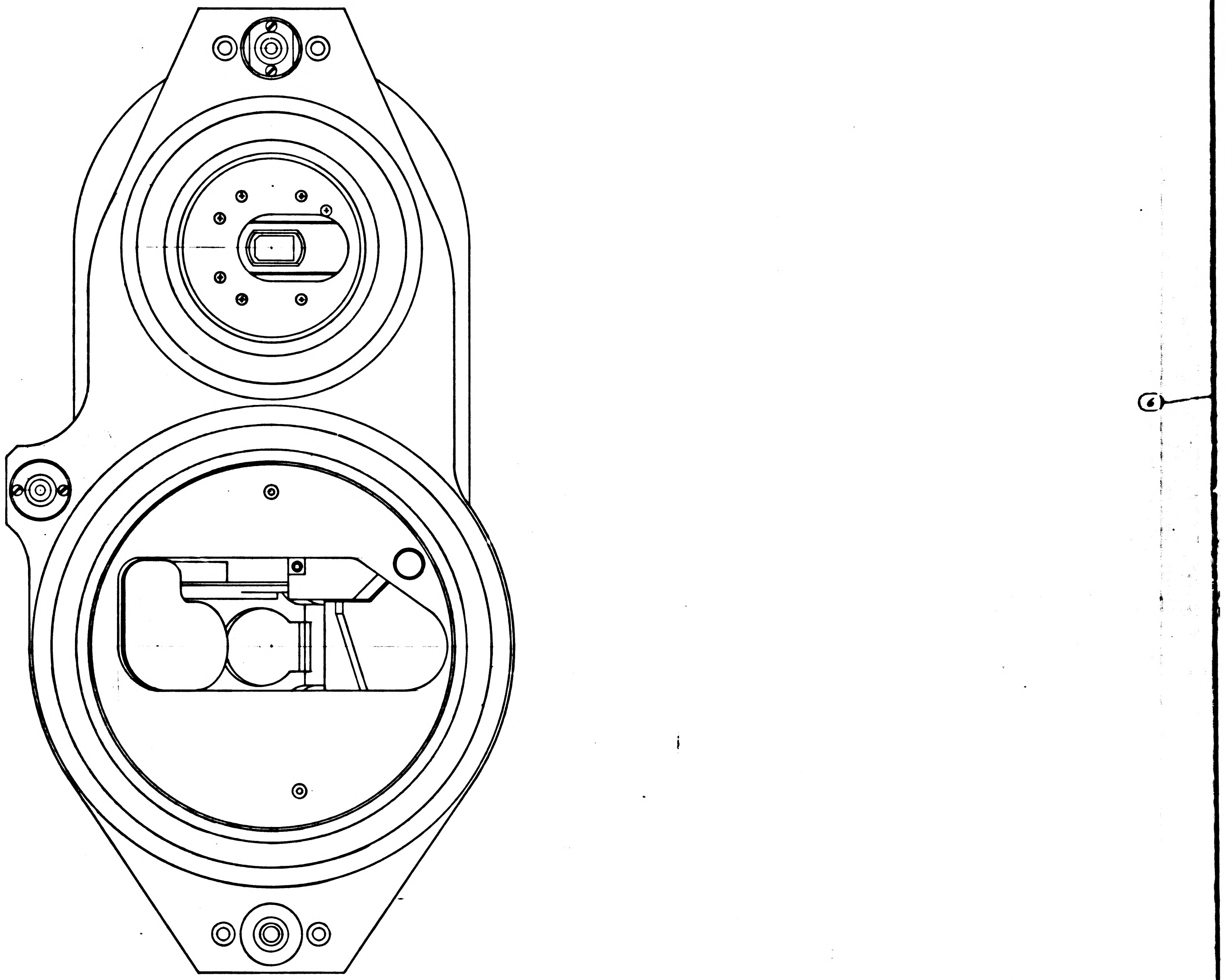
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.

9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.

10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.

11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28, 30, 31 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.

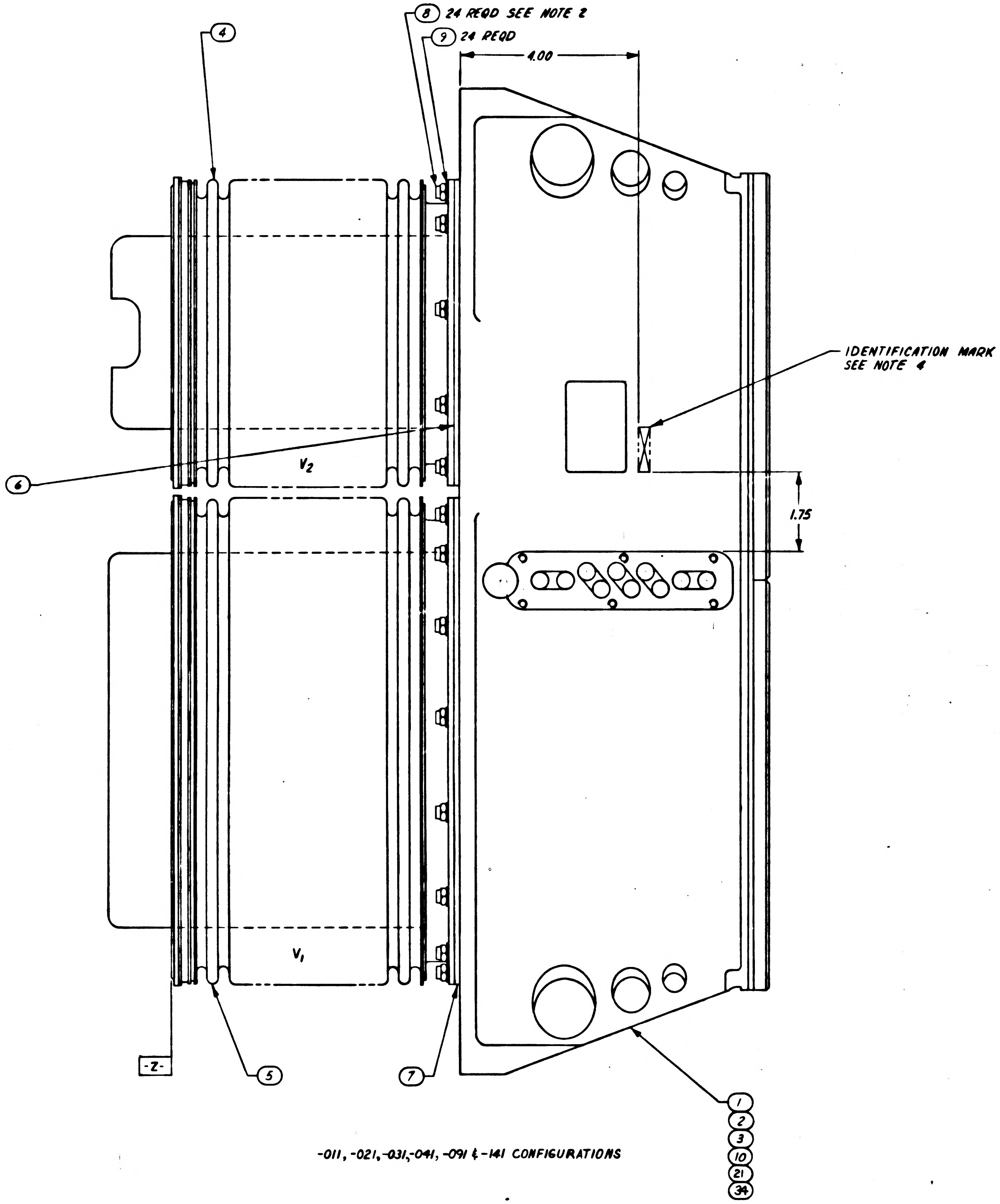
12. A. WITH THE SEXTANT MIRROR ROTATED ABOUT THE TRUNNION AXIS BY THE HAND CONTROL DRIVE CIRCUITRY, TO ITS MAXIMUM STATIC POSITION, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE INSIDE SURFACE OF ITEM ⑬ MUST BE .010, ON -181 CONFIGURATION.
B. WITH THE MIRROR MOVED TO THIS POSITION BY THE ABOVE METHOD, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE BAFFLE OF ITEM ⑬ MUST BE 1/32, ON -181 CONFIGURATION.



2010790 | 1

1/2010790

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557		[illegible]	[illegible]
	B	REVISED PER TDRR 33014		7 mar 67	[illegible]
	C	REVISED PER TDRR 33024		3 [illegible]	[illegible]
	D	REVISED PER TDRR 33693		26 APR 67	VE
	E	REVISED PER TDRR 33976		7 AUG 67	R [illegible]
	F	REVISED PER TDRR 34373		24 AUG 67	[illegible]
	G	REVISED PER TDRR 349 3		7 NOV [illegible]	[illegible]
	H	REVISED PER TDRR 36539		[illegible] 68	[illegible]
	J	REVISED PER TDRR 36342		[illegible]	[illegible]



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

181	171	161	151	141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1																		39	2011000-081	OPTICAL UNIT
	1																	38	1008490-011	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
		1																37	2011000-042	OPTICAL UNIT
			1															36	2011000-038	OPTICAL UNIT
1	1	1	1		1	1												35	1004260-570	NAMEPLATE
				1	1													34	2011000-071	OPTICAL UNIT
	1					1												33	2011000-062	OPTICAL UNIT
							1											32	1004260-553	NAMEPLATE
									1									31	1004260-552	NAMEPLATE
										1								30	1004260-551	NAMEPLATE
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
											1							28	1004260-550	NAMEPLATE
												2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
												4						26	1010630-17	SCREW, FLAT HEAD
												2						25	1021323	INSERT
												1						24	1021321	SEAT, SEXTANT COVER
												1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
												1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
							1	1										21	2011000-061	OPTICAL UNIT
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4	4	4	4		4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX SOC
4	4	4	4		4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
1		1	1		1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1	1	1		1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2	2		2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6	6		6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1	1	1		1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1	1	1	1		1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1	1		1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
									1				1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
										1				1				3	2011000-041	OPTICAL UNIT
											1				1			2	2011000-034	OPTICAL UNIT
												1				1		1	2011000-035	OPTICAL UNIT
QUANTITY REQUIRED																		LIST OF PARTS AND MATERIALS		

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ——
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN: [illegible] DATE 8 AUG 66
CHECKED Ed Foster 10 Aug 66
APPROVAL [illegible]
CONTRACT NAS 9-497
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

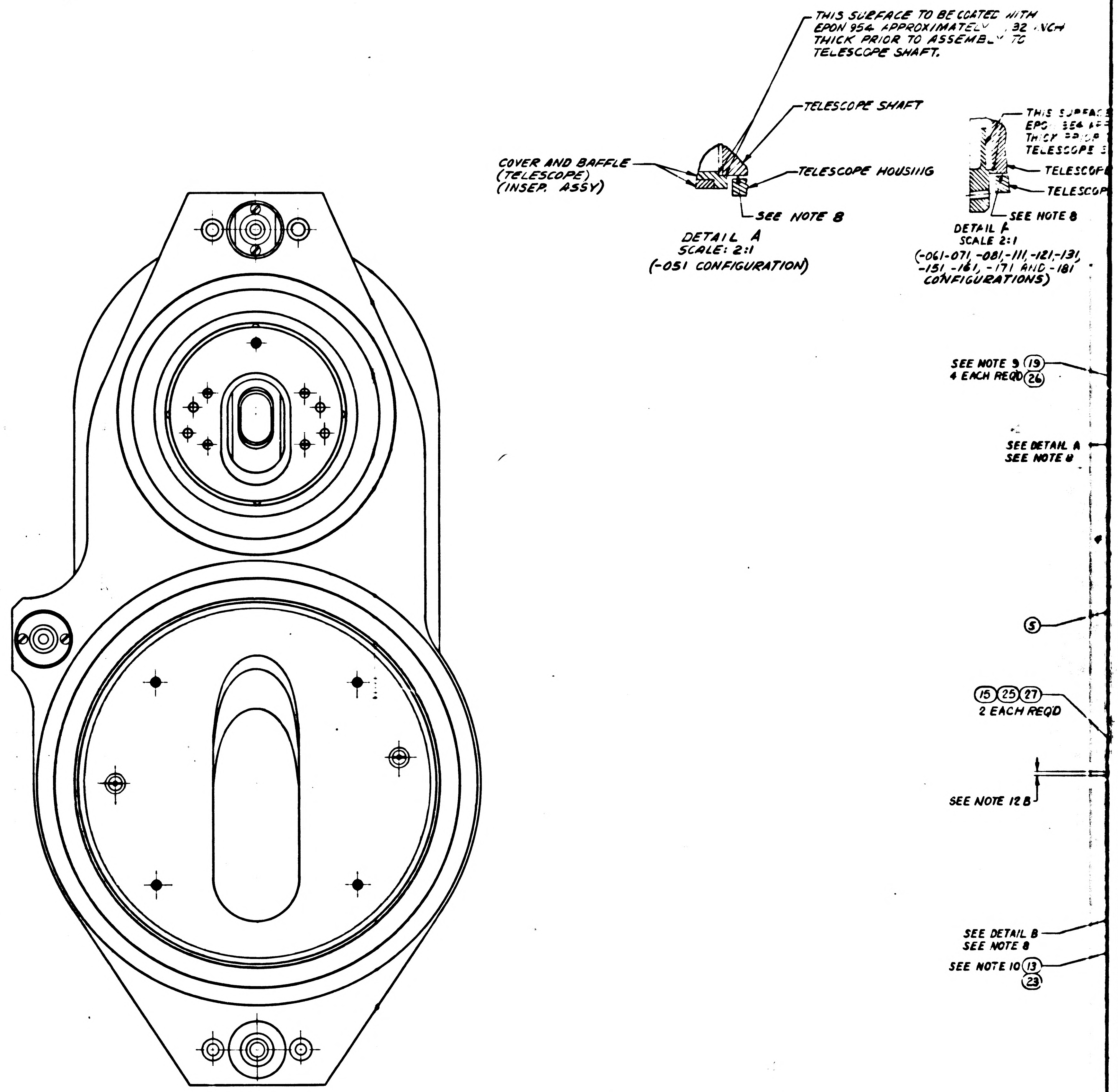
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

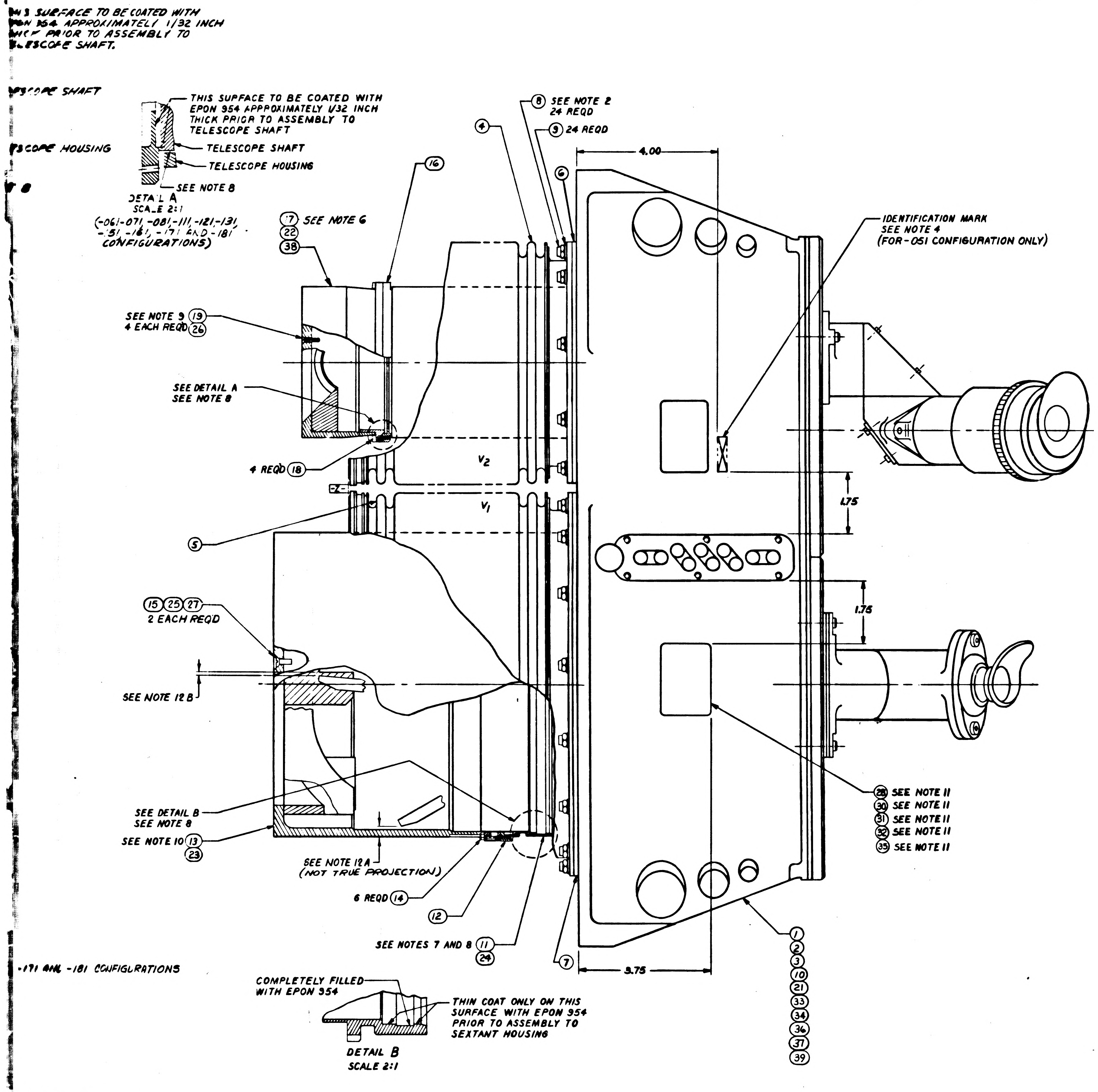
10790

2/2010790


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY .32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT.
TELESCOPE SHAFT
COVER AND BAFFLE (TELESCOPE) (INSEP. ASSY)
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE: 2:1
(-051 CONFIGURATION)
THIS SURFAC
EPO 954 AP
THICK PRIOR
TELESCOPE S
TELESCOPE
TELESCOP
SEE NOTE 8
DETAIL F
SCALE 2:1
(-061-071, -081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS)
SEE NOTE 9 ⑲ ㉖
4 EACH REQD
SEE DETAIL A
SEE NOTE 8
⑤
⑮ ㉕ ㉗
2 EACH REQ'D
SEE NOTE 12 B
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 ⑬ ㉓

-051, -061, -071, -081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 330-4	CHG NO	[illegible]	[illegible]
	C	REVISION STATUS CHANGED		16 MAR 67	[illegible]
	D	REVISION STATUS CHANGED		26 APR 67	[illegible]
	E	REVISED PER TDRR 38978		7 AUG 67	RH
	F	REVISED		24 AUG 67	[illegible]
	G	REVISED PER TDRR 34913		[illegible]	[illegible]
	H	REVISED PER TDRR 36539		22 JUL 68	[illegible]
	J	REVISED PER TDRR 36542		[illegible] 68	[illegible]



...S SURFACE TO BE COATED WITH
...ON 954 APPROXIMATELY 1/32 INCH
...CK PRIOR TO ASSEMBLY TO
...LESCOPE SHAFT.
...SCOPE SHAFT
...SCOPE HOUSING
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
(-061-071, -081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS)
16
7 SEE NOTE 6
22
38
4
8 SEE NOTE 2
24 REQD
9 24 REQD
6
4.00
IDENTIFICATION MARK
SEE NOTE 4
(FOR -051 CONFIGURATION ONLY)
SEE NOTE 9 19
4 EACH REQD 26
SEE DETAIL A
SEE NOTE 8
4 REQD 18
V2
V1
1.75
5
1.75
15 25 27
2 EACH REQD
SEE NOTE 12 B
28 SEE NOTE 11
30 SEE NOTE 11
31 SEE NOTE 11
32 SEE NOTE 11
35 SEE NOTE 11
SEE DETAIL B
SEE NOTE 8
SEE NOTE 10 13
23
SEE NOTE 12 A
(NOT TRUE PROJECTION)
6 REQD 14
12
SEE NOTES 7 AND 8 11
24
7
3.75
1
2
3
10
21
33
34
36
37
39
-171 AND -181 CONFIGURATIONS
COMPLETELY FILLED WITH EPON 954
THIN COAT ONLY ON THIS SURFACE WITH EPON 954 PRIOR TO ASSEMBLY TO SEXTANT HOUSING
DETAIL B
SCALE 2:1

B THIS SHEET ADDED

				ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

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2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN J. KAUINBER DATE 6 AUG 66
CHECKED [illegible]
APPROVAL E. [illegible]
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

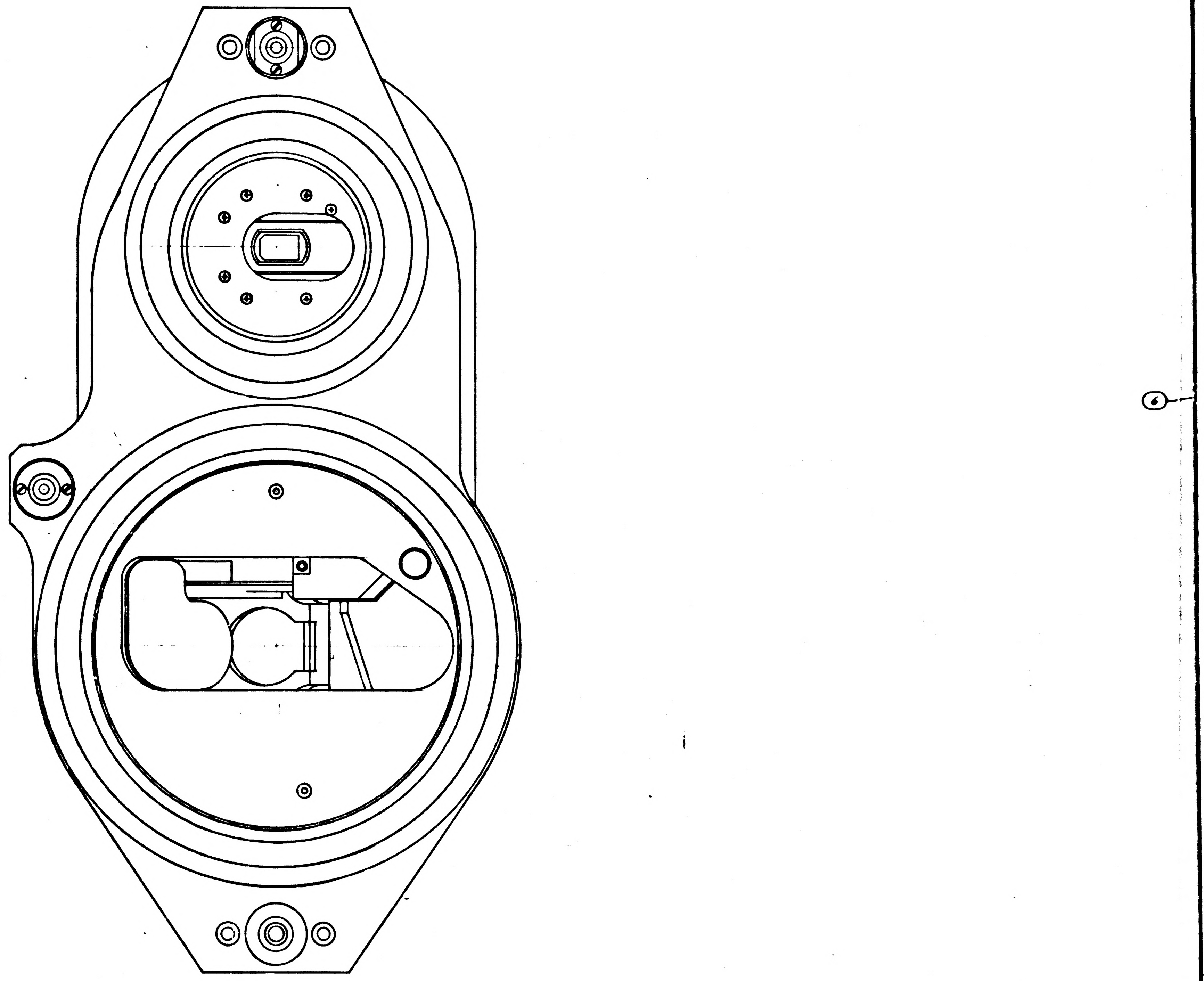
SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 J 2

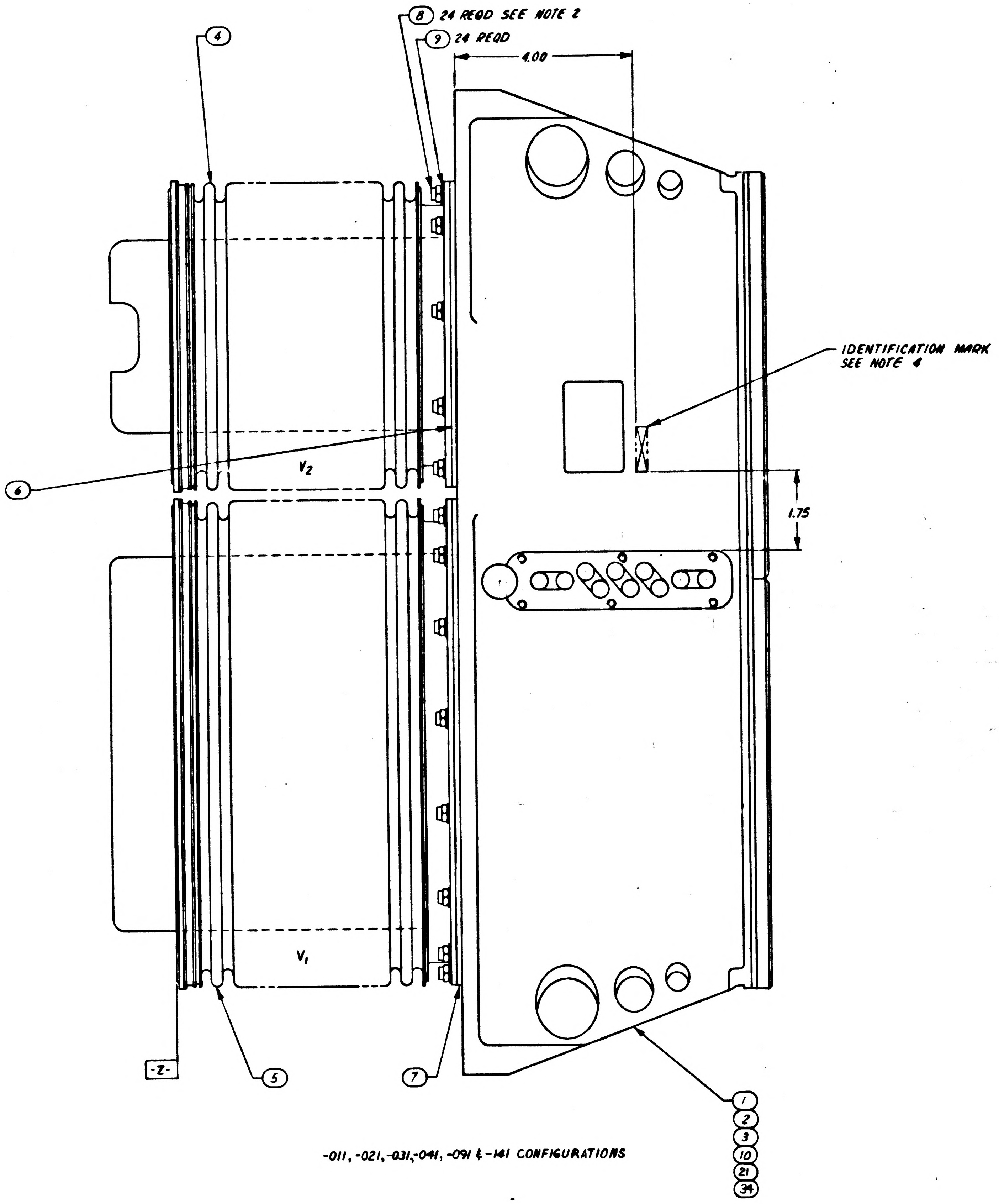
2/2010790

NOTES: (NOTES 1, 2, 3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011, -021, -031, -041, -051, -091, AND -141)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081, -111, -121, -131, -151, -161, 171, AND -181)
(NOTE 11 APPLIES TO CONFIGURATIONS -061, -071, 081, -111, -121, -131, -151, - 161, 171, AND -181)

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.
3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①, ②, ③, ⑩, ㉑, ㉝, ㉞, ㊱, ㊲ OR ㊴, SURFACE -Z- TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK RATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③, ⑩, ㉑, ㉝ ㉞ ㊱ ㊲ OR ㊴ SHALL NOT EXCEED 35 STD CC OF AIR PER MINUTE.
4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER PER ND1002019.
5. SERIALIZE PER ND1002023.
6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.
8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
   CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
   CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.
9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.
11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28, 30 31 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
    CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.
12. A. WITH THE SEXTANT MIRROR ROTATED ABOUT THE TRUNNION AXIS BY THE HAND CONTROL DRIVE CIRCUITRY, TO ITS MAXIMUM STATIC POSITION, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE INSIDE SURFACE OF ITEM ⑬ MUST BE .010, ON -181 CONFIGURATION.
    B. WITH THE MIRROR MOVED TO THIS POSITION BY THE ABOVE METHOD, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE BAFFLE OF ITEM ⑬ MUST BE 1/32, ON -181 CONFIGURATION.
13. MAX RADIAL RESTRAINT OF 20 LBS. PERMITTED.
14. MAX RADIAL RESTRAINT OF 6 LBS PERMITTED.



REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557			
	B	REVISED PER TDRR 33014		MAR	
	C	REVISED PER TDRR 33024		13 MAR	
	D	REVISED PER TDRR 33693		20 APR 67	
	E	REVISED PER TDRR 33978			
	F	REVISED PER TDRR 34373			
	G	REVISED PER TDRR 349.3			
	H	REVISED PER TDRR 36539			
	J	REVISED PER TDRR 36542			
	K	REVISED PER TDRR 36724		10 SEP 68	



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

181	171	161	151	141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1																		39	2011000-081	OPTICAL UNIT
	1																	38	1008490-011	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
		1																37	2011000-042	OPTICAL UNIT
			1															36	2011000-038	OPTICAL UNIT
1	1	1	1		1	1												35	1004260-570	NAMEPLATE
				1	1													34	2011000-071	OPTICAL UNIT
	1					1												33	2011000-062	OPTICAL UNIT
							1											32	1004260-553	NAMEPLATE
									1									31	1004260-552	NAMEPLATE
										1								30	1004260-551	NAMEPLATE
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
											1							28	1004260-550	NAMEPLATE
												2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
												4						26	1010630-17	SCREW, FLAT HEAD
												2						25	1021323	INSERT
												1						24	1021321	SEAT, SEXTANT COVER
												1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP ASSY)
												1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
							1	1										21	2011000-061	OPTICAL UNIT
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4	4	4	4		4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX SOC
4	4	4	4		4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
1		1	1		1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1	1	1		1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2	2		2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6	6		6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1	1	1		1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1	1	1	1		1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1	1		1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
									1				1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
										1				1				3	2011000-041	OPTICAL UNIT
											1				1			2	2011000-034	OPTICAL UNIT
												1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 8 AUG
CHECKED Ed Foster 10 Aug 66
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

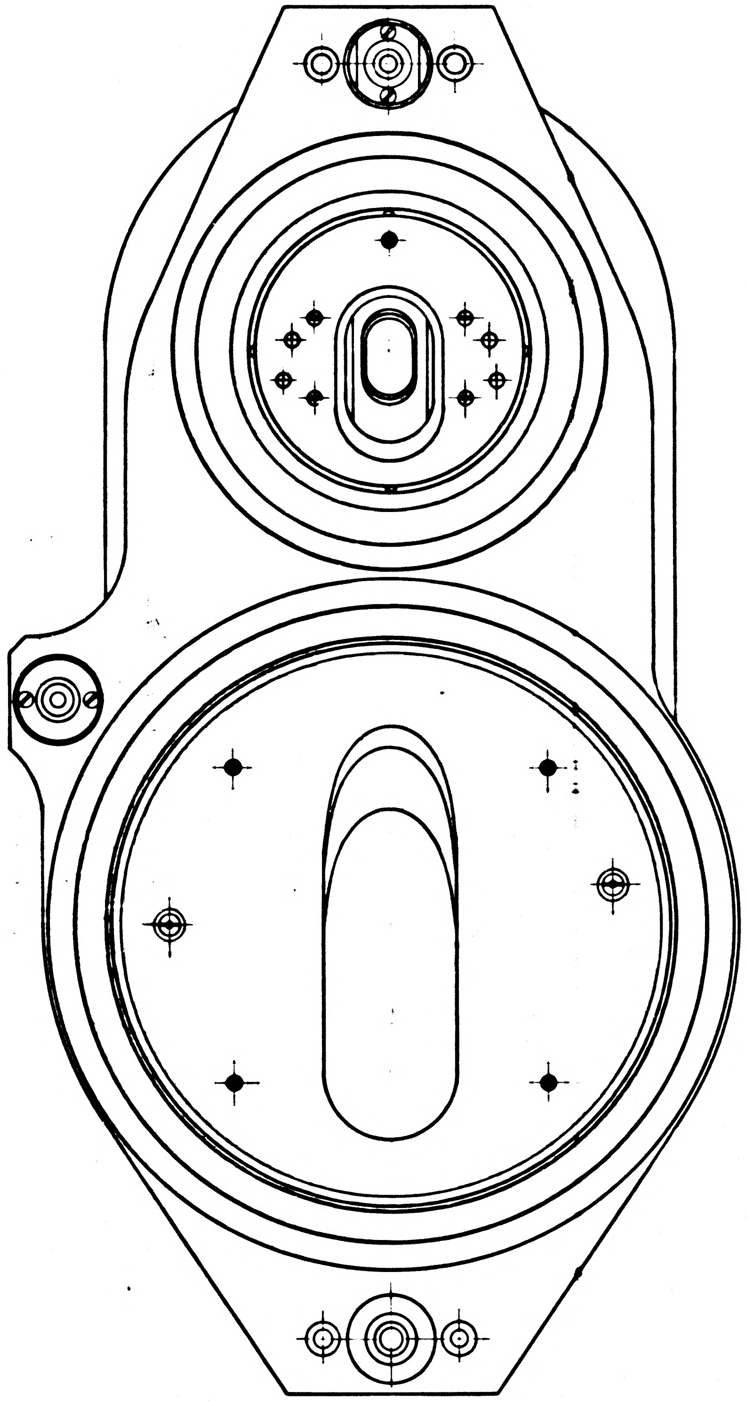
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

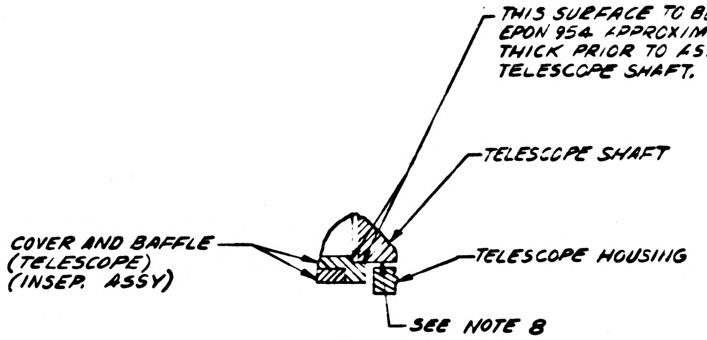
OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 1 OF 2

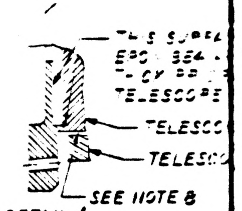
2010790 K 1

2/2010790

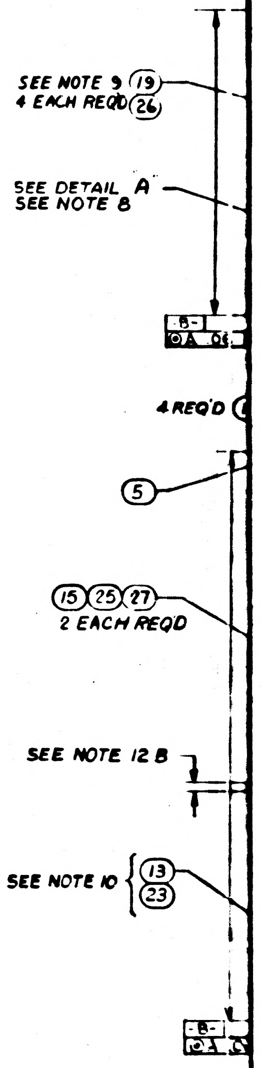


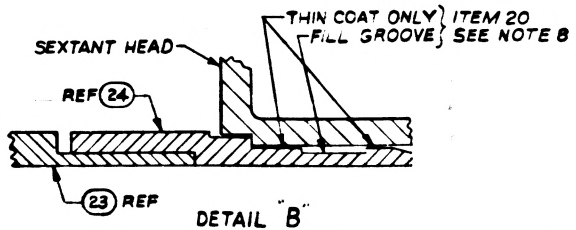

THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY .032 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT.
TELESCOPE SHAFT
COVER AND BAFFLE (TELESCOPE) (INSEP. ASSY)
TELESCOPE HOUSING
SEE NOTE 8

DETAIL A
SCALE: 2:1
(-051 CONFIGURATION)


TELESCO
TELESCO
SEE NOTE 8

DETAIL F
SCALE 2:1
(-061-071, -081,-111,-121,-131, -151 -161, -171 AND -181 CONFIGURATIONS)


SEE NOTE 9 (19) 4 EACH REQD (26)
SEE DETAIL "A" SEE NOTE 8
B
4 REQ'D
(5)
(15)(25)(27) 2 EACH REQD
SEE NOTE 12 B
SEE NOTE 10 (13) (23)
B

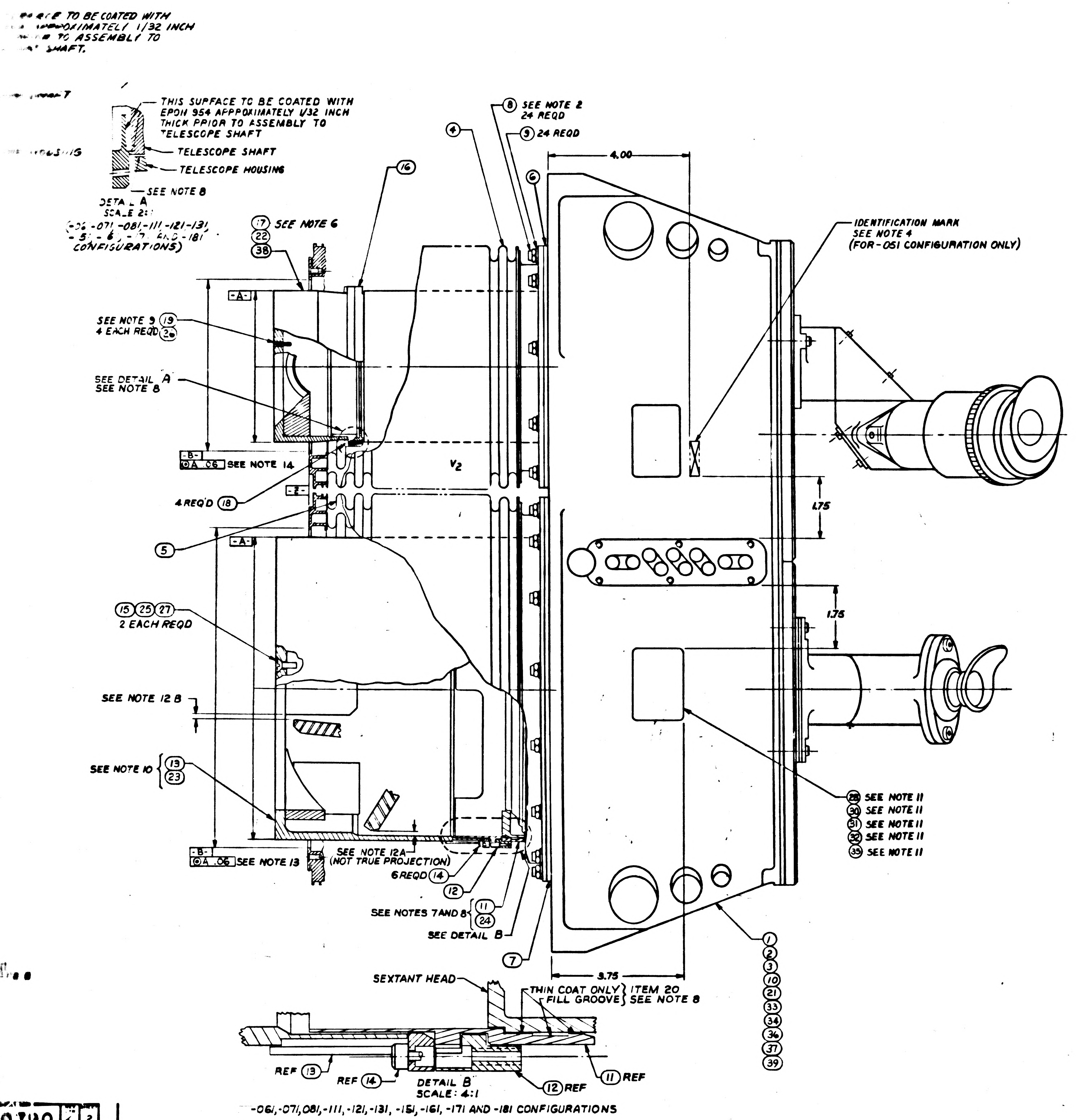

SEXTANT HEAD
THIN COAT ONLY } ITEM 20
FILL GROOVE } SEE NOTE 8
REF (24)
(23) REF

DETAIL "B"
SCALE 4:1
-051 CONFIGURATION

2010790 K 2

1/2010790

ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 338 4	CHG NO	[illegible]	
	C	REVISION STATUS CHANGED		16 MAR [illegible]	RCB
	D	REVISION STATUS CHANGED		[illegible]	
	E	REVISED PER TDRR 38976		AUG 67	R.H.
	F	REVISED		24 AUG 6[illegible]	
	G	REVISED PER TDRR 34913		[illegible]	
	H	REVISED PER TDRR 36539		22-[illegible] 68	
	J	REVISED PER TDRR 36542		[illegible] 68	
	K	REVISED PER TDRR 36724		SEP 68	



...ACE TO BE COATED WITH
...APPROXIMATELY 1/32 INCH
...R TO ASSEMBLY TO
...T SHAFT.
THIS SURFACE TO BE COATED WITH
EPON 954 APPROXIMATELY 1/32 INCH
THICK PRIOR TO ASSEMBLY TO
TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
(-061-071-081-111-121-131,
-151-161-171 AND-181
CONFIGURATIONS)
⑧ SEE NOTE 2
24 REQD
⑨ 24 REQD
④
⑥
⑯
4.00
⑰ SEE NOTE 6
㉒
㊳
-A-
SEE NOTE 9 ⑲ ⑳
4 EACH REQD
SEE DETAIL A
SEE NOTE 8
-B-
⊙A .06 SEE NOTE 14
V_2
-Z-
4 REQ'D ⑱
⑤
-A-
IDENTIFICATION MARK
SEE NOTE 4
(FOR-051 CONFIGURATION ONLY)
1.75
1.75
⑮㉕㉗
2 EACH REQD
SEE NOTE 12 B
SEE NOTE 10 ⑬ ㉓
-B-
⊙A .06 SEE NOTE 13
SEE NOTE 12A
(NOT TRUE PROJECTION)
6 REQD ⑭
⑫
SEE NOTES 7 AND 8 ⑪ ㉔
SEE DETAIL B
⑦
3.75
㉘ SEE NOTE 11
㉚ SEE NOTE 11
㉛ SEE NOTE 11
㉜ SEE NOTE 11
㉟ SEE NOTE 11
① ② ③ ⑩ ㉑ ㉝ ㉞ ㊱ ㊲ ㊴
SEXTANT HEAD
THIN COAT ONLY
FILL GROOVE
ITEM 20
SEE NOTE 8
REF ⑬
REF ⑭
⑫ REF
⑪ REF
DETAIL B
SCALE: 4:1
-061,-071,081,-111,-121,-131,-151,-161,-171 AND-181 CONFIGURATIONS

-051,-061,-071,-081,-111,-121,-131,-151,-161,-171 AND -181 CONFIGURATIONS.

B THIS SHEET ADDED

			011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN J. KAVANAGH DATE 8 AUG 6[illegible]
CHECKED ED FOSTER [illegible]
APPROVAL [illegible]
CONTRACT NAS 9-497
NASA APPROVAL L.C. MIETZGER
MIT APPROVAL E. AUSTIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

2010790 K 2

2/2010790

NOTES: (NOTES 1,2,3, AND 5 APPLY TO ALL CONFIGURATIONS)
(NOTE 4 APPLIES TO CONFIGURATIONS -011,-021,-031,-041,-051, -091, AND -141)
(NOTES 6 THROUGH 10 APPLY TO CONFIGURATIONS -051, 061, 071, 081,-111,-121,-131,-151,-161, 171, AND -181)
(NOTE 11 APPLIES TO CONFIGURATIONS -061,-071, 081,-111,-121,-131,-151,- 161, 171, AND -181)

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. TORQUE ITEM ⑧ TO 46 ± 2 IN-LB.

3. WITH ITEMS ④ AND ⑤ ASSEMBLED TO ITEM ①,②,③, ⑩, ㉑ ㉝,㉞,㊱, ㊲ OR ㊴, SURFACE $\boxed{-Z-}$ TO BE SEALED. VOLUMES V_1 AND V_2 TO BE PRESSURIZED WITH DRY, CLEAN AIR TO 5.0 ± 0.5 PSIG. THE COMBINED LEAK RATE OF ITEMS ④, ⑤, ⑥, ⑦ AND ①, ②, ③,⑩,㉑,㉝ ㉞ ㊱ ㊲ OR ㊴ SHALL NOT EXCEED 35 STD CC OF AIR PER MINUTE.

4. IDENTIFICATION MARK IN LOCATION SHOWN "ASSY 2010790 WITH APPLICABLE DASH NUMBER" PER ND1002019.

5. SERIALIZE PER ND1002023.

6. REMOVE EXISTING COVER, P/N 2012547, AND 4 SCREWS, P/N NAS 1190C04P4L, FROM TELESCOPE HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY. ORIENT COVER AND BAFFLE ASSEMBLY TO WORM SHAFT BEARING RETAINING CAP AS SHOWN IN ZONE 12-F, SHEET 2.

7. REMOVE EXISTING COVER, P/N 2012675, AND 2 NUTS, P/N 2011602 FROM SEXTANT HEAD PRIOR TO ASSEMBLY OF COVER AND BAFFLE ASSEMBLY.

8. BOND PER ND 1002329-001. APPLY A NARROW BAND OF ITEM ⑳, P/N 1008903, (EPON 954) TO THE CIRCUMFERENCE IN THE AREA SHOWN. REMOVE EXCESS ADHESIVE FROM SURFACE NOT TO BE BONDED.
CAUTION: EPON 954 TO BE KEPT FROM TELESCOPE SHAFT AND HOUSING INTERFACE.
CAUTION: AVOID ANY DAMAGE OR BIND TO FLEX PRINT CIRCUIT BOARD DURING OR AFTER INSTALLATION OF COVER, P/N 1008480-011 OR 1021331-011.

9. APPLY SEALING AND RETAINING COMPOUND (MIL-S-22473 GRADE C) PER ND1002211 TO SCREW THREADS. APPLY 4 ± 1 INCH POUNDS TORQUE.

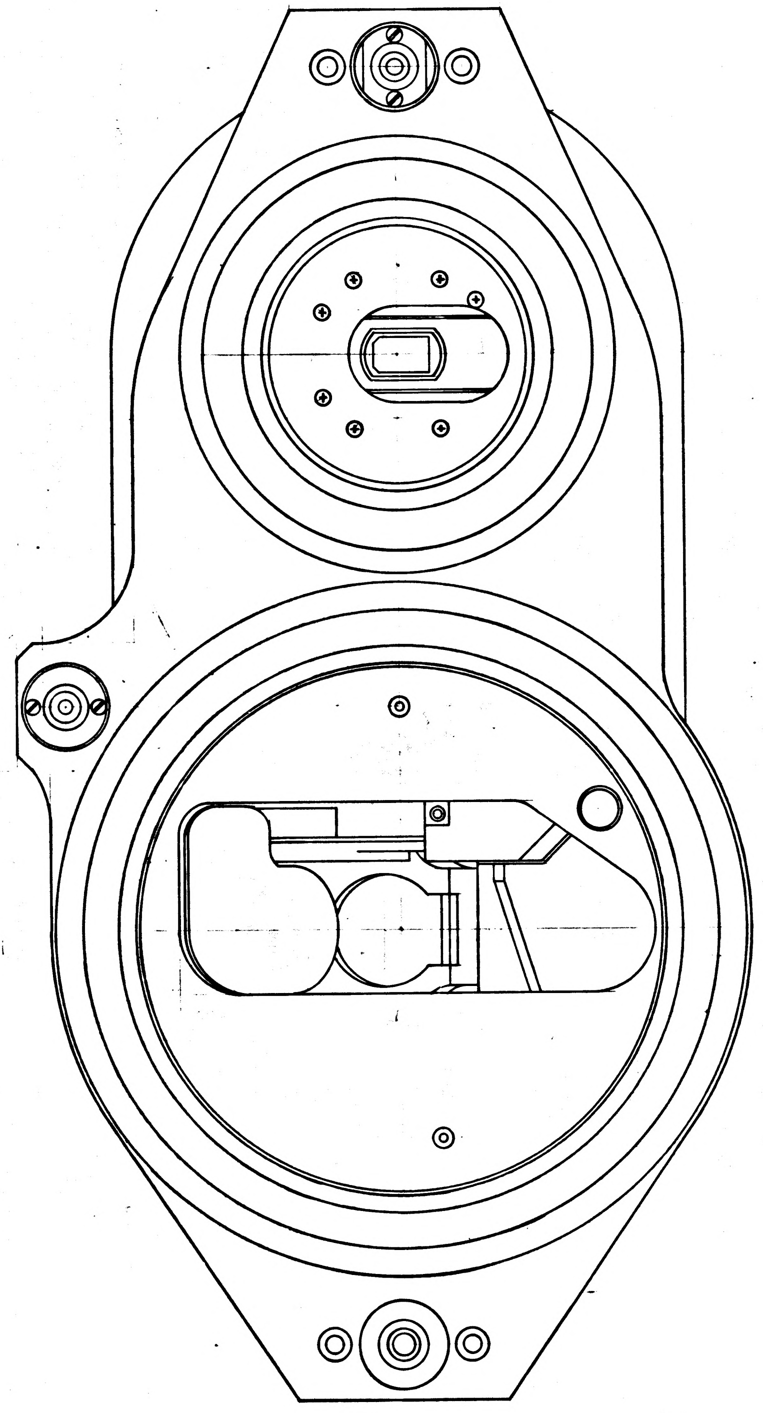
10. ROTATE ITEM ⑬ OR ㉓ PRIOR TO BONDING TO CHECK THAT APPROXIMATELY ONE-EIGHTH INCH CLEARANCE EXISTS BETWEEN SEXTANT MIRROR AND SEXTANT COVER AND BAFFLE ASSEMBLY. DO NOT TOUCH MIRROR SURFACE. MOVE MIRROR BY PLACING FINGER INTO SIDE HOLES OF MIRROR FRAME AND MOVE SLOWLY.

11. TRANSFER SERIAL NUMBER AND ADD PART NUMBER WHERE APPLICABLE TO NEW NAMEPLATE, ITEM 28, 30, 31, 32 OR 35. CHARACTERS SHALL BE .057 TO .067 HIGH. ABRADE BACK OF NEW NAMEPLATE AND CLEAN NAMEPLATE MOUNTING SURFACE WITH MEK BEFORE APPLICATION OF ADHESIVE, ITEM 29. APPLY ITEM 29 PER ND1002219, METHOD II, TO THE BACK OF THE NEW NAMEPLATE AND THE NAMEPLATE MOUNTING SURFACE AND CEMENT TOGETHER.
CAUTION: INSPECT NAMEPLATE MOUNTING SURFACE TO DETERMINE THAT NO CRACKING OR PEELING CONDITIONS OF THE PAINT EXIST IN THE AREA TO WHICH THE NAMEPLATE IS ATTACHED.

12. A. WITH THE SEXTANT MIRROR ROTATED ABOUT THE TRUNNION AXIS BY THE HAND CONTROL DRIVE CIRCUITRY, TO ITS MAXIMUM STATIC POSITION, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE INSIDE SURFACE OF ITEM ⑬ MUST BE .010, ON -181 CONFIGURATION.
    B. WITH THE MIRROR MOVED TO THIS POSITION BY THE ABOVE METHOD, THE MINIMUM CLEARANCE BETWEEN THE MIRROR AND THE BAFFLE OF ITEM ⑬ MUST BE 1/32, ON -181 CONFIGURATION.

13. MAX RADIAL RESTRAINT OF 20 LBS. PERMITTED.

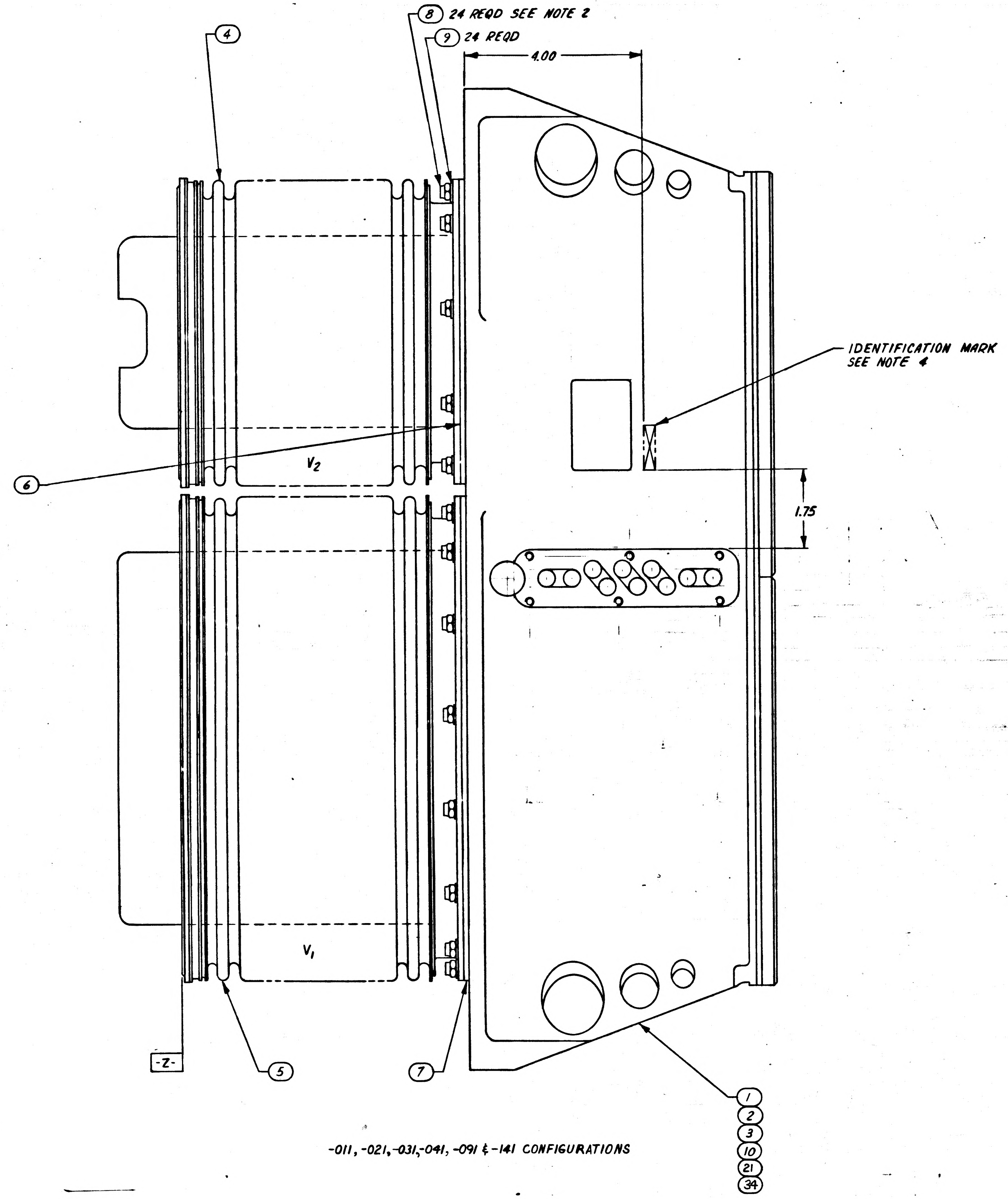
14. MAX RADIAL RESTRAINT OF 6 LBS PERMITTED.



2010790	REV LTR –	SHEET 1

1-/3 2010790

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 31557	CHG NO.	10/13/66	
	B	REVISED PER TDRR 33014		7 MAR 67	
	C	REVISED PER TDRR 33024		13 MAR 67	
	D	REVISED PER TDRR 33653		26 APR 67	VE
	E	REVISED PER TDRR 33975		7 AUG 67	R H RWH
	F	REVISED PER TDRR 34373		24 AUG 67	
	G	REVISED PER TDRR 34913		7 NOV	JWL RWH
	H	REVISED PER TDRR 36539		22 68	
	J	REVISED PER TDRR 36542		30 68	
	K	REVISED PER TDRR 36724		10 SEP 68	
	L	REVISED PER TDRR 37649		10 69	



-011, -021, -031, -041, -091 & -141 CONFIGURATIONS

181	171	161	151	141	131	121	111	091	081	071	061	051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1																		39	2011000-081	OPTICAL UNIT
	1																	38	1008490-011	COVER & BAFFLE, TELESCOPE (INSEP. ASSY)
		1																37	2011000-042	OPTICAL UNIT
			1															36	2011000-038	OPTICAL UNIT
1	1	1	1		1	1												35	1004260-570	NAMEPLATE
				1	1													34	2011000-071	OPTICAL UNIT
	1					1												33	2011000-062	OPTICAL UNIT
							1											32	1004260-553	NAMEPLATE
									1									31	1004260-552	NAMEPLATE
										1								30	1004260-551	NAMEPLATE
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR							29	1011541	ADHESIVE, EPOXY
											1							28	1004260-550	NAMEPLATE
												2						27	1021325	NUT, SLOTTED, FLAT CSK HD.
												4						26	1010630-17	SCREW, FLAT HEAD
												2						25	1021323	INSERT
												1						24	1021321	SEAT, SEXTANT COVER
												1						23	1021331-011	COVER & BAFFLE, SEXTANT (INSEP. ASSY)
												1						22	1021332	COVER & BAFFLE, TELESCOPE (INSEP. ASSY.)
							1	1										21	2011000-061	OPTICAL UNIT
AR	AR	AR	AR		AR	AR	AR		AR	AR	AR	AR						20	1008903	ADHESIVE, EPOXY
4	4	4	4		4	4	4		4	4	4							19	1008494	SCREW, 100° FLAT HEAD, HEX. SOC
4	4	4	4		4	4	4		4	4	4							18	1008484-000	SCREW, CAPTIVE
1		1	1		1	1	1		1	1	1							17	1008490-021	COVER & BAFFLE, TELESCOPE (INSEP ASSY)
1	1	1	1		1	1	1		1	1	1							16	1008495	SEAT, TELESCOPE COVER
2	2	2	2		2	2	2		2	2	2							15	1021379	FASTENER, SCREW TUBE-FLAT HD
6	6	6	6		6	6	6		6	6	6							14	1008484-001	SCREW, CAPTIVE
1	1	1	1		1	1	1		1	1	1							13	1008480-011	SEXTANT COVER & BAFFLE (INSEP. ASSY)
1	1	1	1		1	1	1		1	1	1							12	1021383	CLAMP, SEXTANT COVER
1	1	1	1		1	1	1		1	1	1							11	1021382	SEAT, SEXTANT COVER
									1				1					10	2011000-051	OPTICAL UNIT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		9	AN960C10L	WASHER, FLAT
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24		8	AN363C1032	NUT, SELF-LOCKING
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		7	1899996-002	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		6	1899996-001	SEAL, PLAIN ENCASED
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		5	1898952	BELLOWS, SEXTANT (INSEP ASSY)
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		4	1899951	BELLOWS ASSEMBLY, SCT
										1				1				3	2011000-041	OPTICAL UNIT
											1				1			2	2011000-034	OPTICAL UNIT
												1				1		1	2011000-035	OPTICAL UNIT

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO.
CONTRACT
DRAWN Kl Hunger DATE 8 AUG
CHECKED Ed Foster 10 AUG 66
APPROVAL 11 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL 10/13/66

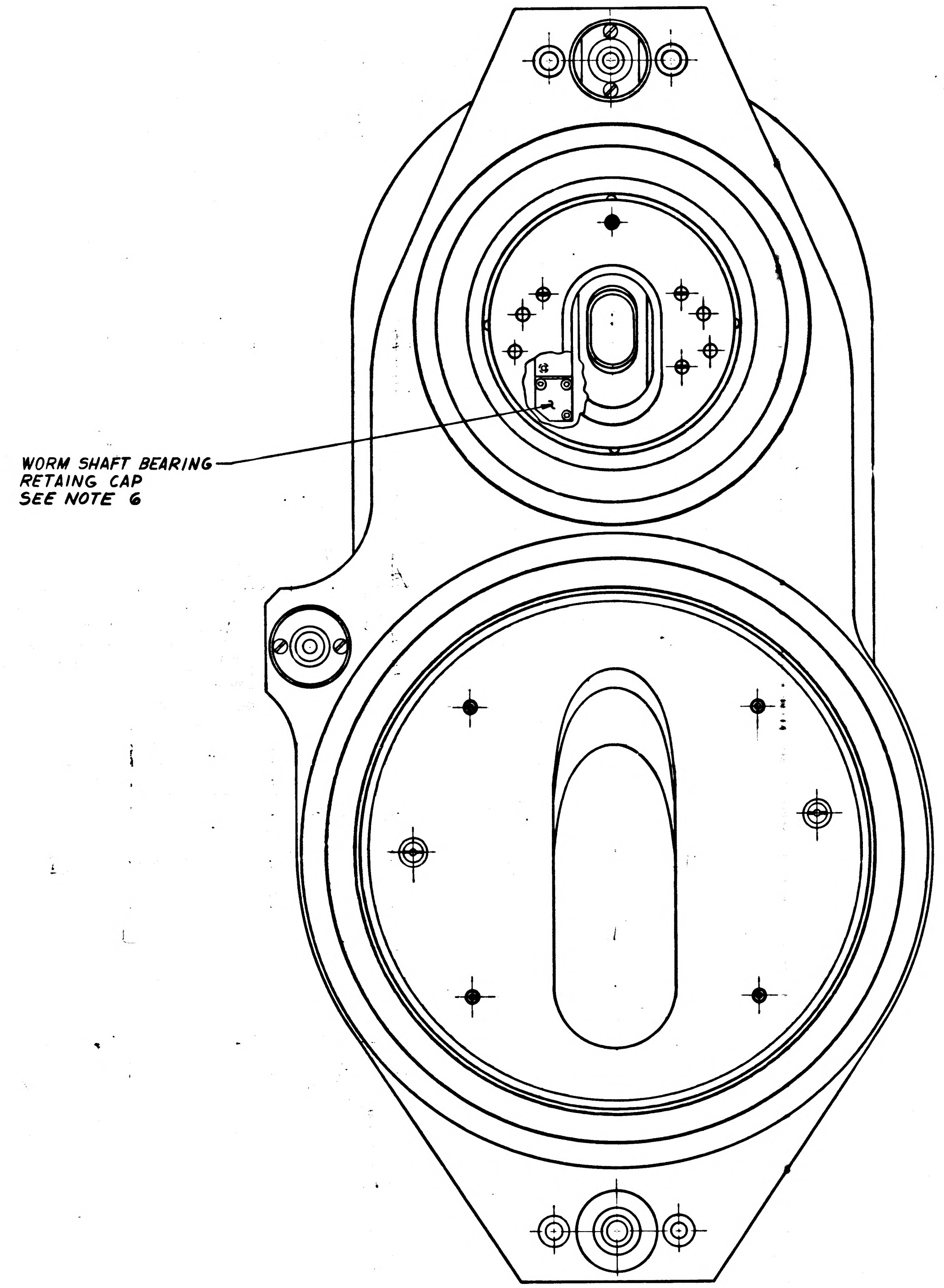
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

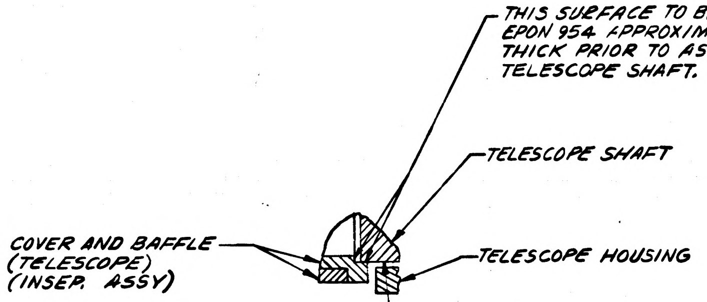
OPTICAL UNIT AND
BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FUL
SHEET 1 OF 2

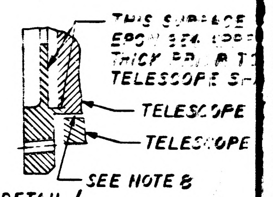
2010790 REV – SHEET 1

2/2010790

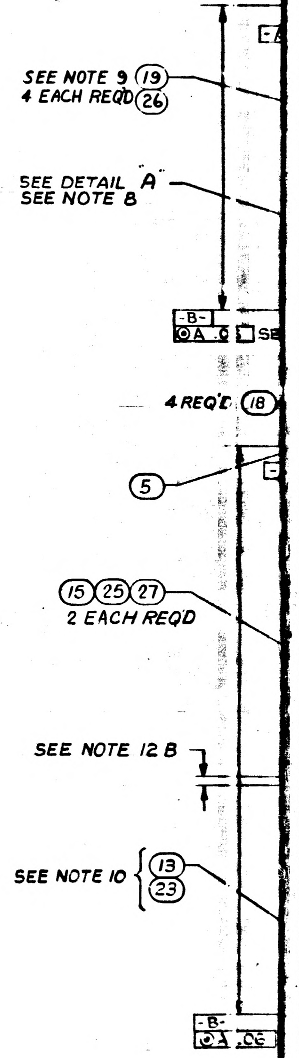

WORM SHAFT BEARING
RETAING CAP
SEE NOTE 6

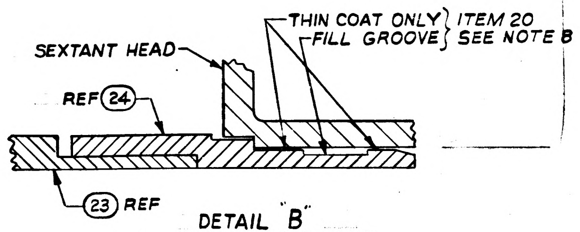

THIS SURFACE TO BE COATED WITH
EPON 954 APPROXIMATELY 1/32 INCH
THICK PRIOR TO ASSEMBLY TO
TELESCOPE SHAFT.
TELESCOPE SHAFT
COVER AND BAFFLE
(TELESCOPE)
(INSEP. ASSY)
TELESCOPE HOUSING
SEE NOTE 8

DETAIL A
SCALE: 2:1
(-051 CONFIGURATION)


THIS SURFACE
EPON 954
THICK PRIOR TO
TELESCOPE S
TELESCOPE
TELESCOPE
SEE NOTE 8

DETAIL A
SCALE 2:1
(-061-071, -081, -111, -121, -131,
-151, -161, -171 AND -181
CONFIGURATIONS)


-A
SEE NOTE 9 (19)
4 EACH REQD (26)
SEE DETAIL "A"
SEE NOTE 8
-B-
A .0
SE
4 REQ'D (18)
(5)
(15) (25) (27)
2 EACH REQD
SEE NOTE 12 B
SEE NOTE 10 (13) (23)
-B-
A .06


SEXTANT HEAD
THIN COAT ONLY
FILL GROOVE
ITEM 20
SEE NOTE B
REF (24)
(23) REF

DETAIL "B"
SCALE 4:1
-051 CONFIGURATION

2010790	REV LTR	SHEET
	-	2

REVISIONS					
ZONE	LTR	DESCRIPTION		DATE	APPROVED
	B	THIS SHEET ADDED PER TDRR 330:4	CHG NO.	9 MAR 67	
	C	REVISION STATUS CHANGED		10 MAR 67	RCB
	D	REVISION STATUS CHANGED		26 APR 67	
	E	REVISED PER TDRR 33975		7 AUG 67	R.W. RWH
	F	REVISED		24 AUG 67	
	G	REVISED PER TDRR 34913		9 NOV 67	RWH
	H	REVISED PER TDRR 36539		22-JUL 68	
	J	REVISED PER TDRR 36542		30 JUL 68	
	K	REVISED PER TDRR 36724		10 SEP 68	JJJ
	L	REVISED PER TDRR 37649		10 JUN 69	M.G.

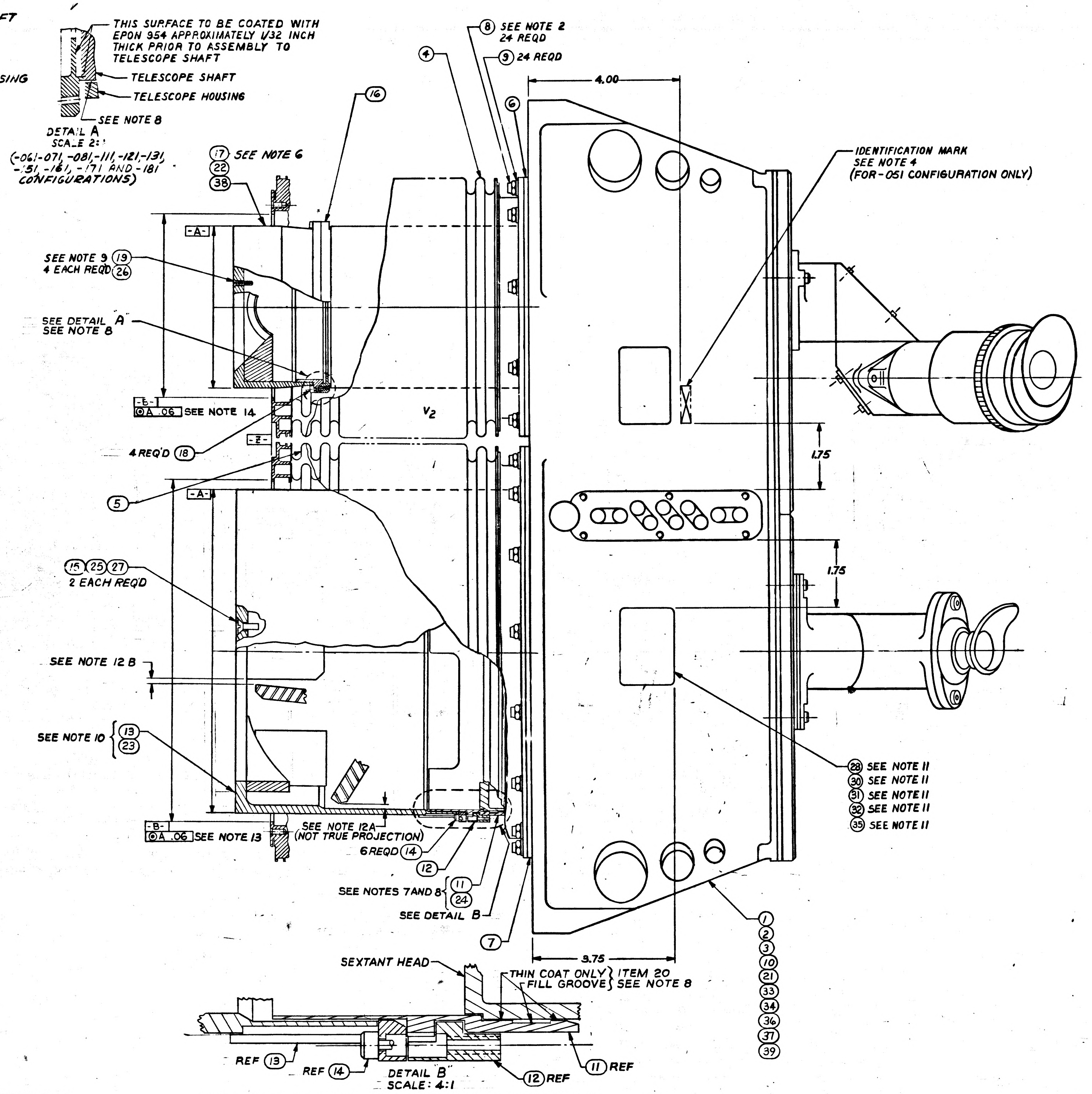
THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT.

TELESCOPE SHAFT

TELESCOPE HOUSING

OTE 8

ITEM 20
SEE NOTE


THIS SURFACE TO BE COATED WITH EPON 954 APPROXIMATELY 1/32 INCH THICK PRIOR TO ASSEMBLY TO TELESCOPE SHAFT
TELESCOPE SHAFT
TELESCOPE HOUSING
SEE NOTE 8
DETAIL A
SCALE 2:1
(-061-071, -081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS)
(8) SEE NOTE 2
24 REQD
(9) 24 REQD
(4)
(16)
(6)
4.00
(17) SEE NOTE 6
(22)
(38)
IDENTIFICATION MARK
SEE NOTE 4
(FOR -051 CONFIGURATION ONLY)
-A-
SEE NOTE 9 (19)
4 EACH REQD (26)
SEE DETAIL "A"
SEE NOTE 8
-B-
⊚A .06 SEE NOTE 14
V2
4 REQ'D (18)
-Z-
1.75
(5)
-A-
(15) (25) (27)
2 EACH REQD
1.75
SEE NOTE 12 B
SEE NOTE 10 (13) (23)
(28) SEE NOTE 11
(30) SEE NOTE 11
(31) SEE NOTE 11
(32) SEE NOTE 11
(35) SEE NOTE 11
-B-
⊚A .06 SEE NOTE 13
SEE NOTE 12A
(NOT TRUE PROJECTION)
6 REQD (14)
(12)
SEE NOTES 7 AND 8 (11) (24)
SEE DETAIL B
(7)
3.75
(1)
(2)
(3)
(10)
(21)
(33)
(34)
(36)
(37)
(39)
SEXTANT HEAD
THIN COAT ONLY
FILL GROOVE
ITEM 20
SEE NOTE 8
REF (13)
REF (14)
DETAIL "B"
SCALE: 4:1
(12) REF
(11) REF

-061, -071, 081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS

-051, -061, -071, -081, -111, -121, -131, -151, -161, -171 AND -181 CONFIGURATIONS.

B THIS SHEET ADDED

			011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS			

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± .02
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT
DRAWN J. KILVINGER DATE 8 AUG 66
CHECKED ED FOSTER 10 AUG 66
APPROVAL E. SNEWCZYK 11 AUG 66
CONTRACT NAS 9-497
NASA APPROVAL A.C. METZGER
MIT APPROVAL E. AUSTIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICAL UNIT AND BELLOWS ASSEMBLY

SIZE J2
CODE IDENT NO. 80230
2010790
SCALE FULL
SHEET 2 OF 2

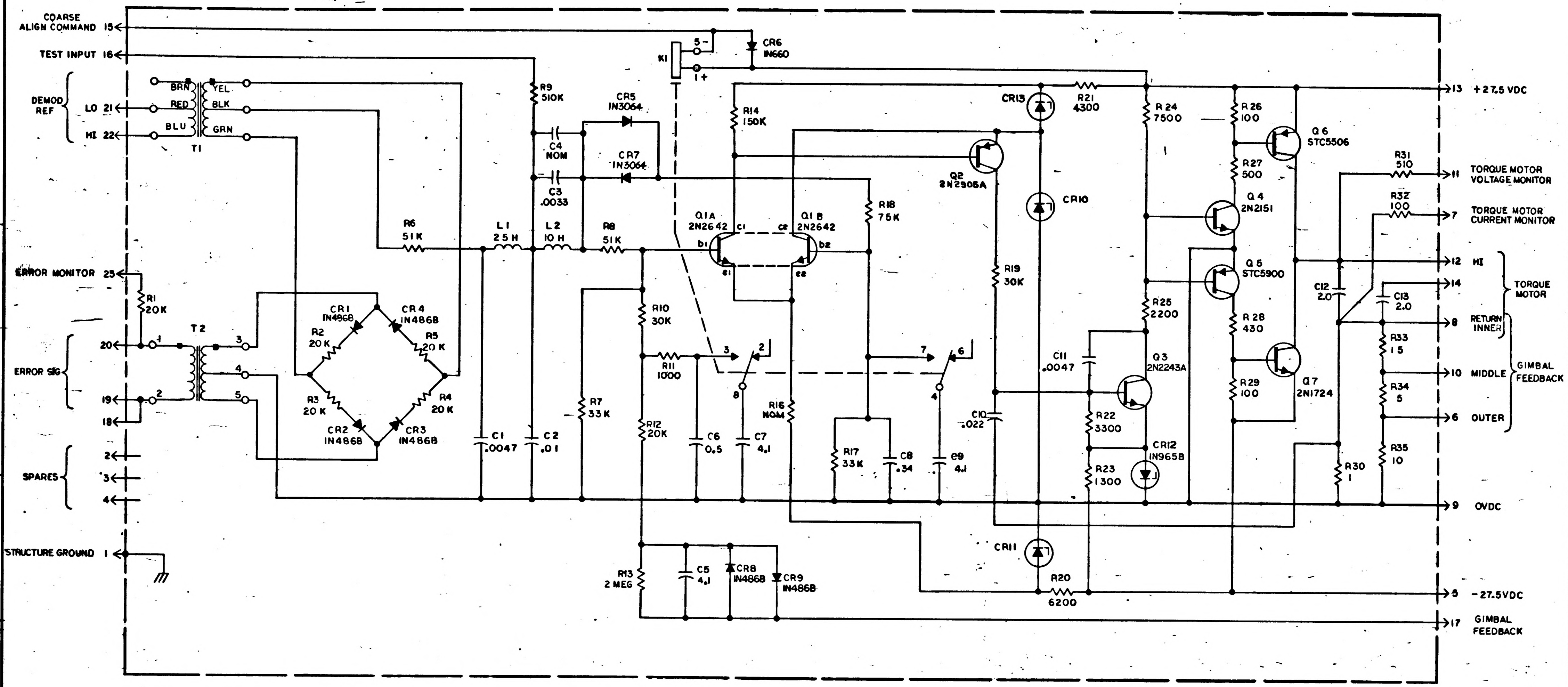
2010790 | REV LTR L | SHEET 2

2/2010790

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 32324		15 Dec 66	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1
ERROR MONITOR 25
R1 20K
ERROR SIG
20
19
18
T2
1
2
3
4
5
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 1N486B
CR4 1N486B
R2 20 K
R5 20 K
R3 20 K
R4 20 K
CR2 1N486B
CR3 1N486B
R6 51K
L1 25 H
L2 10 H
R8 51K
C1 .0047
C2 .01
R7 33K
R9 510K
C4 NOM
C3 .0033
CR5 1N3064
CR7 1N3064
K1
5 -
1 +
CR6 1N660
R14 150K
Q1A 2N2642
Q1B 2N2642
c1
c2
b1
b2
e1
e2
R10 30K
R11 1000
R12 20K
C6 0.5
C7 4.1
8
R16 NOM
R13 2 MEG
C5 4.1
CR8 1N486B
CR9 1N486B
R18 75K
R17 33K
C8 .34
C9 4.1
7
6
Q2 2N2905A
R19 30K
CR13
CR10
CR11
R21 4300
R20 6200
C11 .0047
C10 .022
Q3 2N2243A
R22 3300
R23 1300
CR12 1N965B
R24 7500
R25 2200
R26 100
R27 500
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q6 STC5506
Q7 2N1724
R31 510
R32 100
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
R30 1
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	±2%	1/4W
R2	1010364-501		20K	±1%	1/8W
R3	1010364-501		20K	±1%	1/8W
R4	1010364-501		20K	±1%	1/8W
R5	1010364-501		20K	±1%	1/8W
R6	1006750-73		51K	±2%	1/4W
R7	1006750-68		33K	±2%	1/4W
R8	1006750-73		51K	±2%	1/4W
R9	1010369-98		510K	±5%	1/8W
R10	1006750-67		30K	±2%	1/4W
R11	1006750-32		1000	±2%	1/4W
R12	1006750-63		20K	±2%	1/4W
R13	1010369-112		2 MEG	±5%	1/8W
R14	1006750-84		150K	±2%	1/4W
R16	SEE NOTE 2		NOMINAL	±2%	1/4W
R17	1006750-68		33K	±2%	1/4W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	-47		4.3K		
R22	1006750-44		3300		1/4W
R23	1006760-35		1300		1/2W
R24	1006750-53		7500		1/4W
R25	1006750-40		2200	±2%	1/4W
R26	1010278-39		100	±5%	1/2W
R27	1010399-31		500	±5%	5W
R28	1010389-47		430	±1%	3W
R29	1010278-39		100	±5%	1/2W
R30	1010389-94		1	±1%	3W
R31	1006750-25		510	±2%	1/4W
R32	1006750-8		100	±2%	1/4W
R33	1006802-4		15	±1%	1/2W
R34	1006802-3		5	±1%	1/2W
R35	1006802-1	RESISTOR	10	±1%	1/2W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL	-	
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	1N486B		
CR2					
CR3					
CR4					
CR5	1010370-001		1N3064		
CR6	1010385		1N660		
CR7	1010370-001		1N3064		
CR8	1010392-1		1N486B		
CR9	1010392-1		1N486B		
CR10	1008815-1		6.8 vdc		
CR11	1010372-13		6.2 vdc		
CR12	1008815-9	DIODE	1N965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1008812-1		2N2905A		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1010271		STC5506		
Q7	1010273-1	TRANSISTOR	2N1724		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16

PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
-156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4

PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.
3. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
4. DRAWING FOR REFERENCE:
   2007114 GIMBAL SERVO AMPLIFIER ASSEMBLY
5. RELAYS ARE SHOWN IN THE UNENERGIZED OR "OFF" POSITION.
6. VALUES ARE IN OHM'S AND MICROFARADS.

NEXT ASSY	USED ON
2007114	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN D. Gale DATE 1 NOV 66
CHECKED W. D EHL 2 Nov 66
APPROVAL R. Greenwood 10-2-66
CONTRACT
NASA APPROVAL
CCB APPROVAL

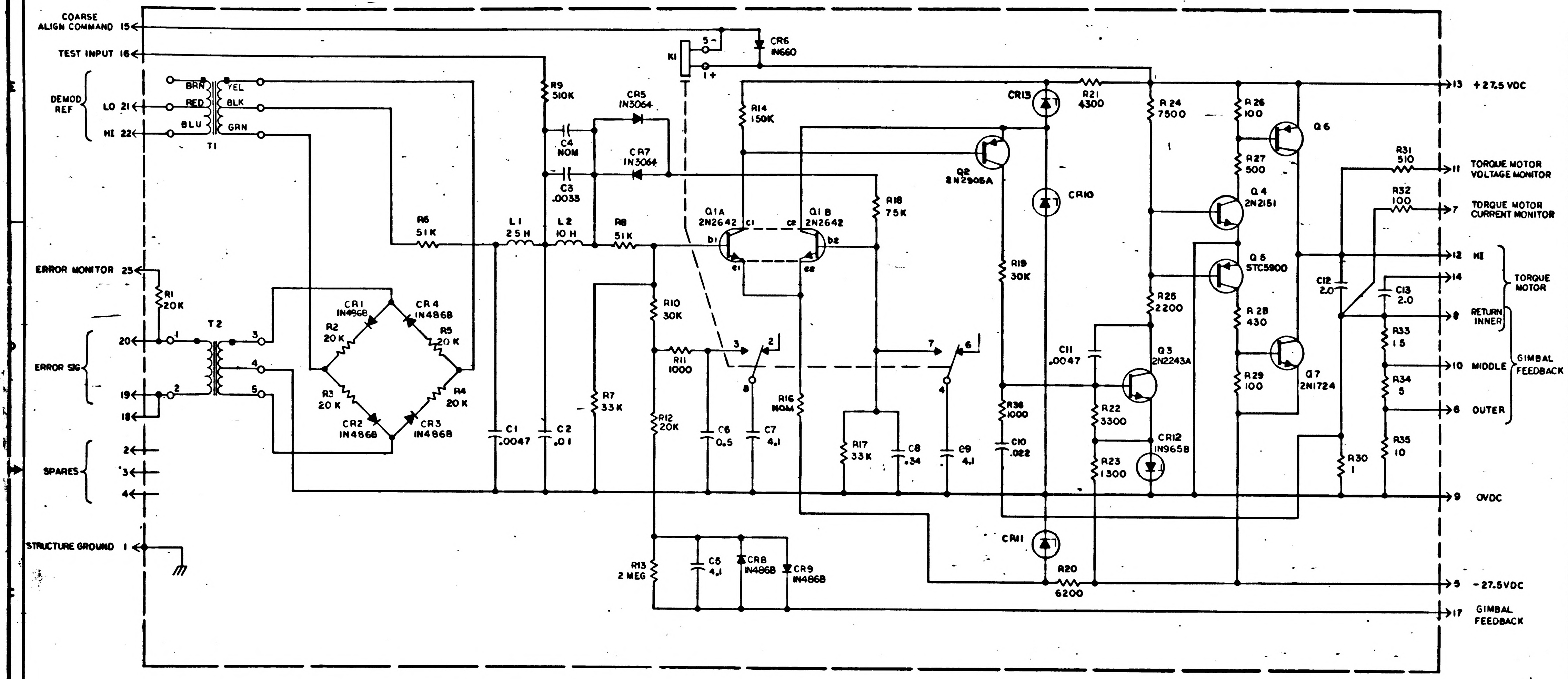
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM, ELECTRICAL-GIMBAL SERVO AMPLIFIER

SIZE
CODE IDENT NO. 80230
2010791
SCALE
SHEET 1 OF 1

[illegible]

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR [illegible]		15 Dec 66	
	B	REVISED PER TDRR 35867		[illegible]	


COARSE ALIGN COMMAND 15
TEST INPUT 16
DEMOD REF
LO 21
HI 22
BRN
RED
BLU
YEL
BLK
GRN
T1
ERROR MONITOR 25
R1 20K
T2
ERROR SIG
20
19
18
1
2
3
4
5
SPARES
2
3
4
STRUCTURE GROUND 1
CR1 1N4868
CR4 1N4868
CR2 1N4868
CR3 1N4868
R2 20K
R5 20K
R3 20K
R4 20K
R6 51K
L1 25H
L2 10H
R8 51K
R9 510K
C4 NOM
C3 .0033
CR5 1N3064
CR7 1N3064
K1
5-
1+
CR6 1N660
C1 .0047
C2 .01
R7 33K
R10 30K
R11 1000
R12 20K
C6 0.5
C7 4.1
R13 2 MEG
C5 4.1
CR8 1N4868
CR9 1N4868
Q1A 2N2642
Q1B 2N2642
b1
c1
e1
b2
c2
e2
R14 150K
R18 75K
R16 NOM
R17 33K
C8 .34
C9 4.1
3
2
8
7
6
4
Q2 2N2905A
CR13
CR10
CR11
R21 4300
R19 30K
R36 1000
C10 .022
C11 .0047
R20 6200
R24 7500
R25 2200
Q3 2N2243A
R22 3300
R23 1300
CR12 1N965B
R26 100
R27 500
Q6
Q4 2N2151
Q5 STC5900
R28 430
R29 100
Q7 2N1724
R31 510
R32 100
C12 2.0
C13 2.0
R33 15
R34 5
R35 10
R30 1
13 +27.5 VDC
11 TORQUE MOTOR VOLTAGE MONITOR
7 TORQUE MOTOR CURRENT MONITOR
12 HI
14
TORQUE MOTOR
8 RETURN INNER
10 MIDDLE
6 OUTER
GIMBAL FEEDBACK
9 OVDC
5 -27.5VDC
17 GIMBAL FEEDBACK

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1006750-63	RESISTOR	20K	±2%	1/4 W
R2	1010364-501		20K	±1%	1/8 W
R3	1010364-501		20K	±1%	1/8 W
R4	1010364-501		20K	±1%	1/8 W
R5	1010364-501		20K	±1%	1/8 W
R6	1006750-73		51K	±2%	1/4 W
R7	1006750-68		33K	±2%	1/4 W
R8	1006750-73		51K	±2%	1/4 W
R9	1010369-98		510K	±5%	1/8 W
R10	1006750-67		30K	±2%	1/4 W
R11	1006750-32		1000	±2%	1/4 W
R12	1006750-63		20K	±2%	1/4 W
R13	1010369-112		2 MEG	±5%	1/8 W
R14	1006750-84		150K	±2%	1/4 W
R16	SEE NOTE 2		NOMINAL	±2%	1/4 W
R17	1006750-68		33K	±2%	1/4 W
R18	-77		75K		
R19	-67		30K		
R20	-51		6200		
R21	-47		4.3K		
R22	1006750-44		3300		1/4 W
R23	1006760-35		1300		1/2 W
R24	1006750-53		7500		1/4 W
R25	1006750-40		2200	±2%	1/4 W
R26	1010278-39		100	±5%	1/2 W
R27	1010399-31		500	±5%	5 W
R28	1010389-47		430	±1%	3 W
R29	1010278-39		100	±5%	1/2 W
R30	1010389-94		1	±1%	3 W
R31	1006750-25		510	±2%	1/4 W
R32	1006750-8		100	±2%	1/4 W
R33	1006802-4		15	±1%	1/2 W
R34	1006802-3		5	±1%	1/2 W
R35	1006802-1	RESISTOR	10	±1%	1/2 W
R36	1006750-32	RESISTOR	1000	±2%	1/4 W
C1	1010264-9	CAPACITOR	.0047	±5%	200V
C2	1010264-13		.01	±5%	200V
C3	1010264-7		.0033	±5%	200V
C4	SEE NOTE 2		NOMINAL		
C5	1010279-119		4.1	±10%	15V
C6	-108		0.5		
C7	-119		4.1		
C8	-106		.34		
C9	1010279-119		4.1	±10%	15V
C10	1010264-17		.022	±5%	200V
C11	1010264-9		.0047	±5%	200V
C12	1010279-252		2.0	±10%	50V
C13	1010279-252	CAPACITOR	2.0	±10%	50V
L1	1010277-9	REACTOR	25H		
L2	1010277-8	REACTOR	10H		
CR1	1010392-1	DIODE	1N4868		
CR2					
CR3					
CR4					
CR5	1010370-001		1N3064		
CR6	1010385		1N660		
CR7	1010370-001		1N3064		
CR8	1010392-1		1N4868		
CR9	1010392-1		1N4868		
CR10	1008815-1		6.8 vdc		
CR11	1010372-13		6.2 vdc		
CR12	1008815-9	DIODE	1N965B		
Q1	1010252-1	TRANSISTOR	2N2642		
Q2	1008812-1		2N2905A		
Q3	1010270		2N2243A		
Q4	1010269-1		2N2151		
Q5	1010437		STC5900		
Q6	1008969				
Q7	1010273-1	TRANSISTOR	2N1724		
CR13	1010372-13	DIODE	6.2vdc		
T1	1010324	TRANSFORMER	DO-T36		
T2	1010710	TRANSFORMER			
K1	1010353-7	RELAY			

R16			
PART NO.	VALUE	PART NO.	VALUE
1006750-67	30.0K	1006750-157	53.5K
-151	31.5K	-74	56.0K
-68	33.0K	-158	59.0K
-152	34.5K	-75	62.0K
-69	36.0K	-159	65.0K
-153	37.5K	-76	68.0K
-70	39.0K	-160	71.5K
-154	41.0K	-77	75.0K
-71	43.0K	-161	78.5K
-155	45.0K	-78	82.0K
-72	47.0K	-162	86.5K
-156	49.0K	1006750-79	91.0K
1006750-73	51.0K		

C4			
PART NO.	VALUE	TOL	RATING
1010409-12	30 UUF	±2%	500 VDC
1010409-18	51 UUF		500 VDC
1010409-25	100 UUF		500 VDC
1010409-32	200 UUF		300 VDC
1010410-5	330 UUF		500 VDC
-8	430 UUF		500 VDC
-10	510 UUF		500 VDC
-12	620 UUF		300 VDC
-14	750 UUF		300 VDC
-15	820 UUF		300 VDC
-16	910 UUF		300 VDC
1010410-17	1000 UUF	±2%	300 VDC

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SELECT R16 AND C4 PER PS 2007114 FROM APPROPRIATE CHART.
3. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
4. DRAWING FOR REFERENCE:
   2007114 GIMBAL SERVO AMPLIFIER *ASSEMBLY*
5. RELAYS ARE SHOWN IN THE UNENERGIZED OR *"OFF" POSITION.*
6. VALUES ARE IN OHMS AND MICROFARADS.

NEXT ASSY	USED ON
2007114	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

M I T
INSTRUMENTATION LAB
Cambridge Mass
DRAWN [illegible] DATE [illegible]
CHECKED W D Enc 2 Nov 66
APPROVAL [illegible]
CONTRACT
NASA APPROVAL
MSC APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

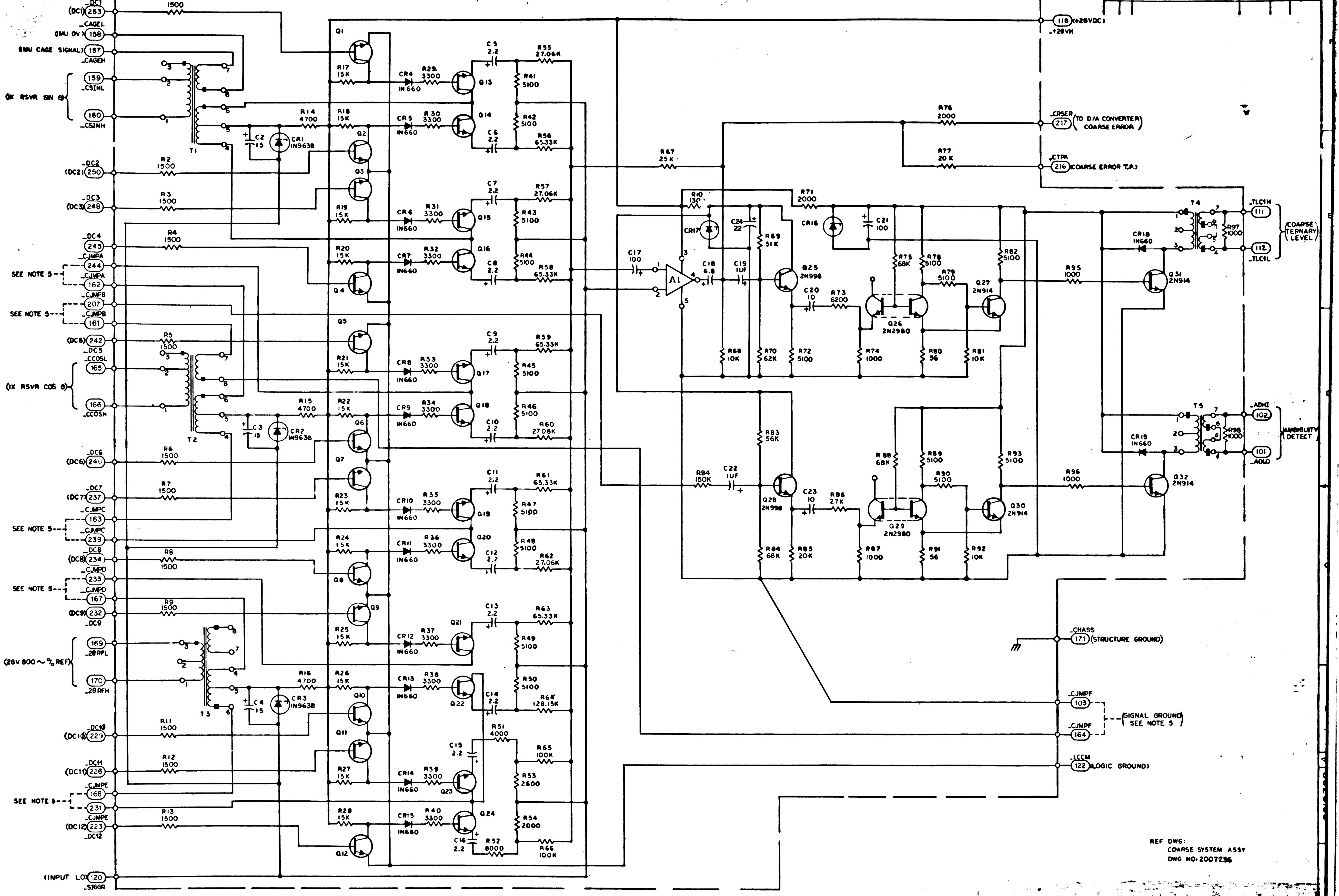
SCHEMATIC DIAGRAM,
ELECTRICAL-GIMBAL SERVO AMPLIFIER.

SIZE E
CODE IDENT NO. 80230
2010791
SCALE
SHEET 1 OF 1

[illegible]

REVISIONS

ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 33350	CHG. NO.	4 AC 67	



(DC1) 253 _DC1
R1 1500
(IMU OV) 158 _CAGEL
(IMU CAGE SIGNAL) 157 _CAGEH
(1X RSVR SIN θ) 159 _CSINL 160 _CSINH
T1
(DC2) 250 _DC2 R2 1500
(DC3) 248 _DC3 R3 1500
245 _DC4 R4 1500
SEE NOTE 5 244 _CJMPA 162 _CJMPA
SEE NOTE 5 207 _CJMPB 161 _CJMPB
(DC5) 242 _DC5 R5 1500
(1X RSVR COS θ) 165 _CCOSL 166 _CCOSH
T2
(DC6) 240 _DC6 R6 1500
(DC7) 237 _DC7 R7 1500
SEE NOTE 5 163 _CJMPC 239 _CJMPC
(DC8) 234 _DC8 R8 1500
SEE NOTE 5 233 _CJMPD 167 _CJMPD
(DC9) 232 _DC9 R9 1500
(28V 800~ 0° REF) 169 _28RFL 170 _28RFH
T3
(DC10) 229 _DC10 R11 1500
(DC11) 226 _DC11 R12 1500
SEE NOTE 5 168 _CJMPE 231 _CJMPE
(DC12) 223 _DC12 R13 1500
(INPUT LO) 120 _SIGGR
C2 15 CR1 1N963B R14 4700
C3 15 CR2 1N963B R15 4700
C4 15 CR3 1N963B R16 4700
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12
R17 15K R18 15K R19 15K R20 15K R21 15K R22 15K R23 15K R24 15K R25 15K R26 15K R27 15K R28 15K
CR4 1N660 CR5 1N660 CR6 1N660 CR7 1N660 CR8 1N660 CR9 1N660 CR10 1N660 CR11 1N660 CR12 1N660 CR13 1N660 CR14 1N660 CR15 1N660
R29 3300 R30 3300 R31 3300 R32 3300 R33 3300 R34 3300 R35 3300 R36 3300 R37 3300 R38 3300 R39 3300 R40 3300
Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
C5 2.2 C6 2.2 C7 2.2 C8 2.2 C9 2.2 C10 2.2 C11 2.2 C12 2.2 C13 2.2 C14 2.2 C15 2.2 C16 2.2
R41 5100 R42 5100 R43 5100 R44 5100 R45 5100 R46 5100 R47 5100 R48 5100 R49 5100 R50 5100
R51 4000 R52 8000 R53 2600 R54 2000
R55 27.06K R56 65.33K R57 27.06K R58 65.33K R59 65.33K R60 27.06K R61 65.33K R62 27.06K R63 65.33K R64 128.15K R65 100K R66 100K
118 (+28VDC) _+28VH
R76 2000 _CRSER 217 (TO D/A CONVERTER) COARSE ERROR
R77 20K _CTPA 216 COARSE ERROR T.P.
R67 25K
R10 130
CR17
C17 100
A1 1 2 3 4 5
C24 22 C18 6.8 C19 1UF
R69 51K R68 10K R70 62K R72 5100
Q25 2N998
C20 10 R73 6200
R71 2000 CR16 C21 100
R75 68K R78 5100 R79 5100 R82 5100
Q26 2N2980 R74 1000 R80 56 R81 10K
Q27 2N914
R95 1000 Q31 2N914
CR18 1N660
T4 _TLC1H 111 112 _TLC1L R97 1000
COARSE TERNARY LEVEL
R83 56K R94 150K C22 1UF
Q28 2N998 R84 68K R85 20K
C23 10 R86 27K
R88 68K R89 5100 R90 5100 R93 5100
Q29 2N2980 R87 1000 R91 56 R92 10K
Q30 2N914
R96 1000 Q32 2N914
CR19 1N660
T5 _ADHI 102 101 _ADLO R98 1000
AMBIGUITY DETECT
_CHASS 171 (STRUCTURE GROUND)
_CJMPF 103 _CJMPF 164 SIGNAL GROUND SEE NOTE 5
_LCGM 122 (LOGIC GROUND)

REF DWG:
COARSE SYSTEM ASSY
DWG NO: 2007236

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE EXPRESSED IN OHMS
3. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (244) TO (162); (207) TO (161); (239) TO (163); (233) TO (167); (231) TO (168); (103) TO (164).

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Wayne Hall DATE 12 NOV 66
CHECKED 4 NOV 66
APPROVAL 13 NOV 66
APPROVAL
NASA APPROVAL
CCA APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	E	2010792

SCALE — WT — SHEET 1 OF 2

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REVISIONS					
ZONE	LTR	DESCRIPTION	ENG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 33350			

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R 1	1006750 - 36	RESISTOR	1500	±2 %	1/4 W
R 2	- 36		1500		
R 3	- 36		1500		
R 4	- 36		1500		
R 5	- 36		1500		
R 6	- 36		1500		
R 7	- 36		1500		
R 8	- 36		1500		
R 9	1006750 - 36		1500		
R 10	1010604 - 47		1300	±1 %	1 W
R 11	1006750 - 36		1500	±2 %	1/4 W
R 12	- 36		1500		
R 13	- 36		1500		
R 14	- 48		4700		
R 15	- 48		4700		
R 16	- 48		4700		
R 17	- 60		15K		
R 18	- 60		15K		
R 19	- 60		15K		
R 20	- 60		15K		
R 21	- 60		15K		
R 22	- 60		15K		
R 23	- 60		15K		
R 24	- 60		15K		
R 25	- 60		15K		
R 26	- 60		15K		
R 27	- 60		15K		
R 28	- 60		15K		
R 29	- 44		3300		
R 30	- 44		3300		
R 31	- 44		3300		
R 32	- 44		3300		
R 33	- 44		3300		
R 34	- 44		3300		
R 35	- 44		3300		
R 36	- 44		3300		
R 37	- 44		3300		
R 38	- 44		3300		
R 39	- 44		3300		
R 40	- 44		3300		
R 41	- 49		5100		
R 42	- 49		5100		
R 43	- 49		5100		
R 44	- 49		5100		
R 45	- 49		5100		
R 46	- 49		5100		
R 47	- 49		5100		
R 48	- 49		5100		
R 49	- 49		5100		
R 50	1006750 - 49		5100	±2 %	1/4 W
R 51	1010733 - 103		4000	± 1 %	1/10 W
R 52	- 104		8000		
R 53	- 102		2600		
R 54	- 101		2000		
R 55	- 8		27.06K	± .1 %	
R 56	- 10		65.33K		
R 57	- 8		27.06K		
R 58	- 10		65.33K		
R 59	- 10		65.33K		
R 60	- 8		27.06K		
R 61	- 10		65.33K		
R 62	- 8		27.06K		
R 63	- 10		65.33K		
R 64	- 17		128.15K		
R 65	- 117		100K	± 1 %	
R 66	- 117		100K	± 1 %	
R 67	1010733 - 12		25 K	± .1 %	1/10 W
R 68	1006750 - 56		10 K	±2 %	1/4 W
R 69	1006750 - 73		51 K		
R 70	1006750 - 75		62 K		
R 71	1010604 - 39		2000	±1 %	1 W
R 72	1006750 - 49		5100	±2 %	1/4 W
R 73	- 51		6200		
R 74	- 32		1000		
R 75	- 76		68 K		
R 76	- 39		2000		
R 77	- 63		20 K		
R 78	- 49		5100		
R 79	- 49		5100		
R 80	- 2		56		
R 81	- 56		10 K		
R 82	- 49		5100		
R 83	- 74		56K		
R 84	- 76		68K		
R 85	- 63		20 K		
R 86	- 66		27K		
R 87	- 32		1000		
R 88	- 76		68K		
R 89	- 49		5100		
R 90	- 49		5100		
R 91	- 2		56		
R 92	- 56		10K		
R 93	- 49		5100		
R 94	- 84		150 K		
R 95	- 32		1000		
R 96	- 32		1000		
R 97	- 32		1000		
R 98	1006750 - 32		1000		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
C 2	1006755 - 33	CAPACITOR	15 UF	±10%	20VDC
C 3	- 33		15		
C 4	- 33		15		
C 5	- 73		2.2		
C 6	- 73		2.2		
C 7	- 73		2.2		
C 8	- 73		2.2		
C 9	- 73		2.2		
C 10	- 73		2.2		
C 11	- 73		2.2		
C 12	- 73		2.2		
C 13	- 73		2.2		
C 14	- 73		2.2		
C 15	- 73		2.2		
C 16	- 73		2.2		20
C 17	- 14		100		10
C 18	- 79		6.8		35
C 19	- 69		1.0		35
C 20	- 31		10		20
C 21	- 14		100		10
C 22	- 69		1.0		35
C 23	- 31		10		20
C 24	1006755 - 85		22		35
CR 1	1008815 - 7	DIODE	IN963B		
CR 2	1008815 - 7		IN963B		
CR 3	1008815 - 7		IN963B		
CR 4	1010385		IN660		
CR 5					
CR 6					
CR 7					
CR 8					
CR 9					
CR 10					
CR 11					
CR 12					
CR 13					
CR 14					
CR 15	1010385		IN 660		
CR 16	1010372-13				
CR 17	1008815 - 9		IN965B		
CR 18	1010385		IN660		
CR 19	1010385	DIODE	IN 660		
Q 1	1010343 - 3	TRANSISTOR			
Q 2	-				
Q 3	-				
Q 4	-				
Q 5	-				
Q 6	-				
Q 7	-				
Q 8	-				
Q 9	-				
Q 10	-				
Q 11	-				
Q 12	-				
Q 13	-				
Q 14	-				
Q 15	-				
Q 16	-				
Q 17	-				
Q 18	-				
Q 19	-				
Q 20	-				
Q 21	-				
Q 22	-				
Q 23	-				
Q 24	1010343 - 3				
Q 25	1010342		2N998		
Q 26	1010652 - 1		2N2980		
Q 27	1010966-1		2N914		
Q 28	1010342		2N 998		
Q 29	1010652 - 1		2N2980		
Q 30	1010966-1		2N914		
Q 31	1010966-1		2N914		
Q 32	1010966-1		2N914		
A 1	SEE NOTE 4	AMPLIFIER			
T 1	1010725	TRANSFORMER			
T 2	1010725				
T 3	1010725				
T 4	1010365				
T 5	1010365				

NEXT ASSY	USED ON
APPLICATION	

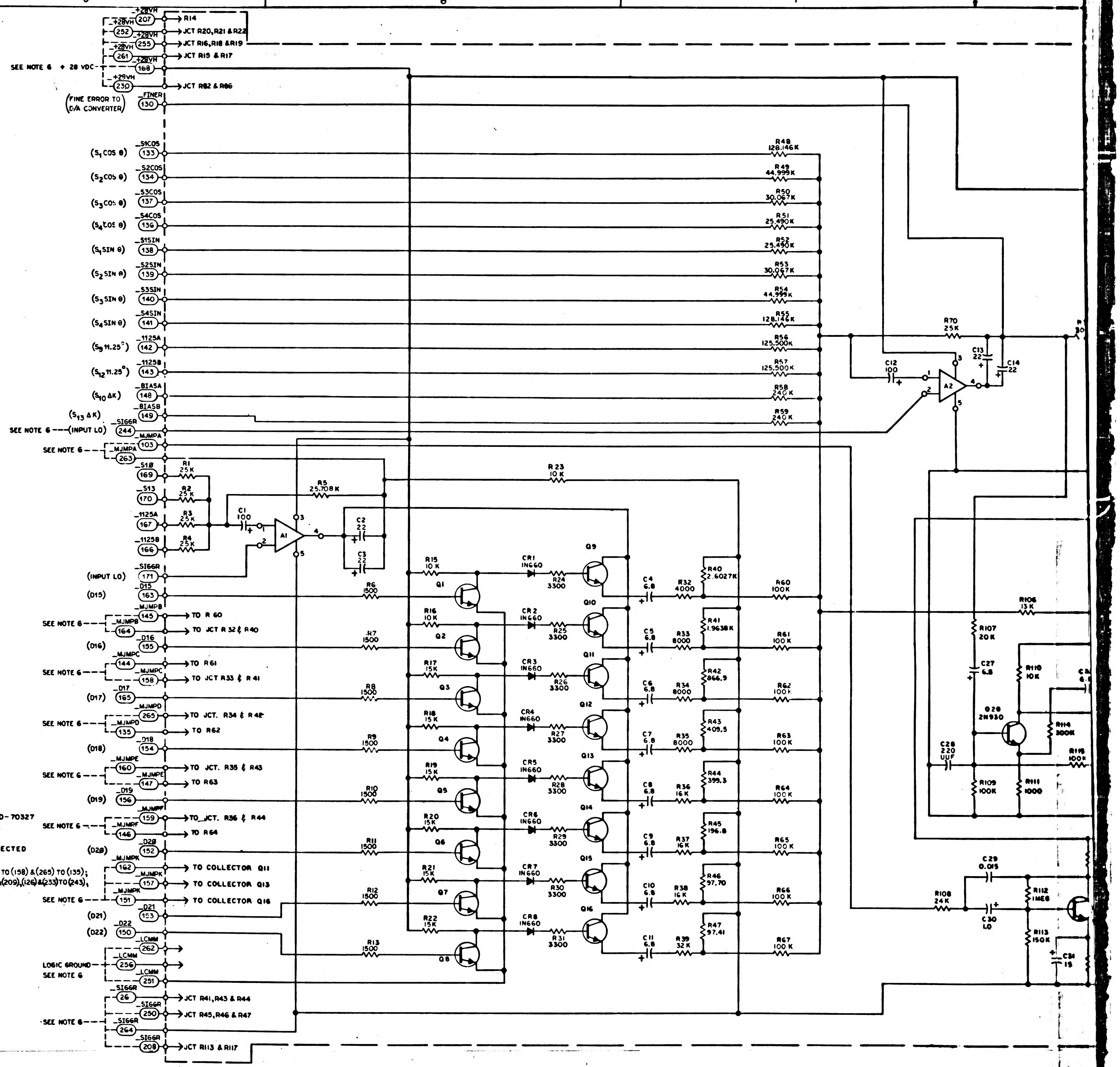
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
HEAT TREATMENT —
FINAL FINISH —

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 12 NOV 66
CHECKED 14 NOV 66
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

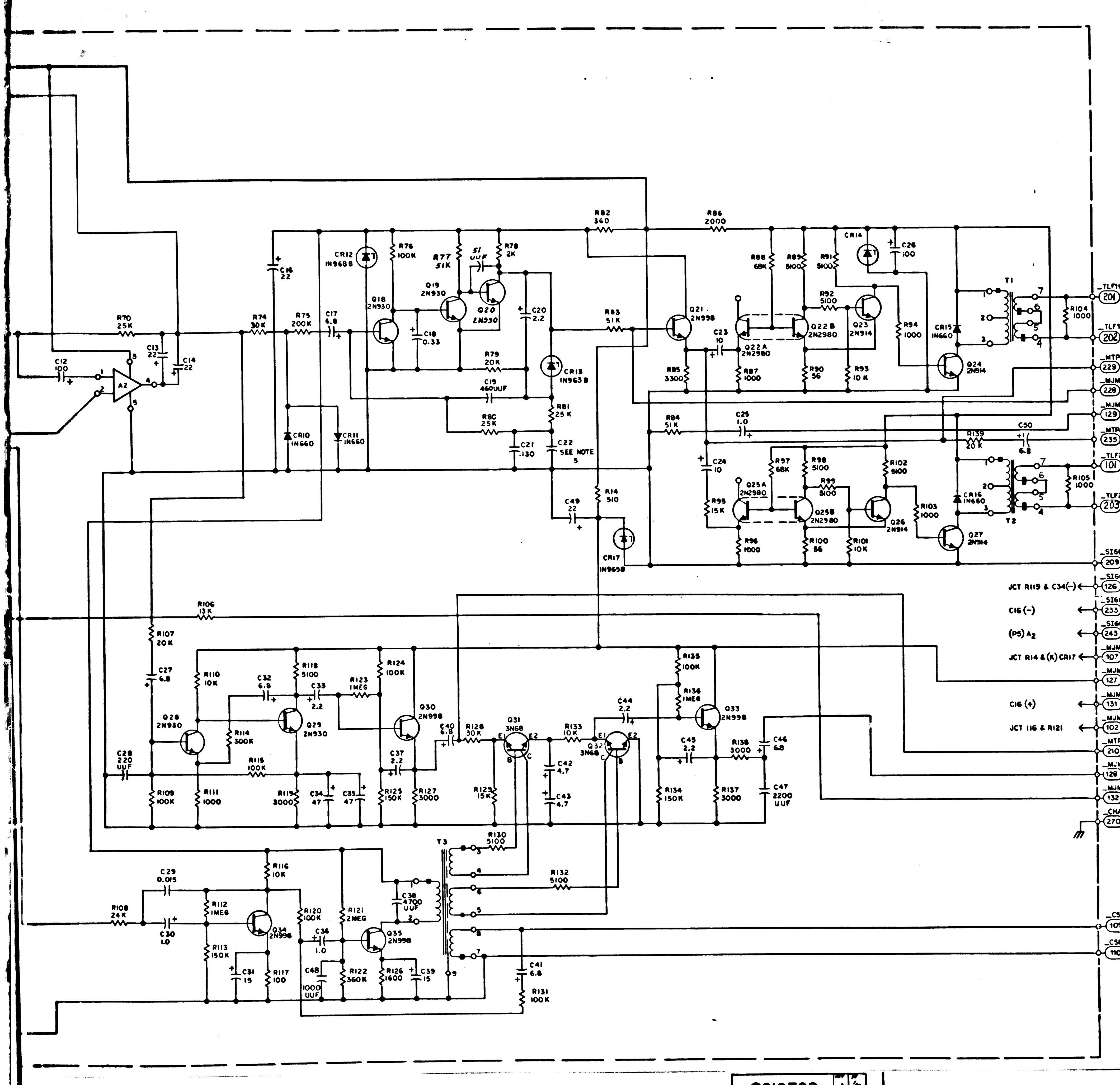
SCHEMATIC,
COARSE SYSTEM ELECTRONICS,
CDU

CODE IDENT NO. 80230 SIZE E NASA DRAWING NO 2010792
SCALE — WT — SHEET 2 OF 2


+28VH
207
R14
252
JCT R20, R21 & R22
255
JCT R16, R18 & R19
261
JCT R15 & R17
SEE NOTE 6 + 28 VDC
168
+29VH
230
JCT R82 & R86
(FINE ERROR TO D/A CONVERTER)
FINER
130
(S1 COS θ) S1COS 133
(S2 COS θ) S2COS 134
(S3 COS θ) S3COS 137
(S4 COS θ) S4COS 136
(S1 SIN θ) S1SIN 138
(S2 SIN θ) S2SIN 139
(S3 SIN θ) S3SIN 140
(S4 SIN θ) S4SIN 141
(S9 11.25°) 1125A 142
(S12 11.25°) 1125B 143
(S10 ΔK) BIASA 148
(S13 ΔK) BIASB 149
SEE NOTE 6 (INPUT LO) SI66R 244
MJMPA 103
SEE NOTE 6 MJMPA 263
S10 169
S13 170
1125A 167
1125B 166
(INPUT LO) SI66R 171
(D15) D15 163
SEE NOTE 6 MJMPB 145 TO R 60
MJMPB 164 TO JCT R 32 & R40
(D16) D16 155
SEE NOTE 6 MJMPC 144 TO R61
MJMPC 158 TO JCT R33 & R 41
(D17) D17 165
SEE NOTE 6 MJMPD 265 TO JCT. R34 & R42
MJMPD 135 TO R62
(D18) D18 154
SEE NOTE 6 MJMPE 160 TO JCT. R35 & R43
MJMPE 147 TO R63
(D19) D19 156
SEE NOTE 6 MJMPF 159 TO JCT. R36 & R44
MJMPF 146 TO R64
(D20) D20 152
MJMPK 162 TO COLLECTOR Q11
MJMPK 157 TO COLLECTOR Q13
SEE NOTE 6 MJMPK 151 TO COLLECTOR Q16
(D21) D21 153
(D22) D22 150
LCMM 262
LOGIC GROUND SEE NOTE 6 LCMM 256
LCMM 251
SI66R 26 JCT R41, R43 & R44
SI66R 250 JCT R45, R46 & R47
SEE NOTE 6 SI66R 264
SI66R 208 JCT R113 & R117
R1 25K
R2 25K
R3 25K
R4 25K
R5 25.708K
C1 100
A1
C2 22
C3 22
R23 10K
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
R12 1500
R13 1500
R15 10K
R16 10K
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
CR1 IN660
CR2 IN660
CR3 IN660
CR4 IN660
CR5 IN660
CR6 IN660
CR7 IN660
CR8 IN660
R24 3300
R25 3300
R26 3300
R27 3300
R28 3300
R29 3300
R30 3300
R31 3300
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
C4 6.8
C5 6.8
C6 6.8
C7 6.8
C8 6.8
C9 6.8
C10 6.8
C11 6.8
R32 4000
R33 8000
R34 8000
R35 8000
R36 16K
R37 16K
R38 16K
R39 32K
R40 2.6027K
R41 1.9638K
R42 866.9
R43 409.5
R44 399.3
R45 196.8
R46 97.70
R47 97.41
R60 100K
R61 100K
R62 100K
R63 100K
R64 100K
R65 100K
R66 100K
R67 100K
R48 128.146K
R49 44.999K
R50 30.067K
R51 25.490K
R52 25.490K
R53 30.067K
R54 44.999K
R55 128.146K
R56 125.500K
R57 125.500K
R58 240K
R59 240K
R70 25K
C12 100
A2
C13 22
C14 22
R106 13K
R107 20K
C27 6.8
R110 10K
Q28 2N930
R114 300K
C28 220 UUF
R109 100K
R111 1000
R115 100K
C29 0.015
R108 24K
C30 LO
R112 1MEG
R113 150K
C31 15

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. THE VALUE OF C22 TO BE SELECTED AT FINAL TEST, PART TO BE SELECTED FROM CHART A
6. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (207), (252), (255), (261) & (168) TO (230); (103) TO (263); (145) TO (164); (144) TO (158) & (265) TO (135); (160) TO (147); (159) TO (146); (262) & (256) TO (251); (260), (250), (244) & (264) TO (208); (209), (126) & (233) TO (243), (131) TO (102); (128) TO (132); (151) & (157) TO (162); (107) TO (127)



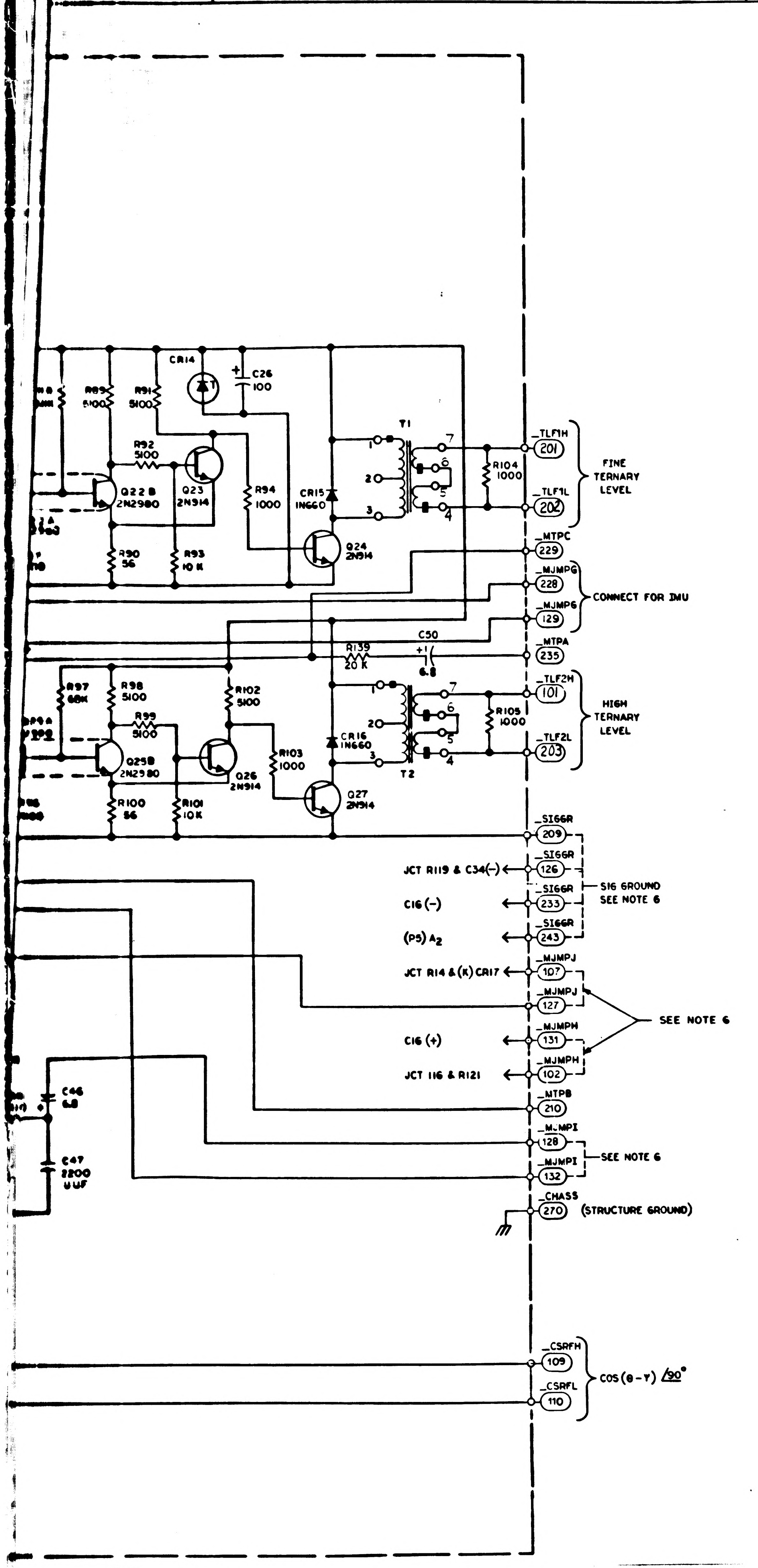
R70 25K
C12 100
A2
C13 22
C14 22
R74 30K
R75 200K
C17 6.8
C16 22
CR12 IN968B
Q18 2N930
R76 100K
R77 51K
Q19 2N930
51 UUF
Q20 2N930
R78 2K
C18 0.33
C20 2.2
R79 20K
C19 460UUF
CR13 IN963B
R80 25K
R81 25K
C21 .130
C22 SEE NOTE 5
CR10 IN660
CR11 IN660
R82 360
R86 2000
R83 51K
Q21 2N998
C23 10
R85 3300
R87 1000
Q22A 2N2980
Q22B 2N2980
R88 68K
R89 5100
R91 5100
R92 5100
Q23 2N914
R90 56
R93 10K
R94 1000
CR14
C26 100
T1
CR15 IN660
Q24 2N914
R104 1000
R84 51K
C25 1.0
C24 10
R95 15K
Q25A 2N2980
Q25B 2N2980
R97 68K
R98 5100
R99 5100
R96 1000
R100 56
R101 10K
R102 5100
Q26 2N914
R103 1000
Q27 2N914
R139 20K
C50 6.8
CR16 IN660
T2
R105 1000
C49 22
R14 510
CR17 IN965B
TLF1H 201
TLF1L 202
FINE TERNARY LEVEL
MTPC 229
MJMPG 228
MJMPG 129
CONNECT FOR IMU
MTPA 235
TLF2H 101
TLF2L 203
HIGH TERNARY LEVEL
SI66R 209
JCT R119 & C34(-)
SI66R 126
S16 GROUND SEE NOTE 6
C16(-)
SI66R 233
(P5) A2
SI66R 243
JCT R14 & (K) CR17
MJMPJ 107
MJMPJ 127
SEE NOTE 6
C16(+)
MJMPH 131
JCT 116 & R121
MJMPH 102
MTPB 210
MJMPI 128
SEE NOTE 6
MJMPI 132
CHASS 270
(STRUCTURE GROUND)
R106 13K
R107 20K
C27 6.8
R110 10K
Q28 2N930
C32 6.8
R118 5100
C33 2.2
R123 1MEG
R124 100K
Q29 2N930
R114 300K
R115 100K
Q30 2N998
C28 220 UUF
R109 100K
R111 1000
R119 3000
C34 47
C35 47
C37 2.2
R125 150K
R127 3000
C40 6.8
R128 30K
Q31 3N68
R129 15K
C42 4.7
C43 4.7
R133 10K
Q32 3N68
C44 2.2
R135 100K
R136 1MEG
Q33 2N998
C45 2.2
R138 3000
C46 6.8
R134 150K
R137 3000
C47 2200 UUF
T3
R130 5100
R132 5100
C29 0.015
R116 10K
R112 1MEG
R108 24K
C30 1.0
Q34 2N998
R120 100K
R121 2MEG
C38 4700 UUF
C36 1.0
Q35 2N998
R113 150K
C31 15
R117 100
C48 1000 UUF
R122 360K
R126 1600
C39 15
C41 6.8
R131 100K
CSRFH 109
CSRFL 110
COS (θ-γ) /90°

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 307	RESISTOR	25 K	±.01 %	1/10 W
R2	- 307				
R3	- 307				
R4	-307				
R5	- 333		25.708K		
R6	1006750 - 36		1500	± 2 %	1/4 W
R7	- 36				
R8	-36				
R9	-36				
R10	-36				
R11	-36				
R12	-36				
R13	-36				
R14	1010604 -46		510	± 1%.	1 W
R15	1006750 -56		10 K	± 2%.	1/4 W
R16	-56		10 K		
R17	-60		15 K		
R18	-60				
R19	-60				
R20	-60				
R21	-60				
R22	-60				
R23	-56		10 K		
R24	-44		3300		
R25	-44				
R26	-44				
R27	-44				
R28	-44				
R29	-44				
R30	-44				
R31	-44				
R32	1010377 -304		4000	±.01 %	1/10 W
R33	1010377 -305		8000	±.01 %	
R34	1010733 -6		8000	±.1 %	
R35	-6		8000		
R36	-7		16 K		
R37	-7		16 K		
R38	-7		16 K		
R39	-9		32 K		
R40	1010377 -303		2.6027 K	±.01 %	
R41	1010377 -302		1.9638 K	±.01 %	
R42	1010733 -18		866.9	±.1%	
R43	-5		409.5		
R44	-4		399.3		
R45	-3		196.8		
R46	-2		97.70		
R47	-1		97.41		
R48	1010377 - 313		128.146K	±.01%	
R49	-311		44.999 K		
R50	-310		30.067 K		
R51	-308		25.490 K		
R52	-308		25.490 K		
R53	-310		30.067K		
R54	-311		44.999 K		
R55	-313		128.146K		
R56	-347		125.500K		
R57	-347		125.500K		
R58	1010369 -90		240 K	± 5 %	1/8 W
R59	1010369 -90		240 K	± 5 %	1/8 W
R60	1010377 -312		100 K	±.01%	1/10 W
R61	1010377 -312			±.01%	
R62	1010733 -11			±.1%	
R63	-11				
R64	-11				
R65	-11				
R66	-11				
R67	-11				
R70	1010377 -307		25K	±.01%	1/10 W
R71					
R72					
R73					
R74	1006750 - 67		30K	± 2 %	1/4 W
R75	1010733 -119		200K	± 1 %	1/10 W
R76	1006750 -80		100K	± 2 %	1/4 W
R77	-73		51K		
R78	-39		2000		
R79	-63		20K		
R80	1010733 -12		25K	±.1 %	1/10 W
R81	1010733 -12		25K	±.1 %	1/10 W
R82	1010604 -45		360	± 1 %	1 W
R83	1006750 -73		51 K	± 2 %	1/4 W
R84	-73		51 K		
R85	-44		3300		
R86	1010604 -39		2000	± 1 %	1 W
R87	1006750 -32		1000	± 2 %	1/4 W
R88	-76		68K		
R89	-49		5100		
R90	-2		56		
R91	-49		5100		
R92	-49		5100		
R93	-56		10 K		
R94	-32		1000		
R95	-60		15 K		
R96	-32		1000		
R97	-76		68K		
R98	-49		5100		
R99	-49		5100		
R100	-2		56		
R101	-56		10 K		
R102	-49		5100		
R103	-32		1000		
R104	-32		1000		
R105	-32		1000		
R106	-59		13 K		
R107	-63		20K		
R108	-65		24K		
R109	-80		100 K		
R110	-56		10 K		
R111	-32		1000		
R112	1010369 -105		1MEG	± 5 %	1/8 W
R113	1006750 -84		150 K	± 2 %	1/4 W
R114	1010369 -92		300K	± 5 %	1/8 W
R115	1006750 -80		100 K	± 2 %	1/4 W
R116	-56		10 K		
R117	-8		100		
R118	-49		5100		
R119	-43		3000		
R120	-80		100 K		
R121	1010369 -112		2 MEG	± 5 %	1/8 W
R122	-94		360 K		
R123	-105		1 MEG		
R124	1006750 -80		100 K	± 2 %	1/4 W
R125	-84		150 K		
R126	-37		1600		

REF DES	PART NO.	DESCRIPTION
R127	1006750 - 43	RESISTO
R128	-67	
R129	-60	
R130	-49	
R131	-80	
R132	-49	
R133	-56	
R134	-84	
R135	-80	
R136	1010369 -105	
R137	1006750 -43	
R138	1006750 -43	
R139	1006750 -63	
C1	1006755 - 14	CAPACITOR
C2	-85	
C3	-85	
C4	-79	
C5	-79	
C6	-79	
C7	-79	
C8	-79	
C9	-79	
C10	-79	
C11	-79	
C12	-14	
C13	-85	
C14	-85	
C16	-85	
C17	-79	
C18	1006777 - 63	
C19	1008900 -013	
C20	1006755 - 73	
C21	1010317 - 4	
C22	SEE NOTE 5	
C23	1006755 - 81	
C24	-81	
C25	-69	
C26	-14	
C27	-79	
C28	1006777 -16	
C29	1006777 - 39	
C30	1006755 - 69	
C31	-33	
C32	-79	
C33	-73	
C34	-36	
C35	-36	
C36	-69	
C37	-73	
C38	1006777 - 28	
C39	1006755 - 33	
C40	-79	
C41	-79	
C42	-10	
C43	-10	
C44	-73	
C45	-73	
C46	-79	
C47	1006777 -26	
C48	1006777 -24	
C49	1006755 -85	
C50	1006755 -79	
C51	1010409 -18	CAPACITO
CR1	1010385	DIODE
CR2		
CR3		
CR4		
CR5		
CR6		
CR7	1010385	
CR8	1010385	
CR10	1010385	
CR11	1010385	
CR12	1008815 -12	
CR13	1008815 -7	
CR14	1010372 -13	
CR15	1010385	
CR16	1010385	
CR17	1008815 -9	
Q1	1010343 -3	TRANSISTO
Q2		
Q3		
Q4		
Q5		
Q6		
Q7		
Q8		
Q9		
Q10		
Q11		
Q12		
Q13		
Q14		
Q15		
Q16	1010343 -3	
Q18	1010397 - 1	
Q19	-1	
Q20	-1	
Q21	1010342	
Q22	1010652 - 1	
Q23	1010966 -1	
Q24	1010966 -1	
Q25	1010652 -1	
Q26	1010966 -1	
Q27	1010966 -1	
Q28	1010397 -1	
Q29	1010397 -1	
Q30	1010342	
Q31	1010367-001	
Q32	1010367-001	
Q33	1010342	
Q34		
Q35		
A1	2007144	AMPLIFI
A2	2007144	AMPLIFI
T1	1010365	TRANSFO
T2	1010365	
T3	1010724	

2010793 A

2/2010793


CR14
C26
100
R89
5100
R91
5100
R92
5100
Q22B
2N2980
Q23
2N914
R94
1000
CR15
1N660
Q24
2N914
R90
56
R93
10 K
T1
R104
1000
_TLF1H
201
_TLF1L
202
FINE TERNARY LEVEL
_MTPC
229
_MJMPG
228
_MJMPG
129
CONNECT FOR IMU
R139
20 K
C50
6.8
_MTPA
235
R97
68K
R98
5100
R99
5100
R102
5100
R103
1000
Q25B
2N2980
Q26
2N914
CR16
1N660
Q27
2N914
T2
R105
1000
R100
56
R101
10K
_TLF2H
101
_TLF2L
203
HIGH TERNARY LEVEL
_SIGGR
209
JCT R119 & C34(−)
_SIGGR
126
C16 (−)
_SIGGR
233
SIG GROUND SEE NOTE 6
(PS) A2
_SIGGR
243
JCT R14 & (K) CR17
_MJMPJ
107
_MJMPJ
127
SEE NOTE 6
C16 (+)
_MJMPH
131
JCT 116 & R121
_MJMPH
102
C46
6.8
C47
2200 UUF
_MTPB
210
_MJMPI
128
_MJMPI
132
SEE NOTE 6
_CHASS
270
(STRUCTURE GROUND)
_CSRFH
109
_CSRFL
110
COS (θ − Y) /90°

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 307	RESISTOR	25 K	±.01 %	1/10 W
R2	- 307				
R3	- 307				
R4	-307				
R5	- 333		25.708K		
R6	1006750-36		1500	± 2 %	1/4 W
R7	- 36				
R8	-36				
R9	-36				
R10	-36				
R11	-36				
R12	-36				
R13	-36				
R14	1010604 -46		510	± 1%	1 W
R15	1006750 -56		10 K	± 2%	1/4 W
R16	-56		10 K		
R17	-60		15 K		
R18	-60				
R19	-60				
R20	-60				
R21	-60				
R22	-60				
R23	-56		10 K		
R24	-44		3300		
R25	-44				
R26	-44				
R27	-44				
R28	-44				
R29	-44				
R30	-44				
R31	-44				
R32	1010377 -304		4000	±.01 %	1/10 W
R33	1010377 -305		8000	±.01 %	
R34	1010733 -6		8000	±.1 %	
R35	-6		8000		
R36	-7		16 K		
R37	-7		16 K		
R38	-7		16 K		
R39	-9		32 K		
R40	1010377 -303		2.6027 K	±.01 %	
R41	1010377 -302		1.9638 K	±.01 %	
R42	1010733 -18		866.9	±.1 %	
R43	-5		409.5		
R44	-4		399.3		
R45	-3		196.8		
R46	-2		97.70		
R47	-1		97.41		
R48	1010377 - 313		128.146K	±.01%	
R49	- 311		44.999 K		
R50	- 310		30.067 K		
R51	- 308		25.490 K		
R52	- 308		25.490 K		
R53	- 310		30.067K		
R54	- 311		44.999 K		
R55	- 313		128.146K		
R56	- 347		125.500K		
R57	- 347		125.500K		
R58	1010369 - 90		240 K	± 5 %	1/8 W
R59	1010369 -90		240 K	± 5 %	1/8 W
R60	1010377 - 312		100 K	±.01 %	1/10 W
R61	1010377 - 312			±.01 %	
R62	1010733 - 11			± .1 %	
R63	- 11				
R64	- 11				
R65	- 11				
R66	- 11				
R67	- 11				
R70	1010377 -307		25K	± .01%	1/10 W
R71					
R72					
R73					
R74	1006750 - 67		30K	± 2 %	1/4 W
R75	1010733 -119		200K	± 1 %	1/10 W
R76	1006750-80		100K	± 2 %	1/4 W
R77	- 73		51K		
R78	- 39		2000		
R79	- 63		20K		
R80	1010733-12		25K	± .1 %	1/10 W
R81	1010733 -12		25K	± .1 %	1/10 W
R82	1010604 -45		360	± 1 %	1 W
R83	1006750-73		51 K	± 2 %	1/4 W
R84	- 73		51 K		
R85	- 44		3300		
R86	1010604-39		2000	± 1 %	1 W
R87	1006750-32		1000	± 2 %	1/4 W
R88	- 76		68K		
R89	-49		5100		
R90	- 2		56		
R91	-49		5100		
R92	-49		5100		
R93	-56		10 K		
R94	-32		1000		
R95	- 60		15 K		
R96	- 32		1000		
R97	- 76		68K		
R98	-49		5100		
R99	-49		5100		
R100	- 2		56		
R101	- 56		10 K		
R102.	-49		5100		
R103	-32		1000		
R104	-32		1000		
R105	-32		1000		
R106	- 59		13 K		
R107	- 63		20K		
R108	- 65		24K		
R109	- 80		100 K		
R110	-56		10 K		
R111	- 32		1000		
R112	1010369 -105		1MEG	± 5 %	1/8 W
R113	1006750- 84		150 K	± 2 %	1/4 W
R114	1010369 - 92		300K	± 5 %	1/8 W
R115	1006750- 80		100 K	± 2 %	1/4 W
R116	- 56		10 K		
R117	- 8		100		
R118	-49		5100		
R119	- 43		3000		
R120	- 80		100K		
R121	1010369 - 112		2 MEG	± 5 %	1/8 W
R122	- 94		360 K		
R123	- 105		1 MEG		
R124	1006750 - 80		100K	± 2 %	1/4 W
R125	- 84		150 K		
R126	- 37		1600		

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R127	1006750 - 43	RESISTOR	3000	± 2 %	1/4 W
R128	-67		30K		
R129	- 60		15 K		
R130	- 49		5100		
R131	- 80		100 K		
R132	-49		5100		
R133	- 56		10 K		
R134	- 84		150 K		
R135	- 80		100 K		
R136	1010369 -105		1MEG	± 5 %	1/8 W
R137	1006750 - 43		3000	± 2 %	1/4 W
R138	1006750 - 43		3000	± 2 %	1/4 W
R139	1006750 - 63		20 K	± 2 %	1/4 W
C1	1006755 - 14	CAPACITOR	100	± 10 %	10 VDC
C2	- 85		22		35 VDC
C3	- 85		22		
C4	- 79		6.8		
C5	- 79				
C6	- 79				
C7	- 79				
C8	- 79				
C9	- 79				
C10	- 79				
C11	- 79				
C12	- 14		100		10 VDC
C13	- 85		22		35 VDC
C14	- 85		22		
C16	- 85		22		
C17	- 79		6.8		
C18	1006777 - 63		0.33		
C19	1008900 - 013		460 UUF	± 1 %	50 VDC
C20	1006755 - 73		2.2	± 10 %	35 VDC
C21	1010317 - 4		.130	± 1 %	30 VDC
C22	SEE NOTE 5		—	± 10 %	100 VDC
C23	1006755 - 81		10		35 VDC
C24	- 81		10		
C25	- 69		1.0		
C26	- 14		100		10 VDC
C27	- 79		6.8		35 VDC
C28	1006777 - 16		220 UUF		100 VDC
C29	1006777 - 39		0.015		100 VDC
C30	1006755 - 69		1.0		35 VDC
C31	- 33		15		20 VDC
C32	- 79		6.8		35 VDC
C33	- 73		2.2		35 VDC
C34	- 36		47		20 VDC
C35	- 36		47		20 VDC
C36	- 69		1.0		35 VDC
C37	- 73		2.2		35 VDC
C38	1006777 - 28		4700 UUF		100 VDC
C39	1006755 - 33		15		20 VDC
C40	- 79		6.8		35 VDC
C41	- 79		6.8		35 VDC
C42	- 10		4.7		10 VDC
C43	- 10		4.7		10 VDC
C44	- 73		2.2		35 VDC
C45	- 73		2.2		
C46	- 79		6.8		
C47	1006777 - 26		2200 UUF		100 VDC
C48	1006777 - 24		1000 UUF		100 VDC
C49	1006755 - 85		22		35 VDC
C50	1006755 - 79		6.8		35 VDC
C51	1010409 - 18	CAPACITOR	51 UUF	± 2 %	500 VDC
CR1	1010385	DIODE	1N660		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7	1010385				
CR8	1010385		1N660		
CR10	1010385		1N660		
CR11	1010385		1N660		
CR12	1008815 - 12		1N968B		
CR13	1008815 - 7		1N963B		
CR14	1010372 - 13				
CR15	1010385		1N660		
CR16	1010385		1N660		
CR17	1008815 - 9		1N965B		
Q1	1010343 - 3	TRANSISTOR			
Q2					
Q3					
Q4					
Q5					
Q6					
Q7					
Q8					
Q9					
Q10					
Q11					
Q12					
Q13					
Q14					
Q15					
Q16	1010343 - 3				
Q18	1010397 - 1		2N930		
Q19	- 1				
Q20	- 1				
Q21	1010342		2N998		
Q22	1010652 - 1		2N2980		
Q23	1010966 - 1		2N914		
Q24	1010966 - 1		2N914		
Q25	1010652 - 1		2N2980		
Q26	1010966 - 1		2N914		
Q27	1010966 - 1		2N914		
Q28	1010397 - 1		2N930		
Q29	1010397 - 1		2N930		
Q30	1010342		2N998		
Q31	1010367-001		3N68		
Q32	1010367-001		3N68		
Q33	1010342		2N998		
Q34					
Q35					
A1	2007144	AMPLIFIER	SEE NOTE 4		
A2	2007144	AMPLIFIER	SEE NOTE 4		
T1	1010365	TRANSFORMER			
T2	1010365				
T3	1010724				

CHART A C22	
PART NO.	VALUE
1006777-24	1000 UUF
-25	2000 UUF
-26	2200 UUF
-27	3300 UUF
-28	4700 UUF
-29	5000 UUF
-30	6800 UUF
-31	.010
1006777-40	5600 UUF
1006777-41	8200 UUF

REVISIONS

ZONE	LTR	DESCRIPTION		DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 53350	CHG. NO.	22 ... 67	

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN Wayne Kenthore 21 Mar 66
CHECKED
APPROVAL
CONTRACT NAS 9-0491
NASA APPROVAL
CCO
SEE APPROVAL

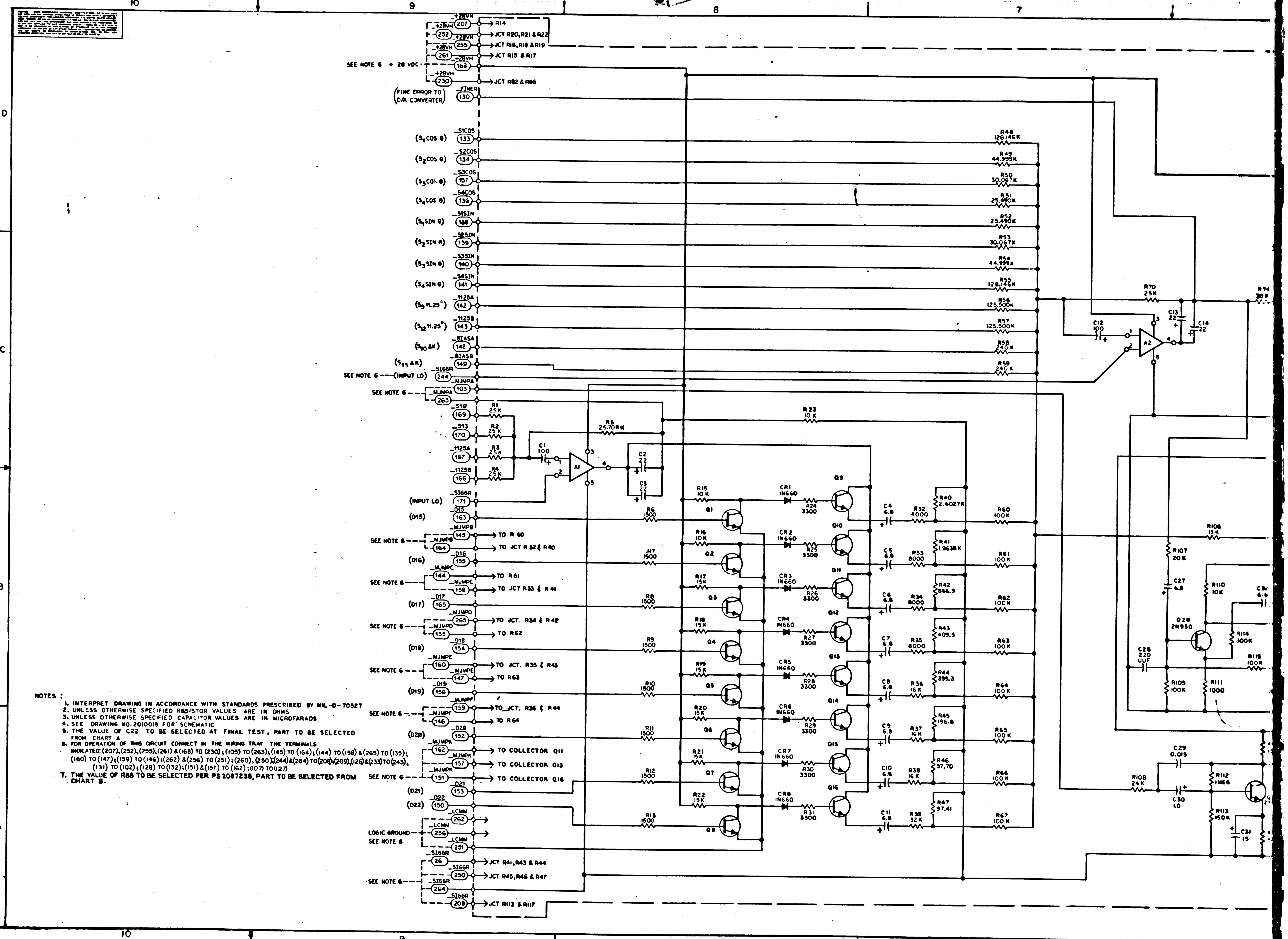
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM MAIN SUMMING AMPL AND QUADRATURE REJECTION

SIZE J | CODE IDENT NO. 80230 | 2010793
SCALE — | SHEET 1 OF

2010793

3/2010793

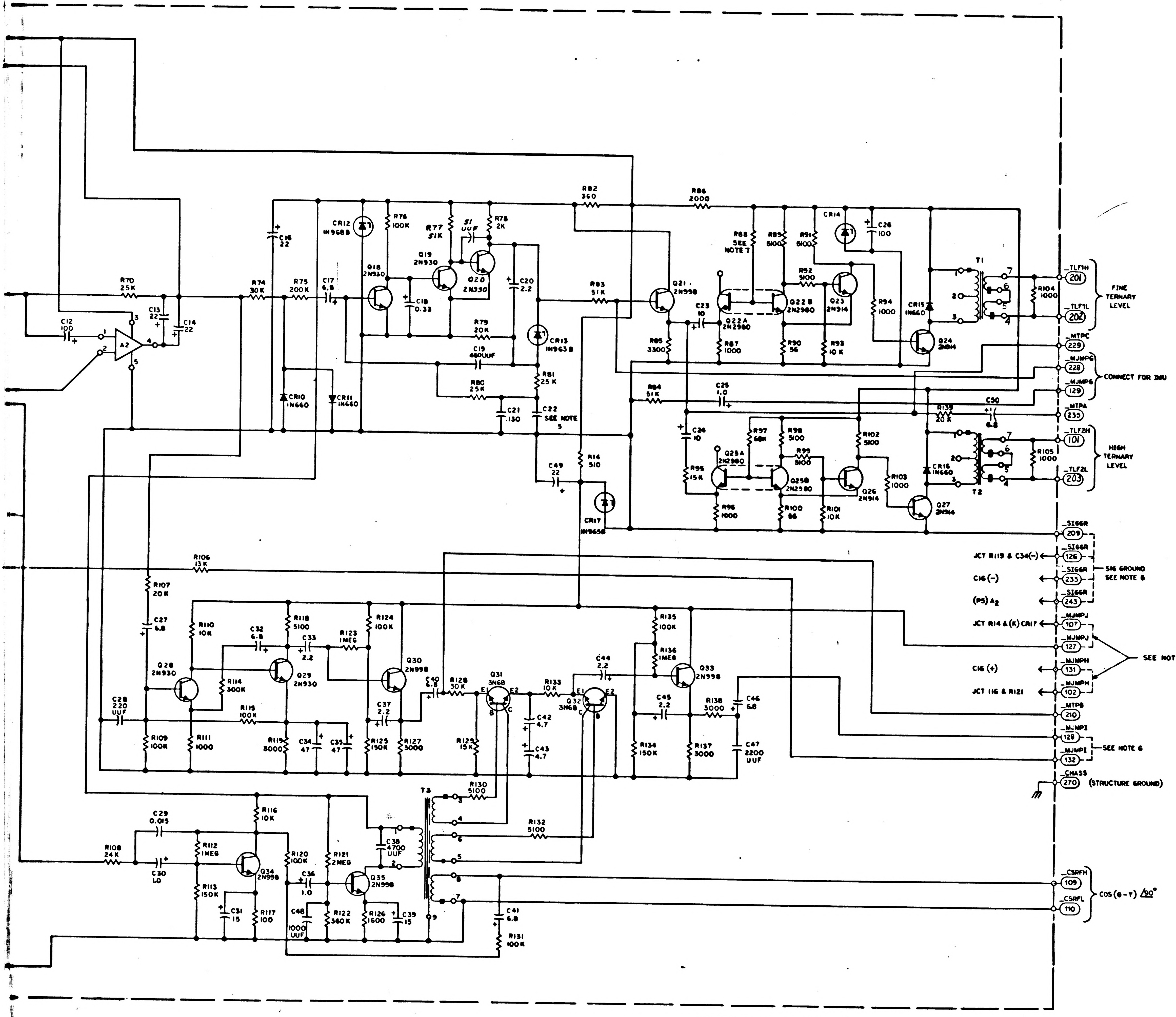


10
9
8
7
D
C
B
A
+28VH 207 → R14
+28VH 252 → JCT R20, R21 & R22
+28VH 255 → JCT R16, R18 & R19
+28VH 261 → JCT R15 & R17
SEE NOTE 6 + 28 VDC +28VH 168
+28VH 230 → JCT R82 & R86
(FINE ERROR TO D/A CONVERTER) FINER 130
(S_1 COS θ) S1COS 133
(S_2 COS θ) S2COS 134
(S_3 COS θ) S3COS 137
(S_4 COS θ) S4COS 136
(S_1 SIN θ) S1SIN 138
(S_2 SIN θ) S2SIN 139
(S_3 SIN θ) S3SIN 140
(S_4 SIN θ) S4SIN 141
(S_9 11.25°) 1125A 142
(S_{12} 11.25°) 1125B 143
(S_{10} ΔK) BIASA 148
(S_{13} ΔK) BIASB 149
SEE NOTE 6 (INPUT LO) SIG6R 244
SEE NOTE 6 MJMPA 103, 263
S10 169
S13 170
1125A 167
1125B 166
(INPUT LO) SIG6R 171
(D15) D15 163
SEE NOTE 6 MJMPB 145 → TO R 60
MJMPB 164 → TO JCT R32 & R40
(D16) D16 155
SEE NOTE 6 MJMPC 144 → TO R61
MJMPC 158 → TO JCT R33 & R41
(D17) D17 165
SEE NOTE 6 MJMPD 265 → TO JCT. R34 & R42
MJMPD 135 → TO R62
(D18) D18 154
SEE NOTE 6 MJMPE 160 → TO JCT. R35 & R43
MJMPE 147 → TO R63
(D19) D19 156
SEE NOTE 6 MJMPF 159 → TO JCT. R36 & R44
MJMPF 146 → TO R64
(D20) D20 152
MJMPK 162 → TO COLLECTOR Q11
MJMPK 157 → TO COLLECTOR Q13
SEE NOTE 6 MJMPK 151 → TO COLLECTOR Q16
(D21) D21 153
(D22) D22 150
LOGIC GROUND SEE NOTE 6 LCMM 262, 256, 251
SIG6R 26 → JCT R41, R43 & R44
SIG6R 250 → JCT R45, R46 & R47
SEE NOTE 6 SIG6R 264
SIG6R 208 → JCT R113 & R117
R1 25K
R2 25K
R3 25K
R4 25K
R5 25,708K
C1 100
A1
C2 22
C3 22
R23 10K
R48 128.146K
R49 44.999K
R50 30.067K
R51 25.490K
R52 25.490K
R53 30.067K
R54 44.999K
R55 128.146K
R56 125.500K
R57 125.500K
R58 240K
R59 240K
R70 25K
C12 100
C13 22
C14 22
A2
R94 30K
R6 1500
R7 1500
R8 1500
R9 1500
R10 1500
R11 1500
R12 1500
R13 1500
R15 10K
R16 10K
R17 15K
R18 15K
R19 15K
R20 15K
R21 15K
R22 15K
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
CR1 1N660
CR2 1N660
CR3 1N660
CR4 1N660
CR5 1N660
CR6 1N660
CR7 1N660
CR8 1N660
R24 3300
R25 3300
R26 3300
R27 3300
R28 3300
R29 3300
R30 3300
R31 3300
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
C4 6.8
C5 6.8
C6 6.8
C7 6.8
C8 6.8
C9 6.8
C10 6.8
C11 6.8
R32 4000
R33 8000
R34 8000
R35 8000
R36 16K
R37 16K
R38 16K
R39 32K
R40 2.6027K
R41 1.9638K
R42 866.9
R43 409.5
R44 399.3
R45 196.8
R46 97.70
R47 97.41
R60 100K
R61 100K
R62 100K
R63 100K
R64 100K
R65 100K
R66 100K
R67 100K
R106 13K
R107 20K
C27 6.8
R110 10K
Q28 2N930
R114 300K
C28 220 UUF
R115 100K
R109 100K
R111 1000
C29 0.015
R108 24K
C30 1.0
R112 1MEG
R113 150K
C31 15

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS
4. SEE DRAWING NO. 2010019 FOR SCHEMATIC
5. THE VALUE OF C22 TO BE SELECTED AT FINAL TEST, PART TO BE SELECTED FROM CHART A
6. FOR OPERATION OF THIS CIRCUIT CONNECT IN THE WIRING TRAY THE TERMINALS INDICATED: (207), (252), (255), (261) & (168) TO (230); (103) TO (263); (145) TO (164); (144) TO (158) & (265) TO (135); (160) TO (147); (159) TO (146); (262) & (256) TO (251); (260), (250), (244) & (264) TO (208); (209), (126) & (233) TO (243), (131) TO (102); (128) TO (132); (151) & (157) TO (162); (107) TO (127)
7. THE VALUE OF R88 TO BE SELECTED PER PS 2087238, PART TO BE SELECTED FROM CHART B.

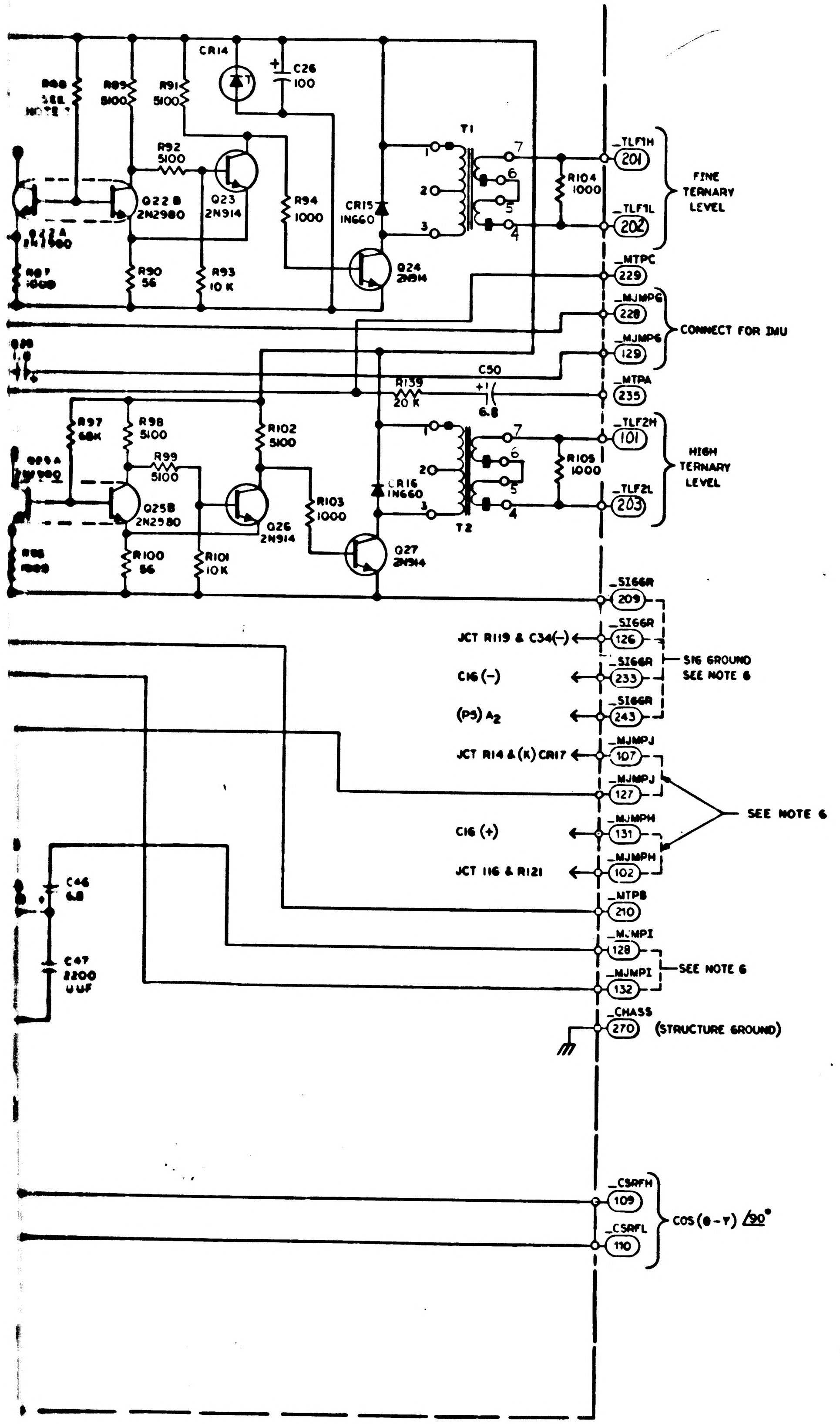
1/2010793



A2
C12 100
R70 25K
C13 22
C14 22
R74 30K
R75 200K
C16 22
C17 6.8
CR10 IN660
CR11 IN660
CR12 IN968B
R76 100K
Q18 2N930
C18 0.33
R77 51K
51 UUF
Q19 2N930
Q20 2N930
R78 2K
C20 2.2
R79 20K
C19 460UUF
CR13 IN963B
R80 25K
R81 25K
C21 .130
C22 SEE NOTE 5
R82 360
R83 51K
R86 2000
Q21 2N998
R85 3300
C23 10
Q22A 2N2980
Q22B 2N2980
R87 1000
R88 SEE NOTE 7
R89 5100
R90 56
R91 5100
R92 5100
R93 10 K
Q23 2N914
CR14
C26 100
R94 1000
CR15 IN660
Q24 2N914
T1
R104 1000
_TLF1H 201
_TLF1L 202
FINE TERNARY LEVEL
_MTPC 229
_MJMPG 228
_MJMPG 129
CONNECT FOR IMU
R139 20 K
C50 6.8
_MTPA 235
R84 51K
C25 1.0
C24 10
R95 15K
Q25A 2N2980
Q25B 2N2980
R96 1000
R97 68K
R98 5100
R99 5100
R100 56
R101 10K
R102 5100
Q26 2N914
R103 1000
Q27 2N914
CR16 IN660
T2
R105 1000
_TLF2H 101
_TLF2L 203
HIGH TERNARY LEVEL
R14 510
C49 22
CR17 IN965B
_SIGGR 209
JCT R119 & C34(-)
_SIGGR 126
C16 (-)
_SIGGR 233
SIG GROUND SEE NOTE 6
(PS) A2
_SIGGR 243
JCT R14 & (K) CR17
_MJMPJ 107
_MJMPJ 127
SEE NOTE 6
C16 (+)
_MJMPH 131
JCT 116 & R121
_MJMPH 102
_MTPB 210
_MJMPI 128
_MJMPI 132
SEE NOTE 6
_CHASS 270
(STRUCTURE GROUND)
R106 13K
R107 20K
C27 6.8
R110 10K
Q28 2N930
C32 6.8
R118 5100
C33 2.2
R123 1MEG
R124 100K
Q29 2N930
R114 300K
R115 100K
Q30 2N998
C28 220 UUF
R109 100K
R111 1000
R119 3000
C34 47
C35 47
C37 2.2
R125 150K
R127 3000
C40 6.8
R128 30K
Q31 3N68
R129 15K
R133 10K
C42 4.7
C43 4.7
Q32 3N68
C44 2.2
R135 100K
R136 1MEG
Q33 2N998
C45 2.2
R138 3000
C46 6.8
R134 150K
R137 3000
C47 2200 UUF
T3
R130 5100
R132 5100
C29 0.015
R116 10K
R108 24K
C30 1.0
R112 1MEG
R113 150K
Q34 2N998
C31 15
R117 100
R120 100K
R121 2MEG
C36 1.0
Q35 2N998
C38 4700 UUF
C48 1000 UUF
R122 360K
R126 1600
C39 15
C41 6.8
R131 100K
_CSRFH 109
_CSRFL 110
COS (θ - Y) /90°

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 307	RESISTOR	25 K	±.01 %	1/10 W
R2	- 307				
R3	- 307				
R4	-307				
R5	- 333		25.708K		
R6	1006750-36		1500	± 2 %	1/4 W
R7	-36				
R8	-36				
R9	-36				
R10	-36				
R11	-36				
R12	-36				
R13	-36				
R14	1010604 -46		510	± 1 %	1 W
R15	1006750 -56		10 K	± 2%	1/4 W
R16	-56		10 K		
R17	-60		15 K		
R18	-60				
R19	-60				
R20	-60				
R21	-60				
R22	-60				
R23	-56		10 K		
R24	-44		3300		
R25	-44				
R26	-44				
R27	-44				
R28	-44				
R29	-44				
R30	-44				
R31	-44				
R32	1010377 -304		4000	±.01 %	1/10 W
R33	1010377 -305		8000	±.01 %	
R34	1010733 -6		8000	±.1 %	
R35	-6		8000		
R36	-7		16 K		
R37	-7		16 K		
R38	-7		16 K		
R39	-9		32 K		
R40	1010377 -303		2.6027 K	±.01 %	
R41	1010377 -302		1.9638 K	±.01 %	
R42	1010733 -18		866.9	±.1%	
R43	-5		409.5		
R44	-4		399.3		
R45	-3		196.8		
R46	-2		97.70		
R47	-1		97.41		
R48	1010377 -313		128.146K	±.01%	
R49	-311		44.999 K		
R50	-310		30.067 K		
R51	-308		25.490 K		
R52	-308		25.490 K		
R53	-310		30.067K		
R54	-311		44.999 K		
R55	-313		128.146K		
R56	-347		125.500K		
R57	-347		125.500K		
R58	1010369 -90		240 K	± 5 %	1/8 W
R59	1010369 -90		240 K	± 5 %	1/8 W
R60	1010377 -312		100 K	±.01 %	1/10 W
R61	1010377 -312			±.01 %	
R62	1010733 -11			±.1%	
R63	-11				
R64	-11				
R65	-11				
R66	-11				
R67	-11				
R70	1010377 -307		25K	±.01%	1/10 W
R71					
R72					
R73					
R74	1006750 - 67		30K	± 2 %	1/4 W
R75	1010733 -119		200K	± 1 %	1/10 W
R76	1006750-80		100K	± 2 %	1/4 W
R77	-73		51K		
R78	-39		2000		
R79	-63		20K		
R80	1010733-12		25K	±.1 %	1/10 W
R81	1010733 -12		25K	±.1 %	1/10 W
R82	1010604 -45		360	± 1 %	1 W
R83	1006750-73		51 K	± 2 %	1/4 W
R84	-73		51K		
R85	-44		3300		
R86	1010604-39		2000	± 1 %	1 W
R87	1006750-32		1000	± 2 %	1/4 W
R88	SEE NOTE 7		—		
R89	1006750-49		5100		
R90	-2		56		
R91	-49		5100		
R92	-49		5100		
R93	-56		10 K		
R94	-32		1000		
R95	-60		15 K		
R96	-32		1000		
R97	-76		68K		
R98	-49		5100		
R99	-49		5100		
R100	-2		56		
R101	-56		10 K		
R102	-49		5100		
R103	-32		1000		
R104	-32		1000		
R105	-32		1000		
R106	-59		13 K		
R107	-63		20K		
R108	-65		24K		
R109	-80		100 K		
R110	-56		10 K		
R111	-32		1000		
R112	1010369 -105		1MEG	± 5 %	1/8 W
R113	1006750- 84		150 K	± 2 %	1/4 W
R114	1010369 -92		300K	± 5 %	1/8 W
R115	1006750- 80		100 K	± 2 %	1/4 W
R116	-56		10 K		
R117	-8		100		
R118	-49		5100		
R119	-43		3000		
R120	-80		100K		
R121	1010369 -112		2 MEG	± 5 %	1/8 W
R122	-94		360K		
R123	-105		1 MEG		
R124	1006750 -80		100K	± 2 %	1/4 W
R125	-84		150 K		
R126	-37		1600		

REF DES	PART NO.	DESCRIPT
R127	1006750 - 43	RESIS
R128	-67	
R129	-60	
R130	-49	
R131	-80	
R132	-49	
R133	-56	
R134	-84	
R135	-80	
R136	1010369 -105	
R137	1006750 -43	
R138	1006750 -43	
R139	1006750 -63	
C1	1006755 - 14	CAPACITO
C2	-85	
C3	-85	
C4	-79	
C5	-79	
C6	-79	
C7	-79	
C8	-79	
C9	-79	
C10	-79	
C11	-79	
C12	-14	
C13	-85	
C14	-85	
C16	-85	
C17	-79	
C18	1006777-63	
C19	1008900-013	
C20	1006755 - 73	
C21	1010317 - 4	
C22	SEE NOTE 5	
C23	1006755-81	
C24	-81	
C25	-69	
C26	-14	
C27	-79	
C28	1006777 -16	
C29	1006777 -39	
C30	1006755-69	
C31	-33	
C32	-79	
C33	-73	
C34	-36	
C35	-36	
C36	-69	
C37	-73	
C38	1006777-28	
C39	1006755-33	
C40	-79	
C41	-79	
C42	-10	
C43	-10	
C44	-73	
C45	-73	
C46	-79	
C47	1006777 -26	
C48	1006777 -24	
C49	1006755 -85	
C50	1006755 -79	
C51	1010409-18	CAPACIT
CR1	1010385	DIODE
CR2		
CR3		
CR4		
CR5		
CR6		
CR7	1010385	
CR8	1010385	
CR10	1010385	
CR11	1010385	
CR12	1008815 -12	
CR13	1008815 - 7	
CR14	1010372 -13	
CR15	1010385	
CR16	1010385	
CR17	1008815-9	
Q1	1010343-3	RANSIST
Q2		
Q3		
Q4		
Q5		
Q6		
Q7		
Q8		
Q9		
Q10		
Q11		
Q12		
Q13		
Q14		
Q15		
Q16	1010343 - 3	
Q18	1010397 - 1	
Q19	- 1	
Q20	- 1	
Q21	1010342	
Q22	1010652 - 1	
Q23	1010966 -1	
Q24	1010966 - 1	
Q25	1010652 -1	
Q26	1010966 -1	
Q27	1010966 -1	
Q28	1010397 -1	
Q29	1010397 -1	
Q30	1010342	
Q31	1010367-001	
Q32	1010367-001	
Q33	1010342	
Q34		
Q35		
A1	2007144	AMPLIFIER
A2	2007144	AMPLIFIER
T1	1010365	TRANSFORM
T2	1010365	
T3	1010724	


CR14
C26
100
R88
SEE NOTE 7
R89
5100
R91
5100
R92
5100
Q22 B
2N2980
Q22 A
2N2980
Q23
2N914
R94
1000
CR15
IN660
R97
1000
R90
56
R93
10 K
Q24
2N914
T1
R104
1000
_TLF1H
201
_TLF1L
202
FINE TERNARY LEVEL
_MTPC
229
_MJMPG
228
_MJMPG
129
CONNECT FOR IMU
R139
20 K
C50
6.8
_MTPA
235
R97
68K
R98
5100
R99
5100
R102
5100
R103
1000
Q25A
2N2980
Q25B
2N2980
Q26
2N914
CR16
IN660
T2
Q27
2N914
R100
56
R101
10K
R105
1000
_TLF2H
101
_TLF2L
203
HIGH TERNARY LEVEL
_SIGGR
209
JCT R119 & C34(−)
_SIGGR
126
C16 (−)
_SIGGR
233
SIG GROUND
SEE NOTE 6
(PS) A2
_SIGGR
243
JCT R14 & (K) CR17
_MJMPJ
107
_MJMPJ
127
SEE NOTE 6
C16 (+)
_MJMPH
131
JCT 116 & R121
_MJMPH
102
_MTPB
210
C46
6.8
C47
2200 UUF
_MJMPI
128
SEE NOTE 6
_MJMPI
132
_CHASS
270
(STRUCTURE GROUND)
_CSRFH
109
COS (θ − γ) /90°
_CSRFL
110

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R1	1010377 - 307	RESISTOR	25 K	±.01 %	1/10 W
R2	- 307	↓	↓	↓	↓
R3	- 307	↓	↓	↓	↓
R4	- 307	↓	↓	↓	↓
R5	- 333	↓	25.708K	↓	↓
R6	1006750-36	↓	1500	± 2 %	1/4 W
R7	-36	↓	↓	↓	↓
R8	-36	↓	↓	↓	↓
R9	-36	↓	↓	↓	↓
R10	-36	↓	↓	↓	↓
R11	-36	↓	↓	↓	↓
R12	-36	↓	↓	↓	↓
R13	-36	↓	↓	↓	↓
R14	1010604 -46	↓	510	± 1 %	1 W
R15	1006750 -56	↓	10 K	± 2%	1/4 W
R16	-56	↓	10 K	↓	↓
R17	-60	↓	15 K	↓	↓
R18	-60	↓	↓	↓	↓
R19	-60	↓	↓	↓	↓
R20	-60	↓	↓	↓	↓
R21	-60	↓	↓	↓	↓
R22	-60	↓	↓	↓	↓
R23	-56	↓	10 K	↓	↓
R24	-44	↓	3300	↓	↓
R25	-44	↓	↓	↓	↓
R26	-44	↓	↓	↓	↓
R27	-44	↓	↓	↓	↓
R28	-44	↓	↓	↓	↓
R29	-44	↓	↓	↓	↓
R30	-44	↓	↓	↓	↓
R31	-44	↓	↓	↓	↓
R32	1010377 - 304	↓	4000	±.01 %	1/10 W
R33	1010377 - 305	↓	8000	±.01 %	↓
R34	1010733 - 6	↓	8000	±.1 %	↓
R35	-6	↓	8000	↓	↓
R36	-7	↓	16 K	↓	↓
R37	-7	↓	16 K	↓	↓
R38	-7	↓	16 K	↓	↓
R39	-9	↓	32 K	↓	↓
R40	1010377 - 303	↓	2.6027 K	±.01 %	↓
R41	1010377 - 302	↓	1.9638 K	±.01 %	↓
R42	1010733 - 18	↓	866.9	±.1 %	↓
R43	-5	↓	409.5	↓	↓
R44	-4	↓	399.3	↓	↓
R45	-3	↓	196.8	↓	↓
R46	-2	↓	97.70	↓	↓
R47	-1	↓	97.41	↓	↓
R48	1010377 - 313	↓	128.146 K	±.01 %	↓
R49	- 311	↓	44.999 K	↓	↓
R50	- 310	↓	30.067 K	↓	↓
R51	- 308	↓	25.490 K	↓	↓
R52	- 308	↓	25.490 K	↓	↓
R53	- 310	↓	30.067 K	↓	↓
R54	- 311	↓	44.999 K	↓	↓
R55	- 313	↓	128.146 K	↓	↓
R56	- 347	↓	125.500K	↓	↓
R57	- 347	↓	125.500K	↓	↓
R58	1010369 - 90	↓	240 K	± 5 %	1/8 W
R59	1010369 - 90	↓	240 K	± 5 %	1/8 W
R60	1010377 - 312	↓	100 K	±.01 %	1/10 W
R61	1010377 - 312	↓	↓	±.01 %	↓
R62	1010733 - 11	↓	↓	±.1 %	↓
R63	- 11	↓	↓	↓	↓
R64	- 11	↓	↓	↓	↓
R65	- 11	↓	↓	↓	↓
R66	- 11	↓	↓	↓	↓
R67	- 11	↓	↓	↓	↓
		↓			
		↓			
R70	1010377 - 307	↓	25K	±.01%	1/10 W
R71		↓			
R72		↓			
R73		↓			
R74	1006750 - 67	↓	30K	± 2 %	1/4 W
R75	1010733 - 119	↓	200K	± 1 %	1/10 W
R76	1006750 - 80	↓	100K	± 2 %	1/4 W
R77	- 73	↓	51K	↓	↓
R78	- 39	↓	2000	↓	↓
R79	- 63	↓	20K	↓	↓
R80	1010733 - 12	↓	25 K	± .1 %	1/10 W
R81	1010733 - 12	↓	25 K	± .1 %	1/10 W
R82	1010604 - 45	↓	360	± 1 %	1 W
R83	1006750 - 73	↓	51 K	± 2 %	1/4 W
R84	- 73	↓	51 K	↓	↓
R85	- 44	↓	3300	↓	↓
R86	1010604 - 39	↓	2000	± 1 %	1 W
R87	1006750 - 32	↓	1000	± 2 %	1/4 W
R88	SEE NOTE 7	↓	—	↓	↓
R89	1006750 - 49	↓	5100	↓	↓
R90	- 2	↓	56	↓	↓
R91	- 49	↓	5100	↓	↓
R92	- 49	↓	5100	↓	↓
R93	- 56	↓	10 K	↓	↓
R94	- 32	↓	1000	↓	↓
R95	- 60	↓	15 K	↓	↓
R96	- 32	↓	1000	↓	↓
R97	- 76	↓	68K	↓	↓
R98	- 49	↓	5100	↓	↓
R99	- 49	↓	5100	↓	↓
R100	- 2	↓	56	↓	↓
R101	- 56	↓	10 K	↓	↓
R102	- 49	↓	5100	↓	↓
R103	- 32	↓	1000	↓	↓
R104	- 32	↓	1000	↓	↓
R105	- 32	↓	1000	↓	↓
R106	- 59	↓	13 K	↓	↓
R107	- 63	↓	20K	↓	↓
R108	- 65	↓	24K	↓	↓
R109	- 80	↓	100K	↓	↓
R110	- 56	↓	10K	↓	↓
R111	- 32	↓	1000	↓	↓
R112	1010369 - 105	↓	1MEG	± 5 %	1/8 W
R113	1006750 - 84	↓	150 K	± 2 %	1/4 W
R114	1010369 - 92	↓	300K	± 5 %	1/8 W
R115	1006750 - 80	↓	100K	± 2 %	1/4 W
R116	- 56	↓	10 K	↓	↓
R117	- 8	↓	100	↓	↓
R118	- 49	↓	5100	↓	↓
R119	- 43	↓	3000	↓	↓
R120	- 80	↓	100K	↓	↓
R121	1010369 - 112	↓	2 MEG	± 5 %	1/8 W
R122	- 94	↓	360K	↓	↓
R123	- 105	↓	1 MEG	↓	↓
R124	1006750 - 80	↓	100K	± 2 %	1/4 W
R125	- 84	↓	150 K	↓	↓
R126	- 37	↓	1600	↓	↓

REF DES	PART NO.	DESCRIPTION	VALUE	TOL	RATING
R127	1006750 - 43	RESISTOR	3000	± 2 %	1/4 W
R128	- 67	↓	30 K	↓	↓
R129	- 60	↓	15 K	↓	↓
R130	- 49	↓	5100	↓	↓
R131	- 80	↓	100 K	↓	↓
R132	- 49	↓	5100	↓	↓
R133	- 56	↓	10 K	↓	↓
R134	- 84	↓	150 K	↓	↓
R135	- 80	↓	100 K	↓	↓
R136	1010369 - 105	↓	1MEG	± 5 %	1/8 W
R137	1006750 - 43	↓	3000	± 2 %	1/4 W
R138	1006750 - 43	↓	3000	± 2 %	1/4 W
R139	1006750 - 63	↓	20 K	± 2 %	1/4 W
C1	1006755 - 14	CAPACITOR	100	± 10 %	10 VDC
C2	- 85	↓	22	↓	35 VDC
C3	- 85	↓	22	↓	↓
C4	- 79	↓	6.8	↓	↓
C5	- 79	↓	↓	↓	↓
C6	- 79	↓	↓	↓	↓
C7	- 79	↓	↓	↓	↓
C8	- 79	↓	↓	↓	↓
C9	- 79	↓	↓	↓	↓
C10	- 79	↓	↓	↓	↓
C11	- 79	↓	↓	↓	↓
C12	- 14	↓	100	↓	10 VDC
C13	- 85	↓	22	↓	35 VDC
C14	- 85	↓	22	↓	↓
		↓		↓	↓
C16	- 85	↓	22	↓	↓
C17	- 79	↓	6.8	↓	↓
C18	1006777 - 63	↓	0.33	↓	↓
C19	1008900 - 013	↓	460 UUF	± 1 %	50 VDC
C20	1006755 - 73	↓	2.2	±10 %	35 VDC
C21	1010317 - 4	↓	.130	± 1 %	30 VDC
C22	SEE NOTE 5	↓	—	± 10 %	100 VDC
C23	1006755 - 81	↓	10	↓	35 VDC
C24	- 81	↓	10	↓	↓
C25	- 69	↓	1.0	↓	↓
C26	- 14	↓	100	↓	10 VDC
C27	- 79	↓	6.8	↓	35 VDC
C28	1006777 - 16	↓	220 UUF	↓	100 VDC
C29	1006777 - 39	↓	0.015	↓	100 VDC
C30	1006755 - 69	↓	1.0	↓	35 VDC
C31	- 33	↓	15	↓	20 VDC
C32	- 79	↓	6.8	↓	35 VDC
C33	- 73	↓	2.2	↓	35 VDC
C34	- 36	↓	47	↓	20 VDC
C35	- 36	↓	47	↓	20 VDC
C36	- 69	↓	1.0	↓	35 VDC
C37	- 73	↓	2.2	↓	35 VDC
C38	1006777 - 28	↓	4700 UUF	↓	100 VDC
C39	1006755 - 33	↓	15	↓	20 VDC
C40	- 79	↓	6.8	↓	35 VDC
C41	- 79	↓	6.8	↓	35 VDC
C42	- 10	↓	4.7	↓	10 VDC
C43	- 10	↓	4.7	↓	10 VDC
C44	- 73	↓	2.2	↓	35 VDC
C45	- 73	↓	2.2	↓	↓
C46	- 79	↓	6.8	↓	↓
C47	1006777 - 26	↓	2200 UUF	↓	100 VDC
C48	1006777 - 24	↓	1000 UUF	↓	100 VDC
C49	1006755 - 85	↓	22	↓	35 VDC
C50	1006755 - 79	↓	6.8	↓	35 VDC
C51	1010409 - 18	CAPACITOR	51 UUF	± 2 %	500 VDC
CR1	1010385	DIODE	IN660		
CR2	↓	↓	↓		
CR3	↓	↓	↓		
CR4	↓	↓	↓		
CR5	↓	↓	↓		
CR6	↓	↓	↓		
CR7	1010385	↓	↓		
CR8	1010385	↓	IN660		
CR10	1010385	↓	IN660		
CR11	1010385	↓	IN660		
CR12	1008815 - 12	↓	IN968B		
CR13	1008815 - 7	↓	IN963B		
CR14	1010372 - 13	↓			
CR15	1010385	↓	IN660		
CR16	1010385	↓	IN660		
CR17	1008815 - 9	↓	IN965B		
Q1	1010343 - 3	TRANSISTOR			
Q2	↓	↓			
Q3	↓	↓			
Q4	↓	↓			
Q5	↓	↓			
Q6	↓	↓			
Q7	↓	↓			
Q8	↓	↓			
Q9	↓	↓			
Q10	↓	↓			
Q11	↓	↓			
Q12	↓	↓			
Q13	↓	↓			
Q14	↓	↓			
Q15	↓	↓			
Q16	1010343 - 3	↓			
		↓			
Q18	1010397 - 1	↓	2N930		
Q19	- 1	↓	↓		—
Q20	- 1	↓	↓		
Q21	1010342	↓	2N998		
Q22	1010652 - 1	↓	2N2980		
Q23	1010966 - 1	↓	2N914		
Q24	1010966 - 1	↓	2N914		
Q25	1010652 - 1	↓	2N2980		
Q26	1010966 - 1	↓	2N914		
Q27	1010966 - 1	↓	2N914		
Q28	1010397 - 1	↓	2N930		
Q29	1010397 - 1	↓	2N930		
Q30	1010342	↓	2N998		
Q31	1010367-001	↓	3N68		
Q32	1010367-001	↓	3N68		
Q33	1010342	↓	2N998		
Q34	↓	↓	↓		
Q35	↓	↓	↓		
A1	2007144	AMPLIFIER	SEE NOTE 4		
A2	2007144	AMPLIFIER	SEE NOTE 4		
T1	1010365	TRANSFORMER			
T2	1010365	↓			
T3	1010724	↓			

CHART A C22	
PART NO.	VALUE
1006777-24	1000 UUF
-25	2000 UUF
-26	2200 UUF
-27	3300 UUF
-28	4700 UUF
-29	5000 UUF
-30	6800 UUF
-31	.010
1006777-40	5600 UUF
1006777-41	8200 UUF

CHART B R88	
PART NO.	VALUE
1006750-75	62K
-76	68K
-159	65K
1006750-160	71.5K

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE CLASS A PER TDRR 33350		22 MAR 67	6 JUN 67
	B	REVISED PER TDRR 34462		31 AUG 67	J J J

APPLICABLE DASH NO.	NEXT ASSY	USED ON
	APPLICATION	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ±
3 PLACE DECIMALS ±
ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN
CHECKED
APPROVAL
CONTRACT NAS9-0491
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

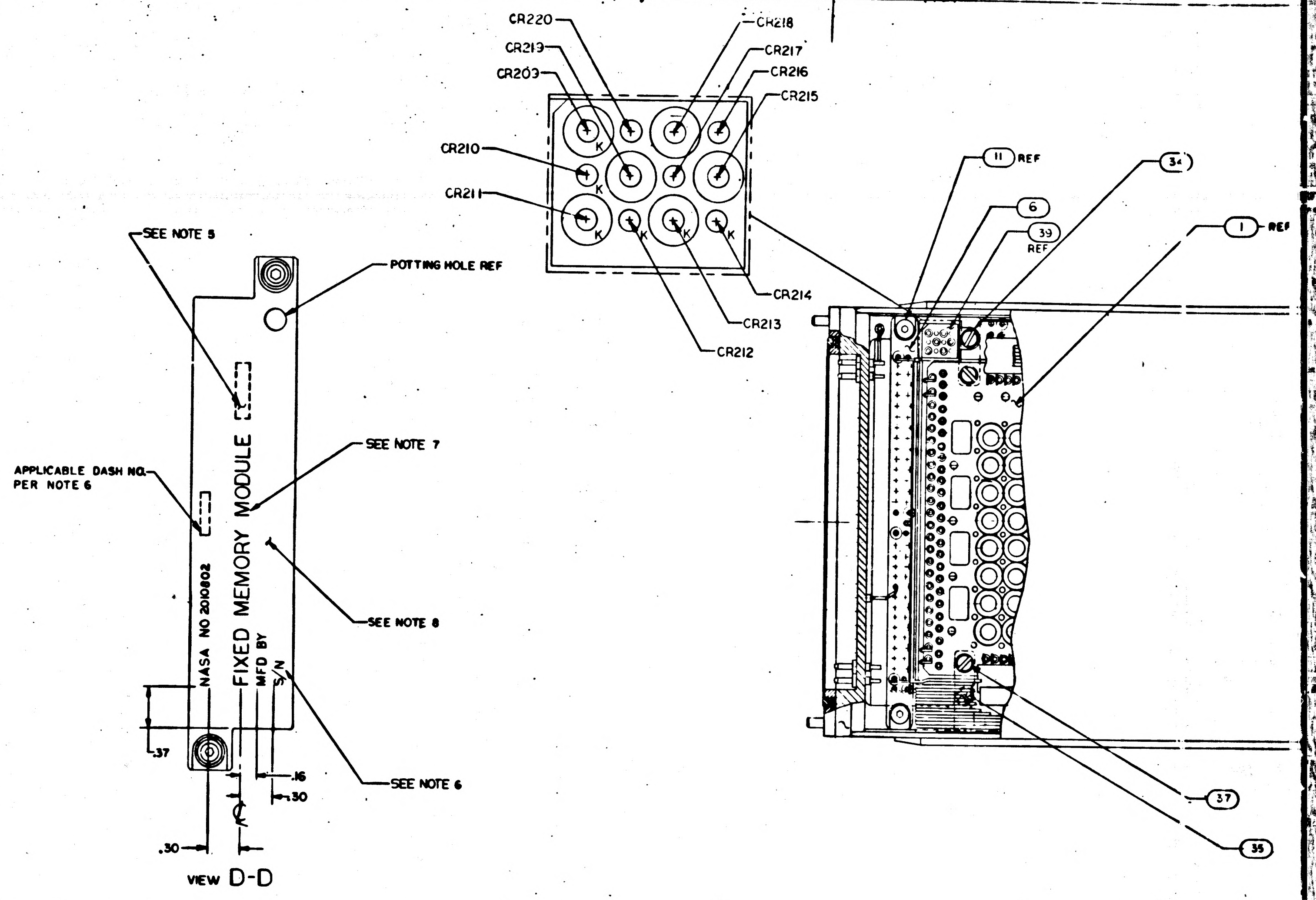
SCHEMATIC DIAGRAM
MAIN SUMMING AMPL AND
QUADRATURE REJECTION

SIZE J
CODE IDENT NO. 80230
2010793
SCALE —
SHEET 1 OF

2010793 B

3/2010793

PART NŌ.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-011	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
-021	B-2	-031	-021	0322		
-031	B-3	-041	-031	0323		
-041	B-4	-051	-041	0324		
-051	B-5	-061	-051	0325		
2010802-061	B-6	2010804-071	2010803-061	0325	2021113-071	PS2016036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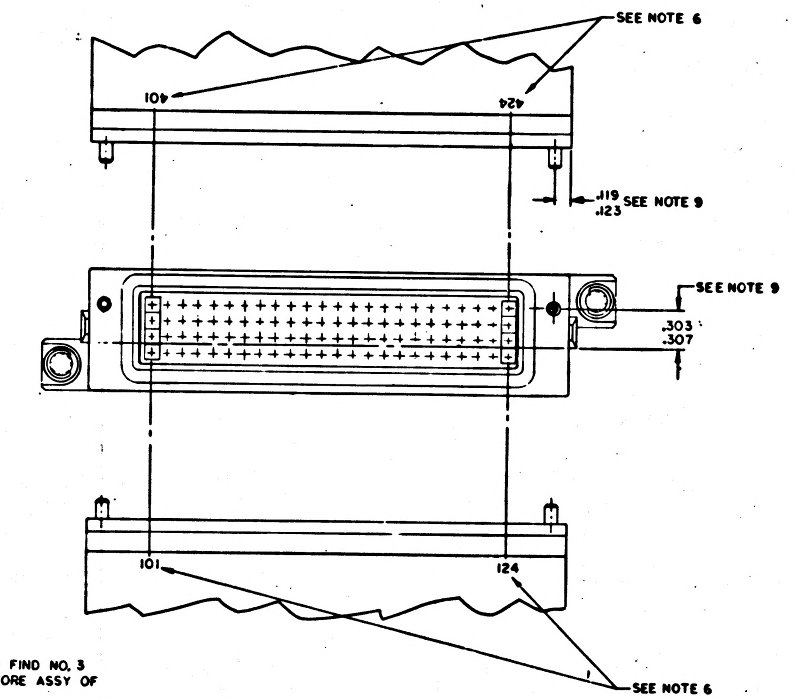
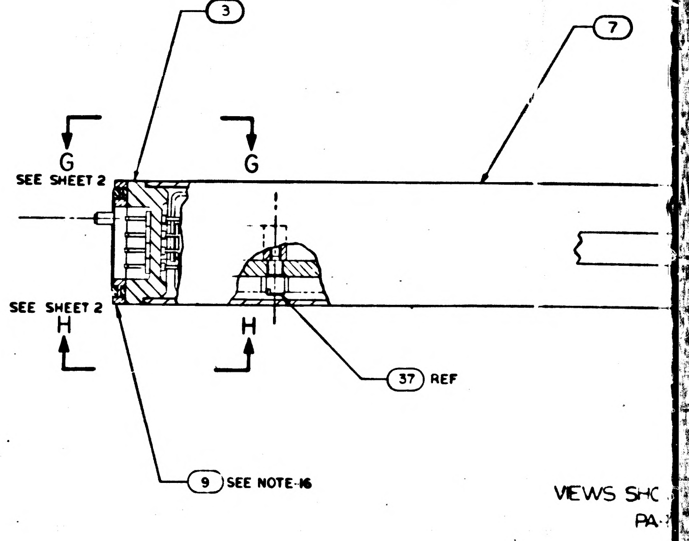
CR219
CR203
CR218
CR217
CR216
CR215
CR210
CR211
K
CR214
CR213
CR212
11 REF
34
6
39 REF
1 REF
37
35
SEE NOTE 5
POTTING HOLE REF
SEE NOTE 7
APPLICABLE DASH NO. PER NOTE 6
FIXED MEMORY MODULE
NASA NO 2010802
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
.30
.30
℄
VIEW D-D


SEE NOTE 6
101
124
.119
.123
SEE NOTE 9
SEE NOTE 9
.303
.307
101
124
SEE NOTE 6


3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
37 REF
9 SEE NOTE 16
VIEWS SHC
PA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9, TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE XI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO.4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

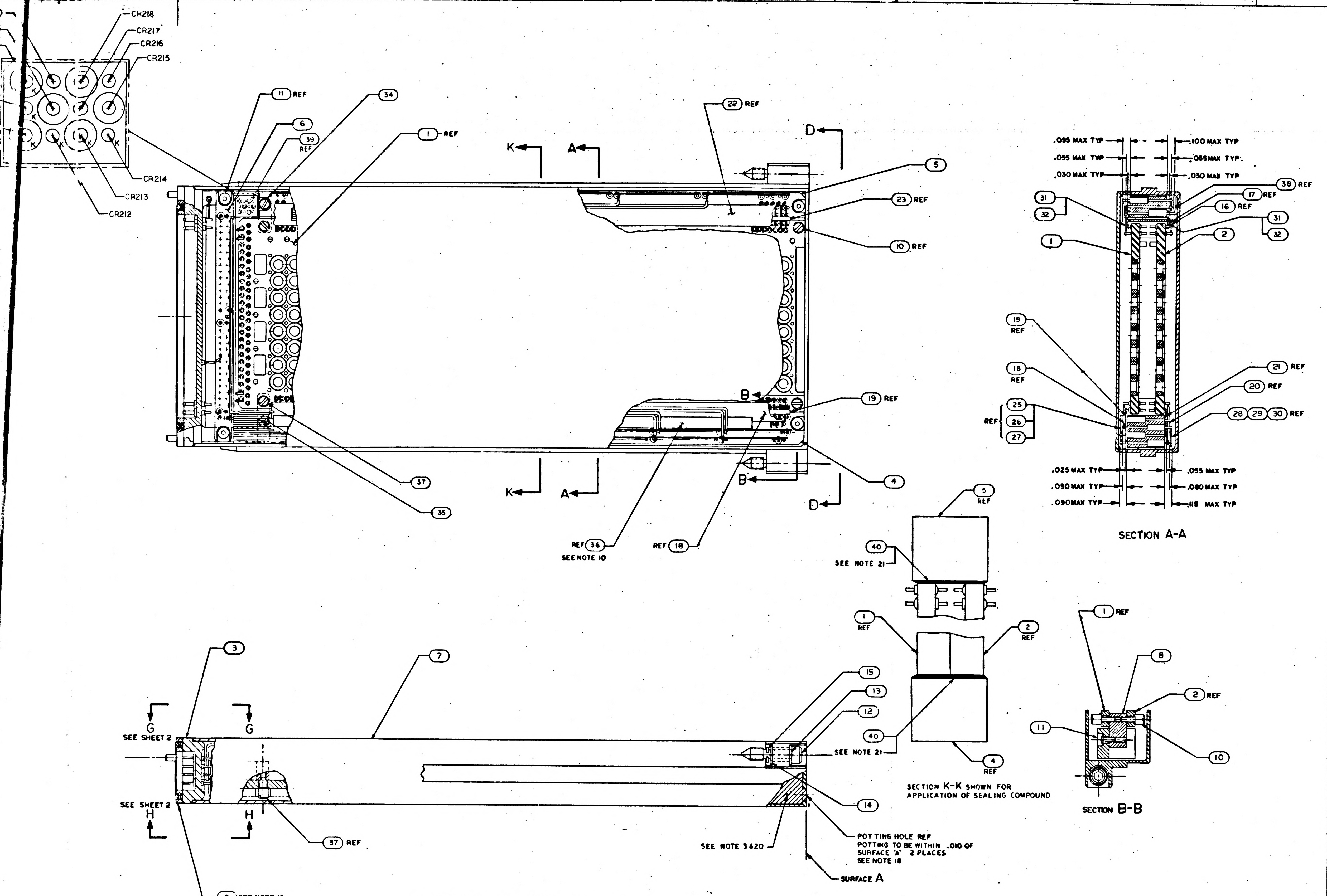
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802	A

← SH1/3 → 2010802 AF1/2

SH 1 OF 2
S01080S

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TCRR 3..9.. DR CHK		



CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
11 REF
34
6
39 REF
1 REF
22 REF
K
A
D
5
23 REF
10 REF
B
19 REF
4
37
35
K
A
B
D
REF 36
SEE NOTE 10
REF 18
SECTION A-A
.095 MAX TYP
.095 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
19 REF
18 REF
21 REF
20 REF
REF 25 26 27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
SEE SHEET 2
G
SEE SHEET 2
H
H
15
13
12
14
37 REF
9 SEE NOTE 16
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A

VIEWS SHOWN WITH POTTING COMPOUND
PARTIALLY REMOVED

S REQUIREMENTS FOR CONTROL
SPECTION OF ROPI MEMORY ASSEMBLIES
2285
MEMORY FIXTURE DWG NO. AP22500

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT, SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART
NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 67
CHECKED 10 APR 67
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 A

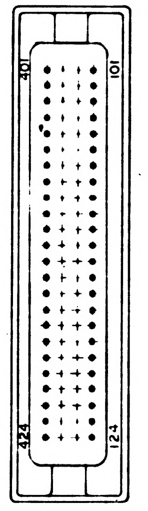
SH1/3 2010802 AF2/21

[illegible]

WIRE LIST			
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

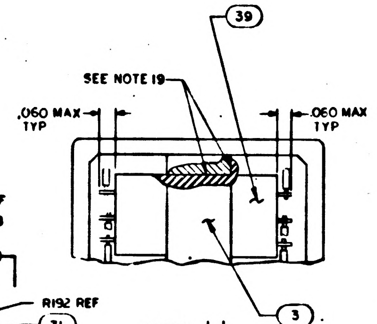
WIRE LIST	
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST	
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192



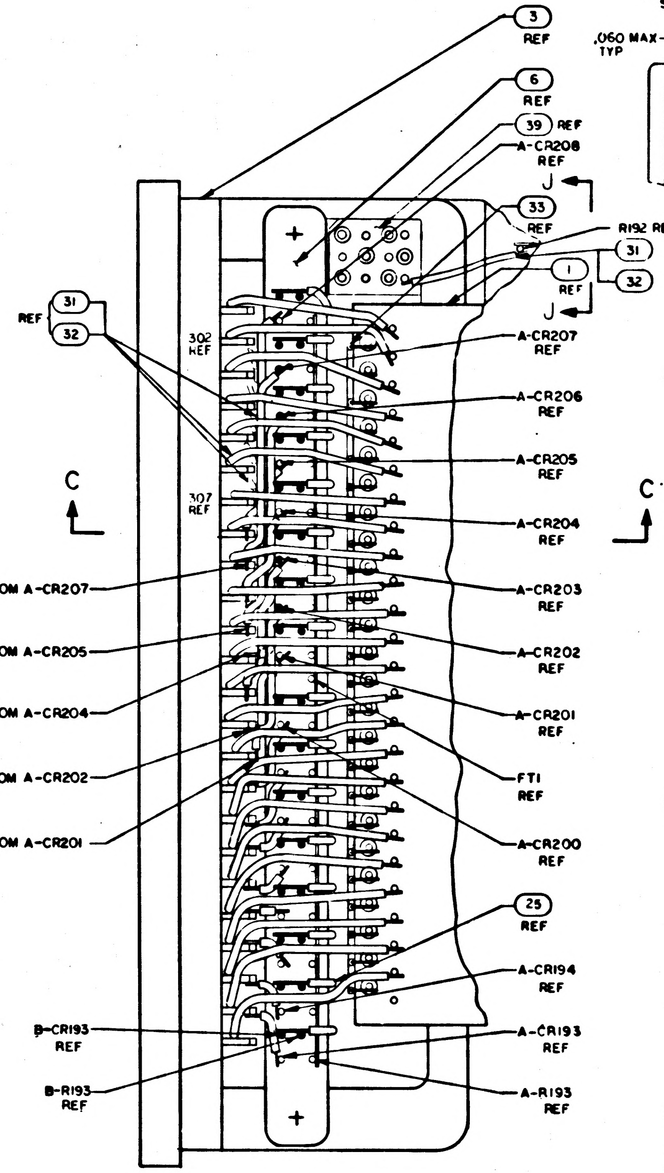
401
101
424
124

SECTION E-E



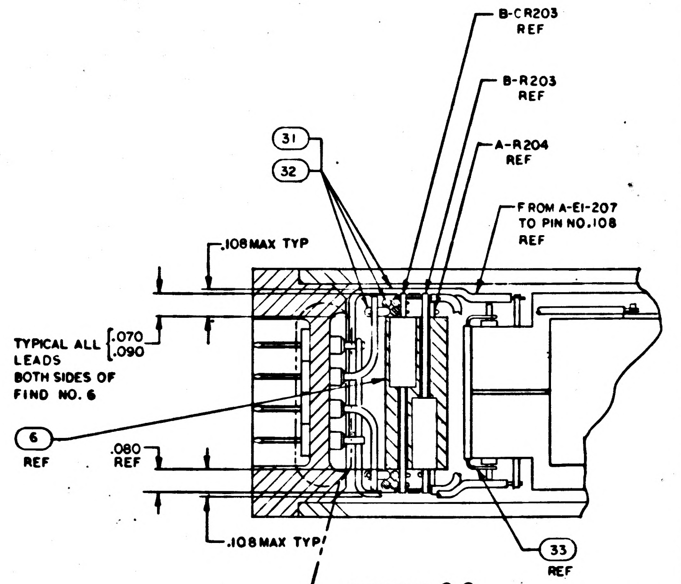
39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

VIEW J-J



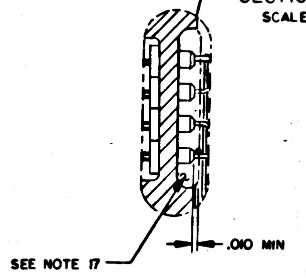
3 REF
6 REF
39 REF
A-CR208 REF
J
33 REF
R192 REF
31
32
1 REF
J
REF 31 32
302 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
C
C
307 REF
A-CR204 REF
FROM A-CR207
A-CR203 REF
FROM A-CR205
A-CR202 REF
FROM A-CR204
A-CR201 REF
FROM A-CR202
FT1 REF
FROM A-CR201
A-CR200 REF
25 REF
A-CR194 REF
B-CR193 REF
A-CR193 REF
B-R193 REF
A-R193 REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14

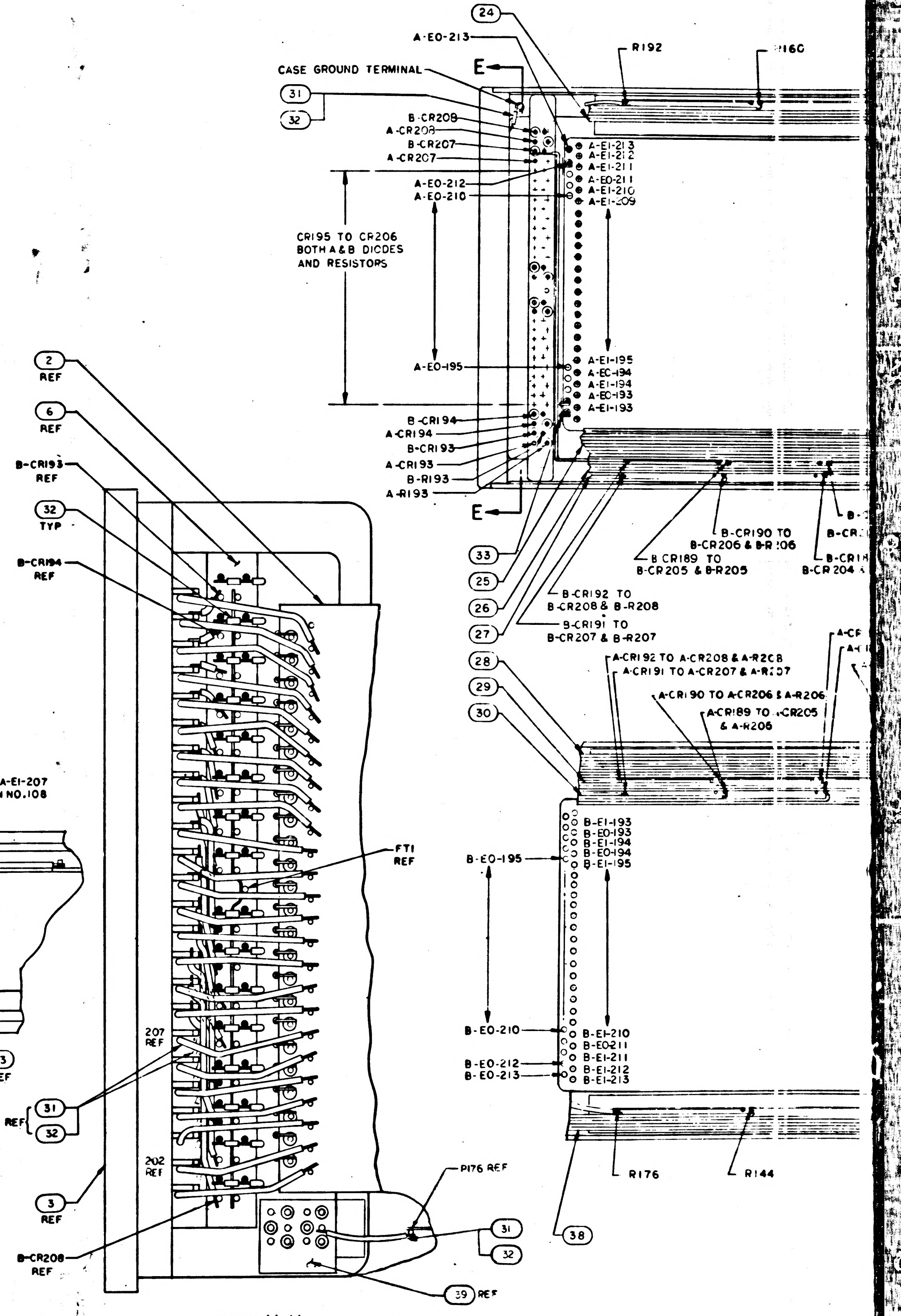


B-CR203 REF
B-R203 REF
31
32
A-R204 REF
FROM A-E1-207 TO PIN NO. 108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070 .090
6 REF
.080 REF
33 REF
.108 MAX TYP

SECTION C-C
SCALE 4/1



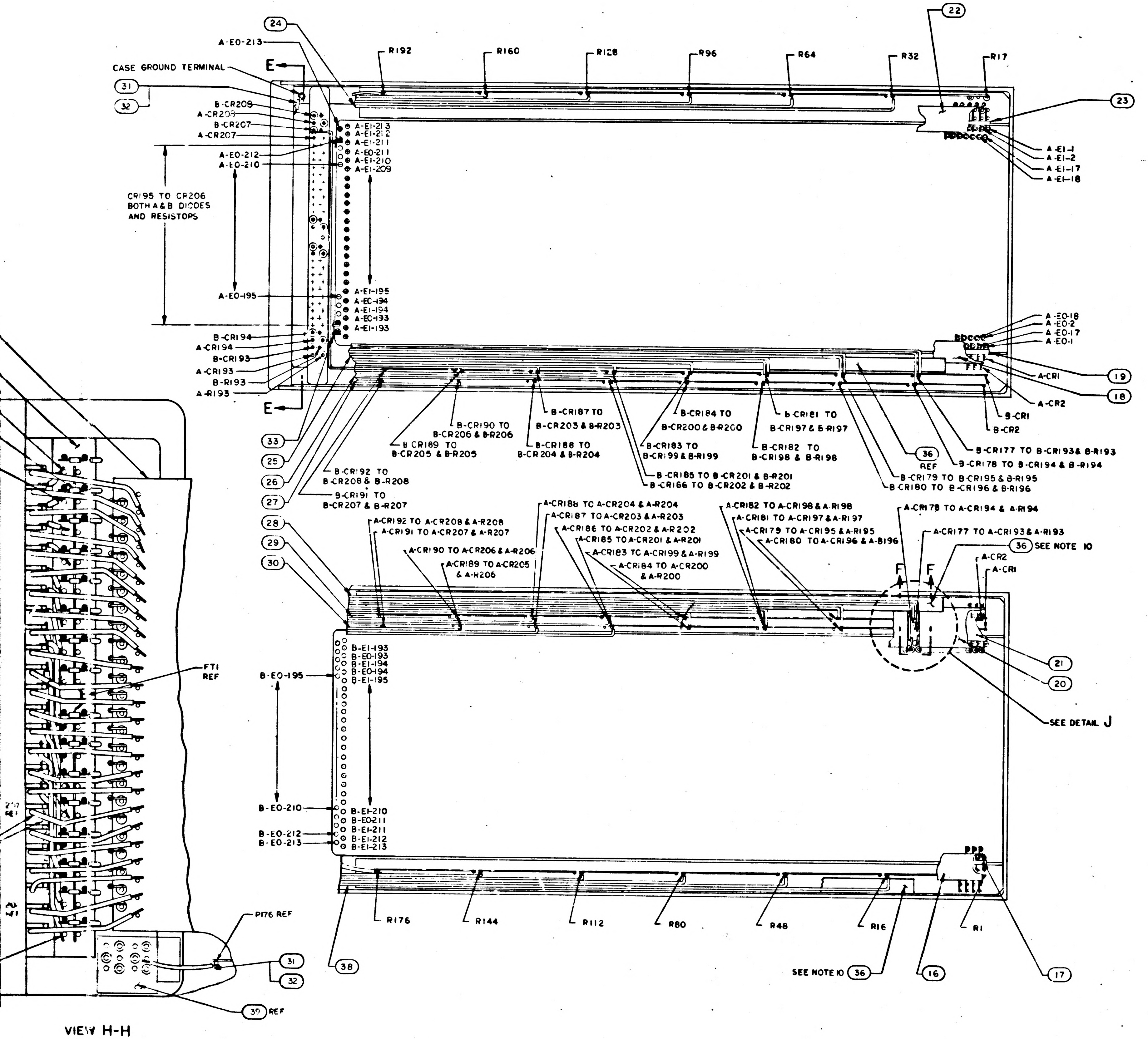
SEE NOTE 17
.010 MIN



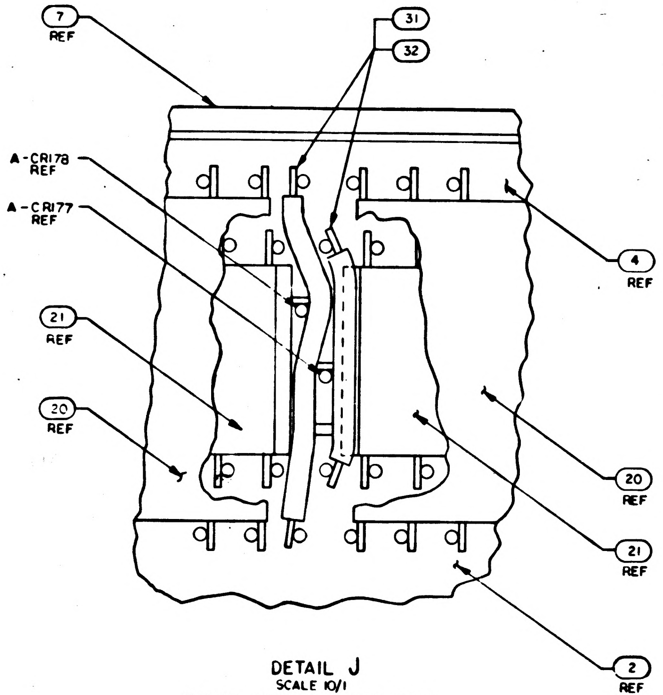
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
REF 31 32
202 REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
38

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14

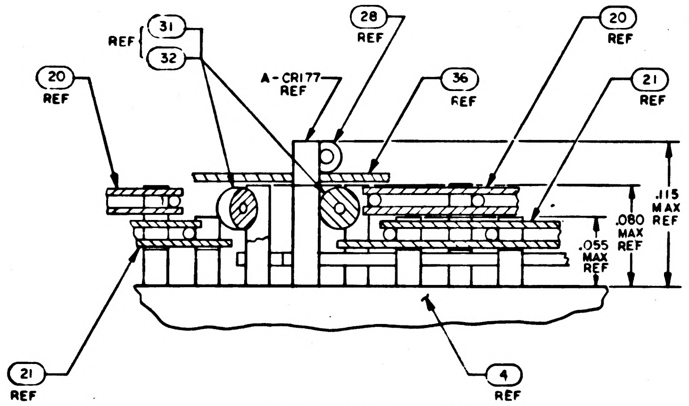
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR. CHK	12/4/67	FEB


24
A-EO-213
R192
R160
R128
R96
R64
R32
R17
22
23
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
A-EO-212
A-EO-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-EO-195
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-EI-1
A-EI-2
A-EI-17
A-EI-18
A-EO-18
A-EO-2
A-EO-17
A-EO-1
A-CR1
A-CR2
B-CR1
B-CR2
19
18
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR179 TO B-CR195 & B-R195
B CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F F
21
20
SEE DETAIL J
FT1 REF
B-EO-195
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-210
B-EI-210
B-EO211
B-EI-211
B-EO-212
B-EI-212
B-EO-213
B-EI-213
R176
R144
R112
R80
R48
R16
R1
P176 REF
31
32
38
SEE NOTE 10 36
16
17
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14


7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NO.S 28 AND 36 REMOVED


REF
31
32
20 REF
28 REF
A-CR177 REF
36 REF
20 REF
21 REF
.115 MAX REF
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 67
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
SCALE 2/1
SHEET 2 OF 3

2010802

2010802 A

[illegible]

8 7 6 5 4

D

C

B

A

8 5

2010802 A

4 3 2

REV	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 37915 DR: CHK:		

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

2010802 A

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON

APPLICATION

MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010802

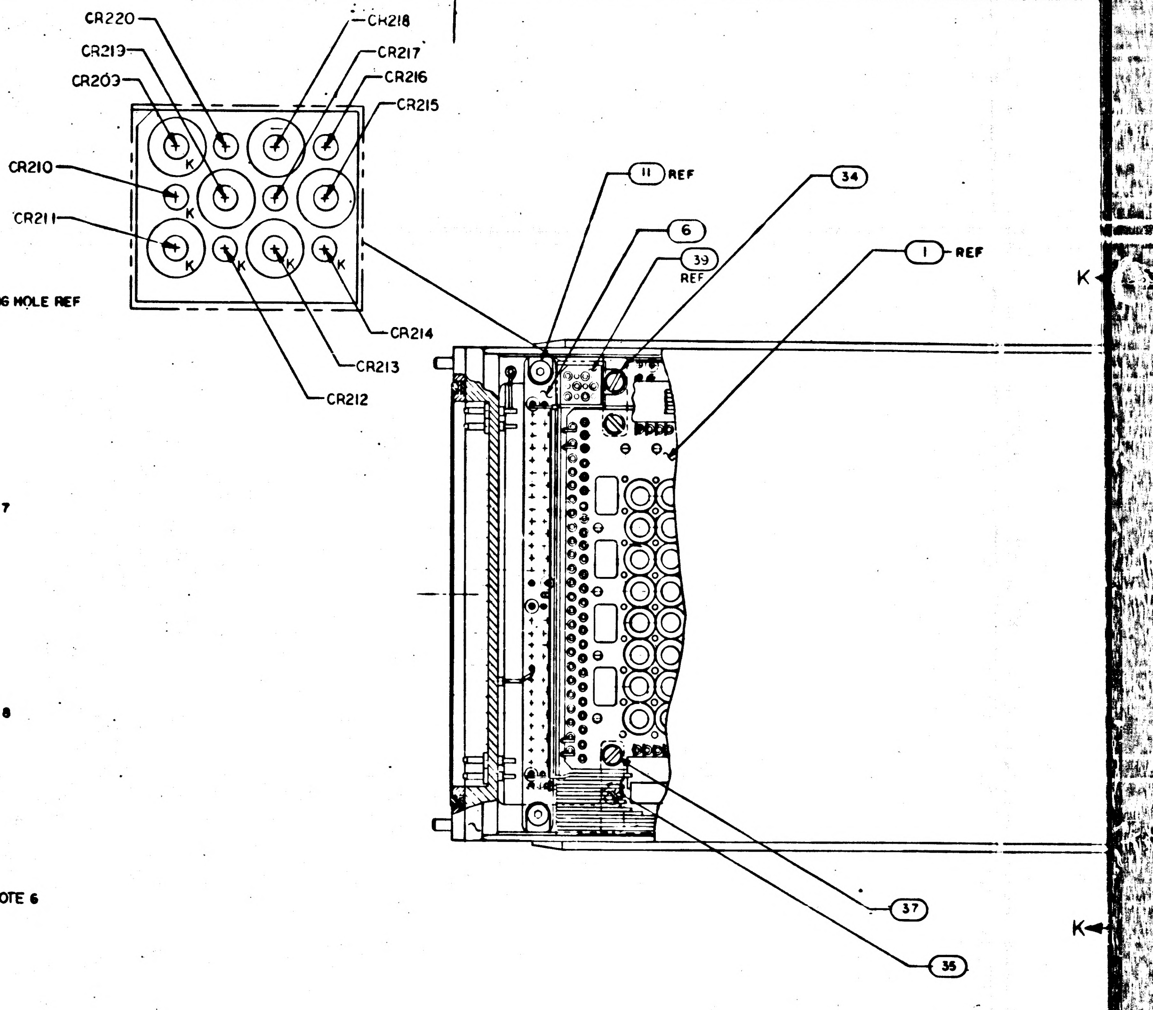
SCALE NONE | SHEET 3 OF 3

2010802 A

4 1

SH3/3 2010802 AF2/72

PART NŌ.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
20[illegible]802-0[illegible]	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
-0[illegible]	B-2	-031	-021	0322		
-0[illegible]	B-3	-041	-031	0323		
-041	B-4	-051	-041	0324		
-051	B-5	-061	-051	0325		
20[illegible]802-06[illegible]	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
[illegible]	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
-081	B-2	-091	-081	0328		
-091	B-3	-111	-091	0329		
-111	B-4	-121	-111	0330		
-121	B-5	-131	-121	0331		
2[illegible]0802-131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042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CR213
CR212
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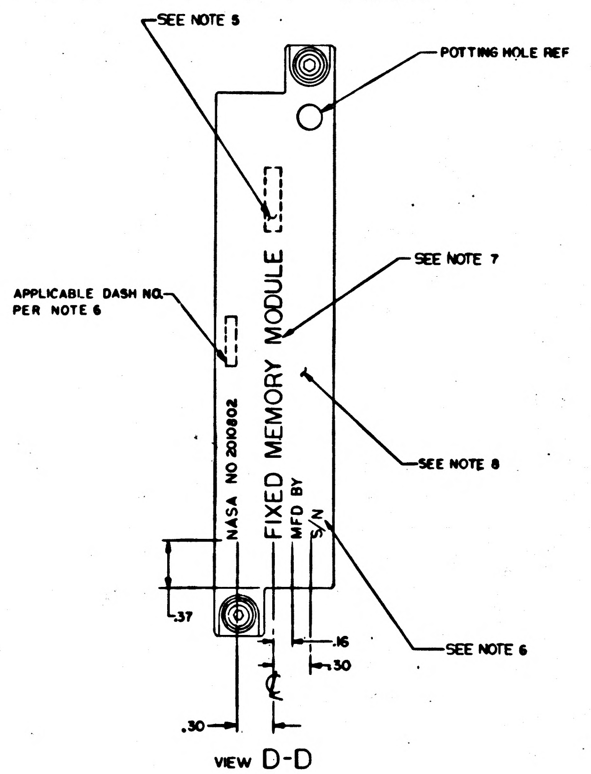
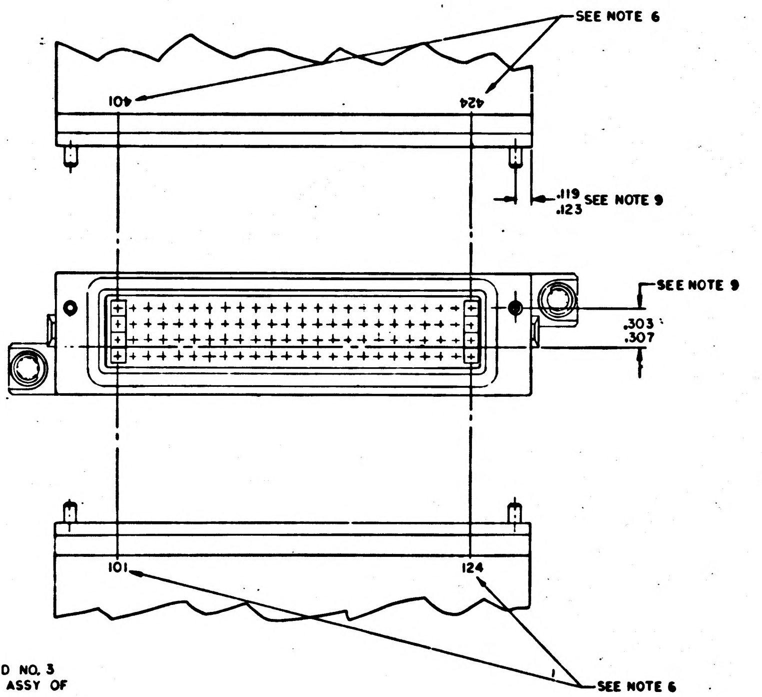
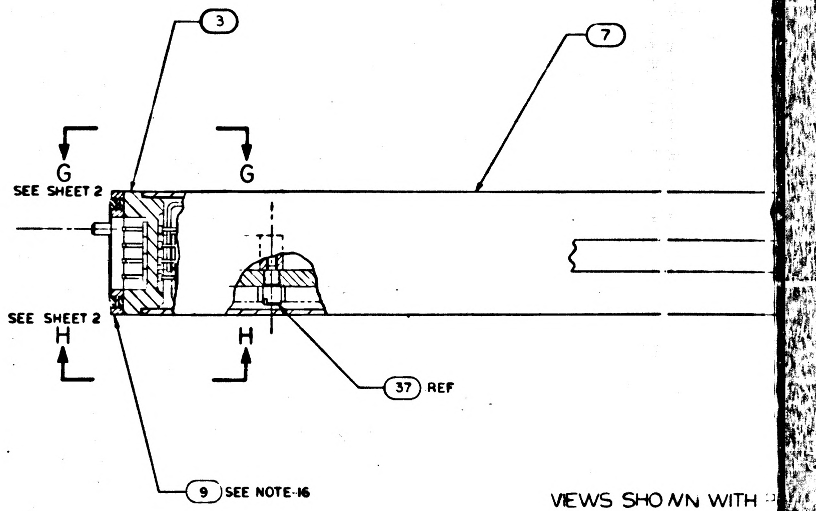
39 REF
34
1 REF
K
37
35
K


SEE NOTE 5
POTTING HOLE REF
SEE NOTE 7
APPLICABLE DASH NO. PER NOTE 6
FIXED MEMORY MODULE
NASA NO 2010802
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
.30
.30
℄

VIEW D-D


SEE NOTE 6
101
124
.119
.123
SEE NOTE 9
SEE NOTE 9
.303
.307
101
124
SEE NOTE 6


3
7
G
G
SEE SHEET 2
G
SEE SHEET 2
H
H
37 REF
9 SEE NOTE-16

VIEWS SHOWN WITH
PARTIALLY

NOTES:

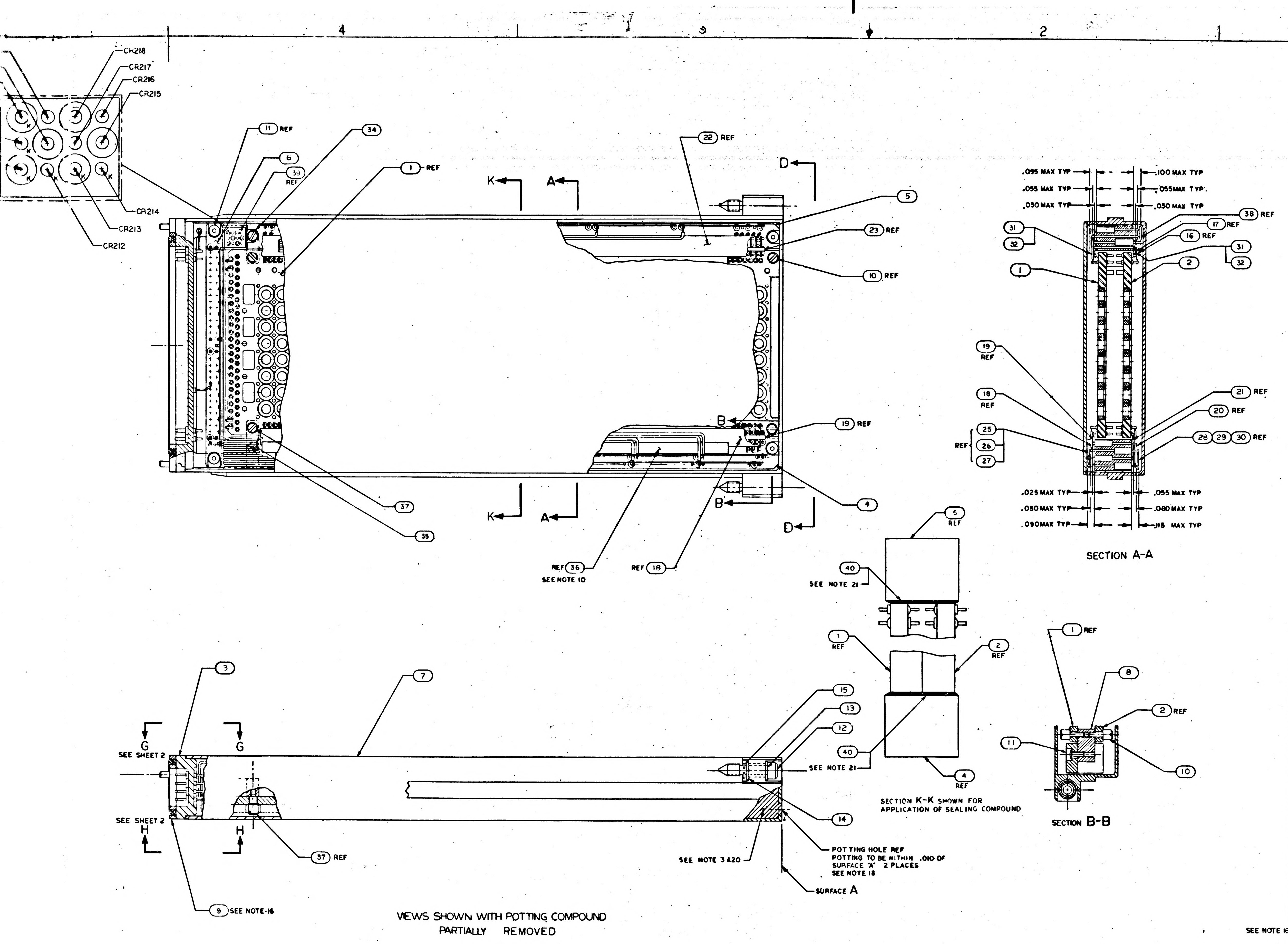
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO EN[illegible]ATION PER NOTE 3, COAT OVER ALL TE[illegible]S OF FIND NO'S 1,2,&3 AND OVER ALL WI[illegible] SLEEVING AND COMPONENT LEADS OF FIN[illegible] NO'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO.4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

2010802	B	

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TORR 37915 DR CHK		
B	REVISED PER TORR 37916 DR CHK	12/11/67	PEB



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CR212
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34
6
39 REF
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
37
35
4
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
2
19 REF
18 REF
21 REF
20 REF
25
26
27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SEE NOTE 21
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
15
13
12
G
SEE SHEET 2
SEE SHEET 2
H
14
37 REF
SEE NOTE 3&20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE-16

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

REQUIREMENTS FOR CONTROL
CTION OF ROPE MEMORY ASSEMBLIES
MEMORY FIXTURE DWG NO. AP22500

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

NEXT ASSY	USED ON
SEE CHART	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Tom Smith DATE 10 APR 67
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 B

[illegible] MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

WIRE LIST

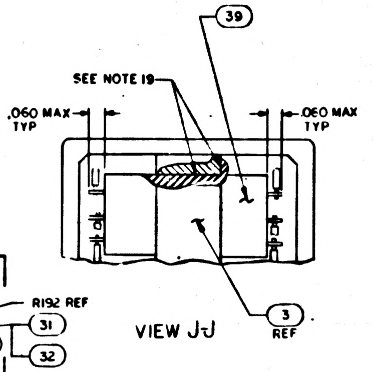
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

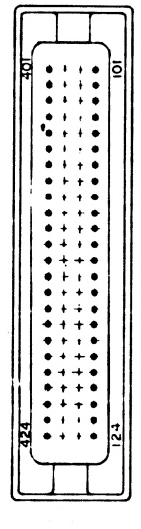
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST

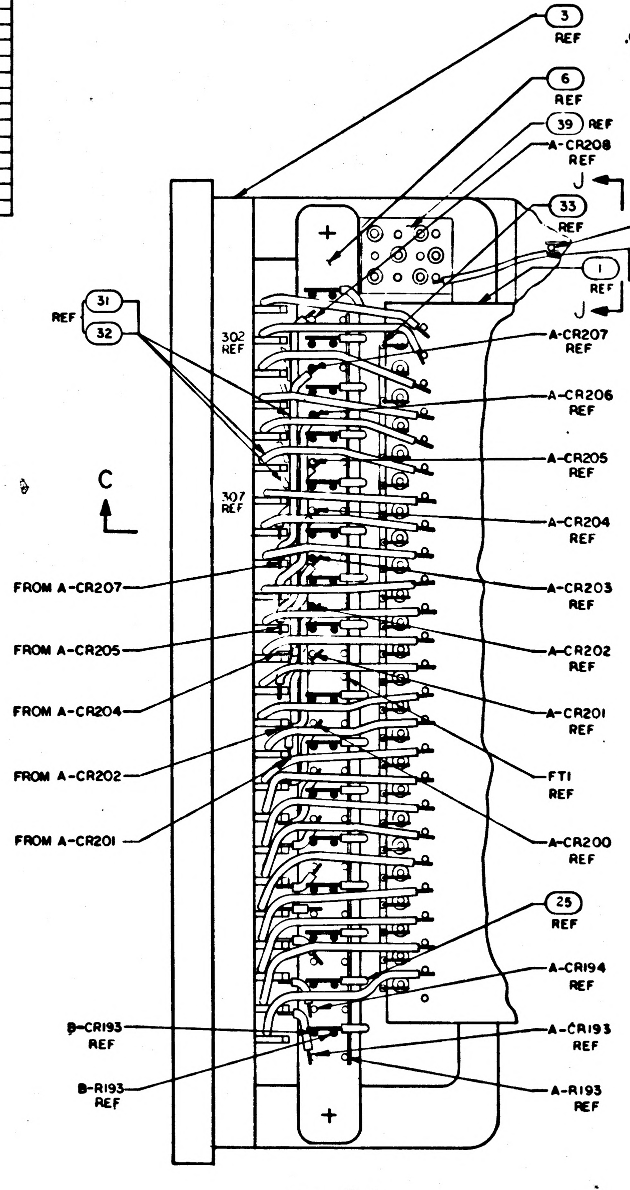
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

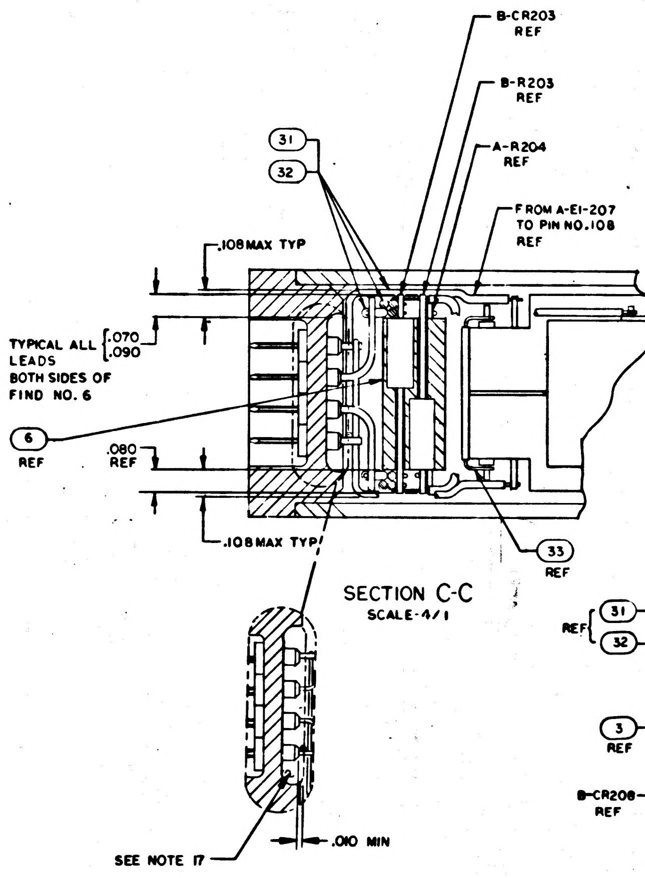
VIEW J-J


401
101
424
124

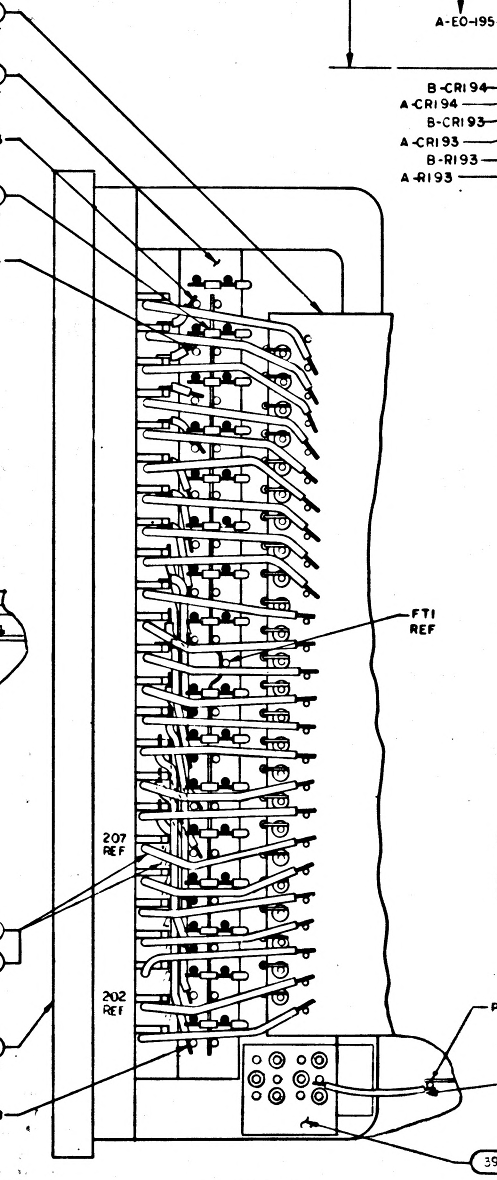
SECTION E-E


3 REF
6 REF
39 REF
A-CR208 REF
J
33 REF
R192 REF
31
32
1 REF
J
REF 31 32
302 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
C
C
307 REF
A-CR204 REF
FROM A-CR207
A-CR203 REF
FROM A-CR205
A-CR202 REF
FROM A-CR204
A-CR201 REF
FROM A-CR202
FT1 REF
FROM A-CR201
A-CR200 REF
25 REF
A-CR194 REF
B-CR193 REF
A-CR193 REF
B-R193 REF
A-R193 REF
+
+

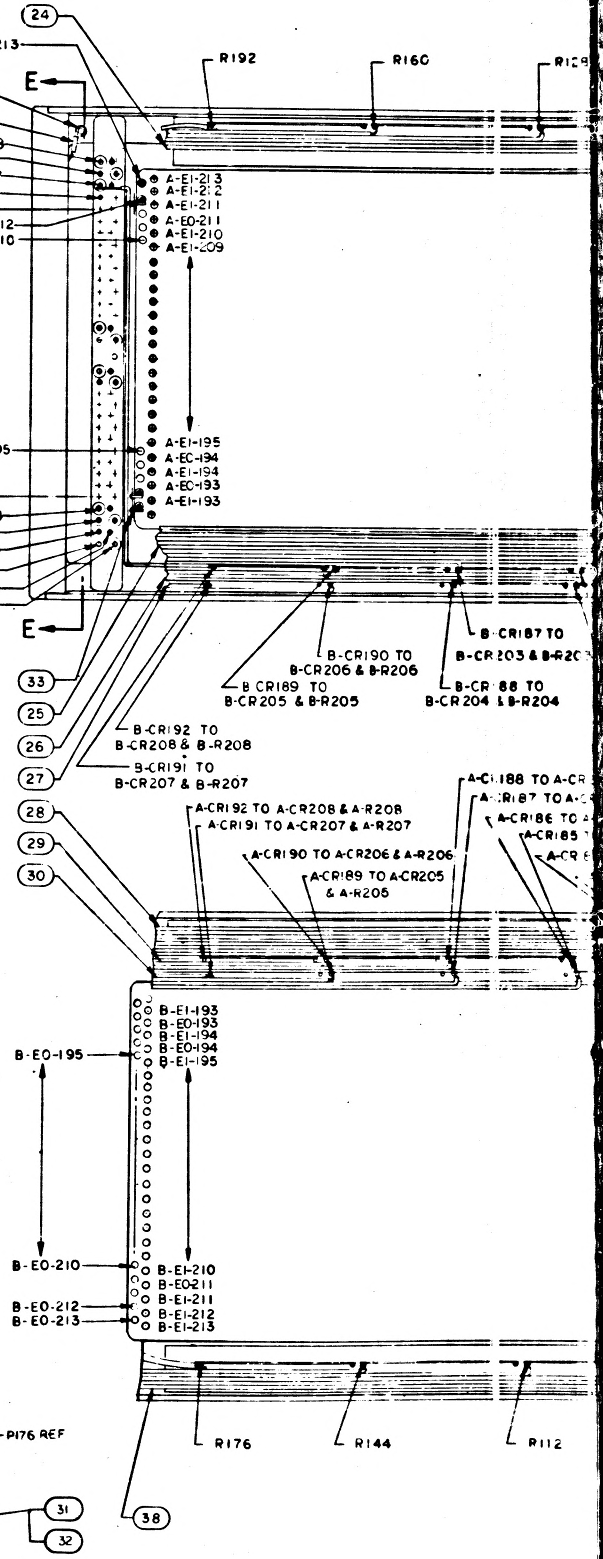
VIEW G-G
SCALE-4/1
SHOWN WITH POTTING AND FIND NO.7 REMOVED. SEE NOTES 11,12,13 AND 14


B-CR203 REF
B-R203 REF
31
32
A-R204 REF
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE-4/1

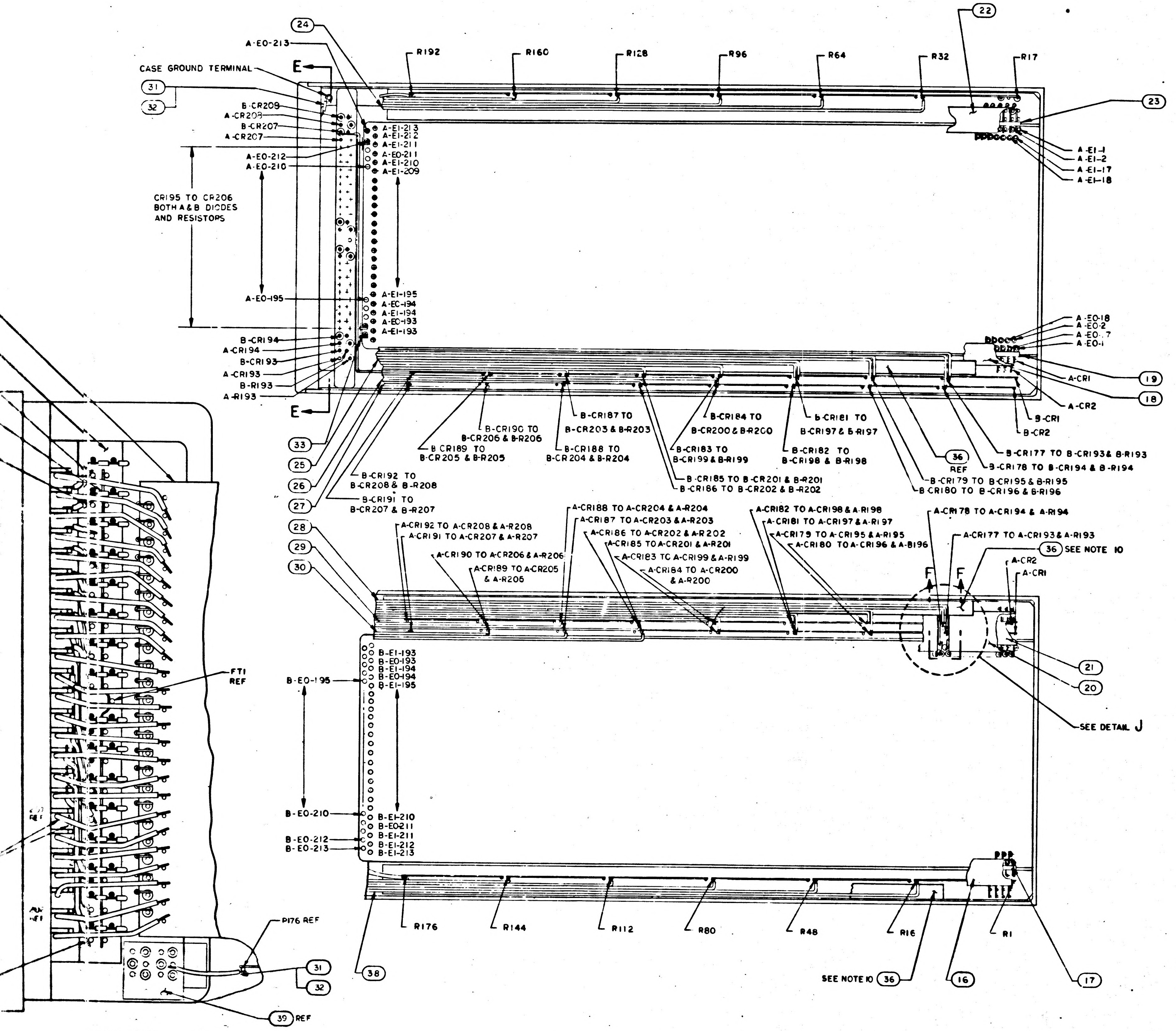

2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
REF 31 32
202 REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE-4/1
SHOWN WITH POTTING AND FIND NO.7 REMOVED. SEE NOTES 11,12,13 AND 14


24
A-E0-213
CASE GROUND TERMINAL
E
31
32
R192
R160
R128
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R20
B-CR188 TO B-CR204 & B-R204
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR
A-CR187 TO A-
A-CR186 TO A
A-CR185
A-CR
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
R112
38

2010802 B

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR H Frank CHK	12/4/69	TEB
B	REVISED PER TDRR 37916 DR P Frank CHK	2/11/70	TEB



24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
R192
R160
R128
R96
R64
R32
R17
22
23
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
A-CR2
B-CR1
B-CR2
19
18
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
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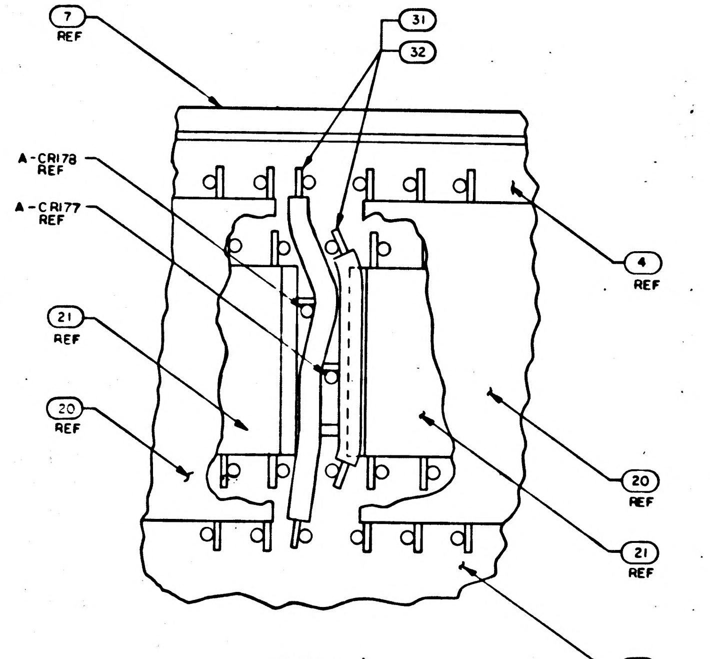
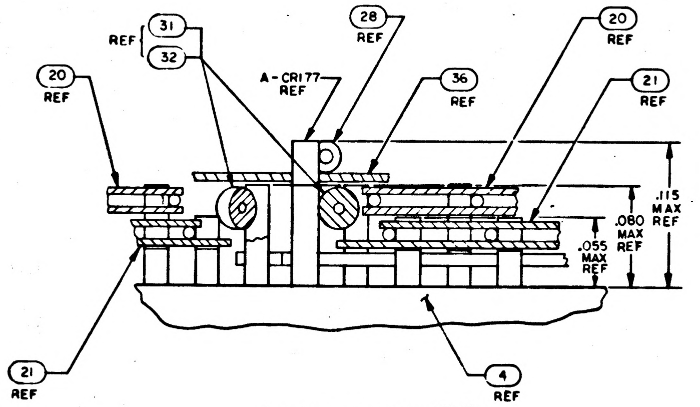
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-R196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E1-210
B-E0211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10
36
16
17
FT1 REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7 REMOVED. SEE NOTES 11, 12, 13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN WITH FIND NO.S 28 AND 36 REMOVED



REF
31
32
20 REF
28 REF
A-CR177 REF
36 REF
20 REF
21 REF
.115 MAX
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED NASA
APPROVED MSC

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO 2010802
SCALE 2/1 SHEET 2 OF 3

2010802 B

2010802 B

SH 2/3 2010802 B E 2/42

8 7 6 5 4

[illegible]

D

C

B

A

TERM. NO.
A-EO-1
A-EO-2
A-EO-3
A-EO-4
A-EO-5
A-EO-6
A-EO-7
A-EO-8
A-EO-9
A-EO-10
A-EO-11
A-EO-12
A-EO-13
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A-EO-90
A-EO-91
A-EO-92
A-EO-93
A-EO-94
A-EO-95
A-EO-96

8 7 6 5 4

2010802 B

4 3 2

SYM	DESCRIPTION	DATE	APPROVAL
	REV TDRR 37652		
A	REVISED PER TDRR 37915 DR H. Lon CHK E. Ulon	12/ 69	??B
B	REVISED PER TDRR 37916 DR H. Lonel CHK E. Ulon	12/11/69	??B

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-E0-1	A-CR1	A-E0-97	A-CR97	B-E0-1	B-CR1	B-E0-97	B-CR97	A-E1-1	R1	A-E1-49	R49	A-E1-97	R97	A-E1-145	R145
A-E0-2	A-CR2	A-E0-98	A-CR98	B-E0-2	B-CR2	B-E0-98	B-CR98	B-E1-1		B-E1-49		B-E1-97		B-E1-145	
A-E0-3	A-CR3	A-E0-99	A-CR99	B-E0-3	B-CR3	B-E0-99	B-CR99	A-E1-2	R2	A-E1-50	R50	A-E1-98	R98	A-E1-146	R146
A-E0-4	A-CR4	A-E0-100	A-CR100	B-E0-4	B-CR4	B-E0-100	B-CR100	B-E1-2		B-E1-50		B-E1-98		B-E1-146	
A-E0-5	A-CR5	A-E0-101	A-CR101	B-E0-5	B-CR5	B-E0-101	B-CR101	A-E1-3	R3	A-E1-51	R51	A-E1-99	R99	A-E1-147	R147
A-E0-6	A-CR6	A-E0-102	A-CR102	B-E0-6	B-CR6	B-E0-102	B-CR102	B-E1-3		B-E1-51		B-E1-99		B-E1-147	
A-E0-7	A-CR7	A-E0-103	A-CR103	B-E0-7	B-CR7	B-E0-103	B-CR103	A-E1-4	R4	A-E1-52	R52	A-E1-100	R100	A-E1-148	R148
A-E0-8	A-CR8	A-E0-104	A-CR104	B-E0-8	B-CR8	B-E0-104	B-CR104	B-E1-4		B-E1-52		B-E1-100		B-E1-148	
A-E0-9	A-CR9	A-E0-105	A-CR105	B-E0-9	B-CR9	B-E0-105	B-CR105	A-E1-5	R5	A-E1-53	R53	A-E1-101	R101	A-E1-149	R149
A-E0-10	A-CR10	A-E0-106	A-CR106	B-E0-10	B-CR10	B-E0-106	B-CR106	B-E1-5		B-E1-53		B-E1-101		B-E1-149	
A-E0-11	A-CR11	A-E0-107	A-CR107	B-E0-11	B-CR11	B-E0-107	B-CR107	A-E1-6	R6	A-E1-54	R54	A-E1-102	R102	A-E1-150	R150
A-E0-12	A-CR12	A-E0-108	A-CR108	B-E0-12	B-CR12	B-E0-108	B-CR108	B-E1-6		B-E1-54		B-E1-102		B-E1-150	
A-E0-13	A-CR13	A-E0-109	A-CR109	B-E0-13	B-CR13	B-E0-109	B-CR109	A-E1-7	R7	A-E1-55	R55	A-E1-103	R103	A-E1-151	R151
A-E0-14	A-CR14	A-E0-110	A-CR110	B-E0-14	B-CR14	B-E0-110	B-CR110	B-E1-7		B-E1-55		B-E1-103		B-E1-151	
A-E0-15	A-CR15	A-E0-111	A-CR111	B-E0-15	B-CR15	B-E0-111	B-CR111	A-E1-8	R8	A-E1-56	R56	A-E1-104	R104	A-E1-152	R152
A-E0-16	A-CR16	A-E0-112	A-CR112	B-E0-16	B-CR16	B-E0-112	B-CR112	B-E1-8		B-E1-56		B-E1-104		B-E1-152	
A-E0-17	A-CR17	A-E0-113	A-CR113	B-E0-17	B-CR17	B-E0-113	B-CR113	A-E1-9	R9	A-E1-57	R57	A-E1-105	R105	A-E1-153	R153
A-E0-18	A-CR18	A-E0-114	A-CR114	B-E0-18	B-CR18	B-E0-114	B-CR114	B-E1-9		B-E1-57		B-E1-105		B-E1-153	
A-E0-19	A-CR19	A-E0-115	A-CR115	B-E0-19	B-CR19	B-E0-115	B-CR115	A-E1-10	R10	A-E1-58	R58	A-E1-106	R106	A-E1-154	R154
A-E0-20	A-CR20	A-E0-116	A-CR116	B-E0-20	B-CR20	B-E0-116	B-CR116	B-E1-10		B-E1-58		B-E1-106		B-E1-154	
A-E0-21	A-CR21	A-E0-117	A-CR117	B-E0-21	B-CR21	B-E0-117	B-CR117	A-E1-11	R11	A-E1-59	R59	A-E1-107	R107	A-E1-155	R155
A-E0-22	A-CR22	A-E0-118	A-CR118	B-E0-22	B-CR22	B-E0-118	B-CR118	B-E1-11		B-E1-59		B-E1-107		B-E1-155	
A-E0-23	A-CR23	A-E0-119	A-CR119	B-E0-23	B-CR23	B-E0-119	B-CR119	A-E1-12	R12	A-E1-60	R60	A-E1-108	R108	A-E1-156	R156
A-E0-24	A-CR24	A-E0-120	A-CR120	B-E0-24	B-CR24	B-E0-120	B-CR120	B-E1-12		B-E1-60		B-E1-108		B-E1-156	
A-E0-25	A-CR25	A-E0-121	A-CR121	B-E0-25	B-CR25	B-E0-121	B-CR121	A-E1-13	R13	A-E1-61	R61	A-E1-109	R109	A-E1-157	R157
A-E0-26	A-CR26	A-E0-122	A-CR122	B-E0-26	B-CR26	B-E0-122	B-CR122	B-E1-13		B-E1-61		B-E1-109		B-E1-157	
A-E0-27	A-CR27	A-E0-123	A-CR123	B-E0-27	B-CR27	B-E0-123	B-CR123	A-E1-14	R14	A-E1-62	R62	A-E1-110	R110	A-E1-158	R158
A-E0-28	A-CR28	A-E0-124	A-CR124	B-E0-28	B-CR28	B-E0-124	B-CR124	B-E1-14		B-E1-62		B-E1-110		B-E1-158	
A-E0-29	A-CR29	A-E0-125	A-CR125	B-E0-29	B-CR29	B-E0-125	B-CR125	A-E1-15	R15	A-E1-63	R63	A-E1-111	R111	A-E1-159	R159
A-E0-30	A-CR30	A-E0-126	A-CR126	B-E0-30	B-CR30	B-E0-126	B-CR126	B-E1-15		B-E1-63		B-E1-111		B-E1-159	
A-E0-31	A-CR31	A-E0-127	A-CR127	B-E0-31	B-CR31	B-E0-127	B-CR127	A-E1-16	R16	A-E1-64	R64	A-E1-112	R112	A-E1-160	R160
A-E0-32	A-CR32	A-E0-128	A-CR128	B-E0-32	B-CR32	B-E0-128	B-CR128	B-E1-16		B-E1-64		B-E1-112		B-E1-160	
A-E0-33	A-CR33	A-E0-129	A-CR129	B-E0-33	B-CR33	B-E0-129	B-CR129	A-E1-17	R17	A-E1-65	R65	A-E1-113	R113	A-E1-161	R161
A-E0-34	A-CR34	A-E0-130	A-CR130	B-E0-34	B-CR34	B-E0-130	B-CR130	B-E1-17		B-E1-65		B-E1-113		B-E1-161	
A-E0-35	A-CR35	A-E0-131	A-CR131	B-E0-35	B-CR35	B-E0-131	B-CR131	A-E1-18	R18	A-E1-66	R66	A-E1-114	R114	A-E1-162	R162
A-E0-36	A-CR36	A-E0-132	A-CR132	B-E0-36	B-CR36	B-E0-132	B-CR132	B-E1-18		B-E1-66		B-E1-114		B-E1-162	
A-E0-37	A-CR37	A-E0-133	A-CR133	B-E0-37	B-CR37	B-E0-133	B-CR133	A-E1-19	R19	A-E1-67	R67	A-E1-115	R115	A-E1-163	R163
A-E0-38	A-CR38	A-E0-134	A-CR134	B-E0-38	B-CR38	B-E0-134	B-CR134	B-E1-19		B-E1-67		B-E1-115		B-E1-163	
A-E0-39	A-CR39	A-E0-135	A-CR135	B-E0-39	B-CR39	B-E0-135	B-CR135	A-E1-20	R20	A-E1-68	R68	A-E1-116	R116	A-E1-164	R164
A-E0-40	A-CR40	A-E0-136	A-CR136	B-E0-40	B-CR40	B-E0-136	B-CR136	B-E1-20		B-E1-68		B-E1-116		B-E1-164	
A-E0-41	A-CR41	A-E0-137	A-CR137	B-E0-41	B-CR41	B-E0-137	B-CR137	A-E1-21	R21	A-E1-69	R69	A-E1-117	R117	A-E1-165	R165
A-E0-42	A-CR42	A-E0-138	A-CR138	B-E0-42	B-CR42	B-E0-138	B-CR138	B-E1-21		B-E1-69		B-E1-117		B-E1-165	
A-E0-43	A-CR43	A-E0-139	A-CR139	B-E0-43	B-CR43	B-E0-139	B-CR139	A-E1-22	R22	A-E1-70	R70	A-E1-118	R118	A-E1-166	R166
A-E0-44	A-CR44	A-E0-140	A-CR140	B-E0-44	B-CR44	B-E0-140	B-CR140	B-E1-22		B-E1-70		B-E1-118		B-E1-166	
A-E0-45	A-CR45	A-E0-141	A-CR141	B-E0-45	B-CR45	B-E0-141	B-CR141	A-E1-23	R23	A-E1-71	R71	A-E1-119	R119	A-E1-167	R167
A-E0-46	A-CR46	A-E0-142	A-CR142	B-E0-46	B-CR46	B-E0-142	B-CR142	B-E1-23		B-E1-71		B-E1-119		B-E1-167	
A-E0-47	A-CR47	A-E0-143	A-CR143	B-E0-47	B-CR47	B-E0-143	B-CR143	A-E1-24	R24	A-E1-72	R72	A-E1-120	R120	A-E1-168	R168
A-E0-48	A-CR48	A-E0-144	A-CR144	B-E0-48	B-CR48	B-E0-144	B-CR144	B-E1-24		B-E1-72		B-E1-120		B-E1-168	
A-E0-49	A-CR49	A-E0-145	A-CR145	B-E0-49	B-CR49	B-E0-145	B-CR145	A-E1-25	R25	A-E1-73	R73	A-E1-121	R121	A-E1-169	R169
A-E0-50	A-CR50	A-E0-146	A-CR146	B-E0-50	B-CR50	B-E0-146	B-CR146	B-E1-25		B-E1-73		B-E1-121		B-E1-169	
A-E0-51	A-CR51	A-E0-147	A-CR147	B-E0-51	B-CR51	B-E0-147	B-CR147	A-E1-26	R26	A-E1-74	R74	A-E1-122	R122	A-E1-170	R170
A-E0-52	A-CR52	A-E0-148	A-CR148	B-E0-52	B-CR52	B-E0-148	B-CR148	B-E1-26		B-E1-74		B-E1-122		B-E1-170	
A-E0-53	A-CR53	A-E0-149	A-CR149	B-E0-53	B-CR53	B-E0-149	B-CR149	A-E1-27	R27	A-E1-75	R75	A-E1-123	R123	A-E1-171	R171
A-E0-54	A-CR54	A-E0-150	A-CR150	B-E0-54	B-CR54	B-E0-150	B-CR150	B-E1-27		B-E1-75		B-E1-123		B-E1-171	
A-E0-55	A-CR55	A-E0-151	A-CR151	B-E0-55	B-CR55	B-E0-151	B-CR151	A-E1-28	R28	A-E1-76	R76	A-E1-124	R124	A-E1-172	R172
A-E0-56	A-CR56	A-E0-152	A-CR152	B-E0-56	B-CR56	B-E0-152	B-CR152	B-E1-28		B-E1-76		B-E1-124		B-E1-172	
A-E0-57	A-CR57	A-E0-153	A-CR153	B-E0-57	B-CR57	B-E0-153	B-CR153	A-E1-29	R29	A-E1-77	R77	A-E1-125	R125	A-E1-173	R173
A-E0-58	A-CR58	A-E0-154	A-CR154	B-E0-58	B-CR58	B-E0-154	B-CR154	B-E1-29		B-E1-77		B-E1-125		B-E1-173	
A-E0-59	A-CR59	A-E0-155	A-CR155	B-E0-59	B-CR59	B-E0-155	B-CR155	A-E1-30	R30	A-E1-78	R78	A-E1-126	R126	A-E1-174	R174
A-E0-60	A-CR60	A-E0-156	A-CR156	B-E0-60	B-CR60	B-E0-156	B-CR156	B-E1-30		B-E1-78		B-E1-126		B-E1-174	
A-E0-61	A-CR61	A-E0-157	A-CR157	B-E0-61	B-CR61	B-E0-157	B-CR157	A-E1-31	R31	A-E1-79	R79	A-E1-127	R127	A-E1-175	R175
A-E0-62	A-CR62	A-E0-158	A-CR158	B-E0-62	B-CR62	B-E0-158	B-CR158	B-E1-31		B-E1-79		B-E1-127		B-E1-175	
A-E0-63	A-CR63	A-E0-159	A-CR159	B-E0-63	B-CR63	B-E0-159	B-CR159	A-E1-32	R32	A-E1-80	R80	A-E1-128	R128	A-E1-176	R176
A-E0-64	A-CR64	A-E0-160	A-CR160	B-E0-64	B-CR64	B-E0-160	B-CR160	B-E1-32		B-E1-80		B-E1-128		B-E1-176	
A-E0-65	A-CR65	A-E0-161	A-CR161	B-E0-65	B-CR65	B-E0-161	B-CR161	A-E1-33	R33	A-E1-81	R81	A-E1-129	R129	A-E1-177	R177
A-E0-66	A-CR66	A-E0-162	A-CR162	B-E0-66	B-CR66	B-E0-162	B-CR162	B-E1-33		B-E1-81		B-E1-129		B-E1-177	
A-E0-67	A-CR67	A-E0-163	A-CR163	B-E0-67	B-CR67	B-E0-163	B-CR163	A-E1-34	R34	A-E1-82	R82	A-E1-130	R130	A-E1-178	R178
A-E0-68	A-CR68	A-E0-164	A-CR164	B-E0-68	B-CR68	B-E0-164	B-CR164	B-E1-34		B-E1-82		B-E1-130		B-E1-178	
A-E0-69	A-CR69	A-E0-165	A-CR165	B-E0-69	B-CR69	B-E0-165	B-CR165	A-E1-35	R35	A-E1-83	R83	A-E1-131	R131	A-E1-179	R179
A-E0-70	A-CR70	A-E0-166	A-CR166	B-E0-70	B-CR70	B-E0-166	B-CR166	B-E1-35		B-E1-83		B-E1-131		B-E1-179	
A-E0-71	A-CR71	A-E0-167	A-CR167	B-E0-71	B-CR71	B-E0-167	B-CR167	A-E1-36	R36	A-E1-84	R84	A-E1-132	R132	A-E1-180	R180
A-E0-72	A-CR72	A-E0-168	A-CR168	B-E0-72	B-CR72	B-E0-168	B-CR168	B-E1-36		B-E1-84		B-E1-132		B-E1-180	
A-E0-73	A-CR73	A-E0-169	A-CR169	B-E0-73	B-CR73	B-E0-169	B-CR169	A-E1-37	R37	A-E1-85	R85	A-E1-133	R133	A-E1-181	R181
A-E0-74	A-CR74	A-E0-170	A-CR170	B-E0-74	B-CR74	B-E0-170	B-CR170	B-E1-37		B-E1-85		B-E1-133		B-E1-181	
A-E0-75	A-CR75	A-E0-171	A-CR171	B-E0-75	B-CR75	B-E0-171	B-CR171	A-E1-38	R38	A-E1-86	R86.	A-E1-134	R134	A-E1-182	R182
A-E0-76	A-CR76	A-E0-172	A-CR172	B-E0-76	B-CR76	B-E0-172	B-CR172	B-E1-38		B-E1-86		B-E1-134		B-E1-182	
A-E0-77	A-CR77	A-E0-173	A-CR173	B-E0-77	B-CR77	B-E0-173	B-CR173	A-E1-39	R39	A-E1-87	R87	A-E1-135	R135	A-E1-183	R183
A-E0-78	A-CR78	A-E0-174	A-CR174	B-E0-78	B-CR78	B-E0-174	B-CR174	B-E1-39		B-E1-87		B-E1-135		B-E1-183	
A-E0-79	A-CR79	A-E0-175	A-CR175	B-E0-79	B-CR79	B-E0-175	B-CR175	A-E1-40	R40	A-E1-88	R88	A-E1-136	R136	A-E1-184	R184
A-E0-80	A-CR80	A-E0-176	A-CR176	B-E0-80	B-CR80	B-E0-176	B-CR176	B-E1-40		B-E1-88		B-E1-136		B-E1-184	
A-E0-81	A-CR81	A-E0-177	A-CR177	B-E0-91	B-CR81	B-E0-177	B-CR177	A-E1-41	R41	A-E1-89	R89	A-E1-137	R137	A-E1-185	R185
A-E0-82	A-CR82	A-E0-178	A-CR178	B-E0-82	B-CR82	B-E0-178	B-CR178	B-E1-41		B-E1-89		B-E1-137		B-E1-185	
A-E0-83	A-CR83	A-E0-179	A-CR179	B-E0-83	B-CR83	B-E0-179	B-CR179	A-E1-42	R42	A-E1-90	R90	A-E1-138	R138	A-E1-186	R186
A-E0-84	A-CR84	A-E0-180	A-CR180	B-E0-84	B-CR84	B-E0-180	B-CR180	B-E1-42		B-E1-90		B-E1-138		B-E1-186	
A-E0-85	A-CR85	A-E0-181	A-CR181	B-E0-85	B-CR85	B-E0-181	B-CR181	A-E1-43	R43	A-E1-91	R91	A-E1-139	R139	A-E1-187	R187
A-E0-86	A-CR86	A-E0-182	A-CR182	B-E0-86	B-CR66	B-E0-182	B-CR182	B-E1-43		B-E1-91		B-E1-139		B-E1-187	
A-E0-87	A-CR87	A-E0-183	A-CR183	B-E0-87	B-CR67	B-E0-183	B-CR183	A-E1-44	R44	A-E1-92	R92	A-E1-140	R140	A-E1-188	R188
A-E0-88	A-CP88	A-E0-184	A-CR184	B-E0-88	B-CR88	B-E0-184	B-CR184	B-E1-44		B-E1-92		B-E1-140		B-E1-188	
A-E0-89	A-CR89	A-E0-185	A-CR185	B-E0-89	B-CR89	B-E0-185	B-CR185	A-E1-45	R45	A-E1-93	R93	A-E1-141	R141	A-E1-189	R189
A-E0-90	A-CR90	A-E0-186	A-CR186	B-E0-90	B-CR90	B-E0-186	B-CR186	B-E1-45		B-E1-93		B-E1-141		B-E1-189	
A-E0-91	A-CR91	A-E0-187	A-CR187	B-E0-91	B-CR91	B-E0-187	B-CR187	A-E1-46	R46	A-E1-94	R94	A-E1-142	R142	A-E1-190	R190
A-E0-92	A-CR92	A-E0-188	A-CR188	B-E0-92	B-CR92	B-E0-188	B-CR188	B-E1-46		B-E1-94		B-E1-142		B-E1-190	
A-E0-93	A-CR93	A-E0-189	A-CR189	B-E0-93	B-CR93	B-E0-189	B-CR189	A-E1-47	R47	A-E1-95	R95	A-E1-143	R143	A-E1-191	R191
A-E0-94	A-CR94	A-E0-190	A-CR190	B-E0-94	B-CR94	B-E0-190	B-CR190	B-E1-47		B-E1-95		B-E1-143		B-E1-191	
A-E0-95	A-CR95	A-E0-191	A-CR191	B-E0-95	B-CR95	B-E0-191	B-CR191	A-E1-48	R48	A-E1-96	R96	A-E1-144	R144	A-E1-192	R192
A-E0-96	A-CR96	A-E0-192	A-CR192	B-E0-96	B-CR96	B-E0-192	B-CR192	B-E1-48		B-E1-96		B-E1-144		B-E1-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED E. Ulon 10 APR
APPROVED
APPROVED

APPROVED
APPROVED MSC

DATE

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802
SCALE NONE
SHEET 3 OF 3

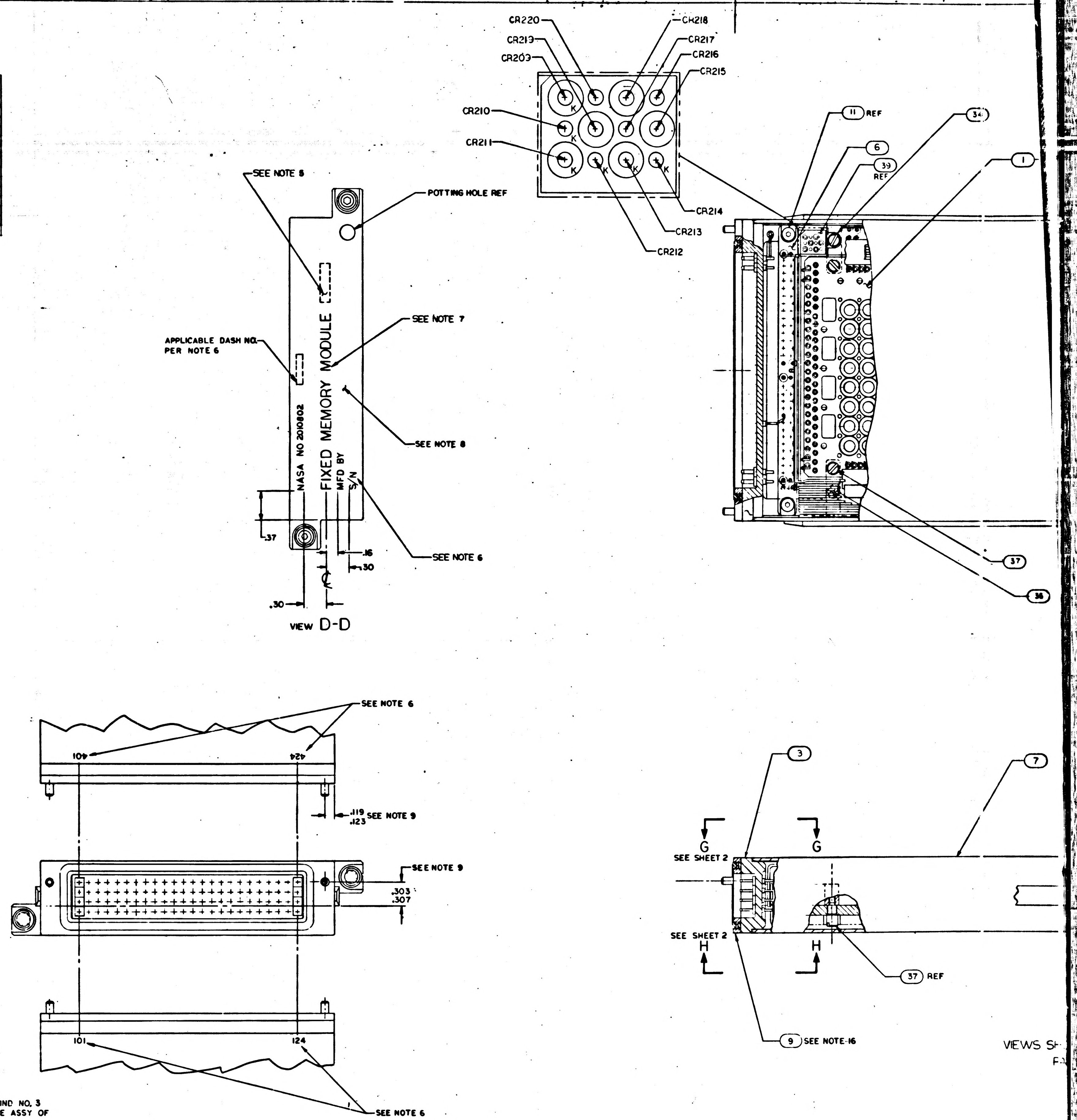
2010802 B

4 3 2 1

SH 3/3 - 2010802 - BE 2/2

[illegible]

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-011	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
-021	B-2	-031	-021	0322		
-031	B-3	-041	-031	0323		
-041	B-4	-051	-041	0324		
-051	B-5	-061	-051	0325		
2010802-061	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
-081	B-2	-091	-081	0328		
-091	B-3	-111	-091	0329		
-111	B-4	-121	-111	0330		
-121	B-5	-131	-121	0331		
2010802-131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042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CR219
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CR217
CR216
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CR210
CR211
K
CR214
CR213
CR212
POTTING HOLE REF
SEE NOTE 5
APPLICABLE DASH NO. PER NOTE 6
SEE NOTE 7
FIXED MEMORY MODULE
NASA NO 2010802
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
.30
.30
VIEW D-D
11 REF
34
6
39 REF
1
37
36
101
124
SEE NOTE 6
.119
.123
SEE NOTE 9
SEE NOTE 9
.303
.307
101
124
SEE NOTE 6
3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
37 REF
9 SEE NOTE 16
VIEWS SH
F

NOTES:

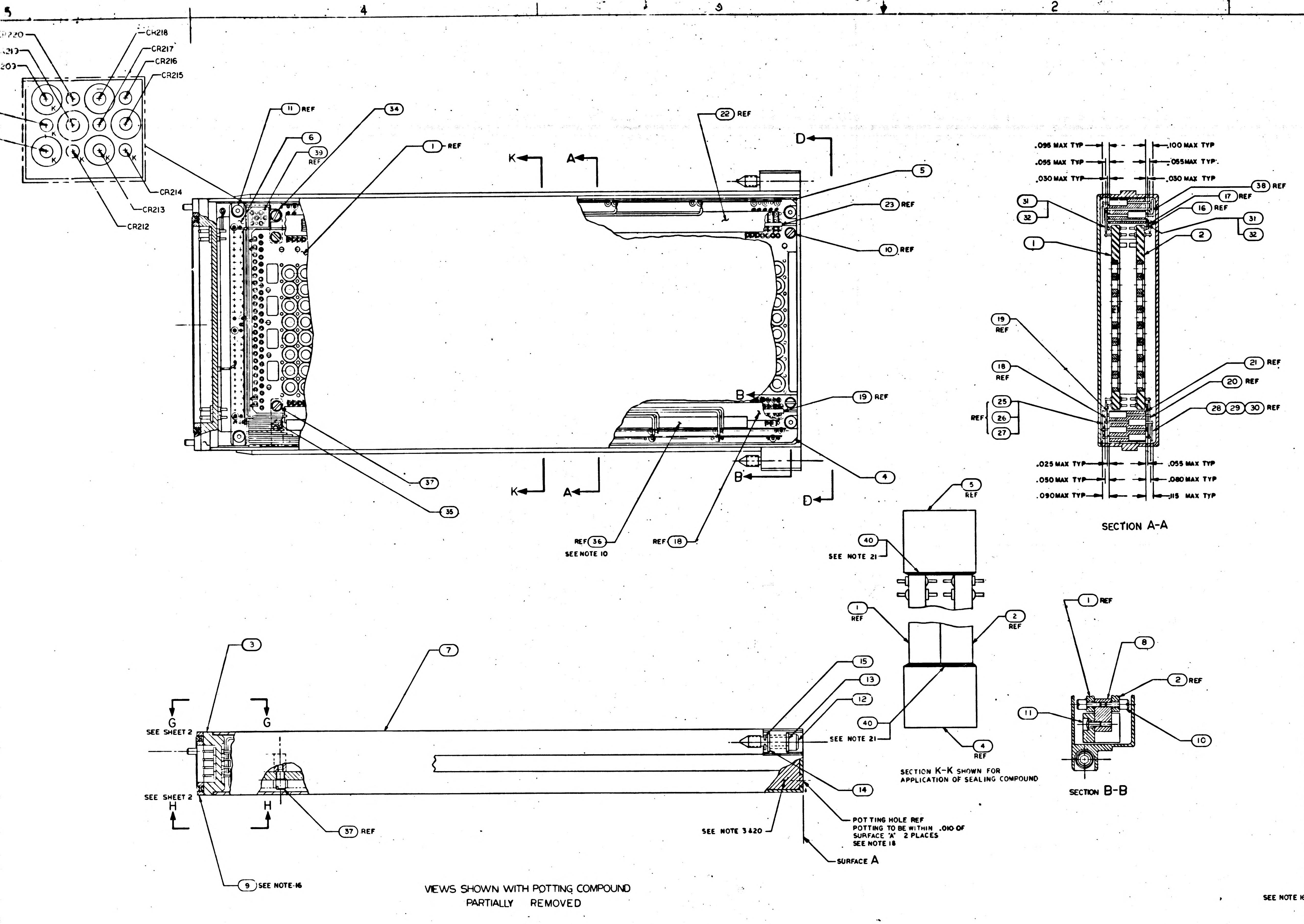
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO. 1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS, TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2,&3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 &39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR H Leonard CHK Urban	12/4/69	PBB
B	REVISED PER TDRR 37916 DR H Leonard CHK Urban	12/11/69	PBB
C	REVISED PER TDRR 37954 DR Rethaus CHK Urban	1/8/70	PBB



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CR215
CR214
CR213
CR212
K
11 REF
6
39 REF
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1 REF
22 REF
K
A
D
5
23 REF
10 REF
B
19 REF
37
35
4
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
19 REF
18 REF
21 REF
20 REF
REF
25
26
27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
15
13
12
14
37 REF
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
5
4
3
2
1
C
B
A

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

PROCESS REQUIREMENTS FOR CONTROL
AND INSPECTION OF ROPE MEMORY ASSEMBLIES
[illegible]
MEMORY FIXTURE DWG NO. AP22500

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 69
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 C

WIRE LIST

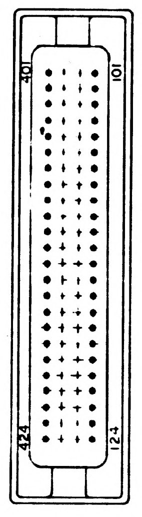
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

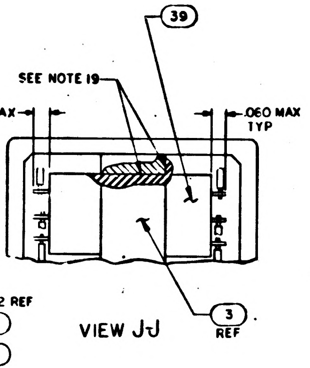
WIRE LIST

COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R132



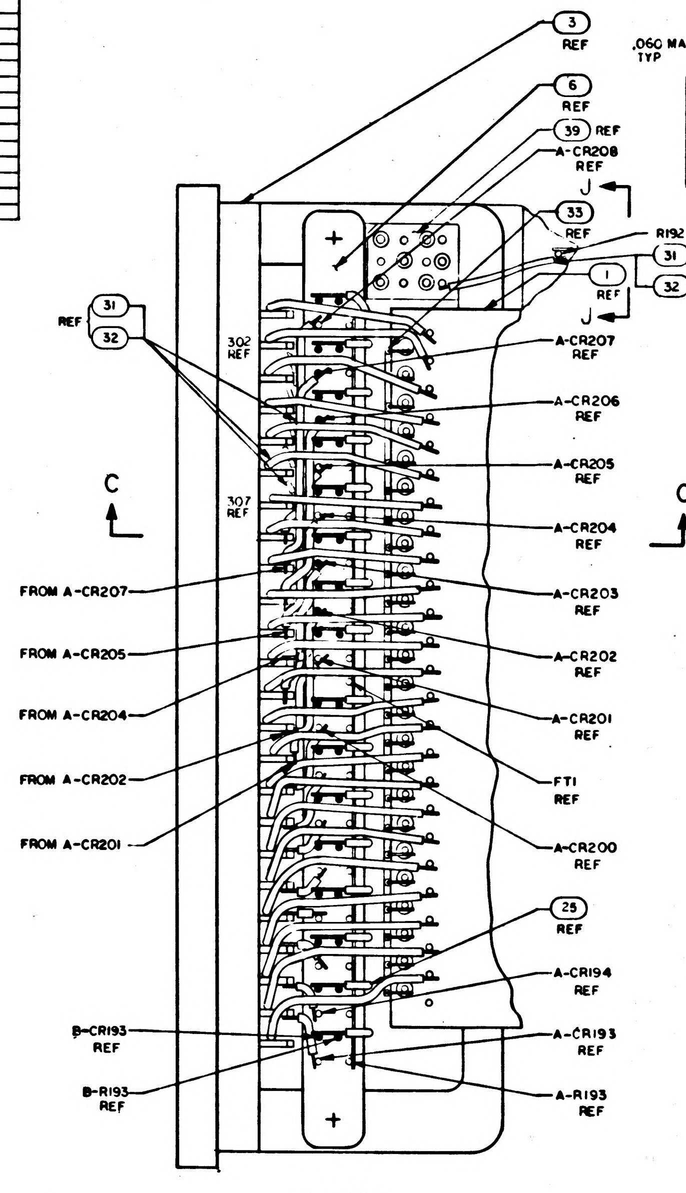
401
101
424
124

SECTION E-E



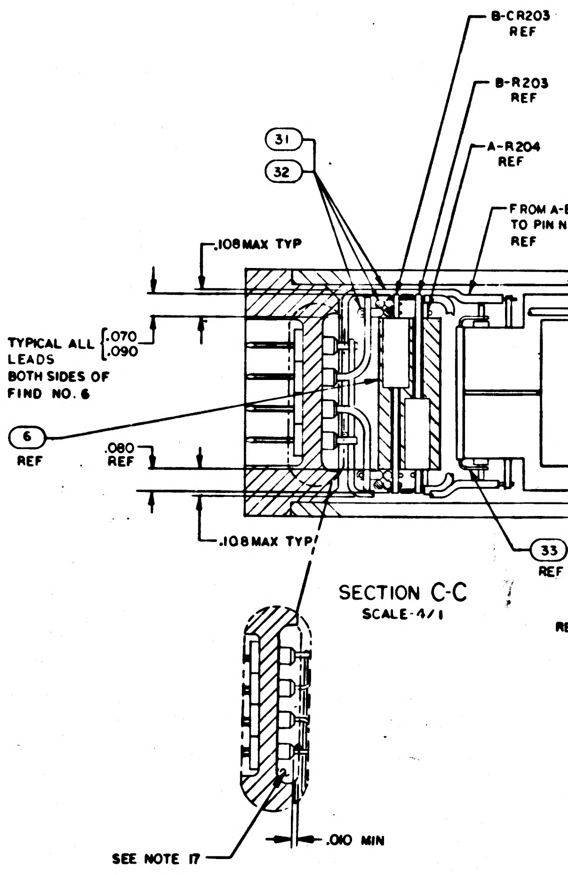
SEE NOTE 19
39
.060 MAX TYP
.060 MAX TYP
3 REF

VIEW J-J



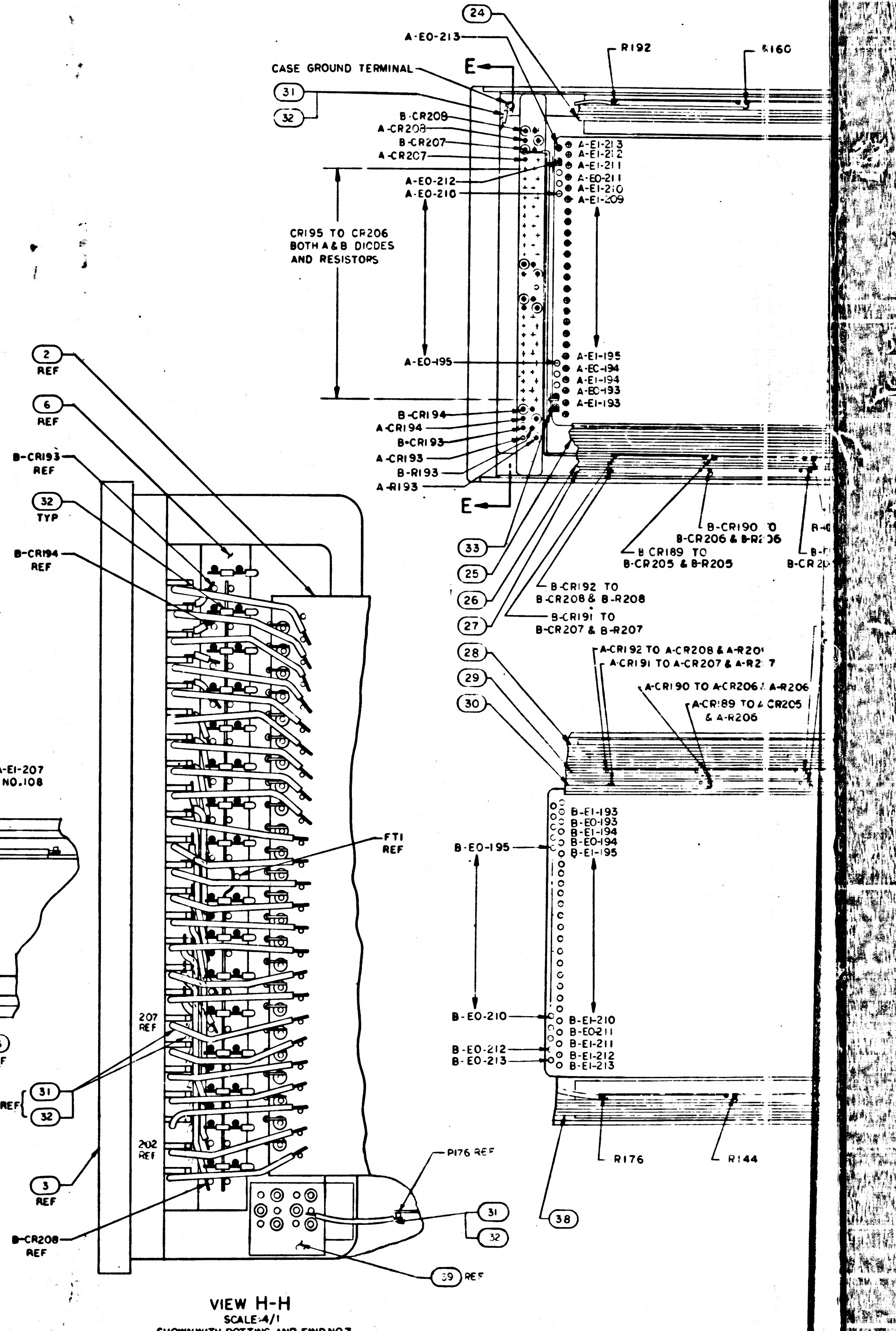
3 REF
6 REF
39 REF
A-CR208 REF
J
33 REF
R192 REF
1 REF
31
32
J
REF 31 32
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FTI REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
B-CR193 REF
B-R193 REF
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
C
C
+
+

VIEW G-G
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



31
32
B-CR203 REF
B-R203 REF
A-R204 REF
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE: 4/1



24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
33
25
26
27
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R20
A-CR191 TO A-CR207 & A-R2 7
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R206
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
38
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FTI REF
207 REF
REF 31 32
202 REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF

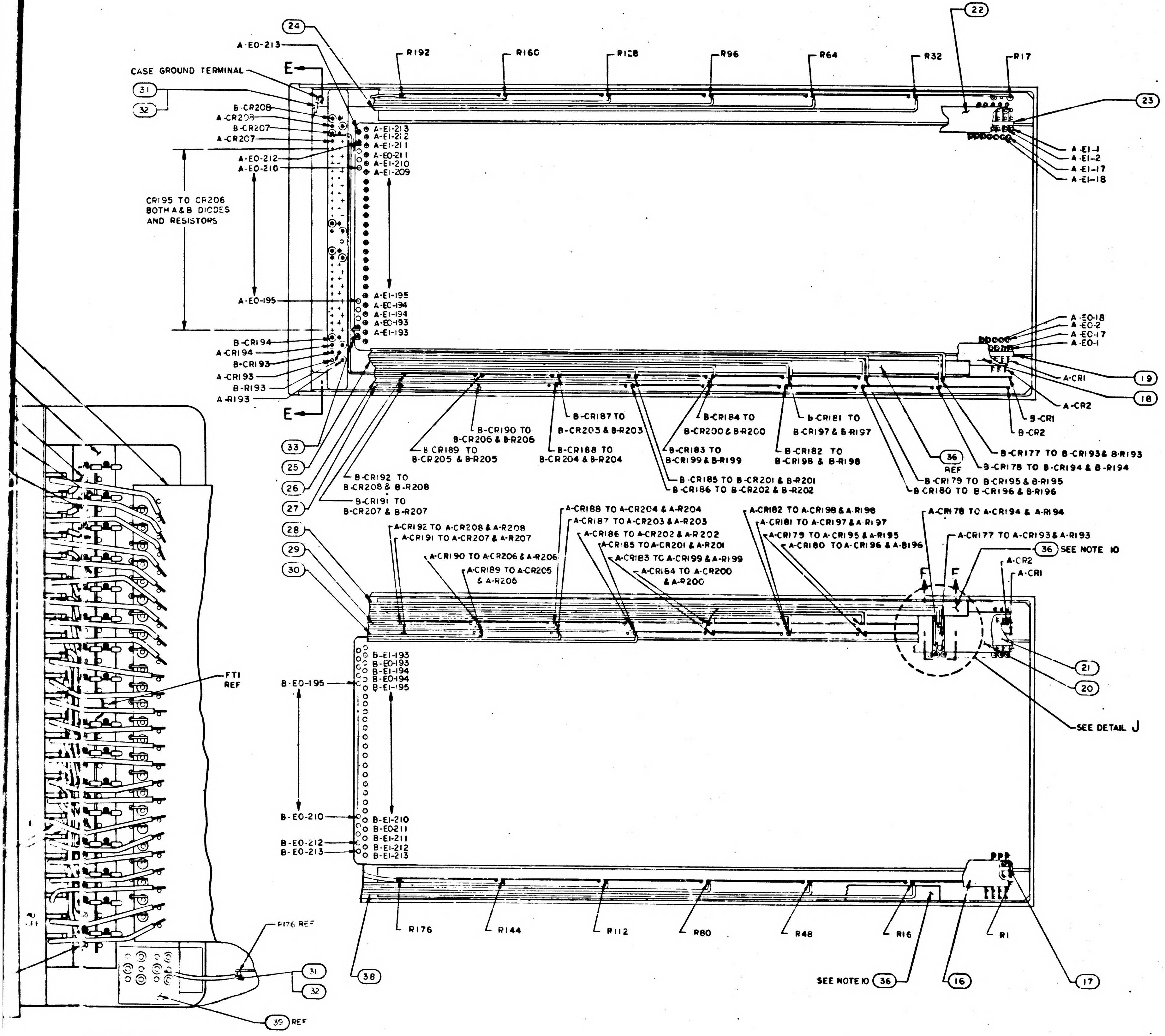
VIEW H-H
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

D C B A

2010802 C

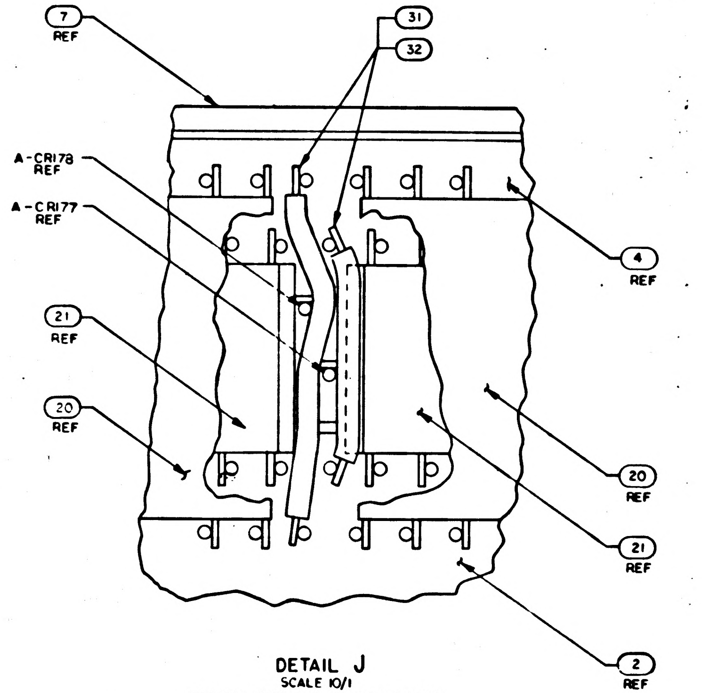
SH 2/3 2010802 CF 1/2

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR J.P. Leonard CHK	12/4/69	PBR
B	REVISED PER TDRR 37916 DR J.P. Leonard CHK	2/11/69	PBR
C	REVISED PER TDRR 37954 DR J. Mellow CHK	1/8/70	PBR



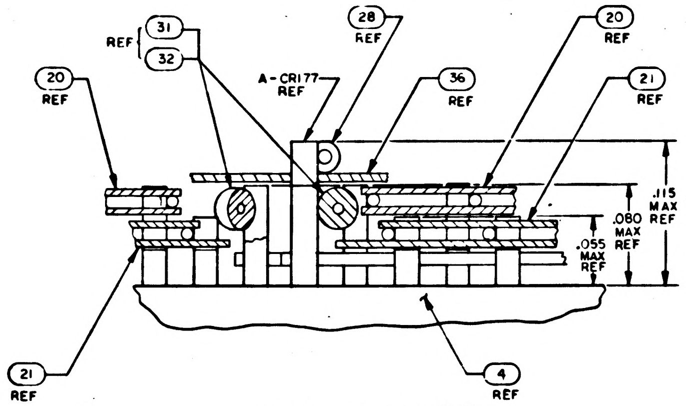
4
3
2
1
24
A-EO-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-EO-212
A-EO-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-EO-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
R192
R160
R128
R96
R64
R32
22
R17
23
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
A-EI-1
A-EI-2
A-EI-17
A-EI-18
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
A-EO-18
A-EO-2
A-EO-17
A-EO-1
A-CR1
19
18
A-CR2
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F F
21
20
SEE DETAIL J
B-EO-195
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-210
B-EI-210
B-EO-211
B-EI-211
B-EO-212
B-EO-213
B-EI-212
B-EI-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10
36
16
17
FT1 REF
R176 REF
31
32
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED SEE NOTES 11,12,13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NOS 28 AND 36 REMOVED



REF
31
32
28 REF
20 REF
20 REF
A-CR177 REF
36 REF
21 REF
.115 MAX REF
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ±.005 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO 2010802
SCALE 2/1
SHEET 2 OF 3

2010802 C

SH 2/3 2010802 CF 2/2

[illegible]

8 7 6 5 4

D C B A

2010802 C

REVISIONS TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR CHK	12/4/69	
B	REVISED PER TDRR 37916 DR CHK	12/4/69	
C	REVISED PER TDRR 37954 DR HK	1/2/70	

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-E0-1	A-CR1	A-E0-97	A-CR97	B-E0-1	B-CR1	B-E0-97	B-CR97	A-E1-1	R1	A-E1-49	R49	A-E1-97	R97	A-E1-145	R145
A-E0-2	A-CR2	A-E0-98	A-CR98	B-E0-2	B-CR2	B-E0-98	B-CR98	B-E1-1		B-E1-49		B-E1-97		B-E1-145	
A-E0-3	A-CR3	A-E0-99	A-CR99	B-E0-3	B-CR3	B-E0-99	B-CR99	A-E1-2	R2	A-E1-50	R50	A-E1-98	R98	A-E1-146	R146
A-E0-4	A-CR4	A-E0-100	A-CR100	B-E0-4	B-CR4	B-E0-100	B-CR100	B-E1-2		B-E1-50		B-E1-98		B-E1-146	
A-E0-5	A-CR5	A-E0-101	A-CR101	B-E0-5	B-CR5	B-E0-101	B-CR101	A-E1-3	R3	A-E1-51	R51	A-E1-99	R99	A-E1-147	R147
A-E0-6	A-CR6	A-E0-102	A-CR102	B-E0-6	B-CR6	B-E0-102	B-CR102	B-E1-3		B-E1-51		B-E1-99		B-E1-147	
A-E0-7	A-CR7	A-E0-103	A-CR103	B-E0-7	B-CR7	B-E0-103	B-CR103	A-E1-4	R4	A-E1-52	R52	A-E1-100	R100	A-E1-148	R148
A-E0-8	A-CR8	A-E0-104	A-CR104	B-E0-8	B-CR8	B-E0-104	B-CR104	B-E1-4		B-E1-52		B-E1-100		B-E1-148	
A-E0-9	A-CR9	A-E0-105	A-CR105	B-E0-9	B-CR9	B-E0-105	B-CR105	A-E1-5	R5	A-E1-53	R53	A-E1-101	R101	A-E1-149	R149
A-E0-10	A-CR10	A-E0-106	A-CR106	B-E0-10	B-CR10	B-E0-106	B-CR106	B-E1-5		B-E1-53		B-E1-101		B-E1-149	
A-E0-11	A-CR11	A-E0-107	A-CR107	B-E0-11	B-CR11	B-E0-107	B-CR107	A-E1-6	R6	A-E1-54	R54	A-E1-102	R102	A-E1-150	R150
A-E0-12	A-CR12	A-E0-108	A-CR108	B-E0-12	B-CR12	B-E0-108	B-CR108	B-E1-6		B-E1-54		B-E1-102		B-E1-150	
A-E0-13	A-CR13	A-E0-109	A-CR109	B-E0-13	B-CR13	B-E0-109	B-CR109	A-E1-7	R7	A-E1-55	R55	A-E1-103	R103	A-E1-151	R151
A-E0-14	A-CR14	A-E0-110	A-CR110	B-E0-14	B-CR14	B-E0-110	B-CR110	B-E1-7		B-E1-55		B-E1-103		B-E1-151	
A-E0-15	A-CR15	A-E0-111	A-CR111	B-E0-15	B-CR15	B-E0-111	B-CR111	A-E1-8	R8	A-E1-56	R56	A-E1-104	R104	A-E1-152	R152
A-E0-16	A-CR16	A-E0-112	A-CR112	B-E0-16	B-CR16	B-E0-112	B-CR112	B-E1-8		B-E1-56		B-E1-104		B-E1-152	
A-E0-17	A-CR17	A-E0-113	A-CR113	B-E0-17	B-CR17	B-E0-113	B-CR113	A-E1-9	R9	A-E1-57	R57	A-E1-105	R105	A-E1-153	R153
A-E0-18	A-CR18	A-E0-114	A-CR114	B-E0-18	B-CR18	B-E0-114	B-CR114	B-E1-9		B-E1-57		B-E1-105		B-E1-153	
A-E0-19	A-CR19	A-E0-115	A-CR115	B-E0-19	B-CR19	B-E0-115	B-CR115	A-E1-10	R10	A-E1-58	R58	A-E1-106	R106	A-E1-154	R154
A-E0-20	A-CR20	A-E0-116	A-CR116	B-E0-20	B-CR20	B-E0-116	B-CR116	B-E1-10		B-E1-58		B-E1-106		B-E1-154	
A-E0-21	A-CR21	A-E0-117	A-CR117	B-E0-21	B-CR21	B-E0-117	B-CR117	A-E1-11	R11	A-E1-59	R59	A-E1-107	R107	A-E1-155	R155
A-E0-22	A-CR22	A-E0-118	A-CR118	B-E0-22	B-CR22	B-E0-118	B-CR118	B-E1-11		B-E1-59		B-E1-107		B-E1-155	
A-E0-23	A-CR23	A-E0-119	A-CR119	B-E0-23	B-CR23	B-E0-119	B-CR119	A-E1-12	R12	A-E1-60	R60	A-E1-108	R108	A-E1-156	R156
A-E0-24	A-CR24	A-E0-120	A-CR120	B-E0-24	B-CR24	B-E0-120	B-CR120	B-E1-12		B-E1-60		B-E1-108		B-E1-156	
A-E0-25	A-CR25	A-E0-121	A-CR121	B-E0-25	B-CR25	B-E0-121	B-CR121	A-E1-13	R13	A-E1-61	R61	A-E1-109	R109	A-E1-157	R157
A-E0-26	A-CR26	A-E0-122	A-CR122	B-E0-26	B-CR26	B-E0-122	B-CR122	B-E1-13		B-E1-61		B-E1-109		B-E1-157	
A-E0-27	A-CR27	A-E0-123	A-CR123	B-E0-27	B-CR27	B-E0-123	B-CR123	A-E1-14	R14	A-E1-62	R62	A-E1-110	R110	A-E1-158	R158
A-E0-28	A-CR28	A-E0-124	A-CR124	B-E0-28	B-CR28	B-E0-124	B-CR124	B-E1-14		B-E1-62		B-E1-110		B-E1-158	
A-E0-29	A-CR29	A-E0-125	A-CR125	B-E0-29	B-CR29	B-E0-125	B-CR125	A-E1-15	R15	A-E1-63	R63	A-E1-111	R111	A-E1-159	R159
A-E0-30	A-CR30	A-E0-126	A-CR126	B-E0-30	B-CR30	B-E0-126	B-CR126	B-E1-15		B-E1-63		B-E1-111		B-E1-159	
A-E0-31	A-CR31	A-E0-127	A-CR127	B-E0-31	B-CR31	B-E0-127	B-CR127	A-E1-16	R16	A-E1-64	R64	A-E1-112	R112	A-E1-160	R160
A-E0-32	A-CR32	A-E0-128	A-CR128	B-E0-32	B-CR32	B-E0-128	B-CR128	B-E1-16		B-E1-64		B-E1-112		B-E1-160	
A-E0-33	A-CR33	A-E0-129	A-CR129	B-E0-33	B-CR33	B-E0-129	B-CR129	A-E1-17	R17	A-E1-65	R65	A-E1-113	R113	A-E1-161	R161
A-E0-34	A-CR34	A-E0-130	A-CR130	B-E0-34	B-CR34	B-E0-130	B-CR130	B-E1-17		B-E1-65		B-E1-113		B-E1-161	
A-E0-35	A-CR35	A-E0-131	A-CR131	B-E0-35	B-CR35	B-E0-131	B-CR131	A-E1-18	R18	A-E1-66	R66	A-E1-114	R114	A-E1-162	R162
A-E0-36	A-CR36	A-E0-132	A-CR132	B-E0-36	B-CR36	B-E0-132	B-CR132	B-E1-18		B-E1-66		B-E1-114		B-E1-162	
A-E0-37	A-CR37	A-E0-133	A-CR133	B-E0-37	B-CR37	B-E0-133	B-CR133	A-E1-19	R19	A-E1-67	R67	A-E1-115	R115	A-E1-163	R163
A-E0-38	A-CR38	A-E0-134	A-CR134	B-E0-38	B-CR38	B-E0-134	B-CR134	B-E1-19		B-E1-67		B-E1-115		B-E1-163	
A-E0-39	A-CR39	A-E0-135	A-CR135	B-E0-39	B-CR39	B-E0-135	B-CR135	A-E1-20	R20	A-E1-68	R68	A-E1-116	R116	A-E1-164	R164
A-E0-40	A-CR40	A-E0-136	A-CR136	B-E0-40	B-CR40	B-E0-136	B-CR136	B-E1-20		B-E1-68		B-E1-116		B-E1-164	
A-E0-41	A-CR41	A-E0-137	A-CR137	B-E0-41	B-CR41	B-E0-137	B-CR137	A-E1-21	R21	A-E1-69	R69	A-E1-117	R117	A-E1-165	R165
A-E0-42	A-CR42	A-E0-138	A-CR138	B-E0-42	B-CR42	B-E0-138	B-CR138	B-E1-21		B-E1-69		B-E1-117		B-E1-165	
A-E0-43	A-CR43	A-E0-139	A-CR139	B-E0-43	B-CR43	B-E0-139	B-CR139	A-E1-22	R22	A-E1-70	R70	A-E1-118	R118	A-E1-166	R166
A-E0-44	A-CR44	A-E0-140	A-CR140	B-E0-44	B-CR44	B-E0-140	B-CR140	B-E1-22		B-E1-70		B-E1-118		B-E1-166	
A-E0-45	A-CR45	A-E0-141	A-CR141	B-E0-45	B-CR45	B-E0-141	B-CR141	A-E1-23	R23	A-E1-71	R71	A-E1-119	R119	A-E1-167	R167
A-E0-46	A-CR46	A-E0-142	A-CR142	B-E0-46	B-CR46	B-E0-142	B-CR142	B-E1-23		B-E1-71		B-E1-119		B-E1-167	
A-E0-47	A-CR47	A-E0-143	A-CR143	B-E0-47	B-CR47	B-E0-143	B-CR143	A-E1-24	R24	A-E1-72	R72	A-E1-120	R120	A-E1-168	R168
A-E0-48	A-CR48	A-E0-144	A-CR144	B-E0-48	B-CR48	B-E0-144	B-CR144	B-E1-24		B-E1-72		B-E1-120		B-E1-168	
A-E0-49	A-CR49	A-E0-145	A-CR145	B-E0-49	B-CR49	B-E0-145	B-CR145	A-E1-25	R25	A-E1-73	R73	A-E1-121	R121	A-E1-169	R169
A-E0-50	A-CR50	A-E0-146	A-CR146	B-E0-50	B-CR50	B-E0-146	B-CR146	B-E1-25		B-E1-73		B-E1-121		B-E1-169	
A-E0-51	A-CR51	A-E0-147	A-CR147	B-E0-51	B-CR51	B-E0-147	B-CR147	A-E1-26	R26	A-E1-74	R74	A-E1-122	R122	A-E1-170	R170
A-E0-52	A-CR52	A-E0-148	A-CR148	B-E0-52	B-CR52	B-E0-148	B-CR148	B-E1-26		B-E1-74		B-E1-122		B-E1-170	
A-E0-53	A-CR53	A-E0-149	A-CR149	B-E0-53	B-CR53	B-E0-149	B-CR149	A-E1-27	R27	A-E1-75	R75	A-E1-123	R123	A-E1-171	R171
A-E0-54	A-CR54	A-E0-150	A-CR150	B-E0-54	B-CR54	B-E0-150	B-CR150	B-E1-27		B-E1-75		B-E1-123		B-E1-171	
A-E0-55	A-CR55	A-E0-151	A-CR151	B-E0-55	B-CR55	B-E0-151	B-CR151	A-E1-28	R28	A-E1-76	R76	A-E1-124	R124	A-E1-172	R172
A-E0-56	A-CR56	A-E0-152	A-CR152	B-E0-56	B-CR56	B-E0-152	B-CR152	B-E1-28		B-E1-76		B-E1-124		B-E1-172	
A-E0-57	A-CR57	A-E0-153	A-CR153	B-E0-57	B-CR57	B-E0-153	B-CR153	A-E1-29	R29	A-E1-77	R77	A-E1-125	R125	A-E1-173	R173
A-E0-58	A-CR58	A-E0-154	A-CR154	B-E0-58	B-CR58	B-E0-154	B-CR154	B-E1-29		B-E1-77		B-E1-125		B-E1-173	
A-E0-59	A-CR59	A-E0-155	A-CR155	B-E0-59	B-CR59	B-E0-155	B-CR155	A-E1-30	R30	A-E1-78	R78	A-E1-126	R126	A-E1-174	R174
A-E0-60	A-CR60	A-E0-156	A-CR156	B-E0-60	B-CR60	B-E0-156	B-CR156	B-E1-30		B-E1-78		B-E1-126		B-E1-174	
A-E0-61	A-CR61	A-E0-157	A-CR157	B-E0-61	B-CR61	B-E0-157	B-CR157	A-E1-31	R31	A-E1-79	R79	A-E1-127	R127	A-E1-175	R175
A-E0-62	A-CR62	A-E0-158	A-CR158	B-E0-62	B-CR62	B-E0-158	B-CR158	B-E1-31		B-E1-79		B-E1-127		B-E1-175	
A-E0-63	A-CR63	A-E0-159	A-CR159	B-E0-63	B-CR63	B-E0-159	B-CR159	A-E1-32	R32	A-E1-80	R80	A-E1-128	R128	A-E1-176	R176
A-E0-64	A-CR64	A-E0-160	A-CR160	B-E0-64	B-CR64	B-E0-160	B-CR160	B-E1-32		B-E1-80		B-E1-128		B-E1-176	
A-E0-65	A-CR65	A-E0-161	A-CR161	B-E0-65	B-CR65	B-E0-161	B-CR161	A-E1-33	R33	A-E1-81	R81	A-E1-129	R129	A-E1-177	R177
A-E0-66	A-CR66	A-E0-162	A-CR162	B-E0-66	B-CR66	B-E0-162	B-CR162	B-E1-33		B-E1-81		B-E1-129		B-E1-177	
A-E0-67	A-CR67	A-E0-163	A-CR163	B-E0-67	B-CR67	B-E0-163	B-CR163	A-E1-34	R34	A-E1-82	R82	A-E1-130	R130	A-E1-178	R178
A-E0-68	A-CR68	A-E0-164	A-CR164	B-E0-68	B-CR68	B-E0-164	B-CR164	B-E1-34		B-E1-82		B-E1-130		B-E1-178	
A-E0-69	A-CR69	A-E0-165	A-CR165	B-E0-69	B-CR69	B-E0-165	B-CR165	A-E1-35	R35	A-E1-83	R83	A-E1-131	R131	A-E1-179	R179
A-E0-70	A-CR70	A-E0-166	A-CR166	B-E0-70	B-CR70	B-E0-166	B-CR166	B-E1-35		B-E1-83		B-E1-131		B-E1-179	
A-E0-71	A-CR71	A-E0-167	A-CR167	B-E0-71	B-CR71	B-E0-167	B-CR167	A-E1-36	R36	A-E1-84	R84	A-E1-132	R132	A-E1-180	R180
A-E0-72	A-CR72	A-E0-168	A-CR168	B-E0-72	B-CR72	B-E0-168	B-CR168	B-E1-36		B-E1-84		B-E1-132		B-E1-180	
A-E0-73	A-CR73	A-E0-169	A-CR169	B-E0-73	B-CR73	B-E0-169	B-CR169	A-E1-37	R37	A-E1-85	R85	A-E1-133	R133	A-E1-181	R181
A-E0-74	A-CR74	A-E0-170	A-CR170	B-E0-74	B-CR74	B-E0-170	B-CR170	B-E1-37		B-E1-85		B-E1-133		B-E1-181	
A-E0-75	A-CR75	A-E0-171	A-CR171	B-E0-75	B-CR75	B-E0-171	B-CR171	A-E1-38	R38	A-E1-86	R86	A-E1-134	R134	A-E1-182	R182
A-E0-76	A-CR76	A-E0-172	A-CR172	B-E0-76	B-CR76	B-E0-172	B-CR172	B-E1-38		B-E1-86		B-E1-134		B-E1-182	
A-E0-77	A-CR77	A-E0-173	A-CR173	B-E0-77	B-CR77	B-E0-173	B-CR173	A-E1-39	R39	A-E1-87	R87	A-E1-135	R135	A-E1-183	R183
A-E0-78	A-CR78	A-E0-174	A-CR174	B-E0-78	B-CR78	B-E0-174	B-CR174	B-E1-39		B-E1-87		B-E1-135		B-E1-183	
A-E0-79	A-CR79	A-E0-175	A-CR175	B-E0-79	B-CR79	B-E0-175	B-CR175	A-E1-40	R40	A-E1-88	R88	A-E1-136	R136	A-E1-184	R184
A-E0-80	A-CR80	A-E0-176	A-CR176	B-E0-80	B-CR80	B-E0-175	B-CR176	B-E1-40		B-E1-88		B-E1-136		B-E1-184	
A-E0-81	A-CR81	A-E0-177	A-CR177	B-E0-81	B-CR81	B-E0-177	B-CR177	A-E1-41	R41	A-E1-89	R89	A-E1-137	R137	A-E1-185	R185
A-E0-82	A-CR82	A-E0-178	A-CR178	B-E0-82	B-CR82	B-E0-178	B-CR178	B-E1-41		B-E1-89		B-E1-137		B-E1-185	
A-E0-83	A-CR83	A-E0-179	A-CR179	B-E0-83	B-CR83	B-E0-179	B-CR179	A-E1-42	R42	A-E1-90	R90	A-E1-138	R138	A-E1-186	R186
A-E0-84	A-CR84	A-E0-180	A-CR180	B-E0-84	B-CR84	B-E0-180	B-CR180	B-E1-42		B-E1-90		B-E1-138		B-E1-186	
A-E0-85	A-CR85	A-E0-181	A-CR181	B-E0-85	B-CR85	B-E0-181	B-CR181	A-E1-43	R43	A-E1-91	R91	A-E1-139	R139	A-E1-187	R187
A-E0-86	A-CR86	A-E0-182	A-CR182	B-E0-86	B-CR86	B-E0-182	B-CR182	B-E1-43		B-E1-91		B-E1-139		B-E1-187	
A-E0-87	A-CR87	A-E0-183	A-CR183	B-E0-87	B-CR87	B-E0-183	B-CR183	A-E1-44	R44	A-E1-92	R92	A-E1-140	R140	A-E1-188	R188
A-E0-88	A-CR88	A-E0-184	A-CR184	B-E0-88	B-CR88	B-E0-184	B-CR184	B-E1-44		B-E1-92		B-E1-140		B-E1-188	
A-E0-89	A-CR89	A-E0-185	A-CR185	B-E0-89	B-CR89	B-E0-185	B-CR185	A-E1-45	R45	A-E1-93	R93	A-E1-141	R141	A-E1-189	R189
A-E0-90	A-CR90	A-E0-186	A-CR186	B-E0-90	B-CR90	B-E0-186	B-CR186	B-E1-45		B-E1-93		B-E1-141		B-E1-189	
A-E0-91	A-CR91	A-E0-187	A-CR187	B-E0-91	B-CR91	B-E0-187	B-CR187	A-E1-46	R46	A-E1-94	R94	A-E1-142	R142	A-E1-190	R190
A-E0-92	A-CR92	A-E0-188	A-CR188	B-E0-92	B-CR92	B-E0-188	B-CR188	B-E1-46		B-E1-94		B-E1-142		B-E1-190	
A-E0-93	A-CR93	A-E0-189	A-CR189	B-E0-93	B-CR93	B-E0-189	B-CR189	A-E1-47	R47	A-E1-95	R95	A-E1-143	R143	A-E1-191	R191
A-E0-94	A-CR94	A-E0-190	A-CR190	B-E0-94	B-CR94	B-E0-190	B-CR190	B-E1-47		B-E1-95		B-E1-143		B-E1-191	
A-E0-95	A-CR95	A-E0-191	A-CR191	B-E0-95	B-CR95	B-E0-191	B-CR191	A-E1-48	R48	A-E1-96	R96	A-E1-144	R144	A-E1-192	R192
A-E0-96	A-CR96	A-E0-192	A-CR192	B-E0-96	B-CR96	B-E0-192	B-CR192	B-E1-48		B-E1-96		B-E1-144		B-E1-192	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED 14 Jul 69
APPROVED MSC

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010802

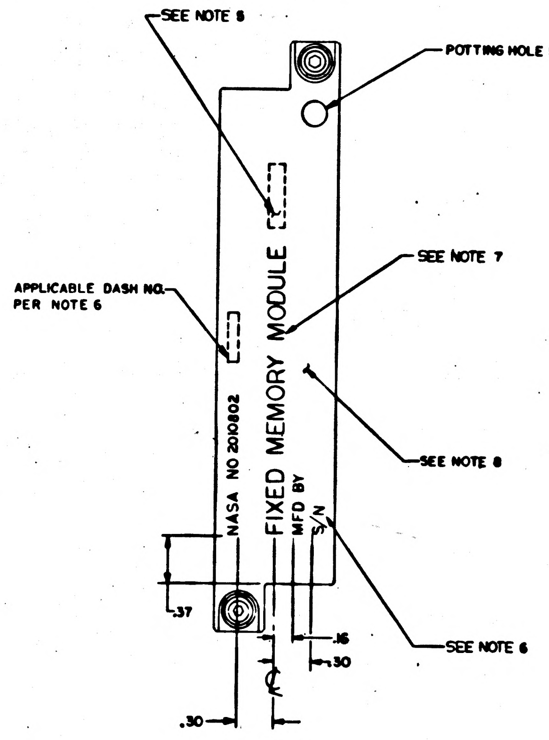
DATE
SCALE NONE
SHEET 3 OF 3

2010802 C

SH 3/3 2010802-CF.2/2

[illegible]

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-011	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
↑ -021	B-2	↑ -031	↑ -021	0322	↑	↑
-031	B-3	-041	-031	0323		
-041	B-4	-051	-041	0324		
↓ -051	B-5	↓ -061	↓ -051	0325	↓	↓
2010802-061	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
↑ -081	B-2	↑ -091	↑ -081	0328	↑	↑
-091	B-3	-111	-091	0329		
-111	B-4	-121	-111	0330		
↓ -121	B-5	↓ -131	↓ -121	0331	↓	↓
2010802-131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042


SEE NOTE 8
POTTING HOLE REF
SEE NOTE 7
APPLICABLE DASH NO. PER NOTE 6
FIXED MEMORY MODULE
NASA NO 2010802
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
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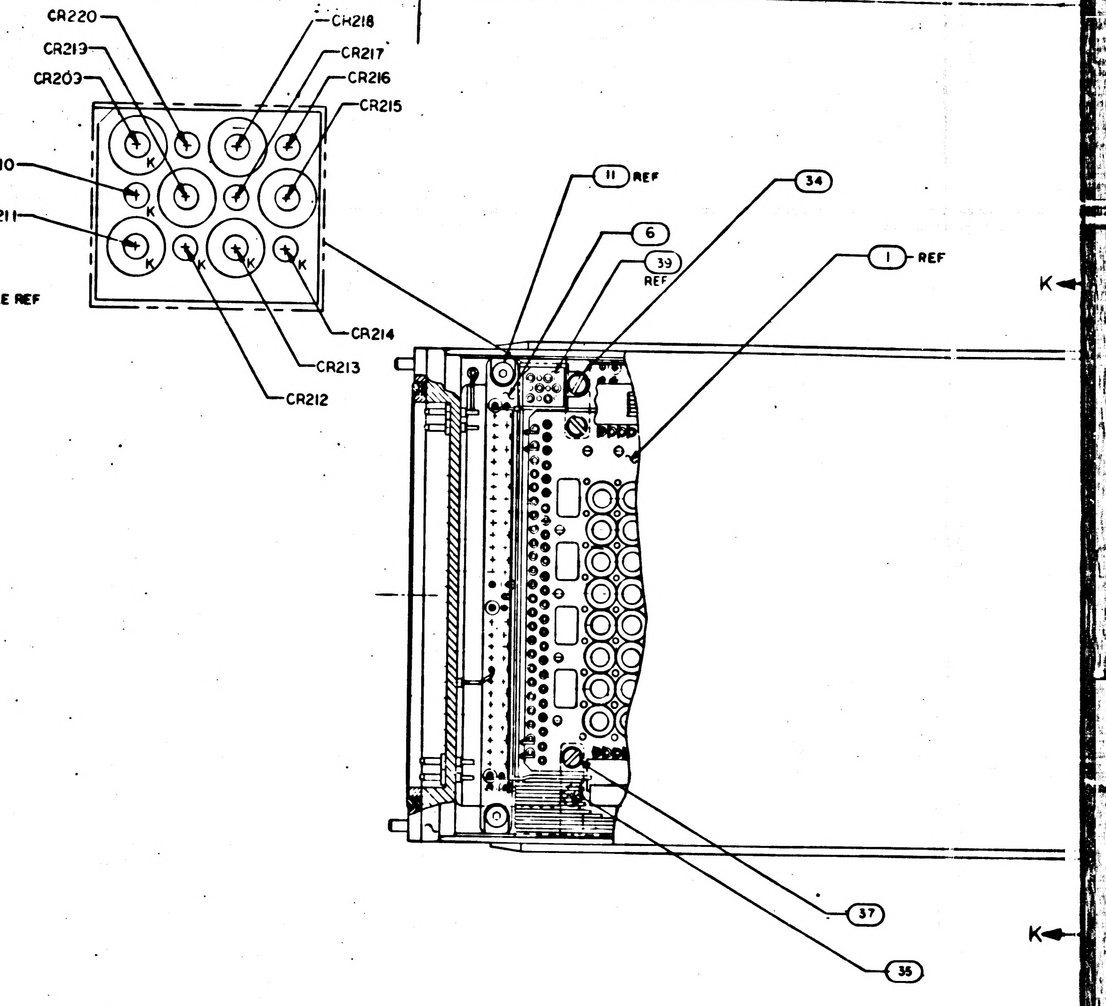
VIEW D-D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CR215
CR210
CR211
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CR214
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CR212
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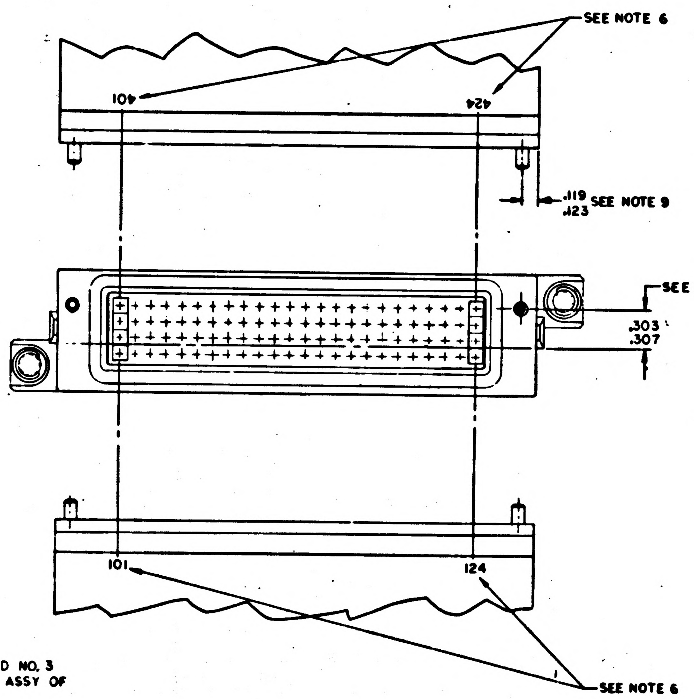
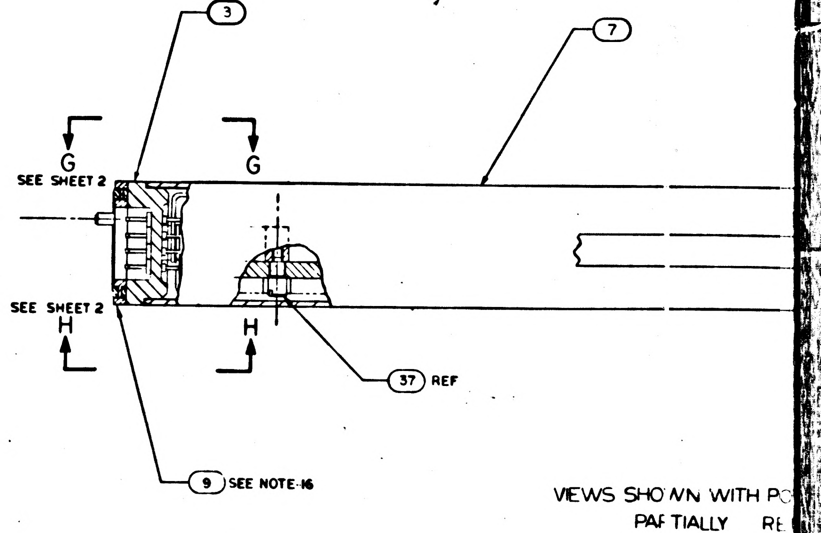
34
6
39 REF
1 REF
K
37
35
K


SEE NOTE 6
104
424
.119
.123 SEE NOTE 9
SEE NOTE 9
.303
.307
101
124
SEE NOTE 6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SEE SHEET 2
SEE SHEET 2
H
H
37 REF
9 SEE NOTE 16

VIEWS SHOWN WITH PO
PARTIALLY RE

NOTES:

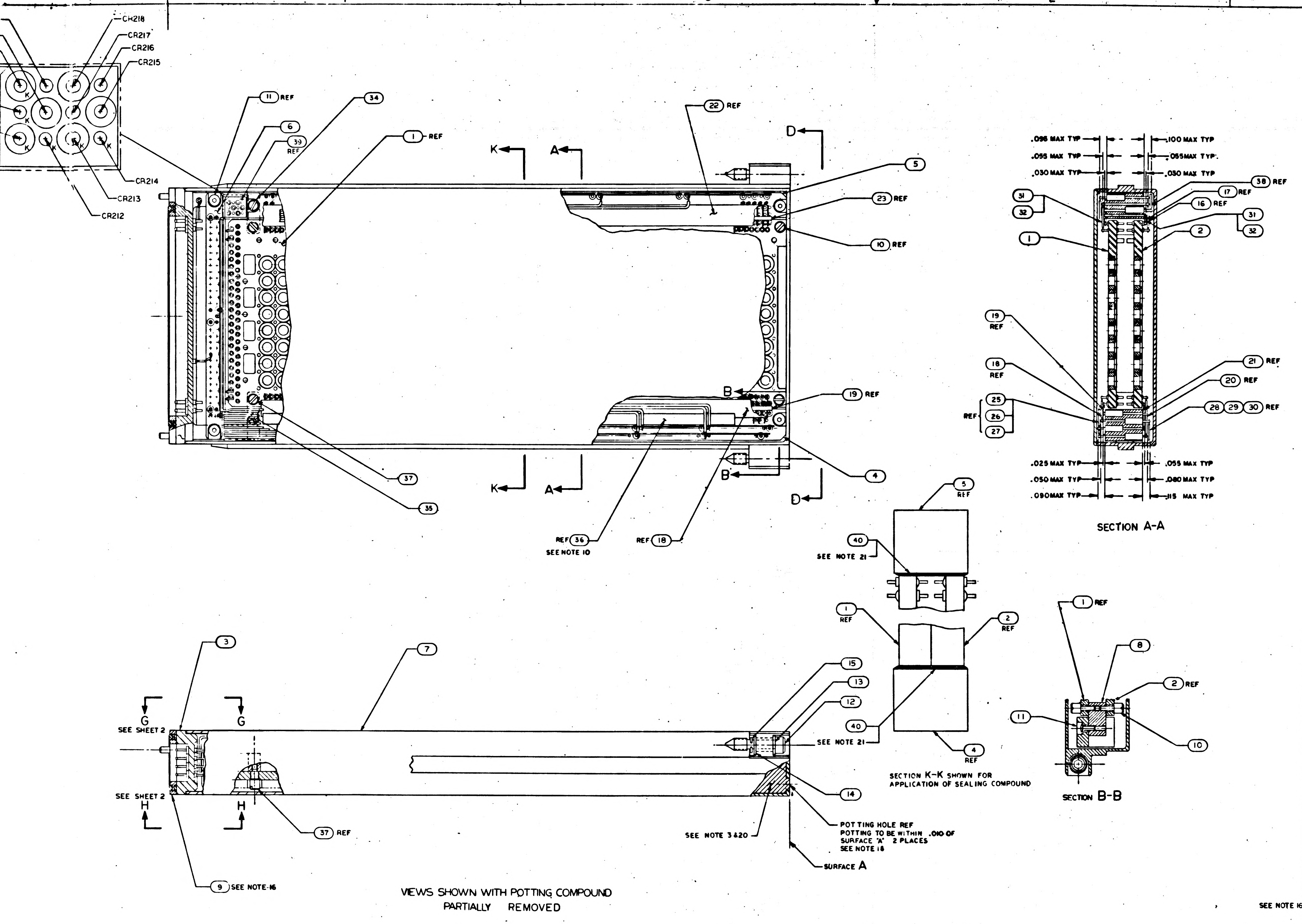
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO. 1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

2010802	D

	REVISIONS TDRR 37652			
SYM	DESCRIPTION	DATE	APPROVAL	
A	REVISED PER TDRR 37915 DR CHK	12/4/69	TBB	
B	REVISED PER TDRR 37916 DR CHK	12/11/69	TBB	
C	REVISED PER TDRR 37954 DR CHK	1/9/70	TBB	
D	REVISED PER TDRR 37967 DR C.G. Fod CHK	2/18/70	TBB	


4
3
2
1
CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
11 REF
6
39 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
37
35
4
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.096 MAX TYP
.095 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
31
32
19 REF
18 REF
21 REF
20 REF
REF 25 26 27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G SEE SHEET 2
G
SEE SHEET 2
H
H
15
13
12
SEE NOTE 21
14
37 REF
SEE NOTE 3&20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
SEE NOTE 16

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

S REQUIREMENTS FOR CONTROL
SPECTION OF ROPE MEMORY ASSEMBLIES
ZMS
MORY FIXTURE DWG NO. AP22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT, SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 68
CHECKED 10 APR 68
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2010802
SCALE 2/1 WT SHEET 1 OF 3

2010802 D

2010802 D

2010802DF 2/2 SH1/3

WIRE LIST

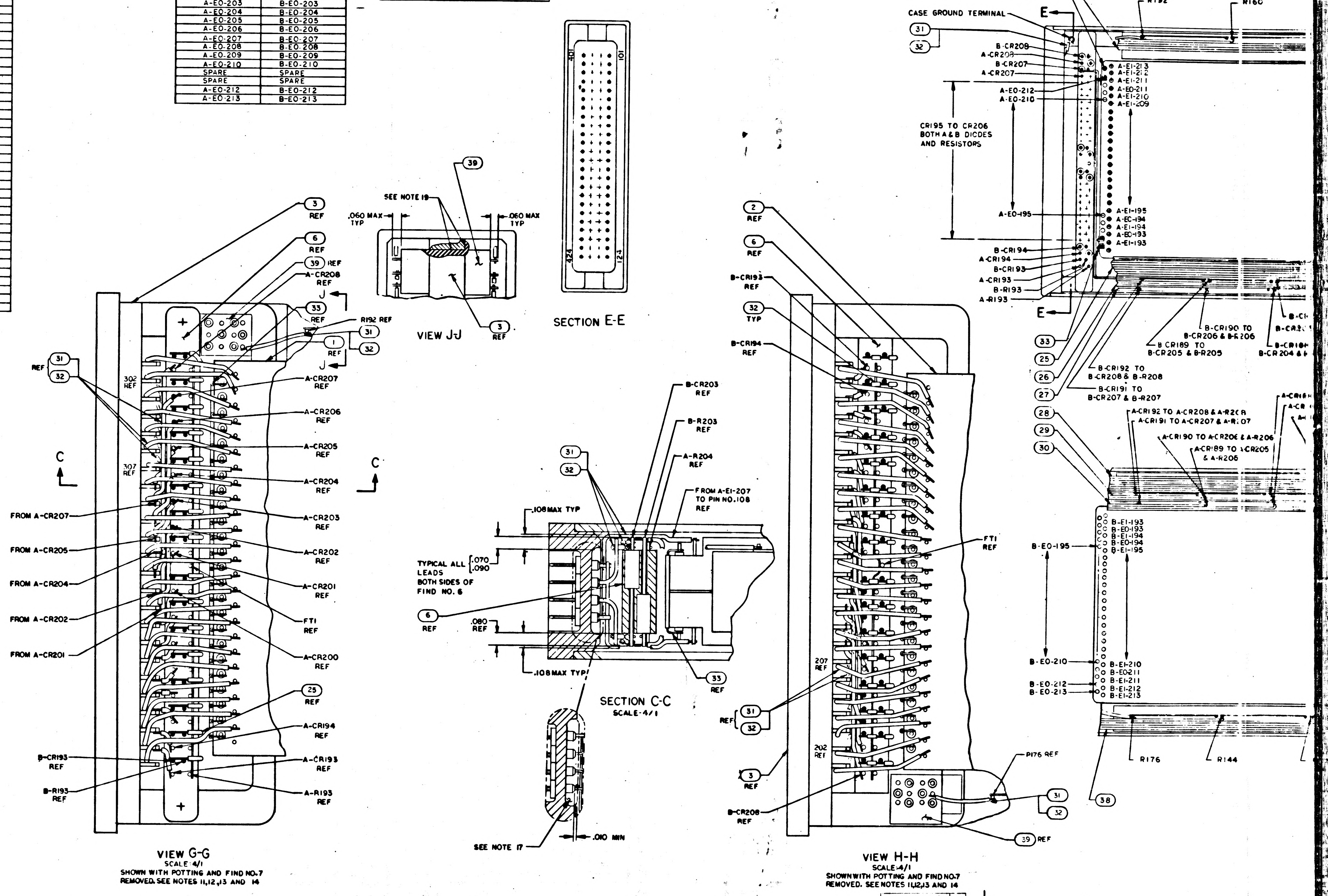
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST

COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


3 REF
6 REF
39 REF
A-CR208 REF
33 REF
R192 REF
31
32
1 REF
J
REF 31 32
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FT1 REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF
C
SEE NOTE 19
39
.060 MAX TYP
.060 MAX TYP
3 REF
401
101
424
124
B-CR203 REF
B-R203 REF
A-R204 REF
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
REF 31 32
3 REF
B-CR208 REF
P176 REF
31
32
39 REF
24
A-E0-213
CASE GROUND TERMINAL
E
R192
R160
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E0-212
B-E1-212
B-E0-213
B-E1-213
R176
R144
38

VIEW J-J

SECTION E-E

SECTION C-C
SCALE 4/1

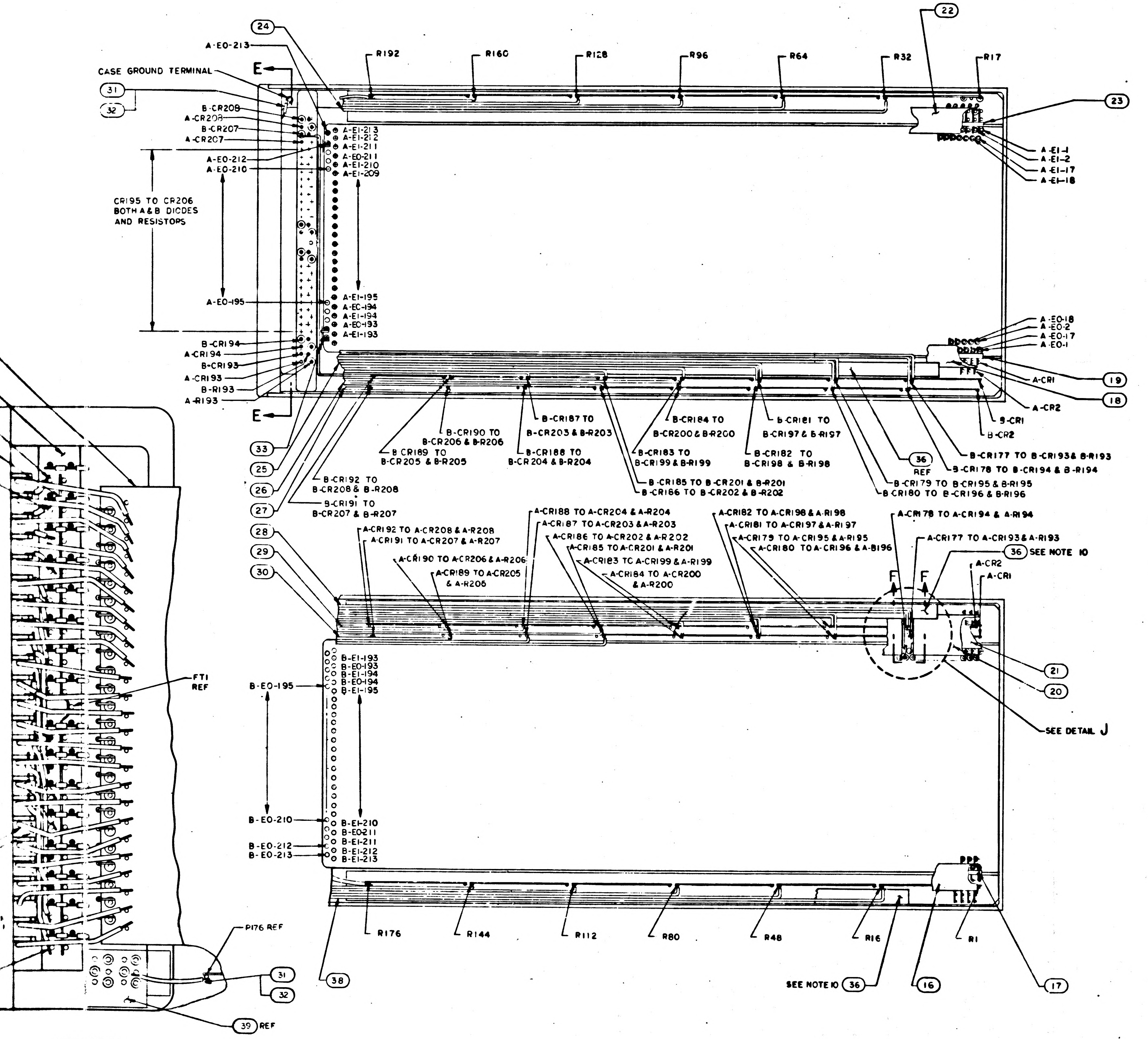
VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14

2010802 D

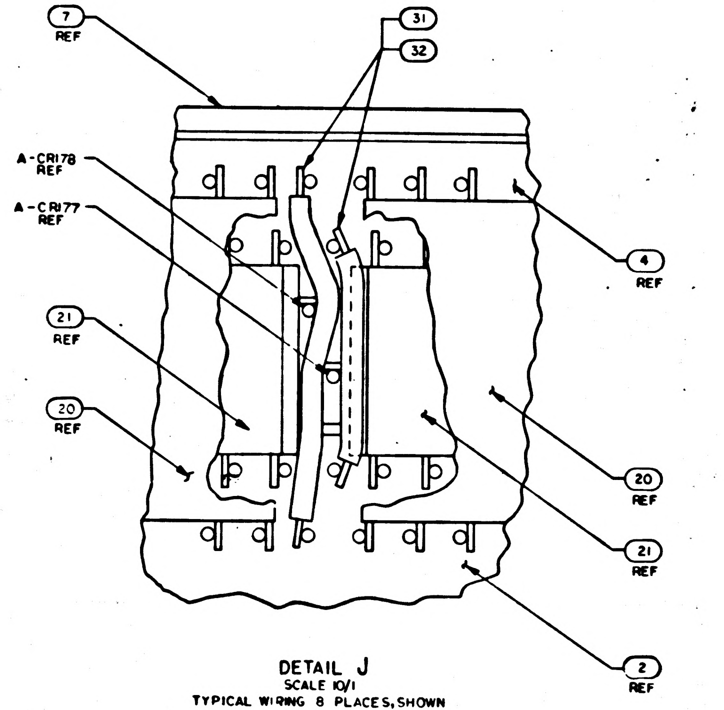
REVISIONS TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR CHK	12/4/69	PBB
B	REVISED PER TDRR 37916 DR CHK	12/11/69	PBB
C	REVISED PER TDRR 37954 DR CHK	1/8/70	PBB
D	REVISED PER TLRR 37967 DR CHK	2/18/70	PBB



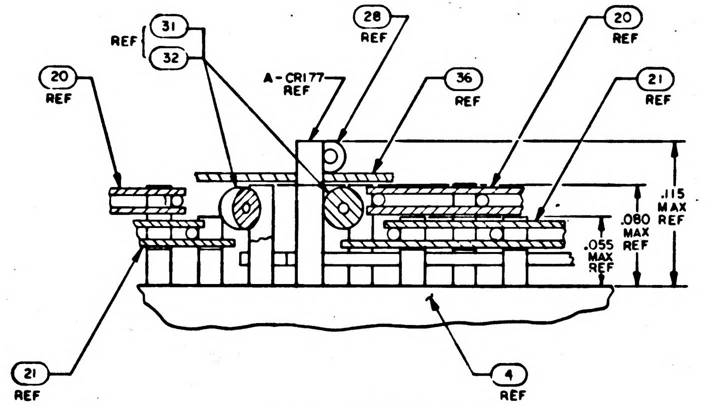
24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
R192
R160
R128
R96
R64
R32
R17
22
23
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
A-CR2
B-CR1
B-CR2
19
18
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
36 REF
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
FT1 REF
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10 36
16
17
P176 REF
31
32
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7 REMOVED. SEE NOTES 11,12,13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN WITH FIND NOS 28 AND 36 REMOVED



REF 31
32
20 REF
A-CR177 REF
28 REF
36 REF
20 REF
21 REF
.115 MAX
.080 REF MAX
.055 REF MAX
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO 2010802
SCALE 2/1 SHEET 2 OF 3

2010802 D

2010802DF2/2 SH2/3

8 7 6 5 4

[illegible]

D

C

B

A

8 7 6 5

4 3 2

SYM	DESCRIPTION	DATE	APP
A	REVISED PER TDRR 37915 DR. Leonard CHK. Urban	12/4/69	TFB
B	REVISED PER TDRR 37916 DR. Leonard CHK. Urban	12/11/69	TFB
C	REVISED PER TDRR 37954 DR. Hadley CHK. Urban	1/4/70	TFB
D	REVISED PER TDRR 37967 DR. R.A. Ford CHK. Urban	2/18/70	TFB

REVISIONS TDRR 37652

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
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A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
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A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith
CHECKED E. Urban
APPROVED
APPROVED

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

APPROVED
APPROVED MSC
DATE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010802

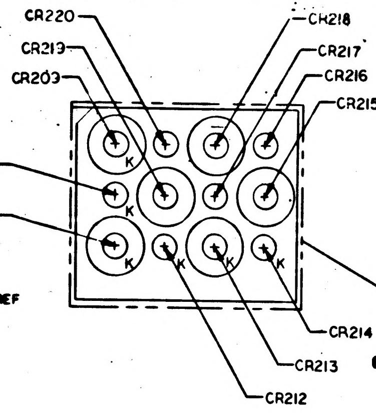
SCALE NONE SHEET 3 OF 3

2010802 D

4 1

2010802DT2/2 SH3/3

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-011	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
-021	B-2	-031	-021	0322		
-031	B-3	-041	-031	0323		
-041	B-4	-051	-041	0324		
-051	B-5	-061	-051	0325		
2010802-061	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
-081	B-2	-091	-081	0328		
-091	B-3	-111	-091	0329		
-111	B-4	-121	-111	0330		
-121	B-5	-131	-121	0331		
2010802-131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042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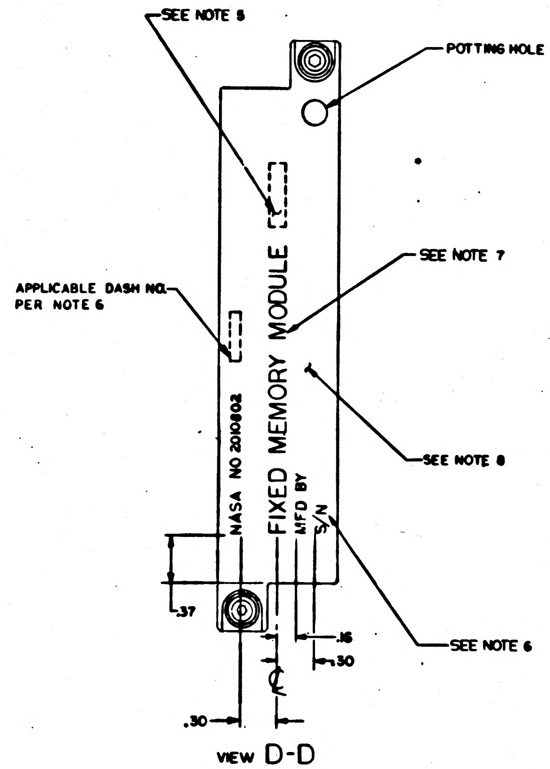
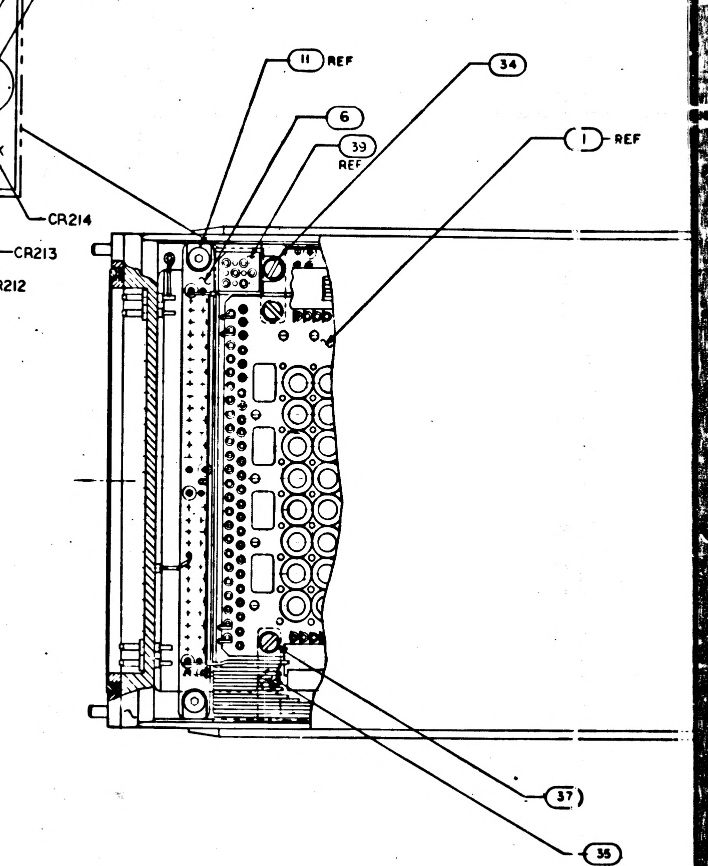
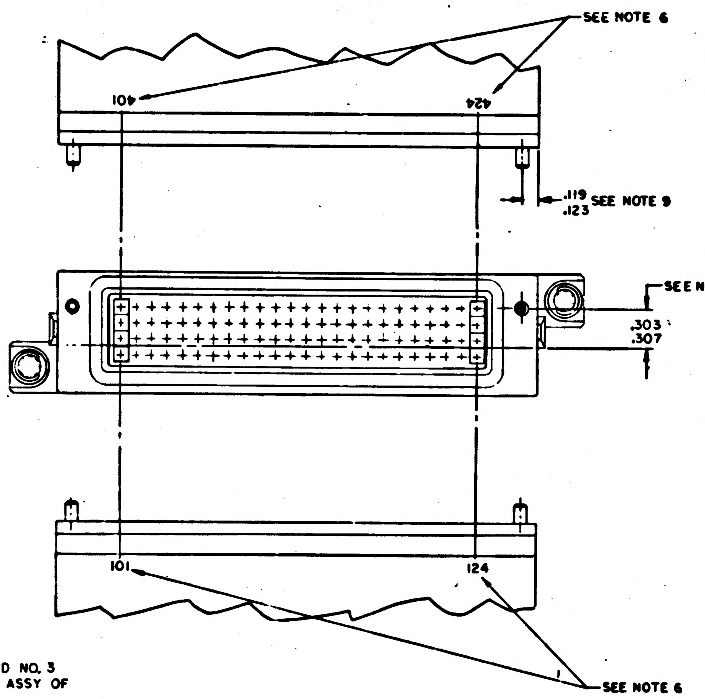
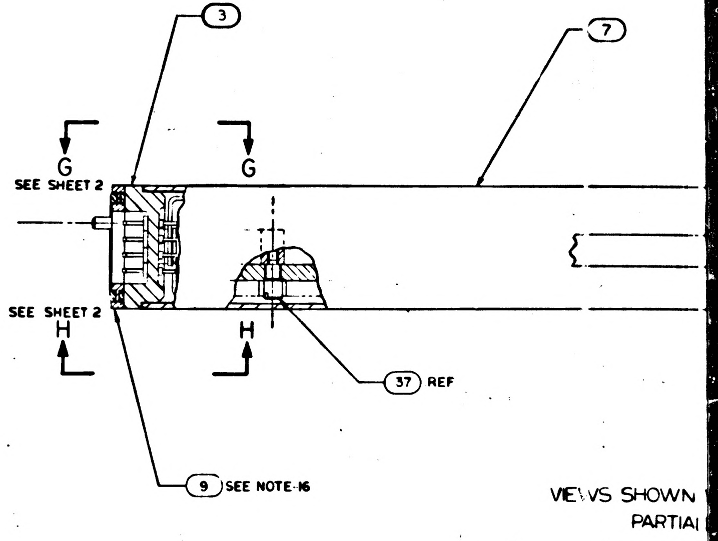
CR212


SEE NOTE 8
POTTING HOLE REF
APPLICABLE DASH NO. PER NOTE 6
SEE NOTE 7
FIXED MEMORY MODULE
NASA NO 2010802
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
.30
.30
VIEW D-D


11 REF
34
6
39 REF
1 REF
37
35


SEE NOTE 6
101
424
.119
.123
SEE NOTE 9
SEE NOTE 9
.303
.307
101
124
SEE NOTE 6

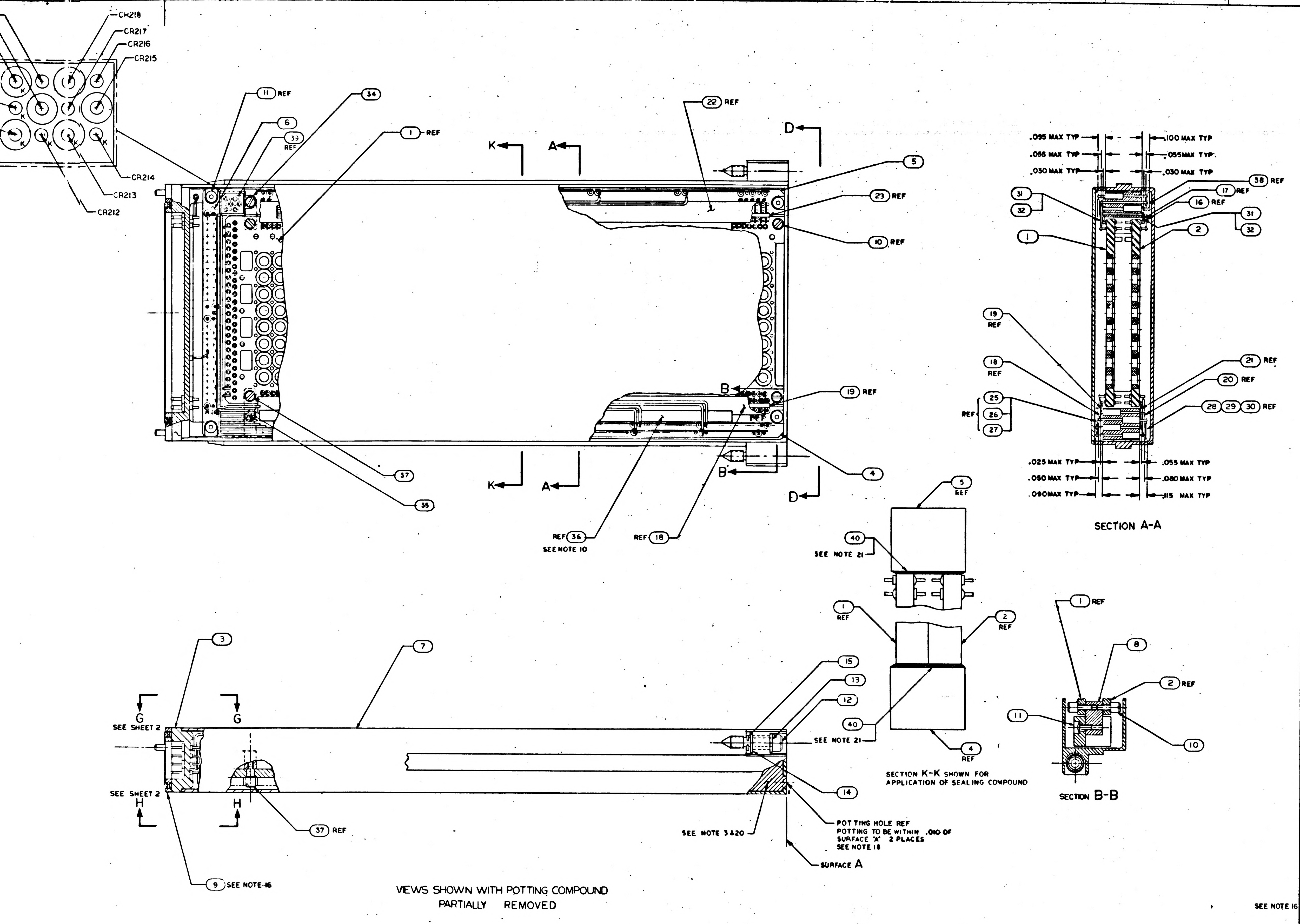

3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
37 REF
9 SEE NOTE 16
VIEWS SHOWN
PARTIAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO. 5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR CHK	4/69	TBR
B	REVISED PER TDRR 37916 DR CHK	2/11/69	TBR
C	REVISED PER TDRR 3795- DR CHK	70	TBR
D	REVISED PER TDRR 37967 DR R.G. Ford CHK	2/12/70	TBR
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	3/9/70	TBR

REVISIONS TDRR 37652


4
3
2
1
CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
11 REF
6
39 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
REF
4
37
35
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.095 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
31
32
19 REF
18 REF
21 REF
20 REF
25
26
27
REF
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
15
13
12
G
SEE SHEET 2
G
SEE NOTE 21
SEE SHEET 2
H
H
14
37 REF
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
C
VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

REQUIREMENTS OR CONTROL
ECTION OF ROPE MEMORY ASSEMBLIES
MORY FIXTURE WG NO. AP22500

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

B

A

2010802 E

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 68
CHECKED 10 APR 67
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2010802
SCALE 2/1 WT SHEET 1 OF 3

WIRE LIST

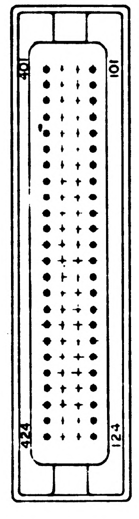
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

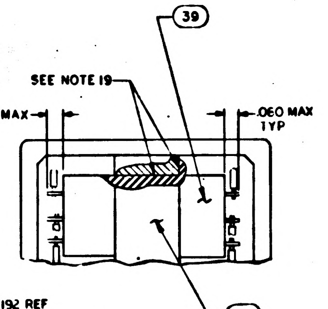
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST

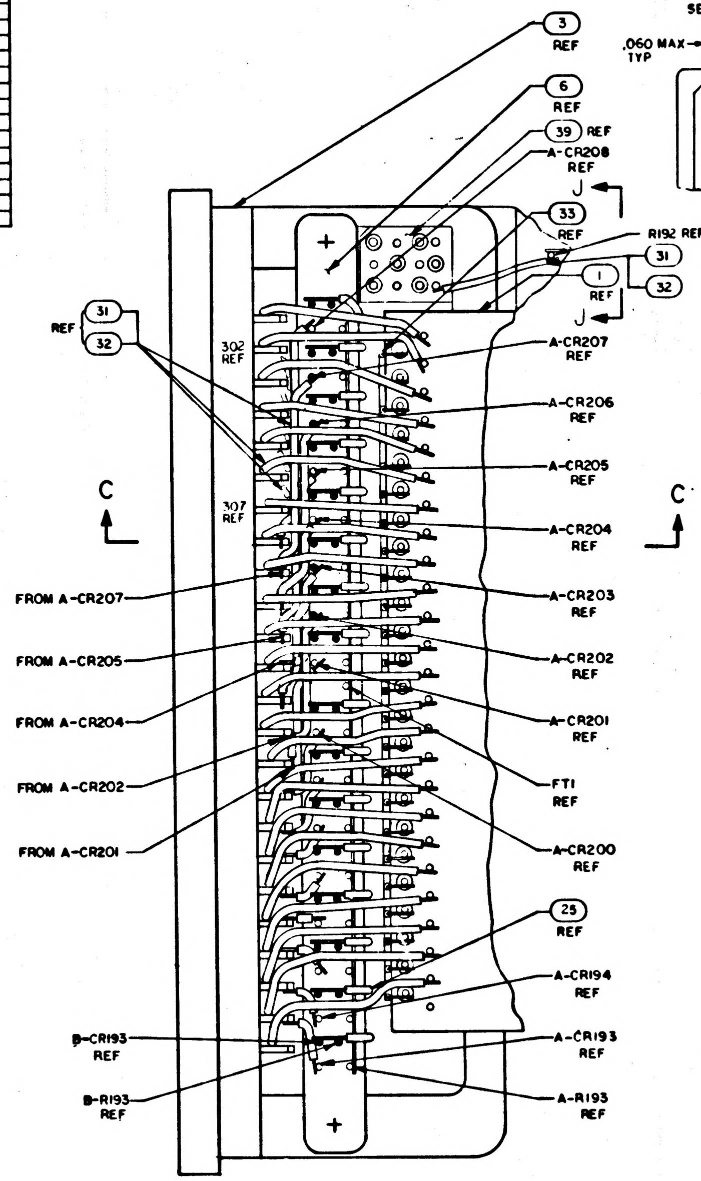
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


401
101
424
124

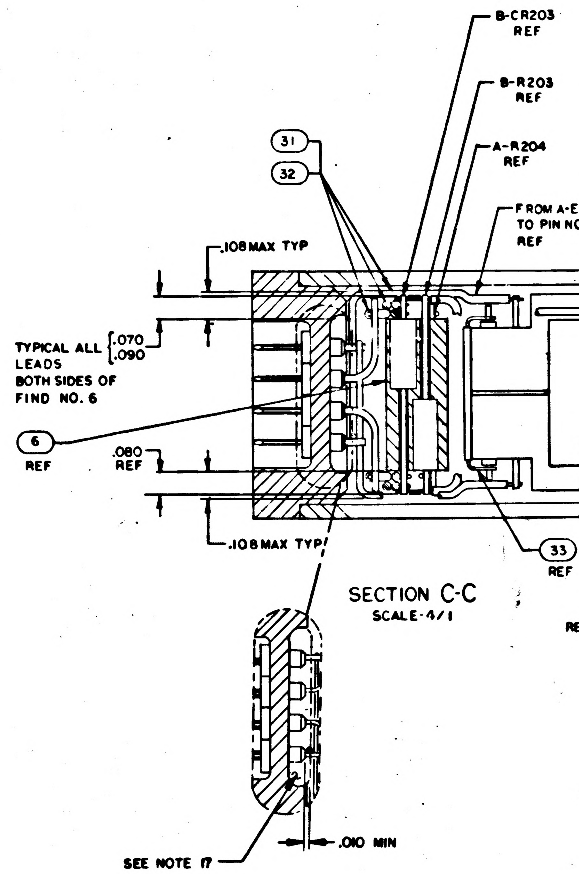
SECTION E-E


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

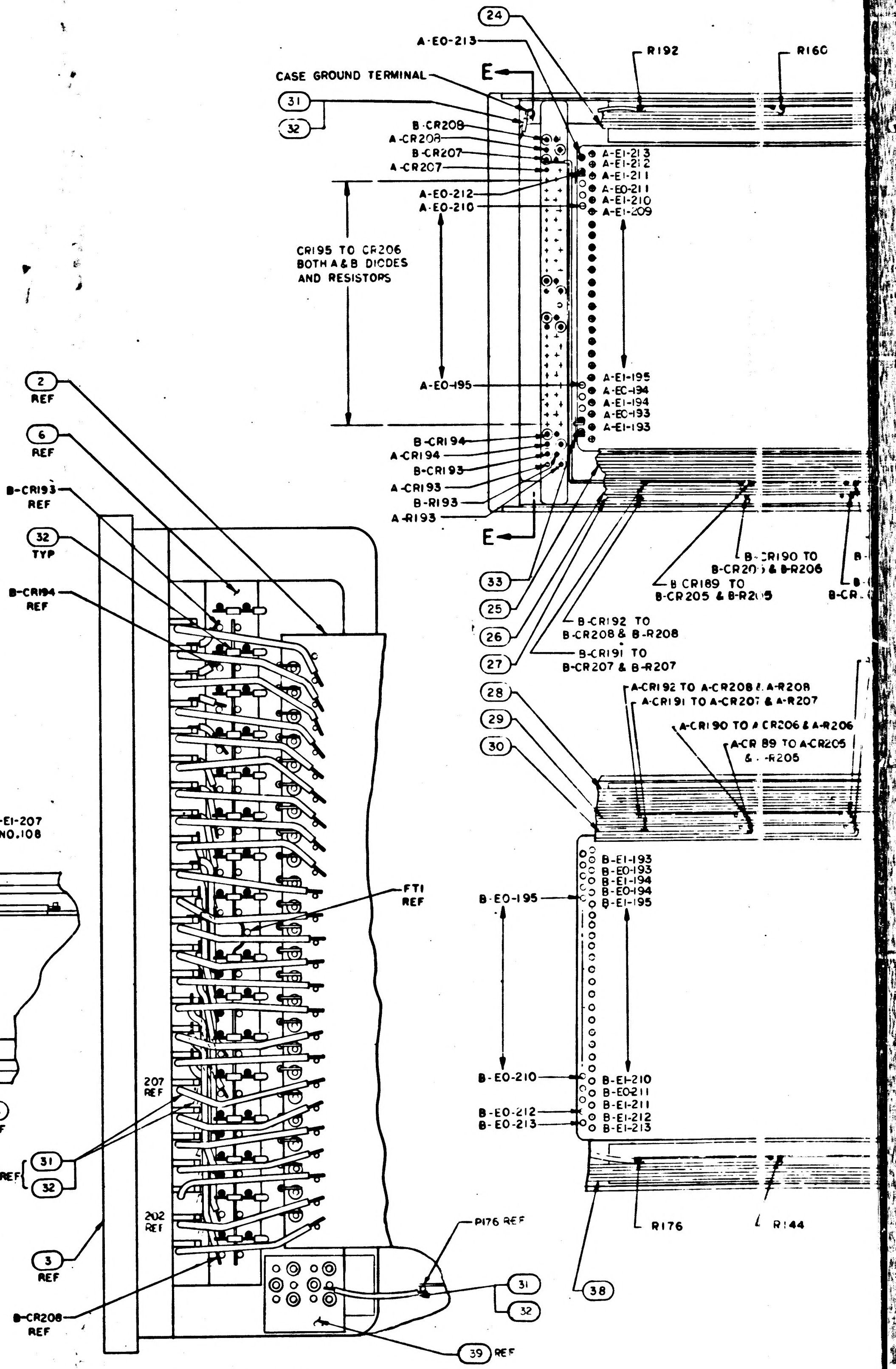
VIEW J-J


3 REF
6 REF
39 REF
A-CR208 REF
33 REF
J
R192 REF
31
32
1 REF
J
31
32
REF
302 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
C
C
307 REF
A-CR204 REF
A-CR203 REF
FROM A-CR207
A-CR202 REF
FROM A-CR205
A-CR201 REF
FROM A-CR204
FT1 REF
FROM A-CR202
A-CR200 REF
FROM A-CR201
25 REF
A-CR194 REF
B-CR193 REF
A-CR193 REF
B-R193 REF
A-R193 REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7 REMOVED. SEE NOTES 11,12,13 AND 14


B-CR203 REF
B-R203 REF
A-R204 REF
31
32
FROM A-E1-207 TO PIN NO. 108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

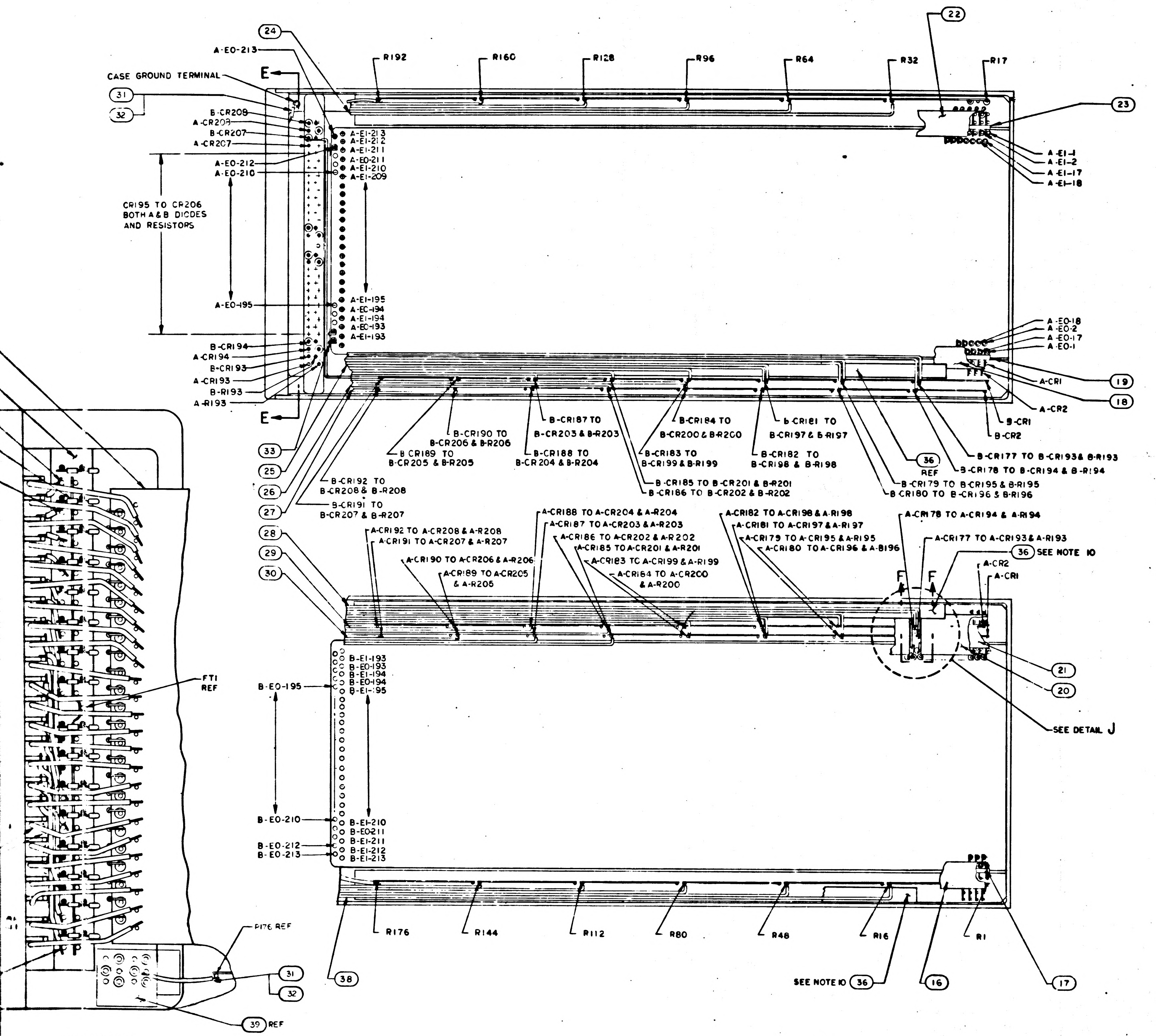
SECTION C-C
SCALE 4/1


24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & -R205
FT1 REF
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
207 REF
31
32
REF
202 REF
3 REF
B-CR208 REF
P176 REF
31
32
38
39 REF
R176
R144

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7 REMOVED. SEE NOTES 11,12,13 AND 14

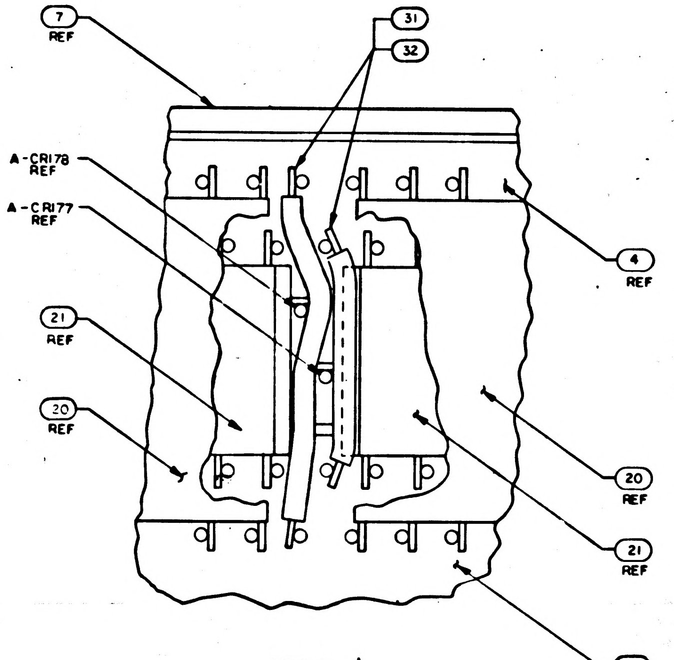
REVISIONS TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR J.P. Leonard CHK E. Urban	12/4/69	PBB
B	REVISED PER TDRR 37916 DR J.P. Leonard CHK E. Urban	12/11/69	PBB
C	REVISED PER TDRR 37954 DR J. Mallory CHK E. Urban	1/6/70	PBB
D	REVISED PER TDRR 37967 DR E.I. Ford CHK E. Urban	1/30/70	PBB
E	REVISED PER TDRR 38022 DR Kufira CHK E. Urban	3/19/70	PBB



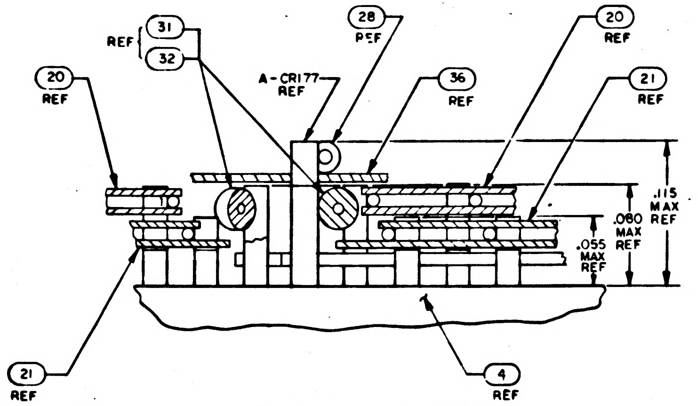
24
A-EO-213
R192
R160
R128
R96
R64
R32
22
R17
23
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-EO-212
A-EO-210
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
A-EI-1
A-EI-2
A-EI-17
A-EI-18
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-EO-195
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
A-EO-18
A-EO-2
A-EO-17
A-EO-1
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-CR1
19
18
A-CR2
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR179 TO B-CR195 & B-R195
B CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
F F
21
20
SEE DETAIL J
FT1 REF
B-EO-195
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-210
B-EI-210
B-EO-211
B-EI-211
B-EO-212
B-EO-213
B-EI-212
B-EI-213
R176
R144
R112
R80
R48
R16
R1
P176 REF
31
32
38
SEE NOTE 10 36
16
17
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NOS 28 AND 36 REMOVED



REF 31
32
28 REF
A-CR177 REF
36 REF
20 REF
21 REF
20 REF
.115 MAX
.080 REF
.080 MAX
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 69
CHECKED E. Urban 10 APR 69
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
SCALE 2/1
SHEET 2 OF 3

2010802 E

2010802 E

C

B

A

8 7 6 5 4

D

C

B

A

[illegible]

2010802 E

8 4

4 3 2 1

REVISIONS TDRR 37652			
A	REVISED PER TDRR 37915 DR	12/4/69	
B	REVISED PER TDRR 37916 DR	12/16/69	
C	REVISED PER TDRR 37954 DR J Kelley CHK	1/3/70	
D	REVISED PER TDRR 37967 DR R.G. Ford CHK	2/18/70	
E	REVISED PER TDRR 38022 DR E Ford CHK	4/9/70	

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

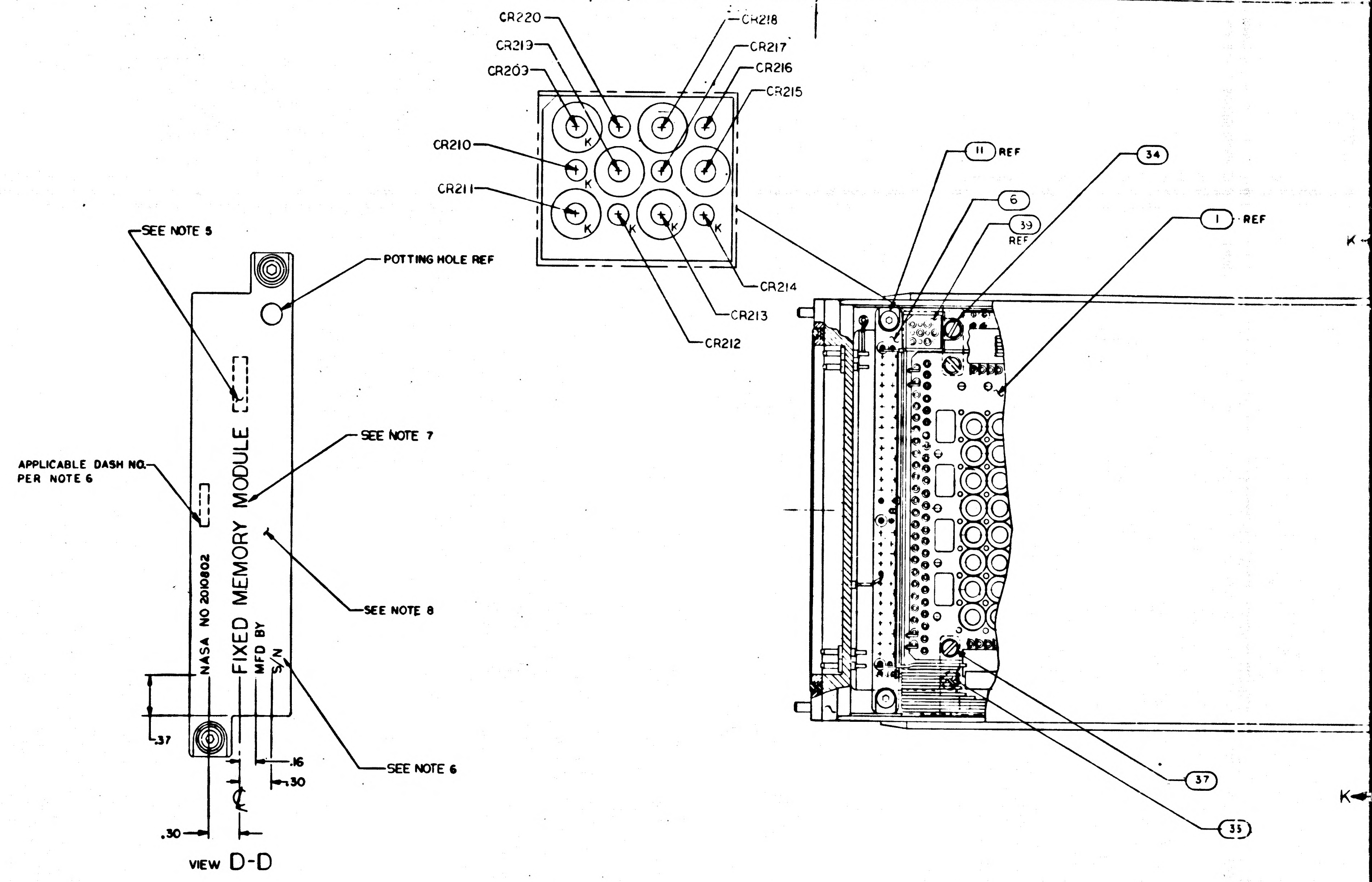
FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO.	SIZE	DRAWING NO.
80230	J	2010802
SCALE NONE		SHEET 3 OF 3

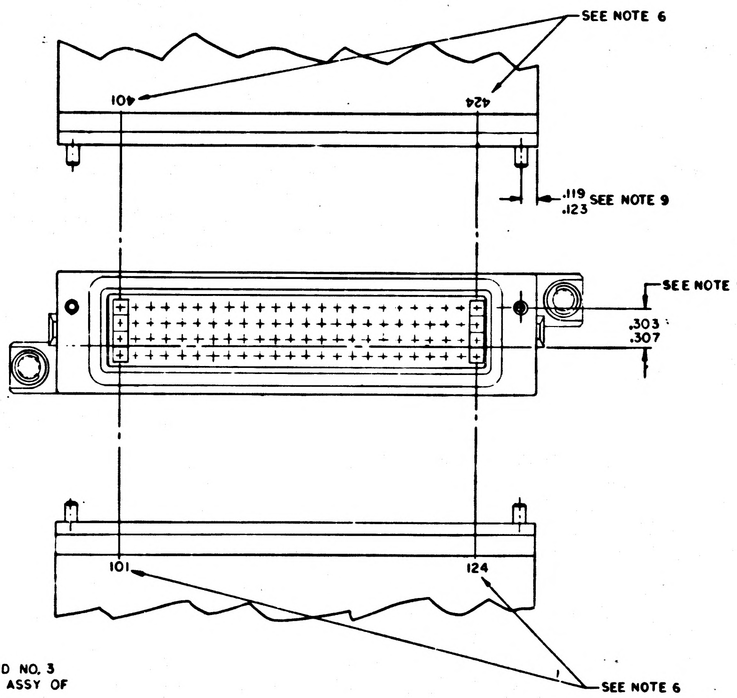
2010802
SH 1 OF 2

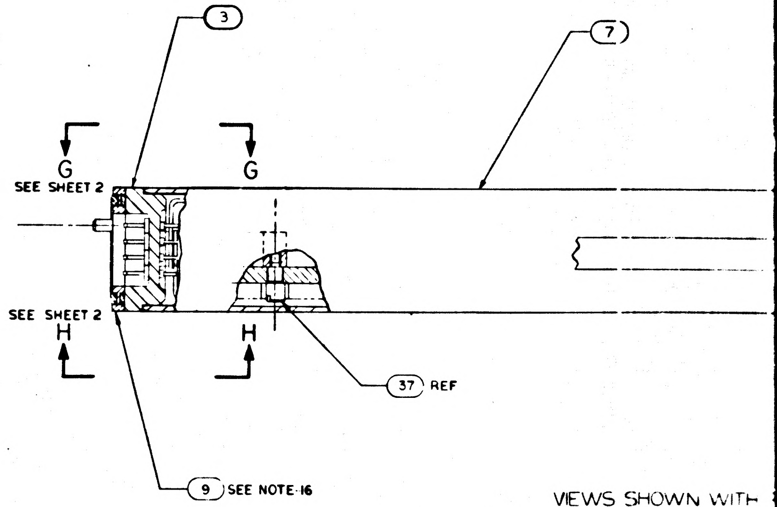
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-0	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
↑ -02	B-2	↑ -031	↑ -021	0322	↑	↑
-03	B-3	-041	-031	0323		
-04	B-4	-051	-041	0324		
↓ -05	B-5	↓ -061	↓ -051	0325	↓	↓
2010802-06	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-07	B-1	2010804-08	2010803-071	0327	2021112-081	PS2016042
↑ -08	B-2	↑ -091	↑ -081	0328	↑	↑
-09	B-3	-111	-091	0329		
-111	B-4	-121	-111	0330		
↓ -121	B-5	↓ -131	↓ -121	0331	↓	↓
2010802-13	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-14	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
2010802-17	B-5	2010804-161	2010803-171	0336	2021112-121	PS2016042



VIEW D-D





VIEWS SHOWN WITH
PARTIALLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122. TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2,&3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 &39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009; METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

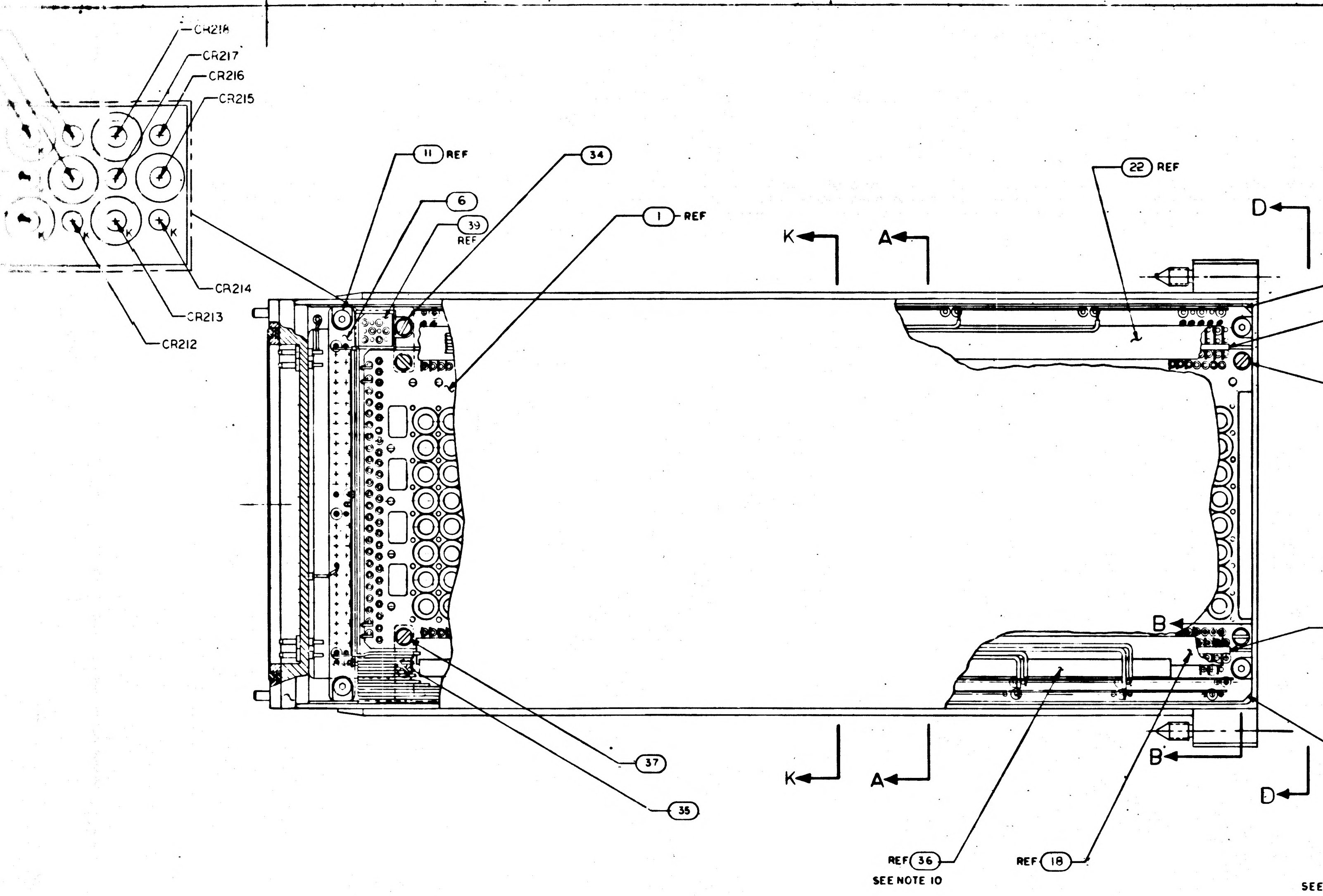
REFERENCES:

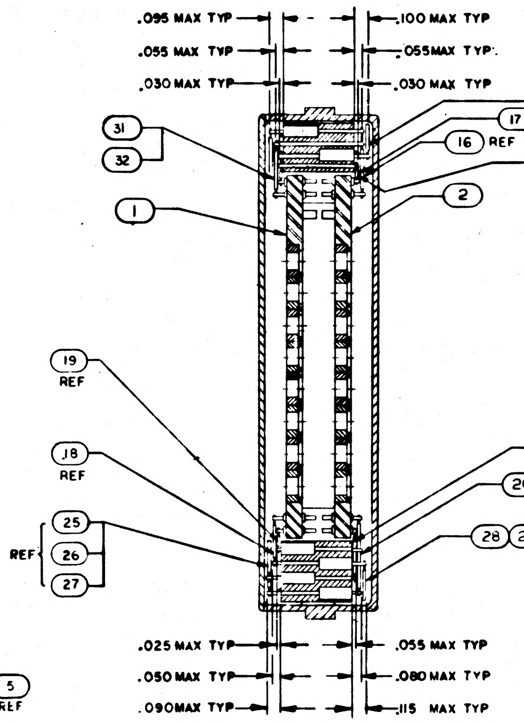
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802 F

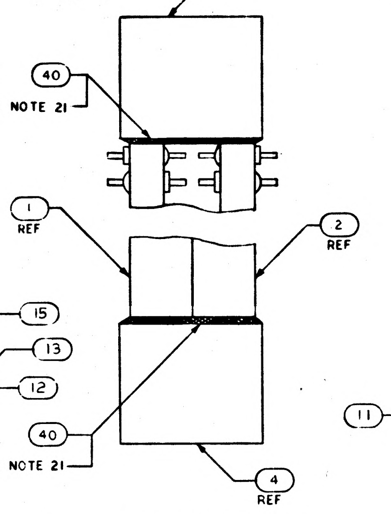
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR *A. Leonard* CHK	11/4/	
B	REVISED PER TDRR 37?6 DR *A. Leonard* CHK	12/11/	*PFK*
C	REVISED PER TDRR 379? DR CHK	1/1/70	*PBB*
D	REVISED PER TDRR 37967 DR *R.G. Ford* CHK	2/18/7	*PBB*
E	REVISED PER TDRR 38022 DR *R.G. Ford* CHK	4/9/7	*PBB*
F	REVISED PER TDRR 3? DR *A. Fallon* CHK	5/11/	*PBB*

TDRR 37

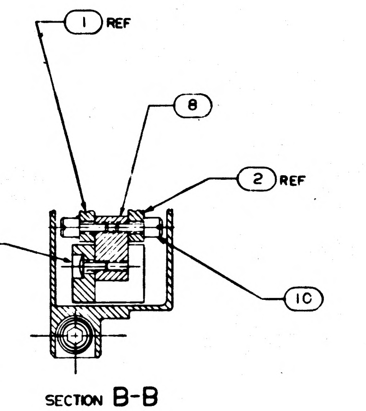

CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
11 REF
34
6
39 REF
1 REF
22 REF
K
A
D
5
23 REF
10 REF
B
19 REF
37
35
K
A
B
D
4
REF 36 SEE NOTE 10
REF 18


.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
31
32
1
38 REF
17 REF
16 REF
31
32
2
19 REF
18 REF
REF 25 26 27
21 REF
20 REF
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP

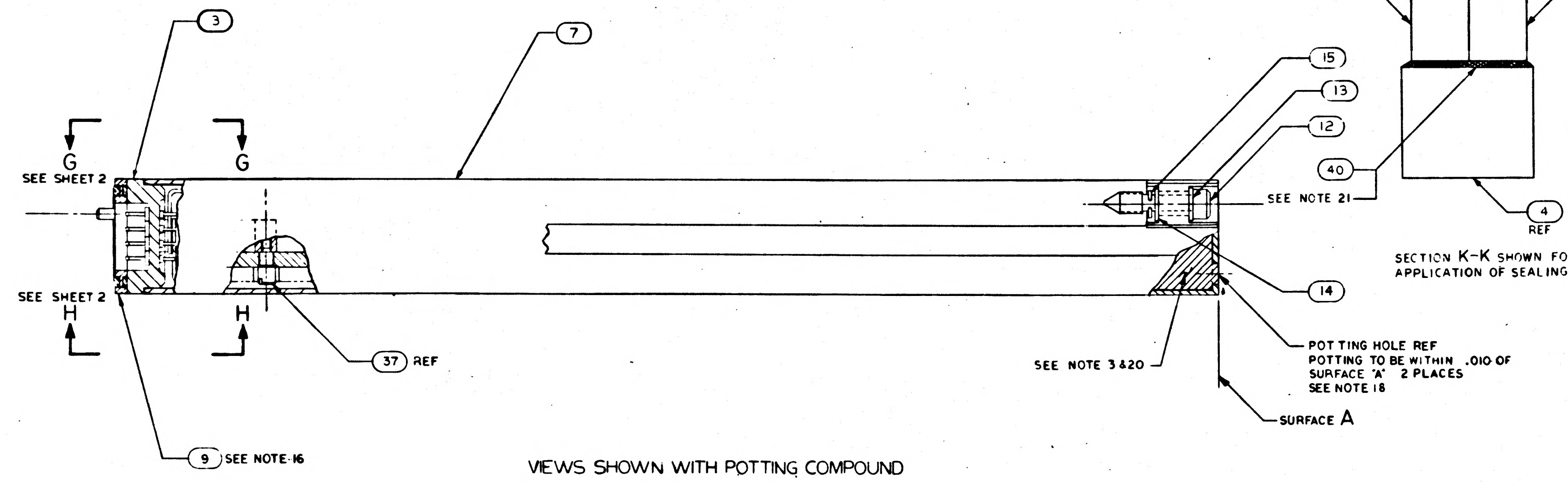
SECTION A-A


5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF

SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND


1 REF
8
2 REF
11
10

SECTION B-B


3
7
15
13
12
G
SEE SHEET 2
G
SEE NOTE 21
SEE SHEET 2
H
H
14
37 REF
SEE NOTE 3&20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

REQUIREMENTS FOR CONTROL
TION OF ROPE MEMORY ASSEMBLIES
FIXTURE DWG NO. AP22500

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± -- DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN *Tom Smith* DATE 10 APR 68
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 F

WIRE LIST

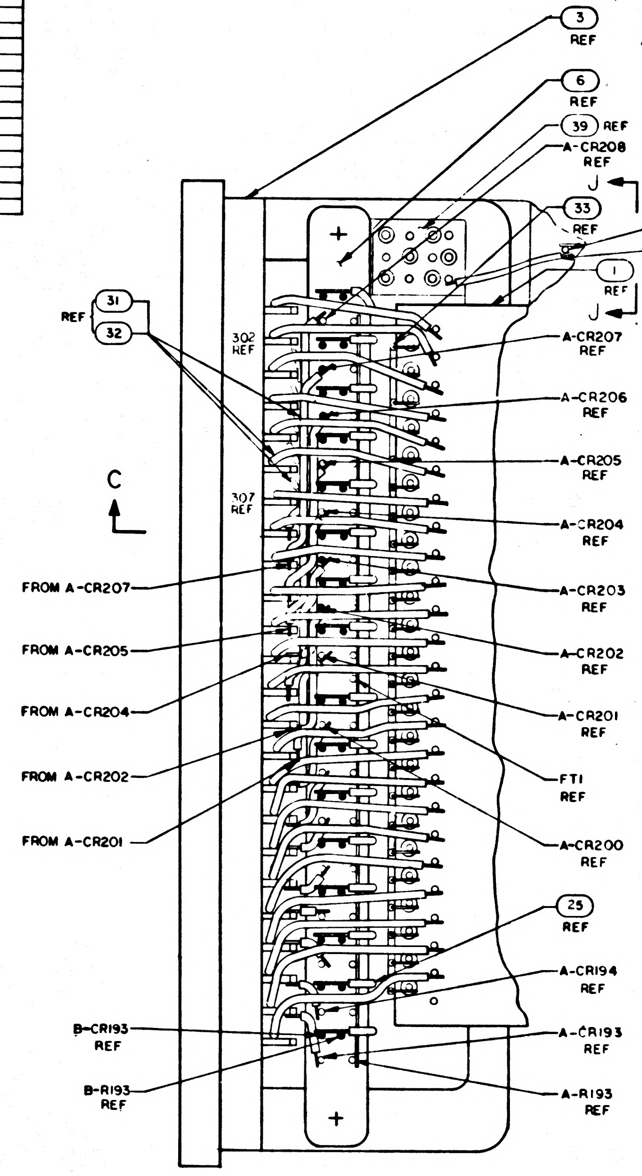
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-EI-213	301	GROUND
102	A-EI-212	302	CR209
103	A-EI-211	303	CR210
104	A-EO-211	304	CR211
105	A-EI-210	305	CR212
106	A-EI-209	306	CR213
107	A-EI-208	307	CR214
108	A-EI-207	308	A-CR208
109	A-EI-206	309	A-CR207
110	A-EI-205	310	A-CR206
111	A-EI-204	311	A-CR205
112	A-EI-203	312	A-CR204
113	A-EI-202	313	A-CR203
114	A-EI-201	314	A-CR202
115	A-EI-200	315	A-CR201
116	A-EI-199	316	A-CR200
117	A-EI-198	317	A-CR199
118	A-EI-197	318	A-CR198
119	A-EI-196	319	A-CR197
120	A-EI-195	320	A-CR196
121	A-EO-194	321	A-CR195
122	A-EI-194	322	A-CR194
123	A-EO-193	323	A-CR193
124	A-EI-193	324	SPARE
201	B-R208	401	B-EI-213
202	CR215	402	B-EI-212
203	CR216	403	B-EI-211
204	CR217	404	B-EO-211
205	CR218	405	B-EI-210
206	CR219	406	B-EI-209
207	CR220	407	B-EI-208
208	B-CR208	408	B-EI-207
209	B-CR207	409	B-EI-206
210	B-CR206	410	B-EI-205
211	B-CR205	411	B-EI-204
212	B-CR204	412	B-EI-203
213	B-CR203	413	B-EI-202
214	B-CR202	414	B-EI-201
215	B-CR201	415	B-EI-200
216	B-CR200	416	B-EI-199
217	B-CR199	417	B-EI-198
218	B-CR198	418	B-EI-197
219	B-CR197	419	B-EI-196
220	B-CR196	420	B-EI-195
221	B-CR195	421	B-EO-194
222	B-CR194	422	B-EI-194
223	B-CR193	423	B-EO-193
224	SPARE	424	B-EI-193

WIRE LIST

TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-EO-195	B-EO-195
A-EO-196	B-EO-196
A-EO-197	B-EO-197
A-EO-198	B-EO-198
A-EO-199	B-EO-199
A-EO-200	B-EO-200
A-EO-201	B-EO-201
A-EO-202	B-EO-202
A-EO-203	B-EO-203
A-EO-204	B-EO-204
A-EO-205	B-EO-205
A-EO-206	B-EO-206
A-EO-207	B-EO-207
A-EO-208	B-EO-208
A-EO-209	B-EO-209
A-EO-210	B-EO-210
SPARE	SPARE
SPARE	SPARE
A-EO-212	B-EO-212
A-EO-213	B-EO-213

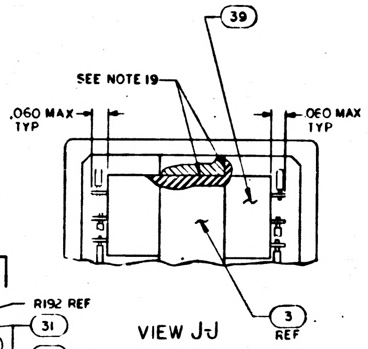
WIRE LIST

COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192



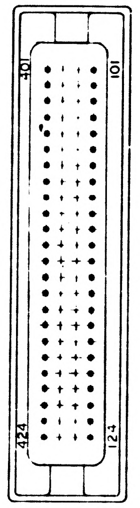
3
REF
6
REF
39 REF
A-CR208
REF
J
33
REF
R192 REF
1
REF
31
32
J
REF
31
32
302
REF
307
REF
A-CR207
REF
A-CR206
REF
A-CR205
REF
C
C
A-CR204
REF
FROM A-CR207
A-CR203
REF
FROM A-CR205
A-CR202
REF
FROM A-CR204
A-CR201
REF
FROM A-CR202
FTI
REF
FROM A-CR201
A-CR200
REF
25
REF
A-CR194
REF
B-CR193
REF
A-CR193
REF
B-R193
REF
A-R193
REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



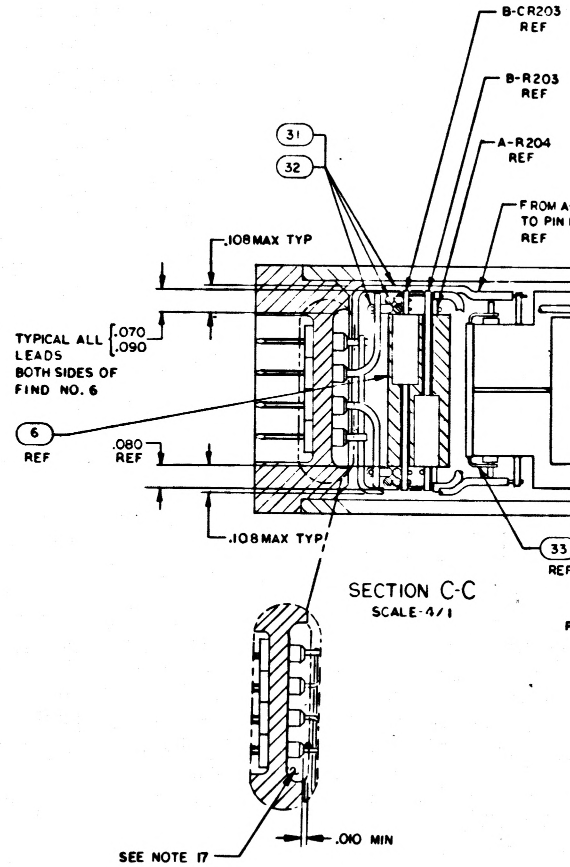
39
SEE NOTE 19
.060 MAX
TYP
.060 MAX
TYP
3
REF

VIEW J-J



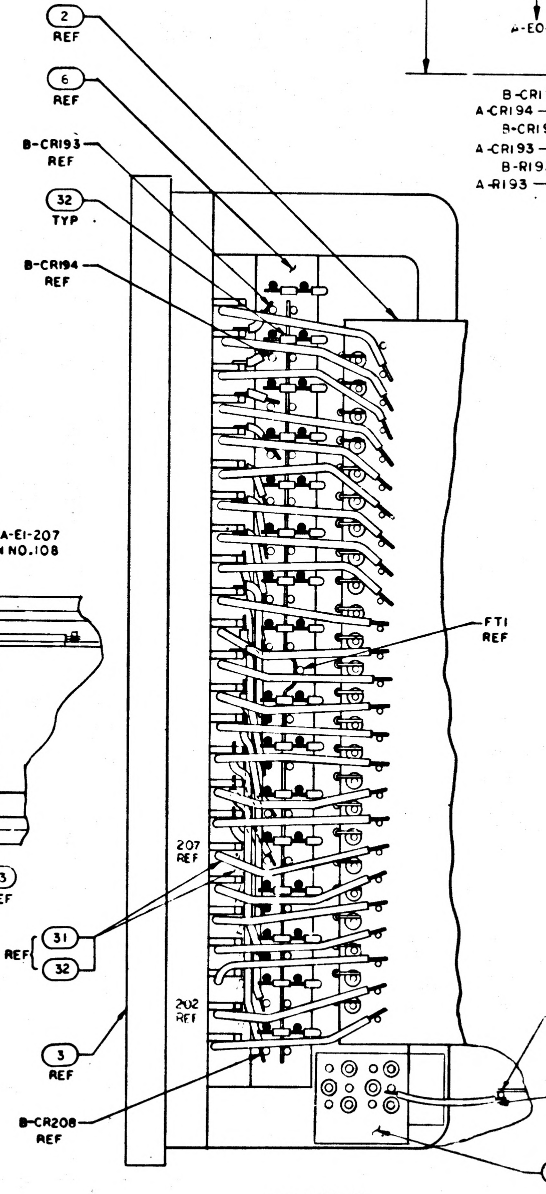
401
101
424
124

SECTION E-E



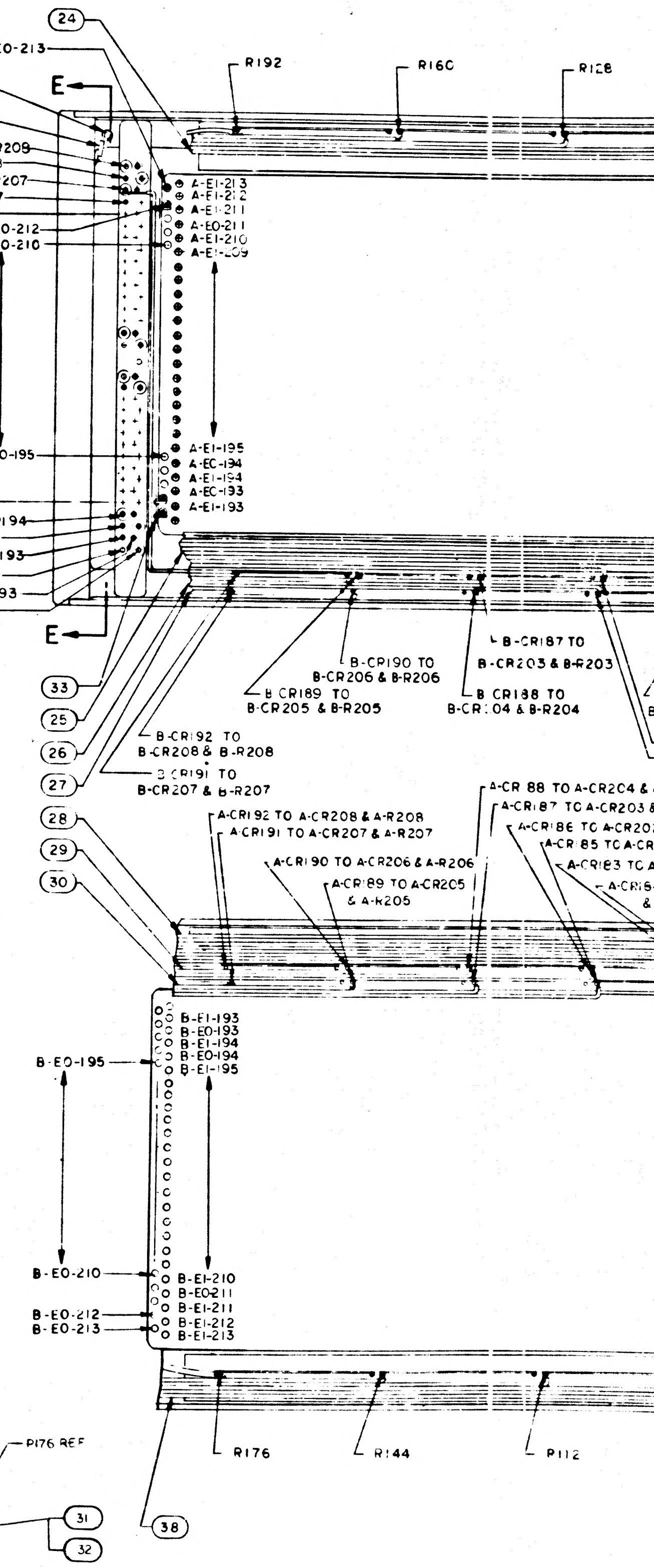
B-CR203
REF
B-R203
REF
31
32
A-R204
REF
FROM A-EI-207
TO PIN NO.108
REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6
REF
.080
.090
.108 MAX TYP
33
REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE 4/1



2
REF
6
REF
B-CR193
REF
32
TYP
B-CR194
REF
FTI
REF
207
REF
31
REF
32
202
REF
3
REF
B-CR208
REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

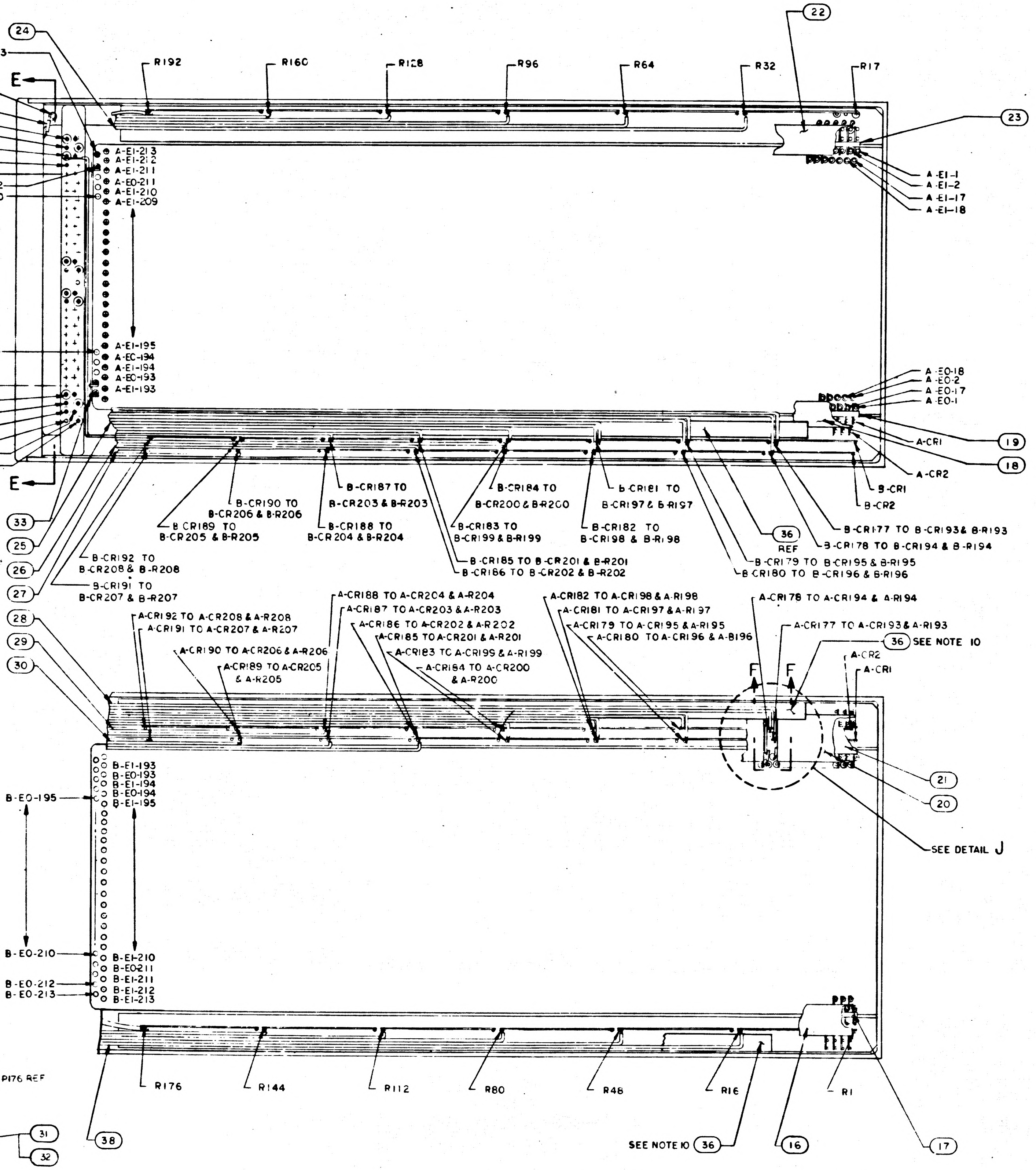


24
A-EO-213
CASE GROUND TERMINAL
31
32
E
R192
R160
R128
B-CR208
A-CR208
B-CR207
A-CR207
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
A-EO-212
A-EO-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-EO-195
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
B-CR190 TO
B-CR206 & B-R206
B-CR187 TO
B-CR203 & B-R203
B CR189 TO
B-CR205 & B-R205
B CR188 TO
B-CR204 & B-R204
33
25
26
27
B-CR192 TO
B-CR208 & B-R208
B CR191 TO
B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205
& A-R205
A-CR 88 TO A-CR204 &
A-CR187 TO A-CR203 &
A-CR186 TO A-CR20
A-CR 85 TO A-CR
A-CR183 TO A
A-CR1
&
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-195
B-EO-210
B-EI-210
B-EO211
B-EI-211
B-EO-212
B-EO-213
B-EI-212
B-EI-213
R176
R144
R112
38

2010802 F

2010802 FF1/2 SH 2/3

A	REVISED PER TDRR [illegible]	[illegible]
B	REVISED PER TDRR 3?9.6 DR [illegible] CH [illegible]	[illegible]
C	REVISED PER TDRR ?954	[illegible]
D	REVISED PER TDRR 3??7 DR [illegible] CH [illegible]	[illegible]
E	REVISED PER TDRR [illegible]	[illegible]
F	REVISED PER TDRR ?532	[illegible]



22
24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
R192
R160
R128
R96
R64
R32
R17
23
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
19
18
A-CR2
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR190 TO A-CR206 & A-R206
A-CR183 TO A-CR199 & A-R199
A-CR189 TO A-CR205 & A-R205
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-R196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
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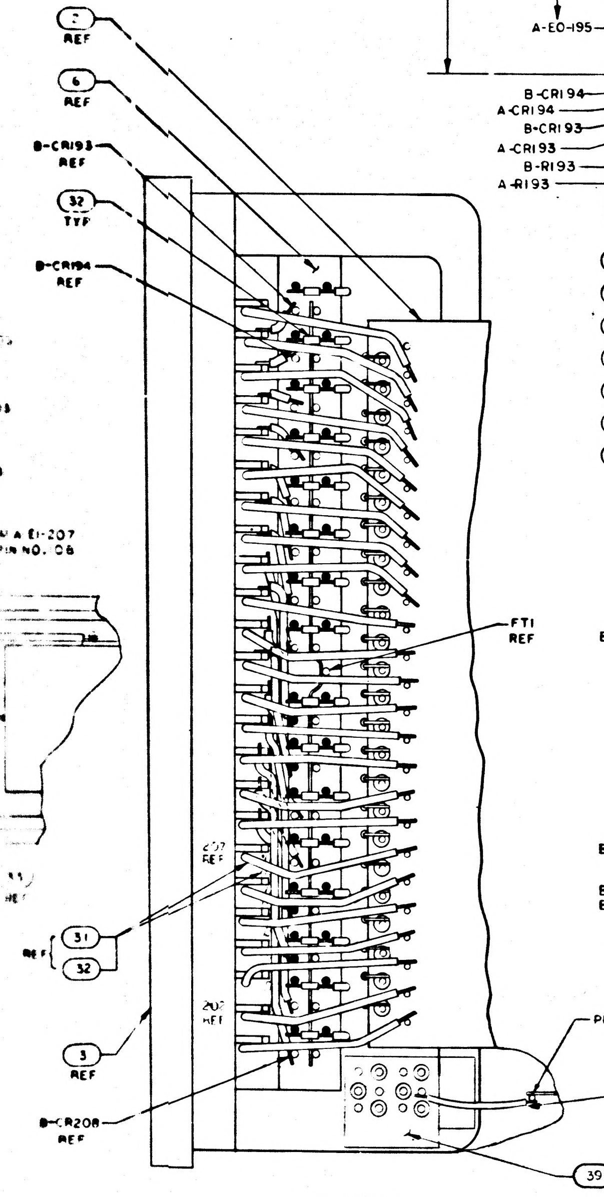
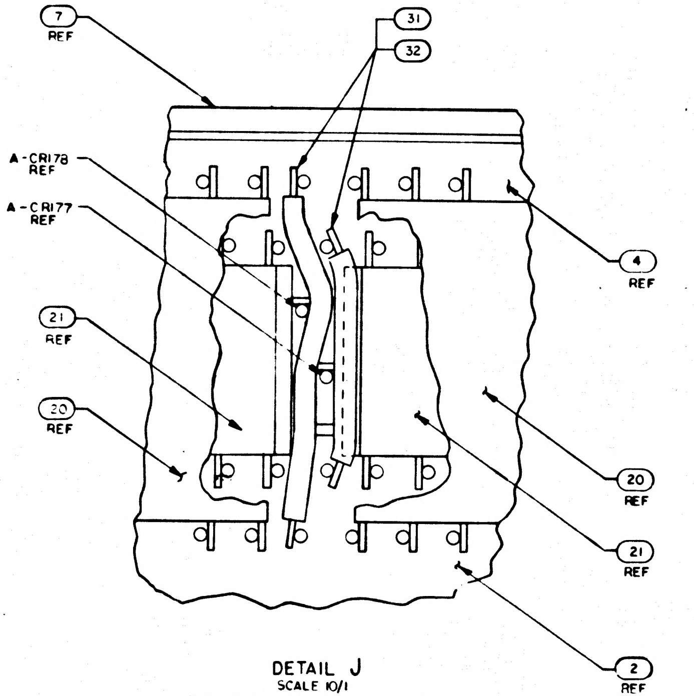
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10 36
16
17



7 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
A E1-207 PIN NO. 08
FT1 REF
207 REF
31
32
REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF

VIEW H-H

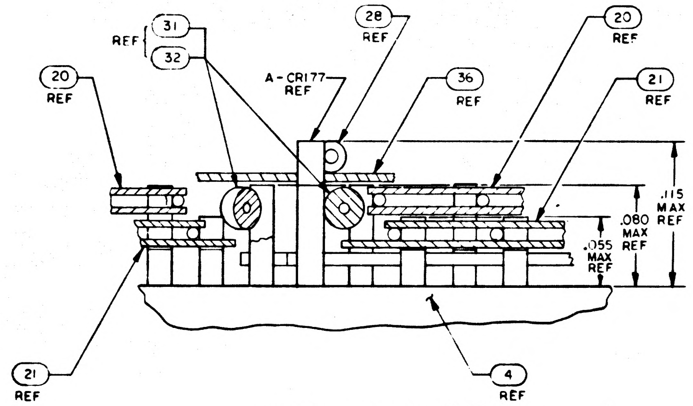
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11,12,13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
4 REF
21 REF
20 REF
20 REF
21 REF
2 REF

DETAIL J

SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NOS 28 AND 36 REMOVED



REF 31
32
20 REF
28 REF
A-CR177 REF
36 REF
20 REF
21 REF
.115 MAX
.080 REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F

SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MFR
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO 2010802
SCALE 2/1 SHEET 2 OF 3

2010802 F

TERM. NO.	COMPONENT NO.
A EO-1	A-CR1
A EO-2	A-CR2
A EO-3	A-CR3
A EO-4	A-CR4
A EO-5	A-CR5
A EO-6	A-CR6
A EO-7	A-CR7
A EO-8	A-CR8
A EO-9	A-CR9
A EO-10	A-CR10
A EO-1	A-CR11
A EO-12	A-CR12
A EO-13	A-CR13
A EO-14	A-CR14
A EO-15	A-CR15
A EO-16	A-CR16
A EO-17	A-CR17
A EO-18	A-CR18
A EO-19	A-CR19
A EO-20	A-CR20
A-EO-21	A-CR21
A-EO-22	A-CR22
A-EO-23	A-CR23
A-EO-24	A-CR24
A-EO-25	A-CR25
A-EO-26	A-CR26
A-EO-27	A-CR27
A-EO-28	A-CR28
A-EO-29	A-CR29
A EO-30	A-CR30
A-EO-31	A-CR31
A-EO-32	A-CR32
A-EO-33	A-CR33
A EO-34	A-CR34
A-EO-35	A-CR35
A-EO-36	A-CR36
A-EO-37	A-CR37
A-EO-38	A-CR38
A-EO-39	A-CR39
A-EO-40	A-CR40
A-EO-41	A-CR41
A-EO-42	A-CR42
A-EO-43	A-CR43
A-EO-44	A-CR44
A-EO-45	A-CR45
A-EO-46	A-CR46
A-EO-47	A-CR47
A-EO-48	A-CR48
A-EO-49	A-CR49
A-EO-50	A-CR50
A-EO-51	A-CR51
A-EO-52	A-CR52
A-EO-53	A-CR53
A-EO-54	A-CR54
A-EO-55	A-CR55
A-EO-56	A-CR56
A-EO-57	A-CR57
A-EO-58	A-CR58
A-EO-59	A-CR59
A-EO-60	A-CR60
A-EO-61	A-CR61
A-EO-62	A-CR62
A-EO-63	A-CR63
A-EO-64	A-CR64
A-EO-65	A-CR65
A-EO-66	A-CR66
A-EO-67	A-CR67
A-EO-68	A-CR68
A-EO-69	A-CR69
A-EO-70	A-CR70
A-EO-71	A-CR71
A-EO-72	A-CR72
A-EO-73	A-CR73
A-EO-74	A-CR74
A-EO-75	A-CR75
A-EO-76	A-CR76
A-EO-77	A-CR77
A-EO-78	A-CR78
A-EO-79	A-CR79
A-EO-80	A-CR80
A-EO-81	A-CR81
A-EO-82	A-CR82
A-EO-83	A-CR83
A-EO-84	A-CR84
A-EO-85	A-CR85
A-EO-86	A-CR86
A-EO-87	A-CR87
A-EO-88	A-CR88
A-EO-89	A-CR89
A-EO-90	A-CR90
A-EO-9	A-CR91
A-EO-92	A-CR92
A-EO-93	A-CR93
A-EO-94	A-CR94
A-EO-95	A-CR95
A-EO-96	A-CR96

5 4 3 2

D REVISED
DR
E REVISED
DR
F REVISED
DR

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
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A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

A

2010802

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON
APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED
APPROVED MSC

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802
DATE
SCALE NONE
SHEET 3 OF 3

5

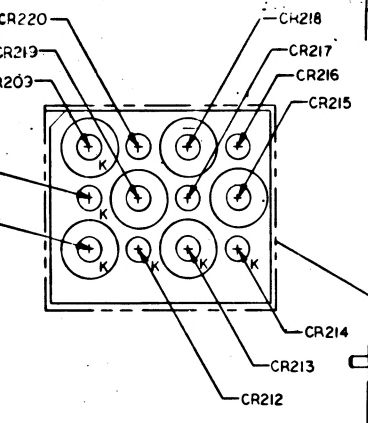
2010802 F

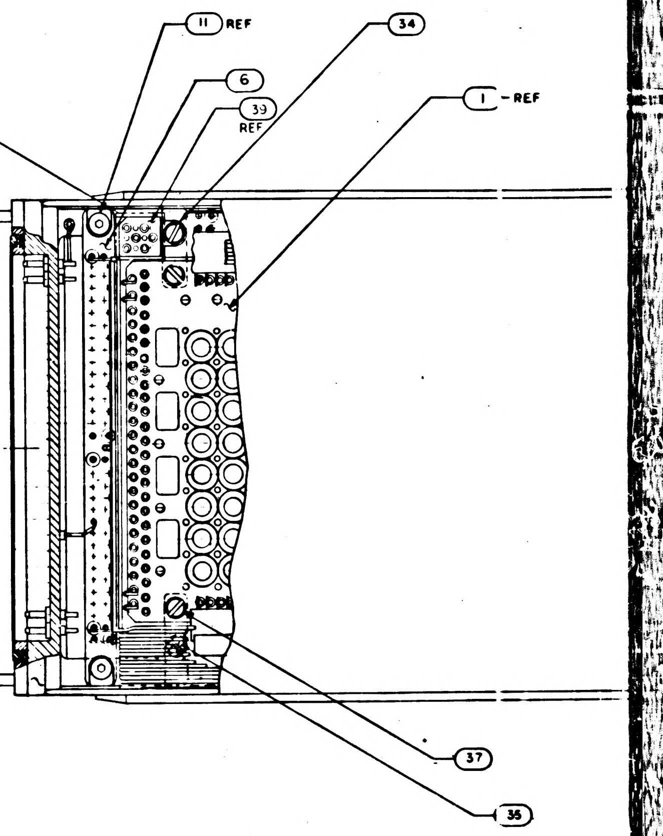
2010802 FF2/2 SH 3/3

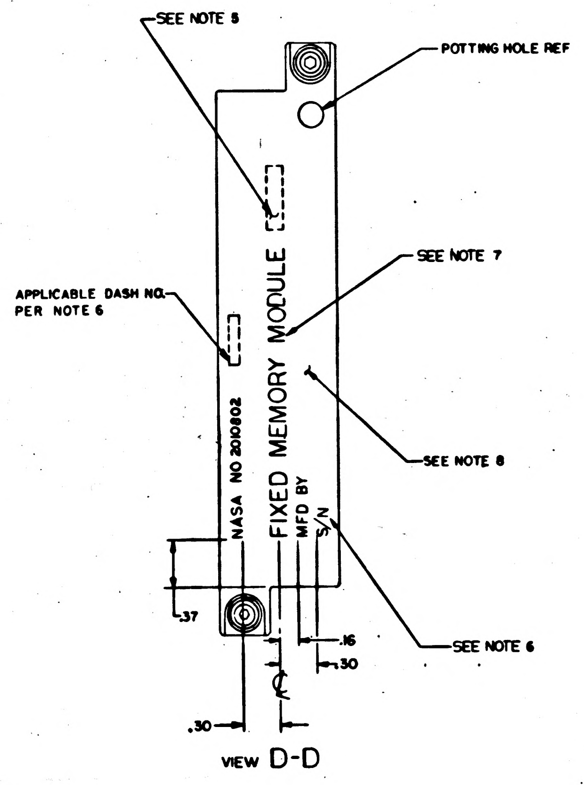
2010802
SH 1 of 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

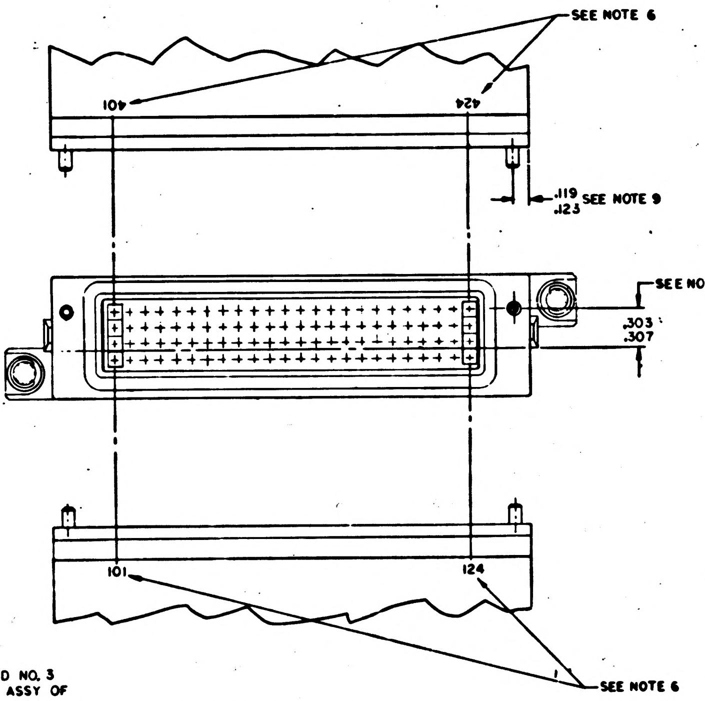
PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-0	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
↑ -021	B-2	↑ -031	↑ -021	0322	↑	↑
│ -031	B-3	│ -041	│ -031	0323	│	│
│ -041	B-4	│ -051	│ -041	0324	│	│
↓ -051	B-5	↓ -061	↓ -051	0325	↓	↓
2010802-061	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
↑ -081	B-2	↑ -091	↑ -081	0328	↑	↑
│ -091	B-3	│ -111	│ -091	0329	│	│
│ -111	B-4	│ -121	│ -111	0330	│	│
↓ -121	B-5	↓ -131	↓ -121	0331	↓	↓
2010802 131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
2010802-171	B-5	2010804-161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804-171	2010803-181	0337	2021113-091	PS2016042
↑ -191	B-2	↑ -181	↑ -191	0338	↑	↑
│ -211	B-3	│ -191	│ -211	0339	│	│
│ -221	B-4	│ -211	│ -221	0340	│	│
↓ -231	B-5	↓ -221	↓ -231	0341	↓	↓
2010802-241	B-6	2010804-231	2010803-241	0342	2021113-091	PS2016042

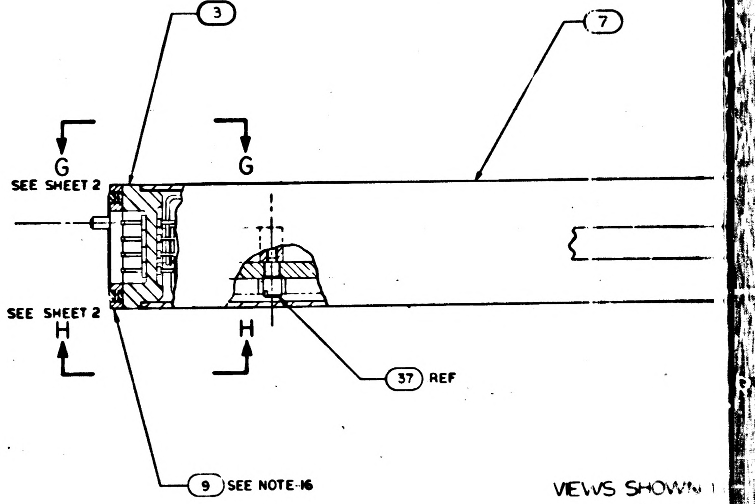






VIEW D-D





VIEWS SHOWN
PARTIAL

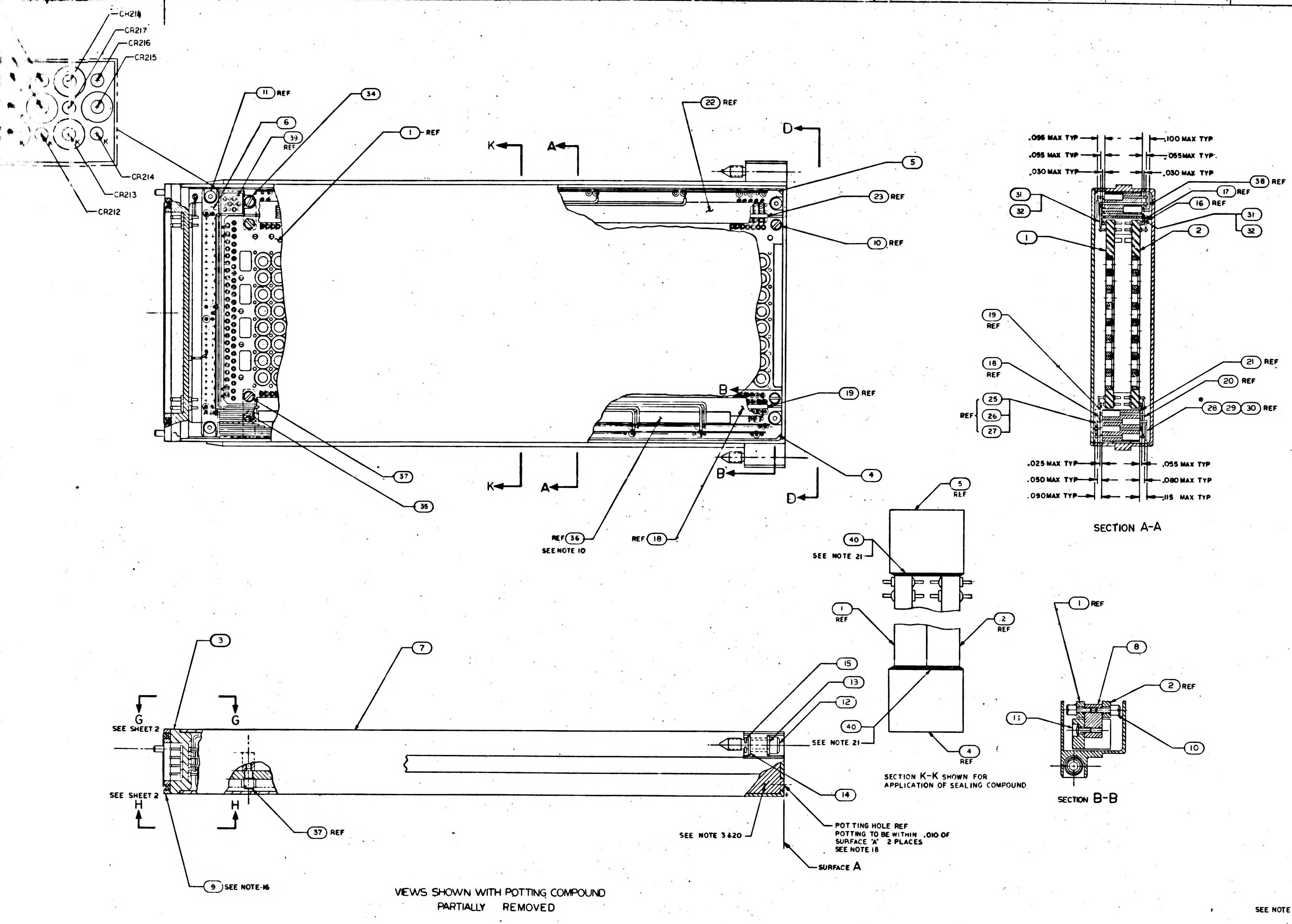
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27.28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO.4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802	G


CR218
CR217
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CR215
CR214
CR213
CR212
K
K
11 REF
6
39 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
4
B
37
35
K
A
D
REF 36
SEE NOTE 10
REF 18
.096 MAX TYP
.095 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
31
32
2
19 REF
18 REF
21 REF
20 REF
REF 25 26 27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
15
13
12
SEE NOTE 21
14
37 REF
9 SEE NOTE-16
SEE NOTE 3&20
POTTING HOLE REF POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES SEE NOTE 18
SURFACE A
4
3
2
1
C
B
A

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

IREMENTS FOR CONTROL
ROPE MEMORY ASSEMBLIES

FIXTURE DWG NO AP22500

REVISIONS TDRR 37[illegible]

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR CHK	12/4/[illegible]	PBB
B	REVISED PER TDRR 37916 DR CHK	12/11/[illegible]	PBB
C	REVISED PER TDRR 37954 DR CHK	1/9/70	PBB
D	REVISED PER TDRR 37967 DR R.G. Ford CHK	2/18/70	PBB
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	4/9/70	PBB
F	REVISED PER TDRR 3[illegible]32 DR CHK	5/11/70	PBB
G	REVISED PER TDRR 38151 DR R. Ford CHK	[illegible]	PBB

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
X	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW. SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

SEE NOTE 16

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Tom Smith DATE 10 APR 69
CHECKED 10 APR 69
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 G

2010802 G

2010802GF2/2 SH. 1/3

S080105

WIRE LIST

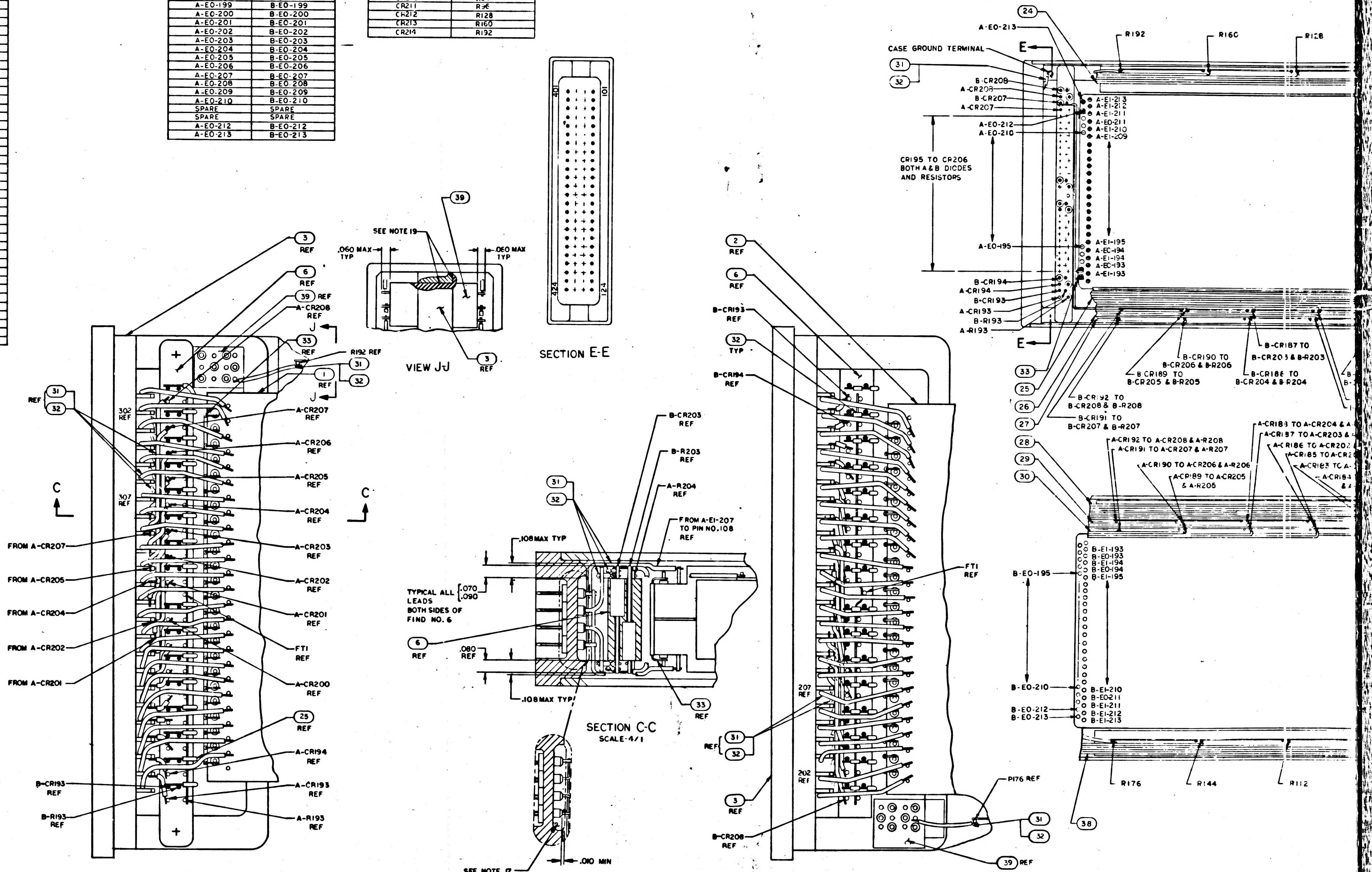
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST

COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


3 REF
6 REF
39 REF
A-CR208 REF
J
33 REF
R192 REF
31
32
1 REF
J
31
32
REF
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FTI REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
C
C
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
39
3 REF
401
101
424
124
31
32
B-CR203 REF
B-R203 REF
A-R204 REF
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
207 REF
202 REF
31
32
REF
3 REF
B-CR208 REF
FTI REF
P176 REF
31
32
39 REF
24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
R192
R160
R128
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR186 TO B-CR204 & B-R204
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-
A-CR187 TO A-CR203 &
A-CR186 TO A-CR202
A-CR185 TO A-CR2
A-CR183 TO A-
A-CR184
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E0-212
B-E0-213
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
R176
R144
R112
38

VIEW J-J

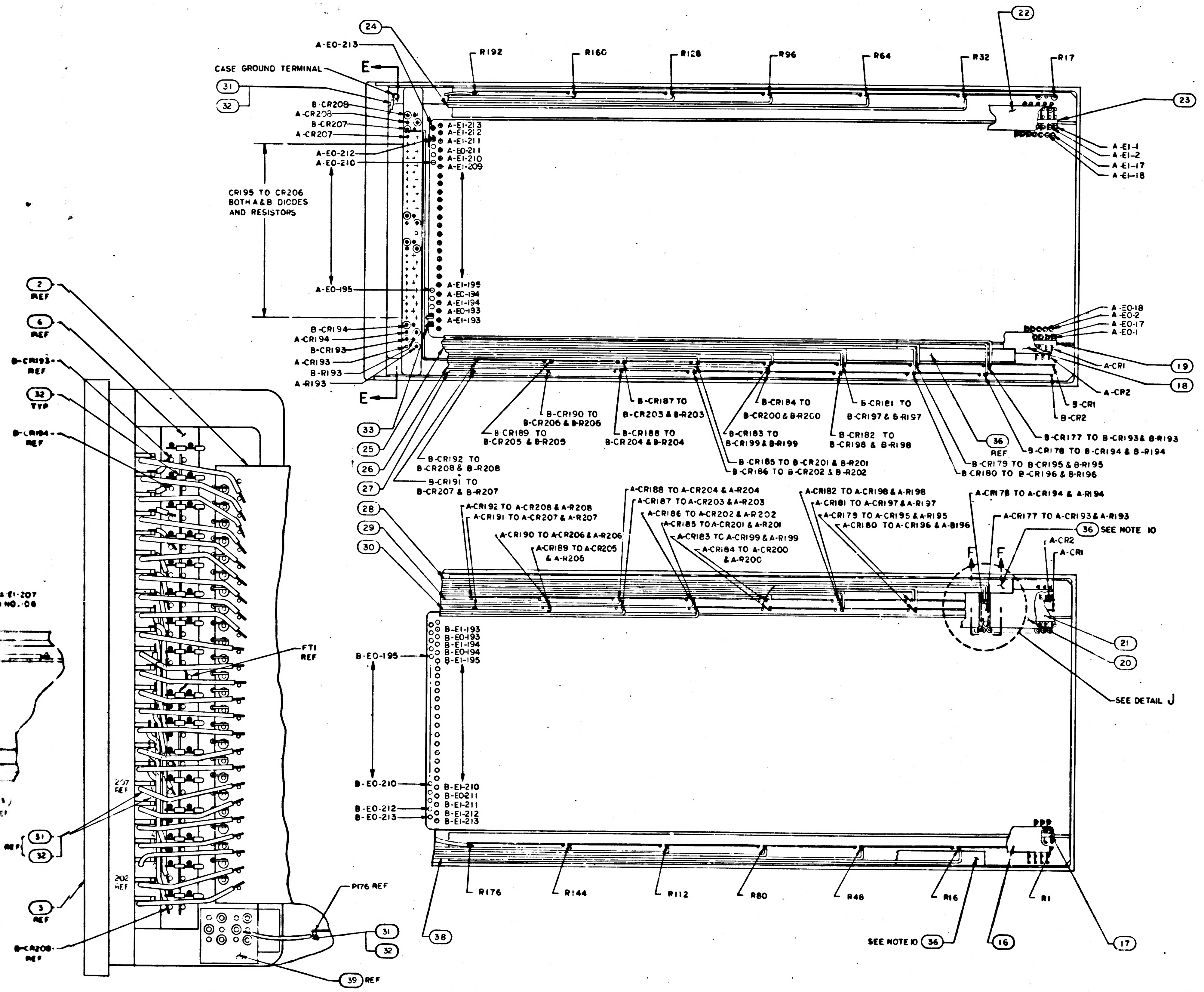
SECTION E-E

SECTION C-C
SCALE-4/1

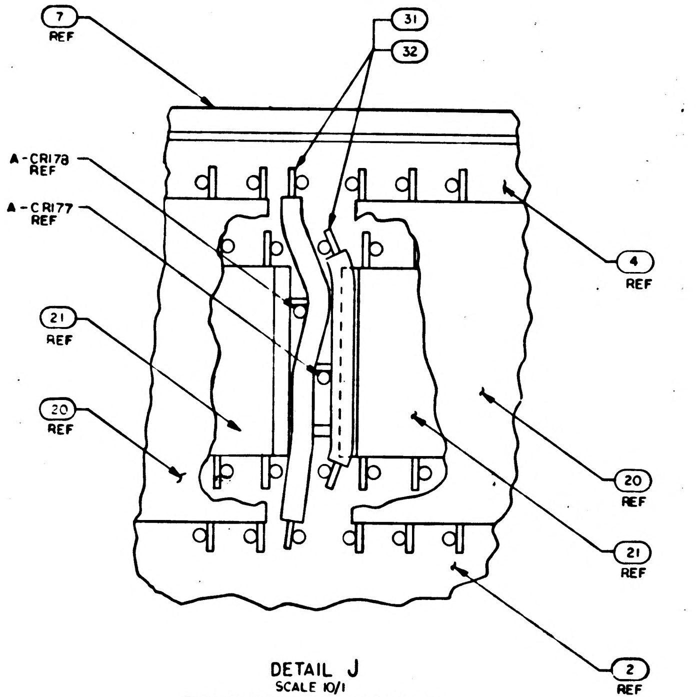
VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

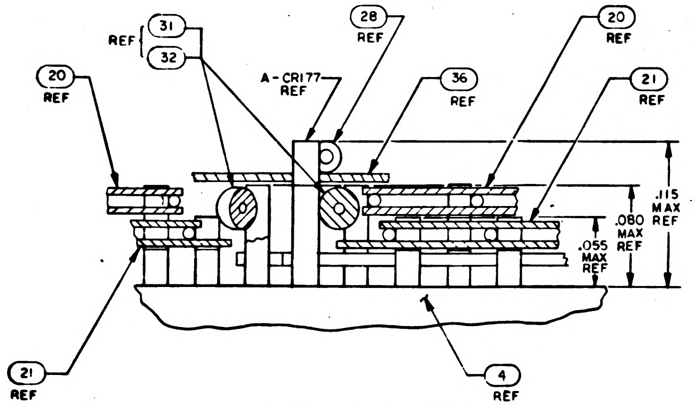
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]/69	PBB
B	REVISED PER TDRR 37916 DR [illegible] CHK [illegible]	[illegible]	PBB
C	REVISED PER TDRR 37954 DR [illegible] CHK [illegible]	1/9/70	PBB
D	REVISED PER TDRR 37967 DR [illegible] CHK [illegible]	4/13/70	PBB
E	REVISED PER TDRR 38022 DR [illegible] CHK [illegible]	4/9/70	PBB
F	REVISED PER TDRR [illegible]32 DR [illegible] CHK [illegible]	5/1/70	PBB
G	REVISED PER TDRR [illegible]51 DR [illegible] CHK [illegible]	[illegible]	PBB


A-EO-213
CASE GROUND TERMINAL
E
31
32
24
R192
R160
R128
R96
R64
R32
R17
22
23
B-CR208
A-CR208
B-CR207
A-CR207
A-EO-212
A-EO-210
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-EO-195
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
A-EI-1
A-EI-2
A-EI-17
A-EI-18
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-EO-18
A-EO-2
A-EO-17
A-EO-1
19
18
A-CR1
A-CR2
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR190 TO A-CR206 & A-R206
A-CR183 TO A-CR199 & A-R199
A-CR189 TO A-CR205 & A-R206
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-195
B-EO-210
B-EI-210
B-EO211
B-EI-211
B-EO-212
B-EO-213
B-EI-212
B-EI-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10 36
16
17
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
REF 31
32
3 REF
B-CR208 REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14


7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NO'S 28 AND 36 REMOVED


REF
31
32
28 REF
20 REF
A-CR177 REF
36 REF
20 REF
21 REF
.115 MAX REF
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

2010802 G

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MSC
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO 2010802
SCALE 2/1
SHEET 2 OF 3

2010802GI-2/2 SH. 2/3

TERM. NO.	COMPON NO
A-EO-1	A-CR
A-EO-2	A-CR
A-EO-3	A-CR
A-EO-4	A-CR4
A-EO-5	A-CR5
A-EO-6	A-CR6
A-EO-7	A-CR7
A-EO-8	A-CR8
A-EO-9	A-CR9
A-EO-10	A-CR1
A-EO-1	A-CR1
A-EO-12	A-CR12
A-EO-13	A-CR13
A-EO-14	A-CR14
A-EO-15	A-CR15
A-EO-16	A-CR16
A-EO-17	A-CR17
A-EO-18	A-CR18
A-EO-19	A-CR19
A-EO-20	A-CR2
A-EO-21	A-CR21
A-EO-22	A-CR2
A-EO-23	A-CR2
A-EO-24	A-CR2
A-EO-25	A-CR2
A-EO-26	A-CR2
A-EO-27	A-CR
A-EO-28	A-CR2
A-EO-29	A-CR2
A-EO-30	A-CR3
A-EO-31	A-CR3
A-EO-32	A-CR32
A-EO-33	A-CR3
A-EO-34	A-CR3
A-EO-35	A-CR3
A-EO-36	A-CR3
A-EO-37	A-CR3
A-EO-38	A-CR3
A-EO-39	A-CR3
A-EO-40	A-CR4
A-EO-41	A-CR4
A-EO-42	A-CR4
A-EO-43	A-CR4
A-EO-44	A-CR4
A-EO-45	A-CR4
A-EO-46	A-CR46
A-EO-47	A-CR4
A-EO-48	A-CR4
A-EO-49	A-CR49
A-EO-50	A-CR5
A-EO-51	A-CR5
A-EO-52	A-CR5
A-EO-53	A-CR53
A-EO-54	A-CR54
A-EO-55	A-CR55
A-EO-56	A-CR5
A-EO-57	A-CR5
A-EO-58	A-CR58
A-EO-59	A-CR59
A-EO-60	A-CR6
A-EO-61	A-CR6
A-EO-62	A-CR6
A-EO-63	A-CR6
A-EO-64	A-CR6
A-EO-65	A-CR6
A-EO-66	A-CR6
A-EO-67	A-CR6
A-EO-68	A-CR6
A-EO-69	A-CR69
A-EO-70	A-CR7
A-EO-71	A-CR7
A-EO-72	A-CR7
A-EO-73	A-CR73
A-EO-74	A-CR7
A-EO-75	A-CR75
A-EO-76	A-CR7
A-EO-77	A-CR7
A-EO-78	A-CR78
A-EO-79	A-CR79
A-EO-80	A-CR80
A-EO-81	A-CR81
A-EO-82	A-CR8
A-EO-83	A-CR8
A-EO-84	A-CR84
A-EO-85	A-CR85
A-EO-86	A-CR86
A-EO-87	A-CR8
A-EO-88	A-CR88
A-EO-89	A-CR8
A-EO-90	A-CR90
A-EO-91	A-CR9
A-EO-92	A-CR9
A-EO-93	A-CR9
A-EO-94	A-CR9
A-EO-95	A-CR9
A-EO-96	A-CR96

2010802 G

4 3 2

LTR	DESCRIPTION	DATE	
A	REVISED PER TDRR 37[illegible] DR [illegible] CHK [illegible]	12[illegible]	778
B	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]	778
C	REVISED PER TDRR 37954 DR [illegible] CHK [illegible]		778
D	REVISED PER TDRR 37967 DR C. Ford CHK [illegible]		778
E	REVISED PER TDRR 38022 DR C. Ford CHK [illegible]		778
F	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]	7/[illegible]	783
G	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]	786

REVISIONS TDR# 765[illegible]

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-E0-1	A-CR1	A-E0-97	A-CR97	B-E0-1	B-CR1	B-E0-97	B-CR97	A-E1-1	R1	A-E1-49	R49	A-E1-97	R97	A-E1-145	R145
A-E0-2	A-CR2	A-E0-98	A-CR98	B-E0-2	B-CR2	B-E0-98	B-CR98	B-E1-1		B-E1-49		B-E1-97		B-E1-145	
A-E0-3	A-CR3	A-E0-99	A-CR99	B-E0-3	B-CR3	B-E0-99	B-CR99	A-E1-2	R2	A-E1-50	R50	A-E1-98	R98	A-E1-146	R146
A-E0-4	A-CR4	A-E0-100	A-CR100	B-E0-4	B-CR4	B-E0-100	B-CR100	B-E1-2		B-E1-50		B-E1-98		B-E1-146	
A-E0-5	A-CR5	A-E0-101	A-CR101	B-E0-5	B-CR5	B-E0-101	B-CR101	A-E1-3	R3	A-E1-51	R51	A-E1-99	R99	A-E1-147	R147
A-E0-6	A-CR6	A-E0-102	A-CR102	B-E0-6	B-CR6	B-E0-102	B-CR102	B-E1-3		B-E1-51		B-E1-99		B-E1-147	
A-E0-7	A-CR7	A-E0-103	A-CR103	B-E0-7	B-CR7	B-E0-103	B-CR103	A-E1-4	R4	A-E1-52	R52	A-E1-100	R100	A-E1-148	R148
A-E0-8	A-CR8	A-E0-104	A-CR104	B-E0-8	B-CR8	B-E0-104	B-CR104	B-E1-4		B-E1-52		B-E1-100		B-E1-148	
A-E0-9	A-CR9	A-E0-105	A-CR105	B-E0-9	B-CR9	B-E0-105	B-CR105	A-E1-5	R5	A-E1-53	R53	A-E1-101	R101	A-E1-149	R149
A-E0-10	A-CR10	A-E0-106	A-CR106	B-E0-10	B-CR10	B-E0-106	B-CR106	B-E1-5		B-E1-53		B-E1-101		B-E1-149	
A-E0-11	A-CR11	A-E0-107	A-CR107	B-E0-11	B-CR11	B-E0-107	B-CR107	A-E1-6	R6	A-E1-54	R54	A-E1-102	R102	A-E1-150	R150
A-E0-12	A-CR12	A-E0-108	A-CR108	B-E0-12	B-CR12	B-E0-108	B-CR108	B-E1-6		B-E1-54		B-E1-102		B-E1-150	
A-E0-13	A-CR13	A-E0-109	A-CR109	B-E0-13	B-CR13	B-E0-109	B-CR109	A-E1-7	R7	A-E1-55	R55	A-E1-103	R103	A-E1-151	R151
A-E0-14	A-CR14	A-E0-110	A-CR110	B-E0-14	B-CR14	B-E0-110	B-CR110	B-E1-7		B-E1-55		B-E1-103		B-E1-151	
A-E0-15	A-CR15	A-E0-111	A-CR111	B-E0-15	B-CR15	B-E0-111	B-CR111	A-E1-8	R8	A-E1-56	R56	A-E1-104	R104	A-E1-152	R152
A-E0-16	A-CR16	A-E0-112	A-CR112	B-E0-16	B-CR16	B-E0-112	B-CR112	B-E1-8		B-E1-56		B-E1-104		B-E1-152	
A-E0-17	A-CR17	A-E0-113	A-CR113	B-E0-17	B-CR17	B-E0-113	B-CR113	A-E1-9	R9	A-E1-57	R57	A-E1-105	R105	A-E1-153	R153
A-E0-18	A-CR18	A-E0-114	A-CR114	B-E0-18	B-CR18	B-E0-114	B-CR114	B-E1-9		B-E1-57		B-E1-105		B-E1-153	
A-E0-19	A-CR19	A-E0-115	A-CR115	B-E0-19	B-CR19	B-E0-115	B-CR115	A-E1-10	R10	A-E1-58	R58	A-E1-106	R106	A-E1-154	R154
A-E0-20	A-CR20	A-E0-116	A-CR116	B-E0-20	B-CR20	B-E0-116	B-CR116	B-E1-10		B-E1-58		B-E1-106		B-E1-154	
A-E0-21	A-CR21	A-E0-117	A-CR117	B-E0-21	B-CR21	B-E0-117	B-CR117	A-E1-11	R11	A-E1-59	R59	A-E1-107	R107	A-E1-155	R155
A-E0-22	A-CR22	A-E0-118	A-CR118	B-E0-22	B-CR22	B-E0-118	B-CR118	B-E1-11		B-E1-59		B-E1-107		B-E1-155	
A-E0-23	A-CR23	A-E0-119	A-CR119	B-E0-23	B-CR23	B-E0-119	B-CR119	A-E1-12	R12	A-E1-60	R60	A-E1-108	R108	A-E1-156	R156
A-E0-24	A-CR24	A-E0-120	A-CR120	B-E0-24	B-CR24	B-E0-120	B-CR120	B-E1-12		B-E1-60		B-E1-108		B-E1-156	
A-E0-25	A-CR25	A-E0-121	A-CR121	B-E0-25	B-CR25	B-E0-121	B-CR121	A-E1-13	R13	A-E1-61	R61	A-E1-109	R109	A-E1-157	R157
A-E0-26	A-CR26	A-E0-122	A-CR122	B-E0-26	B-CR26	B-E0-122	B-CR122	B-E1-13		B-E1-61		B-E1-109		B-E1-157	
A-E0-27	A-CR27	A-E0-123	A-CR123	B-E0-27	B-CR27	B-E0-123	B-CR123	A-E1-14	R14	A-E1-62	R62	A-E1-110	R110	A-E1-158	R158
A-E0-28	A-CR28	A-E0-124	A-CR124	B-E0-28	B-CR28	B-E0-124	B-CR124	B-E1-14		B-E1-62		B-E1-110		B-E1-158	
A-E0-29	A-CR29	A-E0-125	A-CR125	B-E0-29	B-CR29	B-E0-125	B-CR125	A-E1-15	R15	A-E1-63	R63	A-E1-111	R111	A-E1-159	R159
A-E0-30	A-CR30	A-E0-126	A-CR126	B-E0-30	B-CR30	B-E0-126	B-CR126	B-E1-15		B-E1-63		B-E1-111		B-E1-159	
A-E0-31	A-CR31	A-E0-127	A-CR127	B-E0-31	B-CR31	B-E0-127	B-CR127	A-E1-16	R16	A-E1-64	R64	A-E1-112	R112	A-E1-160	R160
A-E0-32	A-CR32	A-E0-128	A-CR128	B-E0-32	B-CR32	B-E0-128	B-CR128	B-E1-16		B-E1-64		B-E1-112		B-E1-160	
A-E0-33	A-CR33	A-E0-129	A-CR129	B-E0-33	B-CR33	B-E0-129	B-CR129	A-E1-17	R17	A-E1-65	R65	A-E1-113	R113	A-E1-161	R161
A-E0-34	A-CR34	A-E0-130	A-CR130	B-E0-34	B-CR34	B-E0-130	B-CR130	B-E1-17		B-E1-65		B-E1-113		B-E1-161	
A-E0-35	A-CR35	A-E0-131	A-CR131	B-E0-35	B-CR35	B-E0-131	B-CR131	A-E1-18	R18	A-E1-66	R66	A-E1-114	R114	A-E1-162	R162
A-E0-36	A-CR36	A-E0-132	A-CR132	B-E0-36	B-CR36	B-E0-132	B-CR132	B-E1-18		B-E1-66		B-E1-114		B-E1-162	
A-E0-37	A-CR37	A-E0-133	A-CR133	B-E0-37	B-CR37	B-E0-133	B-CR133	A-E1-19	R19	A-E1-67	R67	A-E1-115	R115	A-E1-163	R163
A-E0-38	A-CR38	A-E0-134	A-CR134	B-E0-38	B-CR38	B-E0-134	B-CR134	B-E1-19		B-E1-67		B-E1-115		B-E1-163	
A-E0-39	A-CR39	A-E0-135	A-CR135	B-E0-39	B-CR39	B-E0-135	B-CR135	A-E1-20	R20	A-E1-68	R68	A-E1-116	R116	A-E1-164	R164
A-E0-40	A-CR40	A-E0-136	A-CR136	B-E0-40	B-CR40	B-E0-136	B-CR136	B-E1-20		B-E1-68		B-E1-116		B-E1-164	
A-E0-41	A-CR41	A-E0-137	A-CR137	B-E0-41	B-CR41	B-E0-137	B-CR137	A-E1-21	R21	A-E1-69	R69	A-E1-117	R117	A-E1-165	R165
A-E0-42	A-CR42	A-E0-138	A-CR138	B-E0-42	B-CR42	B-E0-138	B-CR138	B-E1-21		B-E1-69		B-E1-117		B-E1-165	
A-E0-43	A-CR43	A-E0-139	A-CR139	B-E0-43	B-CR43	B-E0-139	B-CR139	A-E1-22	R22	A-E1-70	R70	A-E1-118	R118	A-E1-166	R166
A-E0-44	A-CR44	A-E0-140	A-CR140	B-E0-44	B-CR44	B-E0-140	B-CR140	B-E1-22		B-E1-70		B-E1-118		B-E1-166	
A-E0-45	A-CR45	A-E0-141	A-CR141	B-E0-45	B-CR45	B-E0-141	B-CR141	A-E1-23	R23	A-E1-71	R71	A-E1-119	R119	A-E1-167	R167
A-E0-46	A-CR46	A-E0-142	A-CR142	B-E0-46	B-CR46	B-E0-142	B-CR142	B-E1-23		B-E1-71		B-E1-119		B-E1-167	
A-E0-47	A-CR47	A-E0-143	A-CR143	B-E0-47	B-CR47	B-E0-143	B-CR143	A-E1-24	R24	A-E1-72	R72	A-E1-120	R120	A-E1-168	R168
A-E0-48	A-CR48	A-E0-144	A-CR144	B-E0-48	B-CR48	B-E0-144	B-CR144	B-E1-24		B-E1-72		B-E1-120		B-E1-168	
A-E0-49	A-CR49	A-E0-145	A-CR145	B-E0-49	B-CR49	B-E0-145	B-CR145	A-E1-25	R25	A-E1-73	R73	A-E1-121	R121	A-E1-169	R169
A-E0-50	A-CR50	A-E0-146	A-CR146	B-E0-50	B-CR50	B-E0-146	B-CR146	B-E1-25		B-E1-73		B-E1-121		B-E1-169	
A-E0-51	A-CR51	A-E0-147	A-CR147	B-E0-51	B-CR51	B-E0-147	B-CR147	A-E1-26	R26	A-E1-74	R74	A-E1-122	R122	A-E1-170	R170
A-E0-52	A-CR52	A-E0-148	A-CR148	B-E0-52	B-CR52	B-E0-148	B-CR148	B-E1-26		B-E1-74		B-E1-122		B-E1-170	
A-E0-53	A-CR53	A-E0-149	A-CR149	B-E0-53	B-CR53	B-E0-149	B-CR149	A-E1-27	R27	A-E1-75	R75	A-E1-123	R123	A-E1-171	R171
A-E0-54	A-CR54	A-E0-150	A-CR150	B-E0-54	B-CR54	B-E0-150	B-CR150	B-E1-27		B-E1-75		B-E1-123		B-E1-171	
A-E0-55	A-CR55	A-E0-151	A-CR151	B-E0-55	B-CR55	B-E0-151	B-CR151	A-E1-28	R28	A-E1-76	R76	A-E1-124	R124	A-E1-172	R172
A-E0-56	A-CR56	A-E0-152	A-CR152	B-E0-56	B-CR56	B-E0-152	B-CR152	B-E1-28		B-E1-76		B-E1-124		B-E1-172	
A-E0-57	A-CR57	A-E0-153	A-CR153	B-E0-57	B-CR57	B-E0-153	B-CR153	A-E1-29	R29	A-E1-77	R77	A-E1-125	R125	A-E1-173	R173
A-E0-58	A-CR58	A-E0-154	A-CR154	B-E0-58	B-CR58	B-E0-154	B-CR154	B-E1-29		B-E1-77		B-E1-125		B-E1-173	
A-E0-59	A-CR59	A-E0-155	A-CR155	B-E0-59	B-CR59	B-E0-155	B-CR155	A-E1-30	R30	A-E1-78	R78	A-E1-126	R126	A-E1-174	R174
A-E0-60	A-CR60	A-E0-156	A-CR156	B-E0-60	B-CR60	B-E0-156	B-CR156	B-E1-30		B-E1-78		B-E1-126		B-E1-174	
A-E0-61	A-CR61	A-E0-157	A-CR157	B-E0-61	B-CR61	B-E0-157	B-CR157	A-E1-31	R31	A-E1-79	R79	A-E1-127	R127	A-E1-175	R175
A-E0-62	A-CR62	A-E0-158	A-CR158	B-E0-62	B-CR62	B-E0-158	B-CR158	B-E1-31		B-E1-79		B-E1-127		B-E1-175	
A-E0-63	A-CR63	A-E0-159	A-CR159	B-E0-63	B-CR63	B-E0-159	B-CR159	A-E1-32	R32	A-E1-80	R80	A-E1-128	R128	A-E1-176	R176
A-E0-64	A-CR64	A-E0-160	A-CR160	B-E0-64	B-CR64	B-E0-160	B-CR160	B-E1-32		B-E1-80		B-E1-128		B-E1-176	
A-E0-65	A-CR65	A-E0-161	A-CR161	B-E0-65	B-CR65	B-E0-161	B-CR161	A-E1-33	R33	A-E1-81	R81	A-E1-129	R129	A-E1-177	R177
A-E0-66	A-CR66	A-E0-162	A-CR162	B-E0-66	B-CR66	B-E0-162	B-CR162	B-E1-33		B-E1-81		B-E1-129		B-E1-177	
A-E0-67	A-CR67	A-E0-163	A-CR163	B-E0-67	B-CR67	B-E0-163	B-CR163	A-E1-34	R34	A-E1-82	R82	A-E1-130	R130	A-E1-178	R178
A-E0-68	A-CR68	A-E0-164	A-CR164	B-E0-68	B-CR68	B-E0-164	B-CR164	B-E1-34		B-E1-82		B-E1-130		B-E1-178	
A-E0-69	A-CR69	A-E0-165	A-CR165	B-E0-69	B-CR69	B-E0-165	B-CR165	A-E1-35	R35	A-E1-83	R83	A-E1-131	R131	A-E1-179	R179
A-E0-70	A-CR70	A-E0-166	A-CR166	B-E0-70	B-CR70	B-E0-166	B-CR166	B-E1-35		B-E1-83		B-E1-131		B-E1-179	
A-E0-71	A-CR71	A-E0-167	A-CR167	B-E0-71	B-CR71	B-E0-167	B-CR167	A-E1-36	R36	A-E1-84	R84	A-E1-132	R132	A-E1-180	R180
A-E0-72	A-CR72	A-E0-168	A-CR168	B-E0-72	B-CR72	B-E0-168	B-CR168	B-E1-36		B-E1-84		B-E1-132		B-E1-180	
A-E0-73	A-CR73	A-E0-169	A-CR169	B-E0-73	B-CR73	B-E0-169	B-CR169	A-E1-37	R37	A-E1-85	R85	A-E1-133	R133	A-E1-181	R181
A-E0-74	A-CR74	A-E0-170	A-CR170	B-E0-74	B-CR74	B-E0-170	B-CR170	B-E1-37		B-E1-85		B-E1-133		B-E1-181	
A-E0-75	A-CR75	A-E0-171	A-CR171	B-E0-75	B-CR75	B-E0-171	B-CR171	A-E1-38	R38	A-E1-86	R86	A-E1-134	R134	A-E1-182	R182
A-E0-76	A-CR76	A-E0-172	A-CR172	B-E0-76	B-CR76	B-E0-172	B-CR172	B-E1-38		B-E1-86		B-E1-134		B-E1-182	
A-E0-77	A-CR77	A-E0-173	A-CR173	B-E0-77	B-CR77	B-E0-173	B-CR173	A-E1-39	R39	A-E1-87	R87	A-E1-135	R135	A-E1-183	R183
A-E0-78	A-CR78	A-E0-174	A-CR174	B-E0-78	B-CR78	B-E0-174	B-CR174	B-E1-39		B-E1-87		B-E1-135		B-E1-183	
A-E0-79	A-CR79	A-E0-175	A-CR175	B-E0-79	B-CR79	B-E0-175	B-CR175	A-E1-40	R40	A-E1-88	R88	A-E1-136	R136	A-E1-184	R184
A-E0-80	A-CR80	A-E0-176	A-CR176	B-E0-80	B-CR80	B-E0-176	B-CR176	B-E1-40		B-E1-88		B-E1-136		B-E1-184	
A-E0-81	A-CR81	A-E0-177	A-CR177	B-E0-81	B-CR81	B-E0-177	B-CR177	A-E1-41	R41	A-E1-89	R89	A-E1-137	R137	A-E1-185	R185
A-E0-82	A-CR82	A-E0-178	A-CR178	B-E0-82	B-CR82	B-E0-178	B-CR178	B-E1-41		B-E1-89		B-E1-137		B-E1-185	
A-E0-83	A-CR83	A-E0-179	A-CR179	B-E0-83	B-CR83	B-E0-179	B-CR179	A-E1-42	R42	A-E1-90	R90	A-E1-138	R138	A-E1-186	R186
A-E0-84	A-CR84	A-E0-180	A-CR180	B-E0-84	B-CR84	B-E0-180	B-CR180	B-E1-42		B-E1-90		B-E1-138		B-E1-186	
A-E0-85	A-CR85	A-E0-181	A-CR181	B-E0-85	B-CR85	B-E0-181	B-CR181	A-E1-43	R43	A-E1-91	R91	A-E1-139	R139	A-E1-187	R187
A-E0-86	A-CR86	A-E0-182	A-CR182	B-E0-86	B-CR86	B-E0-182	B-CR182	B-E1-43		B-E1-91		B-E1-139		B-E1-187	
A-E0-87	A-CR87	A-E0-183	A-CR183	B-E0-87	B-CR87	B-E0-183	B-CR183	A-E1-44	R44	A-E1-92	R92	A-E1-140	R140	A-E1-188	R188
A-E0-88	A-CR88	A-E0-184	A-CR184	B-E0-88	B-CR88	B-E0-184	B-CR184	B-E1-44		B-E1-92		B-E1-140		B-E1-188	
A-E0-89	A-CR89	A-E0-185	A-CR185	B-E0-89	B-CR89	B-E0-185	B-CR185	A-E1-45	R45	A-E1-93	R93	A-E1-141	R141	A-E1-189	R189
A-E0-90	A-CR90	A-E0-186	A-CR186	B-E0-90	B-CR90	B-E0-186	B-CR186	B-E1-45		B-E1-93		B-E1-141		B-E1-189	
A-E0-91	A-CR91	A-E0-187	A-CR187	B-E0-91	B-CR91	B-E0-187	B-CR187	A-E1-46	R46	A-E1-94	R94	A-E1-142	R142	A-E1-190	R190
A-E0-92	A-CR92	A-E0-188	A-CR188	B-E0-92	B-CR92	B-E0-188	B-CR188	B-E1-46		B-E1-94		B-E1-142		B-E1-190	
A-E0-93	A-CR93	A-E0-189	A-CR189	B-E0-93	B-CR93	B-E0-189	B-CR189	A-E1-47	R47	A-E1-95	R95	A-E1-143	R143	A-E1-191	R191
A-E0-94	A-CR94	A-E0-190	A-CR190	B-E0-94	B-CR94	B-E0-190	B-CR190	B-E1-47		B-E1-95		B-E1-143		B-E1-191	
A-E0-95	A-CR95	A-E0-191	A-CR191	B-E0-95	B-CR95	B-E0-191	B-CR191	A-E1-48	R48	A-E1-96	R96	A-E1-144	R144	A-E1-192	R192
A-E0-96	A-CR96	A-E0-192	A-CR192	B-E0-96	B-CR96	B-E0-192	B-CR192	B-E1-48		B-E1-96		B-E1-144		B-E1-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith 10 APR 6[illegible]
CHECKED [illegible] 10 APR [illegible]
APPROVED [illegible]
APPROVED

APPROVED [illegible]
APPROVED MSC [illegible]

FIXED MEMORY MODULE
• ASSEMBLY

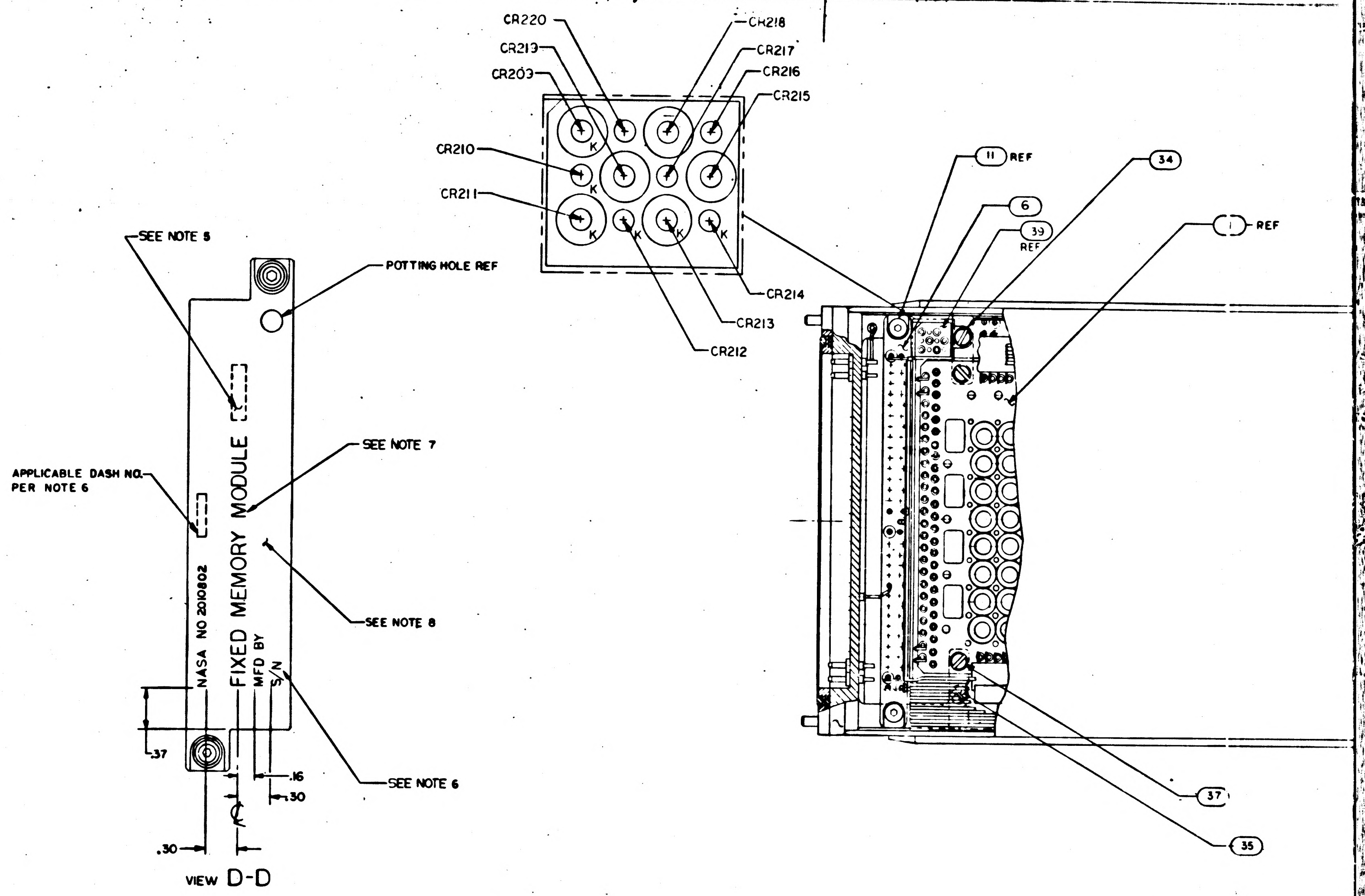
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802
SCALE NONE
SHEET [illegible] OF 2

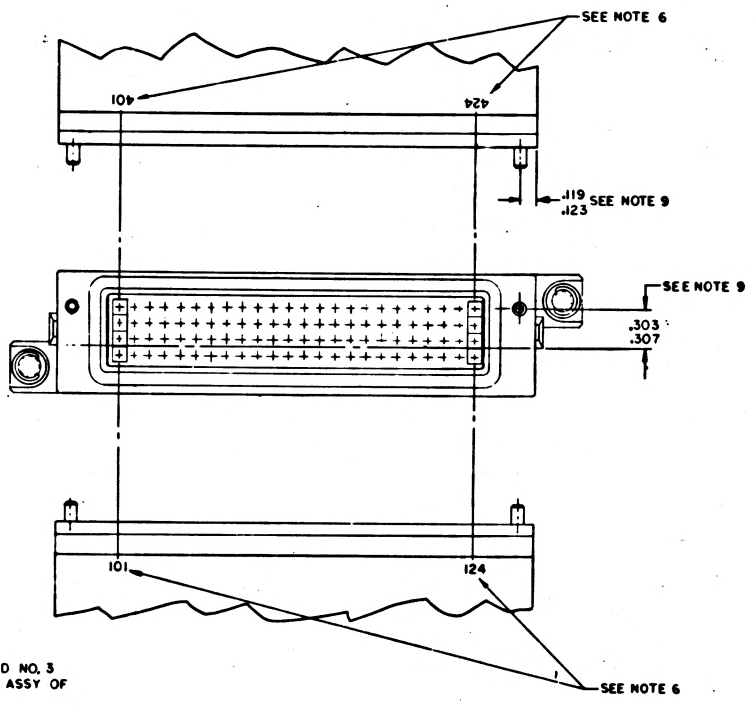
2010802 G

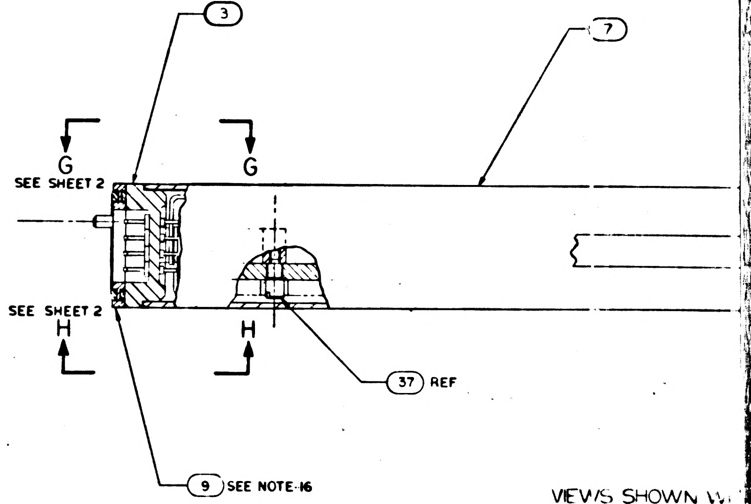
2010802G F 2 X 2 SH 3/3

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-C	B-1	2010804-021	2010803-011	0321	2021113-071	PS2016036
↑ -02	B-2	↑ -031	↑ -021	0322	↑	↑
-03	B-3	-041	-031	0323		
-04	B-4	-051	-041	0324		
↓ -05	B-5	↓ -061	↓ -051	0325	↓	↓
2010802-06	B-6	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-1	2010804-081	2010803-071	0327	2021112-081	PS2016042
↑ -08	B-2	↑ -091	↑ -081	0328	↑	↑
-09	B-3	-111	-091	0329		
-11	B-4	-121	-111	0330		
↓ -121	B-5	↓ -131	↓ -121	0331	↓	↓
2010802-131	B-6	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B-5	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
2010802-171	B-5	2010804-161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804-171	2010803-181	0337	2021113-091	PS2016042
↑ -191	B-2	↑ -181	↑ -191	0338	↑	↑
-211	B-3	-191	-211	0339		
-221	B-4	-211	-221	0340		
↓ -231	B-5	↓ -221	↓ -231	0341	↓	↓
2010802-241	B-6	2010804-231	2010803-241	0342	2021113-091	PS2016042
2010802-251	B-1	2010804-241	2010803-251	0343	2021112-141	PS2016042
↑ -261	B-2	↑ -251	↑ -261	0344	↑	↑
-271	B-3	-261	-271	0345		
-281	B-4	-271	-281	0346		
↓ -291	B-5	↓ -281	↓ -291	0347	↓	↓
2010802-311	B-6	2010804-291	2010803-311	0348	2021112-141	PS2016042







VIEWS SHOWN W
PARTIALLY

NOTES:

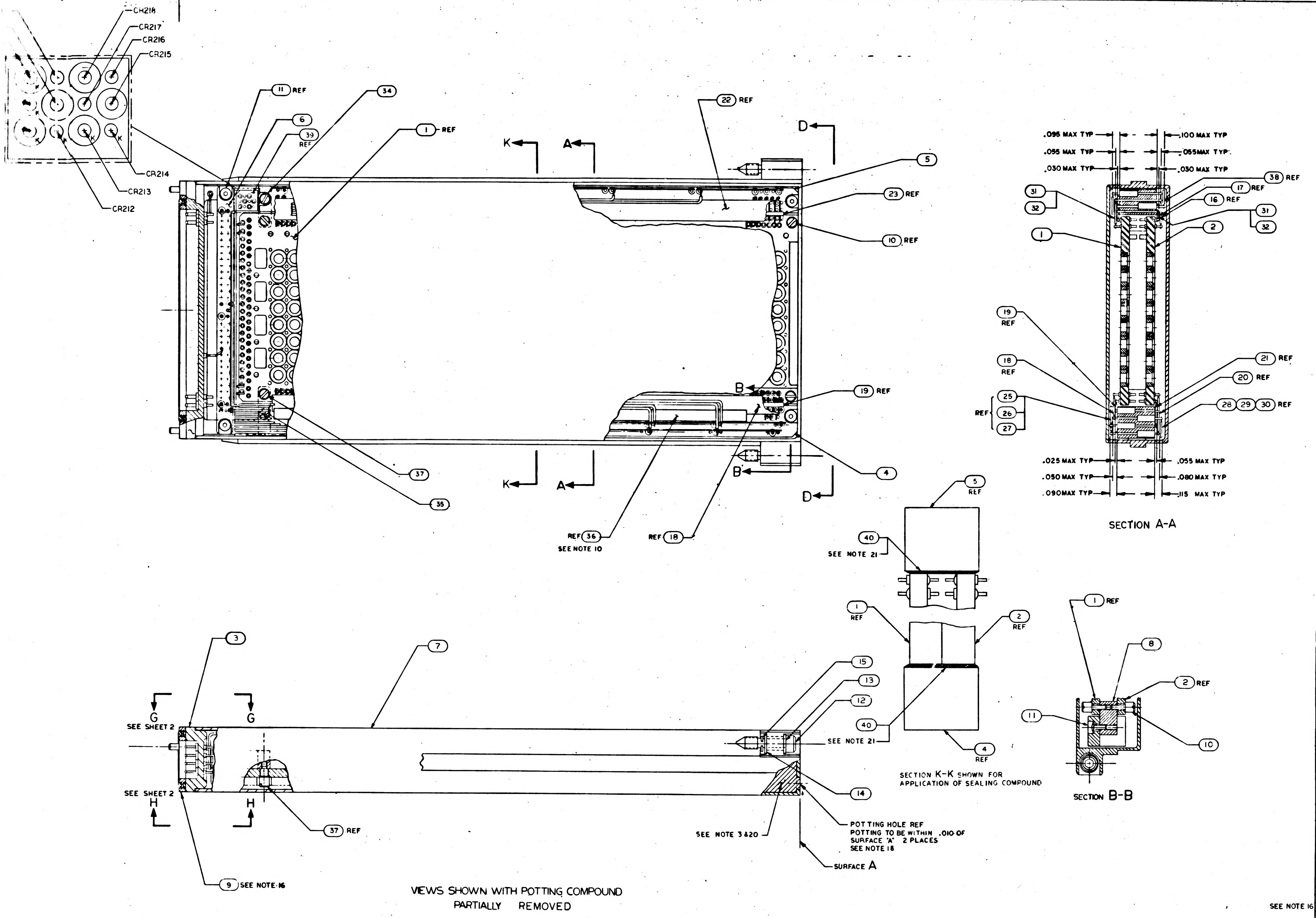
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9, TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

2010802	H

SYM	DESCRIPTION	DATE	APPROVAL
	REVISIONS TDRR 37452		
A	REVISED PER TDRR 37915 DR CHK	[illegible]	FBR
B	REVISED PER TDRR 37916 DR CHK	12/11/69	FBR
C	REVISED PER TDRR 37954 DR CHK	1/14/70	FBR
D	REVISED PER TDRR 37967 DR R.G. Ford CHK	2/11/70	FBR
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	4/9/70	FBR
F	REVISED PER TDRR 3[illegible]32 DR CHK	5/11/70	FBR
G	REVISED PER TDRR 38151 DR R. Ford CHK	[illegible]	FBR
H	REVISED PER TDRR 38173 DR R. Ford CHK	7/2/70	FBR


4
3
2
1
CR218
CR217
CR216
CR215
CR214
CR213
CR212
11 REF
34
6
39 REF
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
B
REF
4
37
35
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
19 REF
18 REF
21 REF
20 REF
25
26
27
REF
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
SEE SHEET 2
G
SEE SHEET 2
H
H
15
13
12
14
37 REF
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
C
B
A

VIEWS SHOWN WITH POTTING COMPOUND
PARTIALLY REMOVED

REQUIREMENTS FOR CONTROL
TION OF ROPE MEMORY ASSEMBLIES
FIXTURE DWG NO. AP22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

SEE NOTE 16

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

NEXT ASSY	USED ON
SEE CHART	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 69
CHECKED 10 APR 69
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

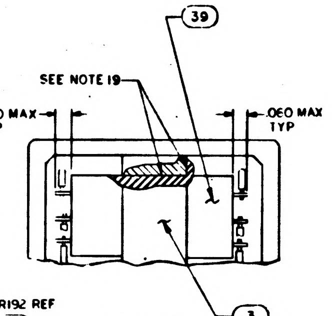
2010802 H

2010802 HF 2/2 SH 1/3

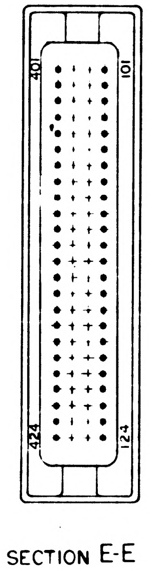
WIRE LIST			
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST	
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0 208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

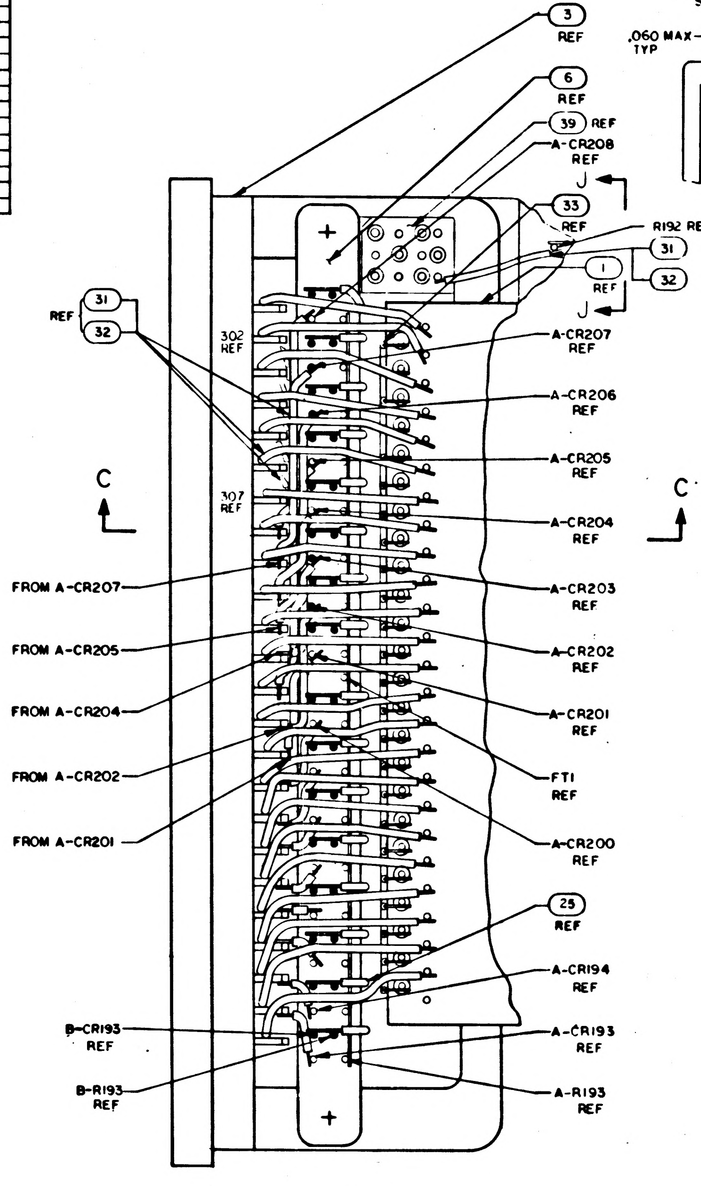
WIRE LIST	
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

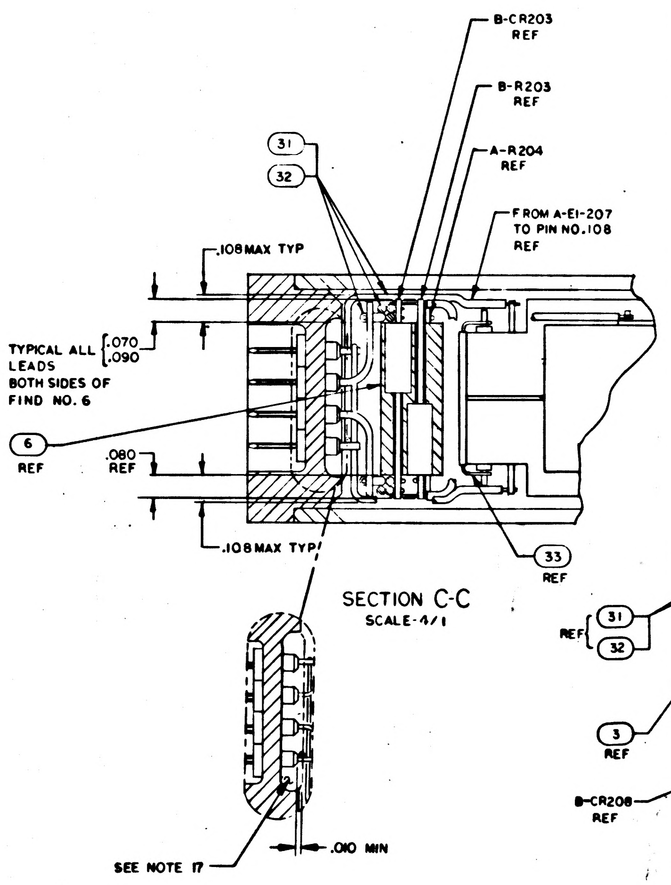
VIEW J-J


401
101
424
124

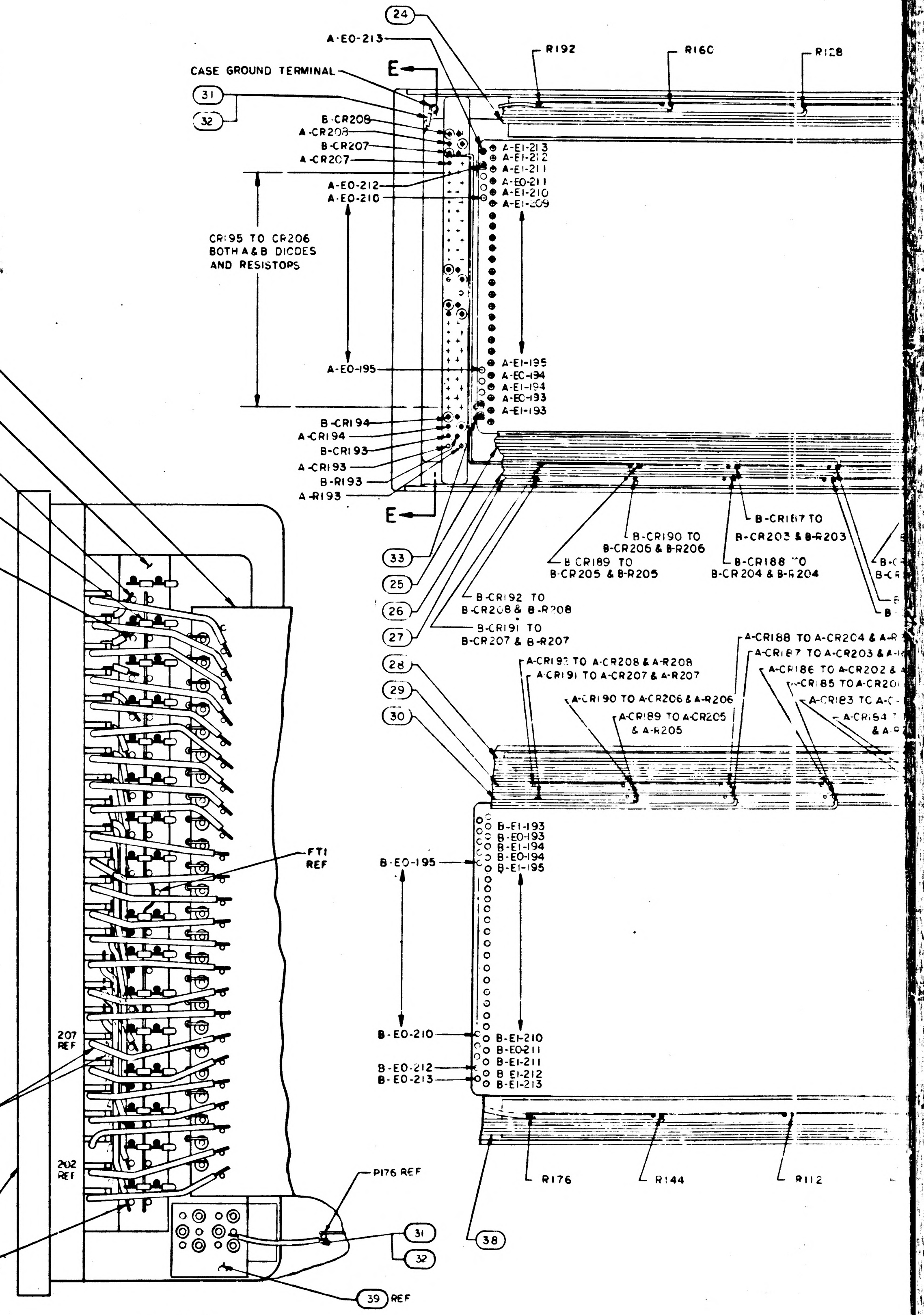
SECTION E-E


3 REF
6 REF
39 REF
A-CR208 REF
33 REF
R192 REF
31
32
1 REF
J
J
31
32
REF
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FTI REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
C
C
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14


31
32
B-CR203 REF
B-R203 REF
A-R204 REF
FROM A-E1-207 TO PIN NO.108 REF
.108MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108MAX TYP
33 REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE 4/1

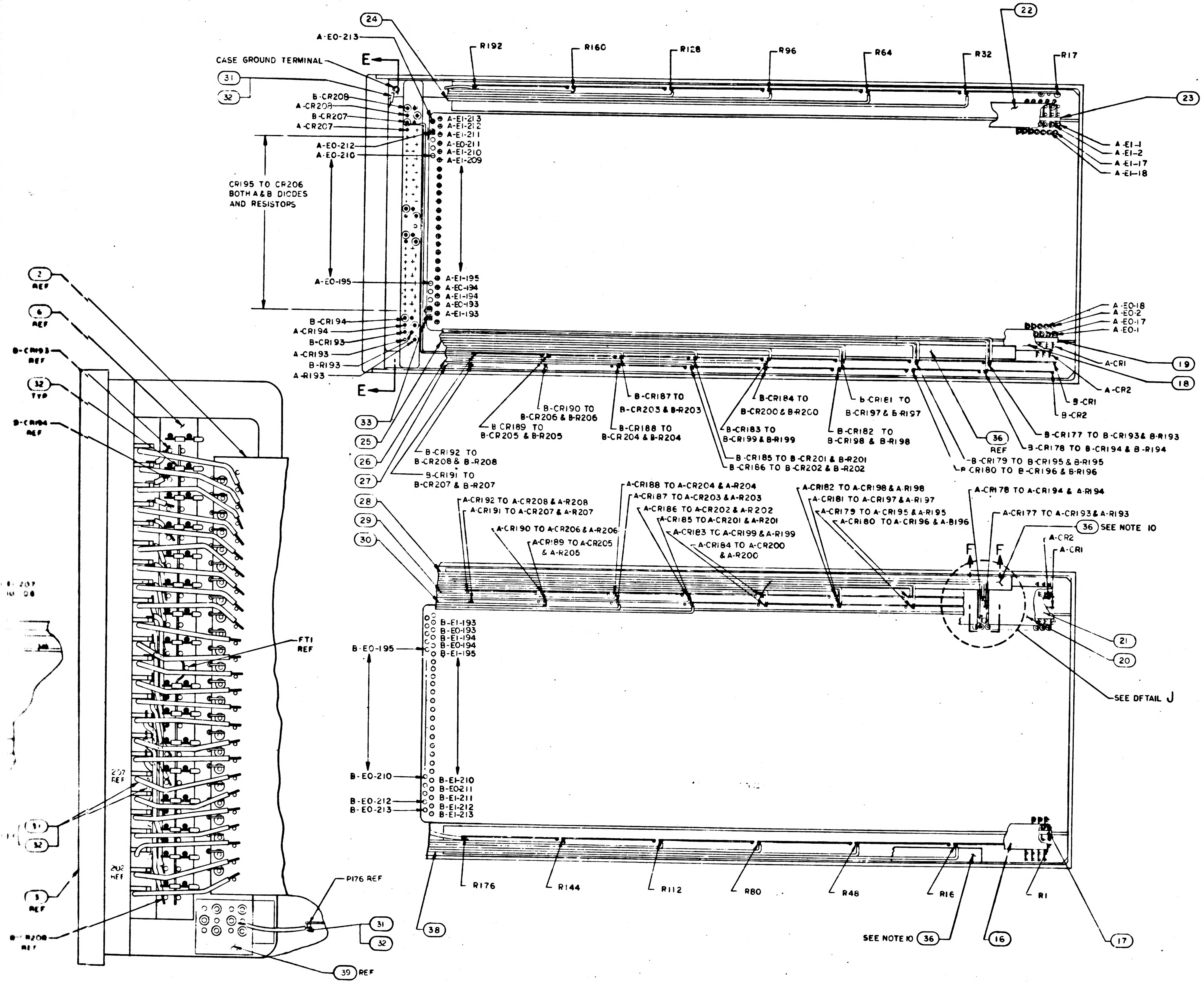

2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
207 REF
202 REF
31
32
REF
3 REF
B-CR208 REF
FTI REF
P176 REF
31
32
39 REF
24
A-E0-213
CASE GROUND TERMINAL
E
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
R192
R160
R128
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
A-CR188 TO A-CR204
A-CR187 TO A-CR203
A-CR186 TO A-CR202
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
B-E0-195
B-E0-210
B-E0-212
B-E0-213
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
R176
R144
R112
38

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

2010802 H

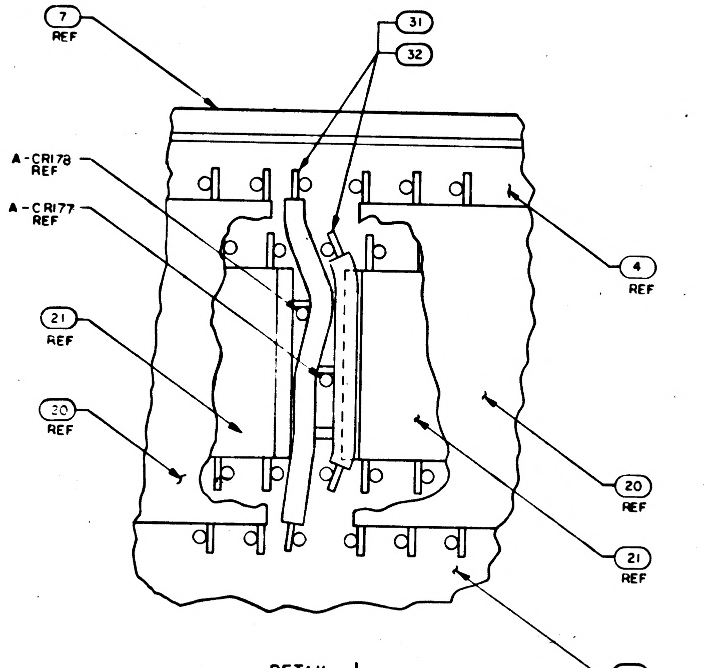
2010802HF 1/2 SIH 2/3

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37[illegible] DR [illegible] CHK [illegible]	12/[illegible]/69	PEB
B	REVISED PER TDRR 37916 DR [illegible] CHK [illegible]	12/[illegible]/69	PEB
C	REVISED PER TDRR 37[illegible] DR [illegible] CHK [illegible]	[illegible]	PEB
D	REVISED PER TDRR 3[illegible] DR [illegible] CHK [illegible]	[illegible]	PEB
E	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]/70	PEB
F	REVISED PER TDRR [illegible]32 DR [illegible]	[illegible]	PEB
G	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]	PEB
H	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]/71	PEB



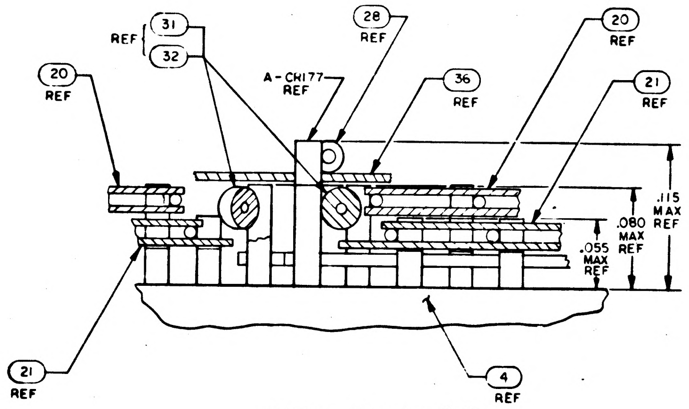
24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
R192
R160
R128
R96
R64
R32
R17
22
23
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
A-CR2
19
18
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
F
F
A-CR2
A-CR1
21
20
SEE DETAIL J
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E0-212
B-E0-213
B-E1-210
B-E0211
B-E1-211
B-E1-212
B-E1-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10 36
16
17
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
31
32
202 REF
3 REF
B-R208 REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE:4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NOS 28 AND 36 REMOVED



REF
31
32
20 REF
28 REF
A-CR177 REF
36 REF
20 REF
21 REF
.115 MAX REF
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
SCALE 2/1
SHEET 2 OF 3

2010802 H

2010802

20108O2HF 2/2 SH 2/3

[illegible]

8 7 6 5 4

D

C

B

A

TERM. NO.
A-EO-1
A-EO-2
A-EO-3
A-EO-4
A-EO-5
A-EO-6
A-EO-7
A-EO-8
A-EO-9
A-EO-10
A-EO-1
A-EO-12
A-EO-13
A-EO-14
A-EO-15
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A-EO-92
A-EO-93
A-EO-94
A-EO-95
A-EO-96

8 5 4

5 4 3 2

REVISIONS TDRR 37652

SYM	DESCRIPTION	DATE	APP
A	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]		
B	REVISED PER TDRR 37916 DR [illegible] CHK E. Urban		
C	REVISED PER TDRR 37954 DR [illegible] CHK [illegible]		
D	REVISED PER TDRR 37967 DR [illegible] Ford CHK [illegible]		
E	REVISED PER TDRR 38022 DR E. Ford CHK [illegible]		
F	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]		
G	REVISED PER TDRR 38151 DR [illegible] CHK E. Urban		
H	REVISED PER TDRR 38173 DR [illegible] CHK [illegible]		

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86.	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED E. Urban
APPROVED
APPROVED
APPROVED NASA [illegible]
APPROVED MSC

FIXED MEMORY MODULE - ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
DATE
SCALE NONE
SHEET 3 OF 3

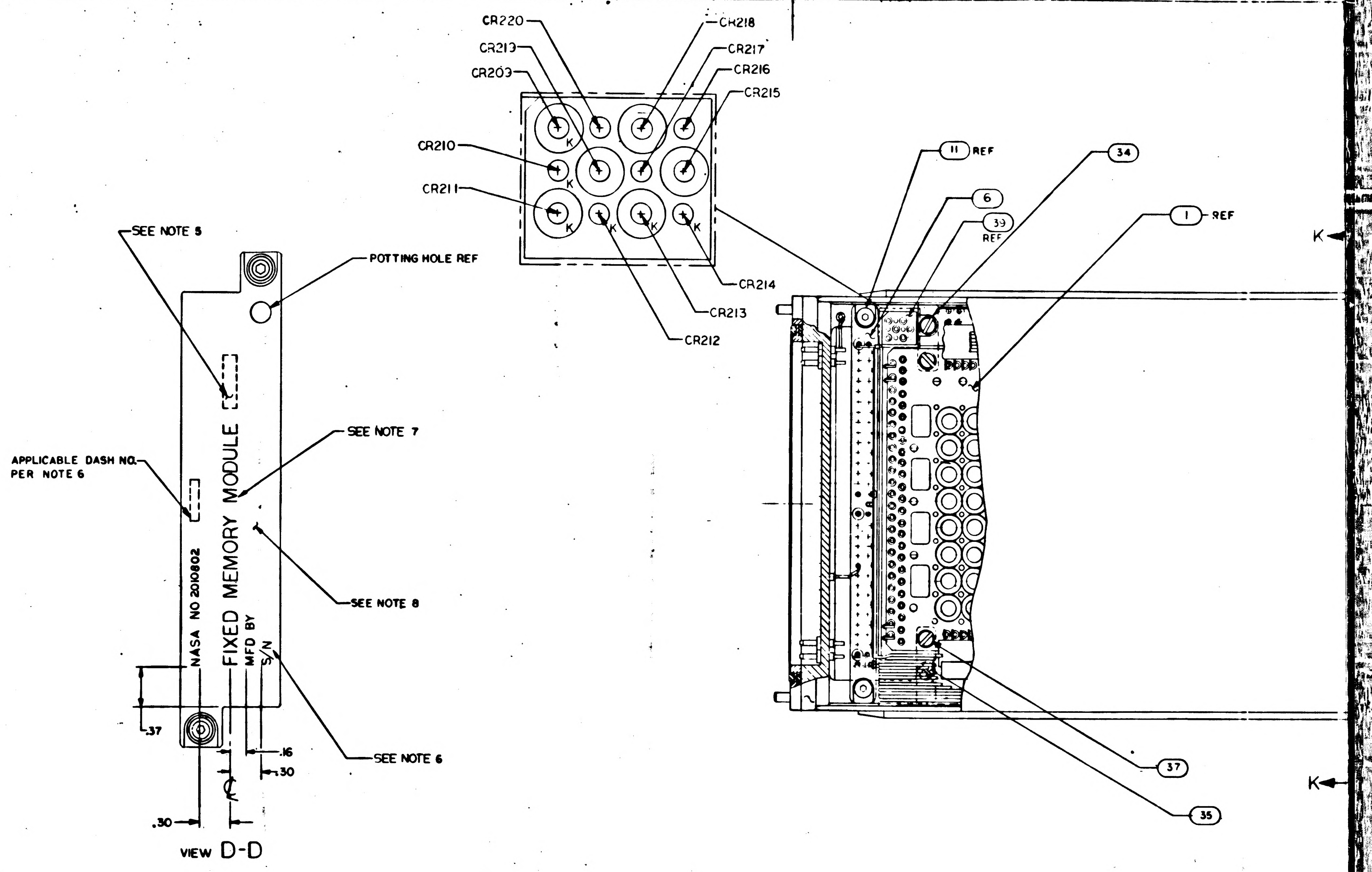
5

2010802 H

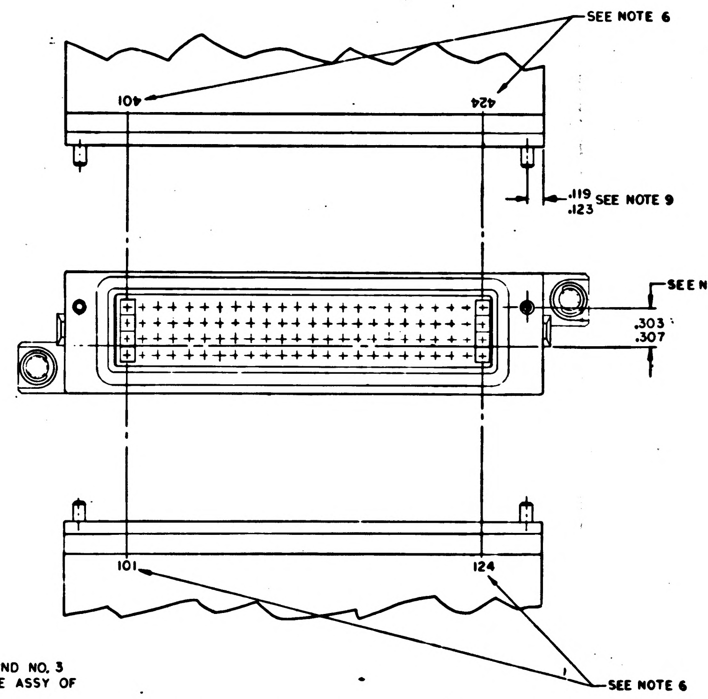
2010802HF 2/2 SH 3/3

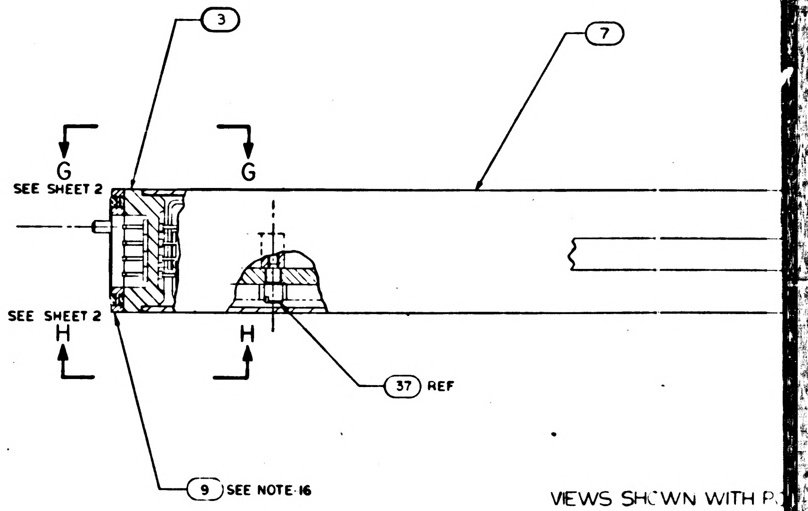
NOTICE – [illegible]

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
201[illegible]2-0[illegible]	B-	2010804 021	2010803-011	0321	2021113-071	PS2016036
-021	B-	↑ 031	↑ -021	0322	↑	↑
-031	B-	041	-031	0323		
-041	B-	051	-041	0324		
-051	B-	↓ 061	↓ -051	0325	↓	↓
201[illegible]2-061	B-	2010804 071	2010803-061	0326	2021113-071	PS2016036
201[illegible]2-071	B-	2010804 081	2010803-071	0327	2021112-081	PS2016042
-081	B-	↑ 091	↑ -081	0328	↑	↑
-091	B-	111	-091	0329		
-111	B-	121	-111	0330		
-121	B-	↓ 131	↓ -121	0331	↓	↓
201[illegible]2-131	B-	2010804 141	2010803-131	0332	2021112-081	PS2016042
201[illegible]2-141	B-	2010804 131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
2[illegible]-171	B-	2010804 161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804-171	2010803-181	0337	2021113-091	PS2016042
↑ -191	B-2	↑ -181	↑ -191	0338	↑	↑
-211	B-3	-191	-211	0339		
-221	B-4	-211	-221	0340		
↓ -231	B-5	↓ -221	↓ -231	0341	↓	↓
2010802-241	B-6	2010804-231	2010803-241	0342	2021113-091	PS2016042
2010802-251	B-1	2010804-241	2010803-251	0343	2021112-141	PS2016042
↑ -261	B-2	↑ -251	↑ -261	0344	↑	↑
-271	B-3	-261	-271	0345		
-281	B-4	-271	-281	0346		
↓ -291	B-5	↓ -281	↓ -291	0347	↓	↓
2010802-311	B-6	2010804-291	2010803-311	0348	2021112-141	PS2016042
201[illegible]-321	B-1	2010804-311	2010803-321	0349	2021112-151	PS2016042
↑ -331	B-2	↑ -321	↑ -331	0350	↑	↑
-341	B-3	-331	-341	0351		
-351	B-4	-341	-351	0352		
↓ -361	B-5	↓ -351	↓ -361	0353	↓	↓
201[illegible]-371	B-6	2010804-361	2010803-371	0354	2021112-151	PS2016042



VIEW D-D





VIEWS SHOWN WITH P
PARTIALLY R

NOTES:

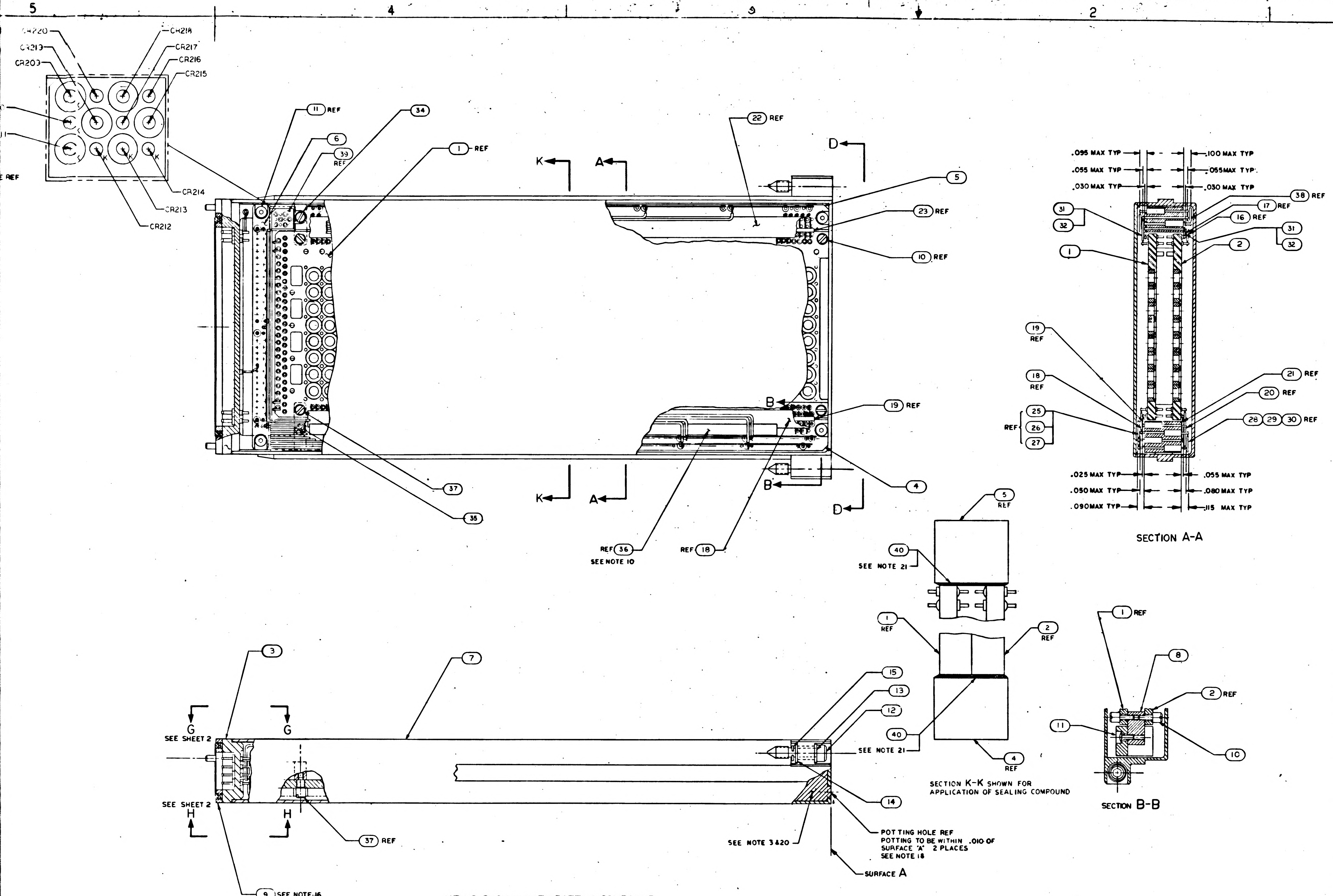
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE XI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2,&3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802	J

	REVISIONS TDRR 3765		
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR H Leonard CHK	4	FBR
B	REVISED PER TDRR 37916 DR H Leonard CHK	2/	FBR
C	REVISED PER TDRR 379 DR CHK		FBR
D	REVISED PER TDRR 37967 DR R.G. Ford CHK		FBR
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	2/	FBR
F	REVISED PER TDRR 3 DR CHK	5/11	FBR
G	REVISED PER TDRR 38151 DR R. Ford CHK		FBR
H	REVISED PER TDRR 38173 DR R. Ford CHK		FBR
J	REVISED PER TDRR 382 DR CHK		FBR


5
4
3
2
1
CR220
CR213
CR203
CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
K
K
E REF
11 REF
6
39 REF
34
1 REF
K
A
22 REF
D
5
23 REF
10 REF
19 REF
B
4
37
35
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
31
32
19 REF
18 REF
25
26
27
REF
21 REF
20 REF
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
15
13
12
SEE NOTE 21
G
SEE SHEET 2
G
SEE SHEET 2
H
H
14
37 REF
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE 'A' 2 PLACES
SEE NOTE 18
SEE NOTE 3 & 20
SURFACE A
9 SEE NOTE 16
C
B
A

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

ES:
1 PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2 FIXED MEMORY FIXTURE DWG NO. AP22500

SEE NOTE 16

FOR APPLICABLE PART NO. SEE CHART

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT, SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	E RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

2010802

SEE CHART		
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

M I T
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 67
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230 SIZE J NASA DRAWING NO. 2010802
SCALE 2/1 WT SHEET 1 OF 3

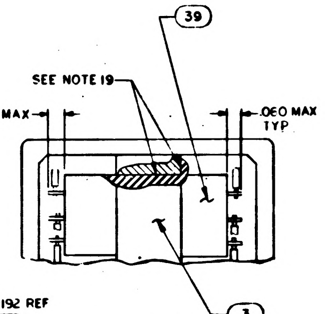
2010802 J

2010802 JF2/2 SH1/3

WIRE LIST			
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

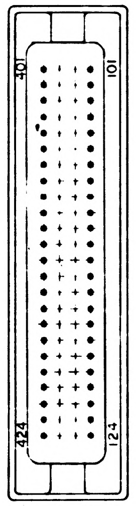
WIRE LIST	
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST	
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192



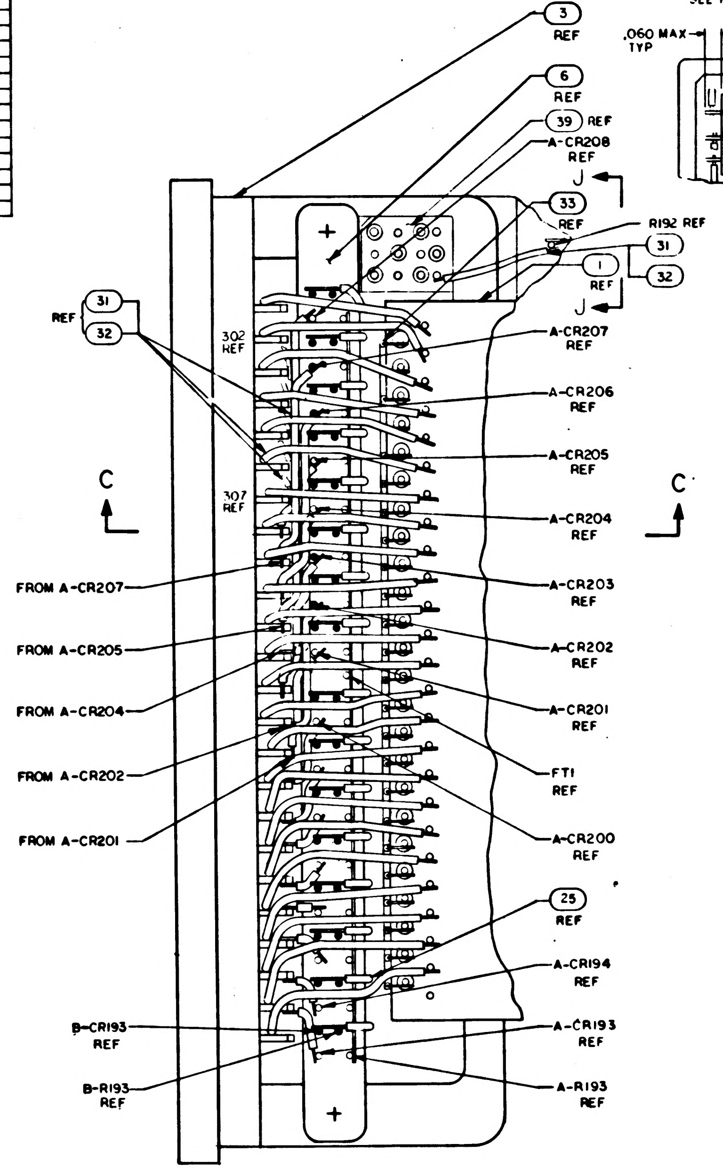
39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

VIEW J-J



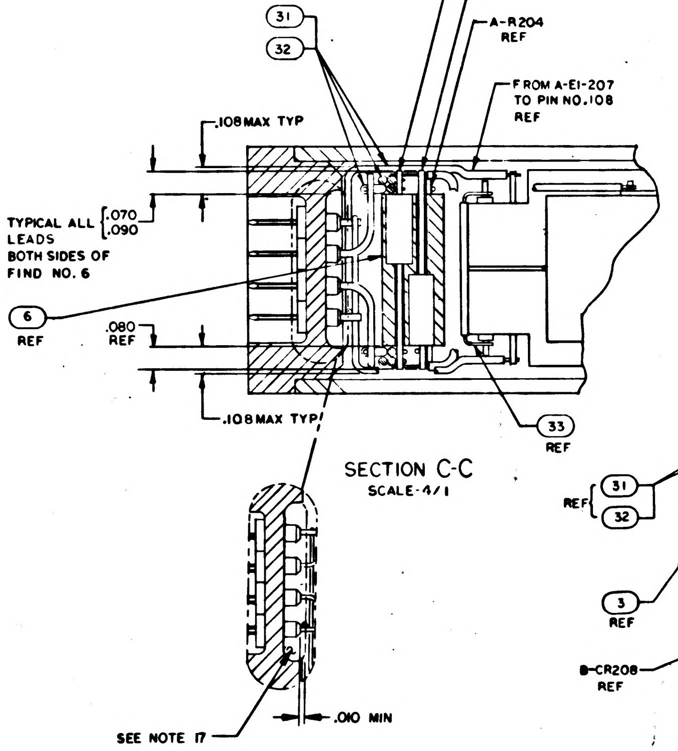
401
101
424
124

SECTION E-E



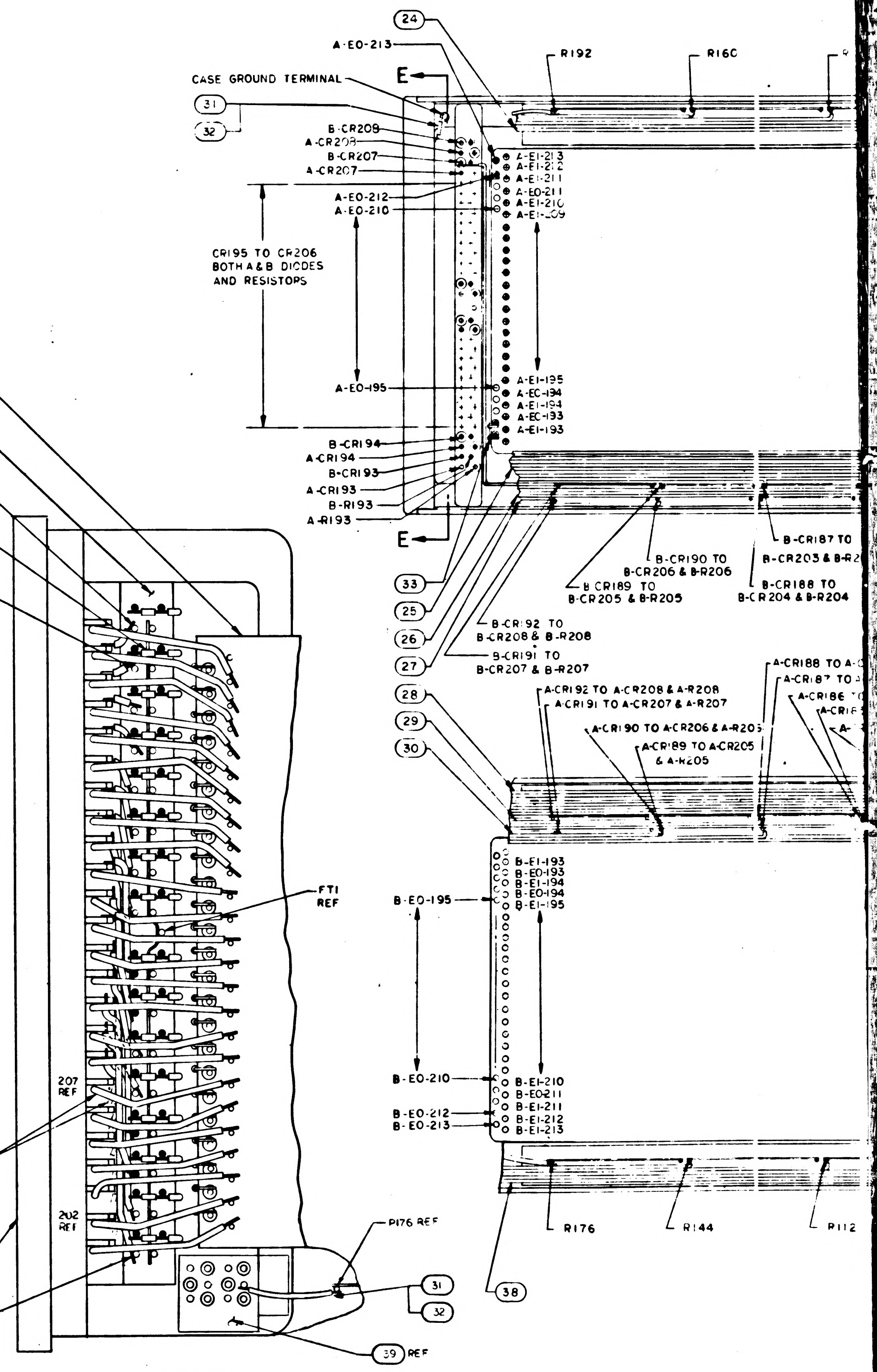
3 REF
6 REF
39 REF
A-CR208 REF
33 REF
R192 REF
31
32
1 REF
J
J
31
32
REF
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FT1 REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
C
C
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11, 12, 13 AND 14



B-CR203 REF
B-R203 REF
A-R204 REF
31
32
FROM A-E1-207 TO PIN NO. 108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

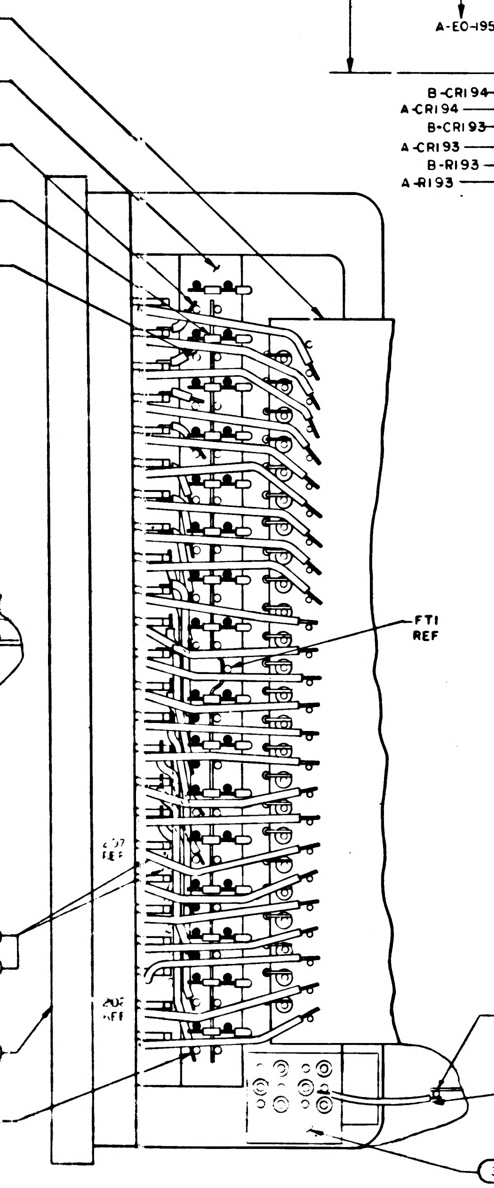
SECTION C-C
SCALE 4/1



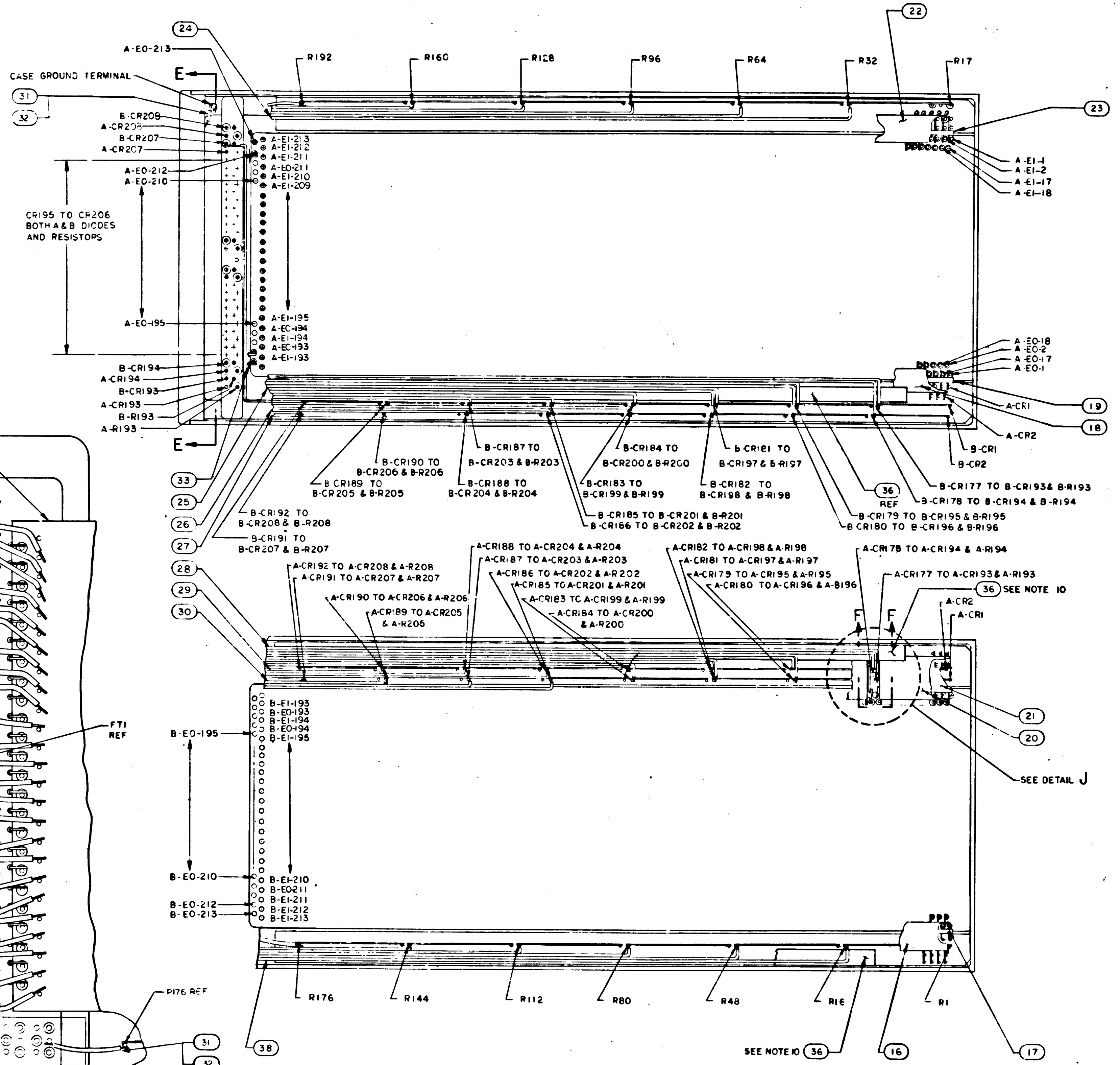
2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
31
32
REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R
B-CR188 TO B-CR204 & B-R204
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R205
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A
A-CR187 TO
A-CR186
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
R112
38

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11, 12, 13 AND 14

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 37915 DR CHK	4/6	
B	REVISED PER TDRR 37916 DR CHK		
C	REVISED PER TDRR 37954 DR CHK	7/4	
D	REVISED PER TDRR 37967 DR CHK	4/1	
E	REVISED PER TDRR 38022 DR CHK	4/9/70	
F	REVISED PER TDRR 38032 DR CHK	5/11/70	
G	REVISED PER TDRR 38151 DR CHK	6/5/70	
H	REVISED PER TDRR 38173 DR CHK	7/12/70	
J	REVISED PER TDRR 38250 DR	10/3/70	


FT1 REF
P176 REF
31
32
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7 REMOVED. SEE NOTES 11,12,13 AND 14


CASE GROUND TERMINAL
E
31
32
24
22
23
A-E0-213
R192
R160
R128
R96
R64
R32
R17
B-CR209
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E0-18
A-E0-2
A-E0-17
A-E0-1
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-CR1
A-CR2
19
18
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
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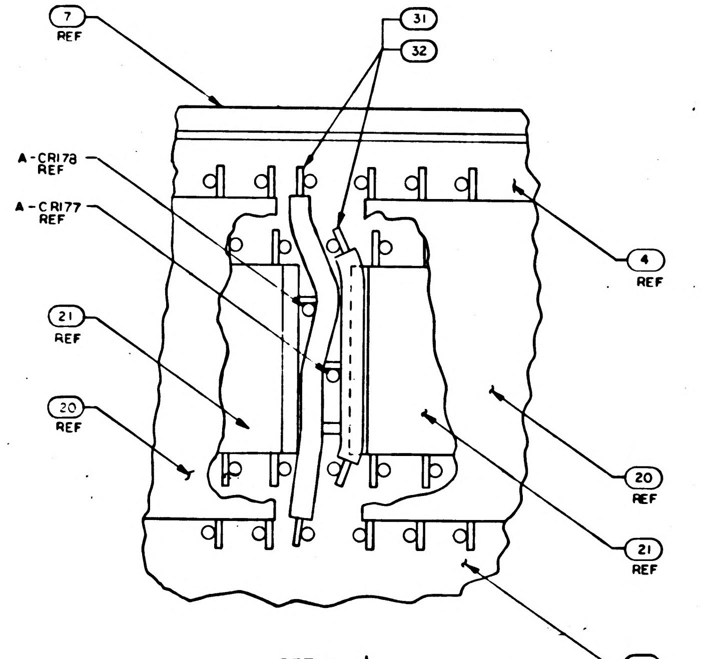
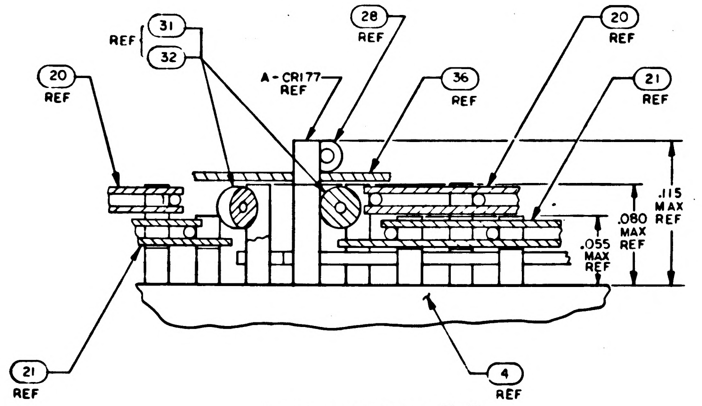
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-R196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10
36
16
17


7 REF
31
32
A-CR178 REF
A-CR177 REF
4 REF
21 REF
20 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN WITH FIND NOS 28 AND 36 REMOVED


REF
31
32
28 REF
20 REF
20 REF
A-CR177 REF
36 REF
21 REF
.115 MAX
.080 REF MAX
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230 SIZE J DRAWING NO 2010802
SCALE 2/1 SHEET 2 OF 3

2010802 J

2010802

2010802 JF2/2 SH2/3

8 7 6 5 4

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

D

C

B

A

TERM. NO.
A-EO-1
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A-EO-7
A-EO-8
A-EO-9
A-EO-10
A-EO-11
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A-EO-92
A-EO-93
A-EO-94
A-EO-95
A-EO-96

2010802 J

8 6 4

5 4 3 2

TDRR 37652

A	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]	[illegible]	[illegible]
B	REVISED PER [illegible] DR [illegible] CHK [illegible]	[illegible]	[illegible]
C	REVISED PER [illegible] 454 DR [illegible] CHK [illegible]	1/4/71	PFR
D	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	2/[illegible]	PFR
E	REVISED PER TDRR 38022 [illegible]	4/9/[illegible]	PFR
F	REVISED PER TDRR [illegible]032 DR [illegible] CHK [illegible]	[illegible]	PFR
G	REVISED PER [illegible] DR [illegible]	[illegible]/15	PFR
H	REVISED PER TDRR [illegible]173 DR [illegible] CHK [illegible]	[illegible]	PFR
J	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	[illegible]	PFR

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-E0-1	A-CR1	A-E0-97	A-CR97	B-E0-1	B-CR1	B-E0-97	B-CR97	A-E1-1	R1	A-E1-49	R49	A-E1-97	R97	A-E1-145	R145
A-E0-2	A-CR2	A-E0-98	A-CR98	B-E0-2	B-CR2	B-E0-98	B-CR98	B-E1-1		B-E1-49		B-E1-97		B-E1-145	
A-E0-3	A-CR3	A-E0-99	A-CR99	B-E0-3	B-CR3	B-E0-99	B-CR99	A-E1-2	R2	A-E1-50	R50	A-E1-98	R98	A-E1-146	R146
A-E0-4	A-CR4	A-E0-100	A-CR100	B-E0-4	B-CR4	B-E0-100	B-CR100	B-E1-2		B-E1-50		B-E1-98		B-E1-146	
A-E0-5	A-CR5	A-E0-101	A-CR101	B-E0-5	B-CR5	B-E0-101	B-CR101	A-E1-3	R3	A-E1-51	R51	A-E1-99	R99	A-E1-147	R147
A-E0-6	A-CR6	A-E0-102	A-CR102	B-E0-6	B-CR6	B-E0-102	B-CR102	B-E1-3		B-E1-51		B-E1-99		B-E1-147	
A-E0-7	A-CR7	A-E0-103	A-CR103	B-E0-7	B-CR7	B-E0-103	B-CR103	A-E1-4	R4	A-E1-52	R52	A-E1-100	R100	A-E1-148	R148
A-E0-8	A-CR8	A-E0-104	A-CR104	B-E0-8	B-CR8	B-E0-104	B-CR104	B-E1-4		B-E1-52		B-E1-100		B-E1-148	
A-E0-9	A-CR9	A-E0-105	A-CR105	B-E0-9	B-CR9	B-E0-105	B-CR105	A-E1-5	R5	A-E1-53	R53	A-E1-101	R101	A-E1-149	R149
A-E0-10	A-CR10	A-E0-106	A-CR106	B-E0-10	B-CR10	B-E0-106	B-CR106	B-E1-5		B-E1-53		B-E1-101		B-E1-149	
A-E0-11	A-CR11	A-E0-107	A-CR107	B-E0-11	B-CR11	B-E0-107	B-CR107	A-E1-6	R6	A-E1-54	R54	A-E1-102	R102	A-E1-150	R150
A-E0-12	A-CR12	A-E0-108	A-CR108	B-E0-12	B-CR12	B-E0-108	B-CR108	B-E1-6		B-E1-54		B-E1-102		B-E1-150	
A-E0-13	A-CR13	A-E0-109	A-CR109	B-E0-13	B-CR13	B-E0-109	B-CR109	A-E1-7	R7	A-E1-55	R55	A-E1-103	R103	A-E1-151	R151
A-E0-14	A-CR14	A-E0-110	A-CR110	B-E0-14	B-CR14	B-E0-110	B-CR110	B-E1-7		B-E1-55		B-E1-103		B-E1-151	
A-E0-15	A-CR15	A-E0-111	A-CR111	B-E0-15	B-CR15	B-E0-111	B-CR111	A-E1-8	R8	A-E1-56	R56	A-E1-104	R104	A-E1-152	R152
A-E0-16	A-CR16	A-E0-112	A-CR112	B-E0-16	B-CR16	B-E0-112	B-CR112	B-E1-8		B-E1-56		B-E1-104		B-E1-152	
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A-E0-18	A-CR18	A-E0-114	A-CR114	B-E0-18	B-CR18	B-E0-114	B-CR114	B-E1-9		B-E1-57		B-E1-105		B-E1-153	
A-E0-19	A-CR19	A-E0-115	A-CR115	B-E0-19	B-CR19	B-E0-115	B-CR115	A-E1-10	R10	A-E1-58	R58	A-E1-106	R106	A-E1-154	R154
A-E0-20	A-CR20	A-E0-116	A-CR116	B-E0-20	B-CR20	B-E0-116	B-CR116	B-E1-10		B-E1-58		B-E1-106		B-E1-154	
A-E0-21	A-CR21	A-E0-117	A-CR117	B-E0-21	B-CR21	B-E0-117	B-CR117	A-E1-11	R11	A-E1-59	R59	A-E1-107	R107	A-E1-155	R155
A-E0-22	A-CR22	A-E0-118	A-CR118	B-E0-22	B-CR22	B-E0-118	B-CR118	B-E1-11		B-E1-59		B-E1-107		B-E1-155	
A-E0-23	A-CR23	A-E0-119	A-CR119	B-E0-23	B-CR23	B-E0-119	B-CR119	A-E1-12	R12	A-E1-60	R60	A-E1-108	R108	A-E1-156	R156
A-E0-24	A-CR24	A-E0-120	A-CR120	B-E0-24	B-CR24	B-E0-120	B-CR120	B-E1-12		B-E1-60		B-E1-108		B-E1-156	
A-E0-25	A-CR25	A-E0-121	A-CR121	B-E0-25	B-CR25	B-E0-121	B-CR121	A-E1-13	R13	A-E1-61	R61	A-E1-109	R109	A-E1-157	R157
A-E0-26	A-CR26	A-E0-122	A-CR122	B-E0-26	B-CR26	B-E0-122	B-CR122	B-E1-13		B-E1-61		B-E1-109		B-E1-157	
A-E0-27	A-CR27	A-E0-123	A-CR123	B-E0-27	B-CR27	B-E0-123	B-CR123	A-E1-14	R14	A-E1-62	R62	A-E1-110	R110	A-E1-158	R158
A-E0-28	A-CR28	A-E0-124	A-CR124	B-E0-28	B-CR28	B-E0-124	B-CR124	B-E1-14		B-E1-62		B-E1-110		B-E1-158	
A-E0-29	A-CR29	A-E0-125	A-CR125	B-E0-29	B-CR29	B-E0-125	B-CR125	A-E1-15	R15	A-E1-63	R63	A-E1-111	R111	A-E1-159	R159
A-E0-30	A-CR30	A-E0-126	A-CR126	B-E0-30	B-CR30	B-E0-126	B-CR126	B-E1-15		B-E1-63		B-E1-111		B-E1-159	
A-E0-31	A-CR31	A-E0-127	A-CR127	B-E0-31	B-CR31	B-E0-127	B-CR127	A-E1-16	R16	A-E1-64	R64	A-E1-112	R112	A-E1-160	R160
A-E0-32	A-CR32	A-E0-128	A-CR128	B-E0-32	B-CR32	B-E0-128	B-CR128	B-E1-16		B-E1-64		B-E1-112		B-E1-160	
A-E0-33	A-CR33	A-E0-129	A-CR129	B-E0-33	B-CR33	B-E0-129	B-CR129	A-E1-17	R17	A-E1-65	R65	A-E1-113	R113	A-E1-161	R161
A-E0-34	A-CR34	A-E0-130	A-CR130	B-E0-34	B-CR34	B-E0-130	B-CR130	B-E1-17		B-E1-65		B-E1-113		B-E1-161	
A-E0-35	A-CR35	A-E0-131	A-CR131	B-E0-35	B-CR35	B-E0-131	B-CR131	A-E1-18	R18	A-E1-66	R66	A-E1-114	R114	A-E1-162	R162
A-E0-36	A-CR36	A-E0-132	A-CR132	B-E0-36	B-CR36	B-E0-132	B-CR132	B-E1-18		B-E1-66		B-E1-114		B-E1-162	
A-E0-37	A-CR37	A-E0-133	A-CR133	B-E0-37	B-CR37	B-E0-133	B-CR133	A-E1-19	R19	A-E1-67	R67	A-E1-115	R115	A-E1-163	R163
A-E0-38	A-CR38	A-E0-134	A-CR134	B-E0-38	B-CR38	B-E0-134	B-CR134	B-E1-19		B-E1-67		B-E1-115		B-E1-163	
A-E0-39	A-CR39	A-E0-135	A-CR135	B-E0-39	B-CR39	B-E0-135	B-CR135	A-E1-20	R20	A-E1-68	R68	A-E1-116	R116	A-E1-164	R164
A-E0-40	A-CR40	A-E0-136	A-CR136	B-E0-40	B-CR40	B-E0-136	B-CR136	B-E1-20		B-E1-68		B-E1-116		B-E1-164	
A-E0-41	A-CR41	A-E0-137	A-CR137	B-E0-41	B-CR41	B-E0-137	B-CR137	A-E1-21	R21	A-E1-69	R69	A-E1-117	R117	A-E1-165	R165
A-E0-42	A-CR42	A-E0-138	A-CR138	B-E0-42	B-CR42	B-E0-138	B-CR138	B-E1-21		B-E1-69		B-E1-117		B-E1-165	
A-E0-43	A-CR43	A-E0-139	A-CR139	B-E0-43	B-CR43	B-E0-139	B-CR139	A-E1-22	R22	A-E1-70	R70	A-E1-118	R118	A-E1-166	R166
A-E0-44	A-CR44	A-E0-140	A-CR140	B-E0-44	B-CR44	B-E0-140	B-CR140	B-E1-22		B-E1-70		B-E1-118		B-E1-166	
A-E0-45	A-CR45	A-E0-141	A-CR141	B-E0-45	B-CR45	B-E0-141	B-CR141	A-E1-23	R23	A-E1-71	R71	A-E1-119	R119	A-E1-167	R167
A-E0-46	A-CR46	A-E0-142	A-CR142	B-E0-46	B-CR46	B-E0-142	B-CR142	B-E1-23		B-E1-71		B-E1-119		B-E1-167	
A-E0-47	A-CR47	A-E0-143	A-CR143	B-E0-47	B-CR47	B-E0-143	B-CR143	A-E1-24	R24	A-E1-72	R72	A-E1-120	R120	A-E1-168	R168
A-E0-48	A-CR48	A-E0-144	A-CR144	B-E0-48	B-CR48	B-E0-144	B-CR144	B-E1-24		B-E1-72		B-E1-120		B-E1-168	
A-E0-49	A-CR49	A-E0-145	A-CR145	B-E0-49	B-CR49	B-E0-145	B-CR145	A-E1-25	R25	A-E1-73	R73	A-E1-121	R121	A-E1-169	R169
A-E0-50	A-CR50	A-E0-146	A-CR146	B-E0-50	B-CR50	B-E0-146	B-CR146	B-E1-25		B-E1-73		B-E1-121		B-E1-169	
A-E0-51	A-CR51	A-E0-147	A-CR147	B-E0-51	B-CR51	B-E0-147	B-CR147	A-E1-26	R26	A-E1-74	R74	A-E1-122	R122	A-E1-170	R170
A-E0-52	A-CR52	A-E0-148	A-CR148	B-E0-52	B-CR52	B-E0-148	B-CR148	B-E1-26		B-E1-74		B-E1-122		B-E1-170	
A-E0-53	A-CR53	A-E0-149	A-CR149	B-E0-53	B-CR53	B-E0-149	B-CR149	A-E1-27	R27	A-E1-75	R75	A-E1-123	R123	A-E1-171	R171
A-E0-54	A-CR54	A-E0-150	A-CR150	B-E0-54	B-CR54	B-E0-150	B-CR150	B-E1-27		B-E1-75		B-E1-123		B-E1-171	
A-E0-55	A-CR55	A-E0-151	A-CR151	B-E0-55	B-CR55	B-E0-151	B-CR151	A-E1-28	R28	A-E1-76	R76	A-E1-124	R124	A-E1-172	R172
A-E0-56	A-CR56	A-E0-152	A-CR152	B-E0-56	B-CR56	B-E0-152	B-CR152	B-E1-28		B-E1-76		B-E1-124		B-E1-172	
A-E0-57	A-CR57	A-E0-153	A-CR153	B-E0-57	B-CR57	B-E0-153	B-CR153	A-E1-29	R29	A-E1-77	R77	A-E1-125	R125	A-E1-173	R173
A-E0-58	A-CR58	A-E0-154	A-CR154	B-E0-58	B-CR58	B-E0-154	B-CR154	B-E1-29		B-E1-77		B-E1-125		B-E1-173	
A-E0-59	A-CR59	A-E0-155	A-CR155	B-E0-59	B-CR59	B-E0-155	B-CR155	A-E1-30	R30	A-E1-78	R78	A-E1-126	R126	A-E1-174	R174
A-E0-60	A-CR60	A-E0-156	A-CR156	B-E0-60	B-CR60	B-E0-156	B-CR156	B-E1-30		B-E1-78		B-E1-126		B-E1-174	
A-E0-61	A-CR61	A-E0-157	A-CR157	B-E0-61	B-CR61	B-E0-157	B-CR157	A-E1-31	R31	A-E1-79	R79	A-E1-127	R127	A-E1-175	R175
A-E0-62	A-CR62	A-E0-158	A-CR158	B-E0-62	B-CR62	B-E0-158	B-CR158	B-E1-31		B-E1-79		B-E1-127		B-E1-175	
A-E0-63	A-CR63	A-E0-159	A-CR159	B-E0-63	B-CR63	B-E0-159	B-CR159	A-E1-32	R32	A-E1-80	R80	A-E1-128	R128	A-E1-176	R176
A-E0-64	A-CR64	A-E0-160	A-CR160	B-E0-64	B-CR64	B-E0-160	B-CR160	B-E1-32		B-E1-80		B-E1-128		B-E1-176	
A-E0-65	A-CR65	A-E0-161	A-CR161	B-E0-65	B-CR65	B-E0-161	B-CR161	A-E1-33	R33	A-E1-81	R81	A-E1-129	R129	A-E1-177	R177
A-E0-66	A-CR66	A-E0-162	A-CR162	B-E0-66	B-CR66	B-E0-162	B-CR162	B-E1-33		B-E1-81		B-E1-129		B-E1-177	
A-E0-67	A-CR67	A-E0-163	A-CR163	B-E0-67	B-CR67	B-E0-163	B-CR163	A-E1-34	R34	A-E1-82	R82	A-E1-130	R130	A-E1-178	R178
A-E0-68	A-CR68	A-E0-164	A-CR164	B-E0-68	B-CR68	B-E0-164	B-CR164	B-E1-34		B-E1-82		B-E1-130		B-E1-178	
A-E0-69	A-CR69	A-E0-165	A-CR165	B-E0-69	B-CR69	B-E0-165	B-CR165	A-E1-35	R35	A-E1-83	R83	A-E1-131	R131	A-E1-179	R179
A-E0-70	A-CR70	A-E0-166	A-CR166	B-E0-70	B-CR70	B-E0-166	B-CR166	B-E1-35		B-E1-83		B-E1-131		B-E1-179	
A-E0-71	A-CR71	A-E0-167	A-CR167	B-E0-71	B-CR71	B-E0-167	B-CR167	A-E1-36	R36	A-E1-84	R84	A-E1-132	R132	A-E1-180	R180
A-E0-72	A-CR72	A-E0-168	A-CR168	B-E0-72	B-CR72	B-E0-168	B-CR168	B-E1-36		B-E1-84		B-E1-132		B-E1-180	
A-E0-73	A-CR73	A-E0-169	A-CR169	B-E0-73	B-CR73	B-E0-169	B-CR169	A-E1-37	R37	A-E1-85	R85	A-E1-133	R133	A-E1-181	R181
A-E0-74	A-CR74	A-E0-170	A-CR170	B-E0-74	B-CR74	B-E0-170	B-CR170	B-E1-37		B-E1-85		B-E1-133		B-E1-181	
A-E0-75	A-CR75	A-E0-171	A-CR171	B-E0-75	B-CR75	B-E0-171	B-CR171	A-E1-38	R38	A-E1-86	R86	A-E1-134	R134	A-E1-182	R182
A-E0-76	A-CR76	A-E0-172	A-CR172	B-E0-76	B-CR76	B-E0-172	B-CR172	B-E1-38		B-E1-86		B-E1-134		B-E1-182	
A-E0-77	A-CR77	A-E0-173	A-CR173	B-E0-77	B-CR77	B-E0-173	B-CR173	A-E1-39	R39	A-E1-87	R87	A-E1-135	R135	A-E1-183	R183
A-E0-78	A-CR78	A-E0-174	A-CR174	B-E0-78	B-CR78	B-E0-174	B-CR174	B-E1-39		B-E1-87		B-E1-135		B-E1-183	
A-E0-79	A-CR79	A-E0-175	A-CR175	B-E0-79	B-CR79	B-E0-175	B-CR175	A-E1-40	R40	A-E1-88	R88	A-E1-136	R136	A-E1-184	R184
A-E0-80	A-CR80	A-E0-176	A-CR176	B-E0-80	B-CR80	B-E0-176	B-CR176	B-E1-40		B-E1-88		B-E1-136		B-E1-184	
A-E0-81	A-CR81	A-E0-177	A-CR177	B-E0-81	B-CR81	B-E0-177	B-CR177	A-E1-41	R41	A-E1-89	R89	A-E1-137	R137	A-E1-185	R185
A-E0-82	A-CR82	A-E0-178	A-CR178	B-E0-82	B-CR82	B-E0-178	B-CR178	B-E1-41		B-E1-89		B-E1-137		B-E1-185	
A-E0-83	A-CR83	A-E0-179	A-CR179	B-E0-83	B-CR83	B-E0-179	B-CR179	A-E1-42	R42	A-E1-90	R90	A-E1-138	R138	A-E1-186	R186
A-E0-84	A-CR84	A-E0-180	A-CR180	B-E0-84	B-CR84	B-E0-180	B-CR180	B-E1-42		B-E1-90		B-E1-138		B-E1-186	
A-E0-85	A-CR85	A-E0-181	A-CR181	B-E0-85	B-CR85	B-E0-181	B-CR181	A-E1-43	R43	A-E1-91	R91	A-E1-139	R139	A-E1-187	R187
A-E0-86	A-CR86	A-E0-182	A-CR182	B-E0-86	B-CR86	B-E0-182	B-CR182	B-E1-43		B-E1-91		B-E1-139		B-E1-187	
A-E0-87	A-CR87	A-E0-183	A-CR183	B-E0-87	B-CR87	B-E0-183	B-CR183	A-E1-44	R44	A-E1-92	R92	A-E1-140	R140	A-E1-188	R188
A-E0-88	A-CR88	A-E0-184	A-CR184	B-E0-88	B-CR88	B-E0-184	B-CR184	B-E1-44		B-E1-92		B-E1-140		B-E1-188	
A-E0-89	A-CR89	A-E0-185	A-CR185	B-E0-89	B-CR89	B-E0-185	B-CR185	A-E1-45	R45	A-E1-93	R93	A-E1-141	R141	A-E1-189	R189
A-E0-90	A-CR90	A-E0-186	A-CR186	B-E0-90	B-CR90	B-E0-186	B-CR186	B-E1-45		B-E1-93		B-E1-141		B-E1-189	
A-E0-91	A-CR91	A-E0-187	A-CR187	B-E0-91	B-CR91	B-E0-187	B-CR187	A-E1-46	R46	A-E1-94	R94	A-E1-142	R142	A-E1-190	R190
A-E0-92	A-CR92	A-E0-188	A-CR188	B-E0-92	B-CR92	B-E0-188	B-CR188	B-E1-46		B-E1-94		B-E1-142		B-E1-190	
A-E0-93	A-CR93	A-E0-189	A-CR189	B-E0-93	B-CR93	B-E0-189	B-CR189	A-E1-47	R47	A-E1-95	R95	A-E1-143	R143	A-E1-191	R191
A-E0-94	A-CR94	A-E0-190	A-CR190	B-E0-94	B-CR94	B-E0-190	B-CR190	B-E1-47		B-E1-95		B-E1-143		B-E1-191	
A-E0-95	A-CR95	A-E0-191	A-CR191	B-E0-95	B-CR95	B-E0-191	B-CR191	A-E1-48	R48	A-E1-96	R96	A-E1-144	R144	A-E1-192	R192
A-E0-96	A-CR96	A-E0-192	A-CR192	B-E0-96	B-CR96	B-E0-192	B-CR192	B-E1-48		B-E1-96		B-E1-144		B-E1-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10APR[illegible]
CHECKED [illegible] 10APR[illegible]
APPROVED [illegible]
APPROVED

APPROVED [illegible]
APPROVED MSC [illegible]

DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
- ASSEMBLY

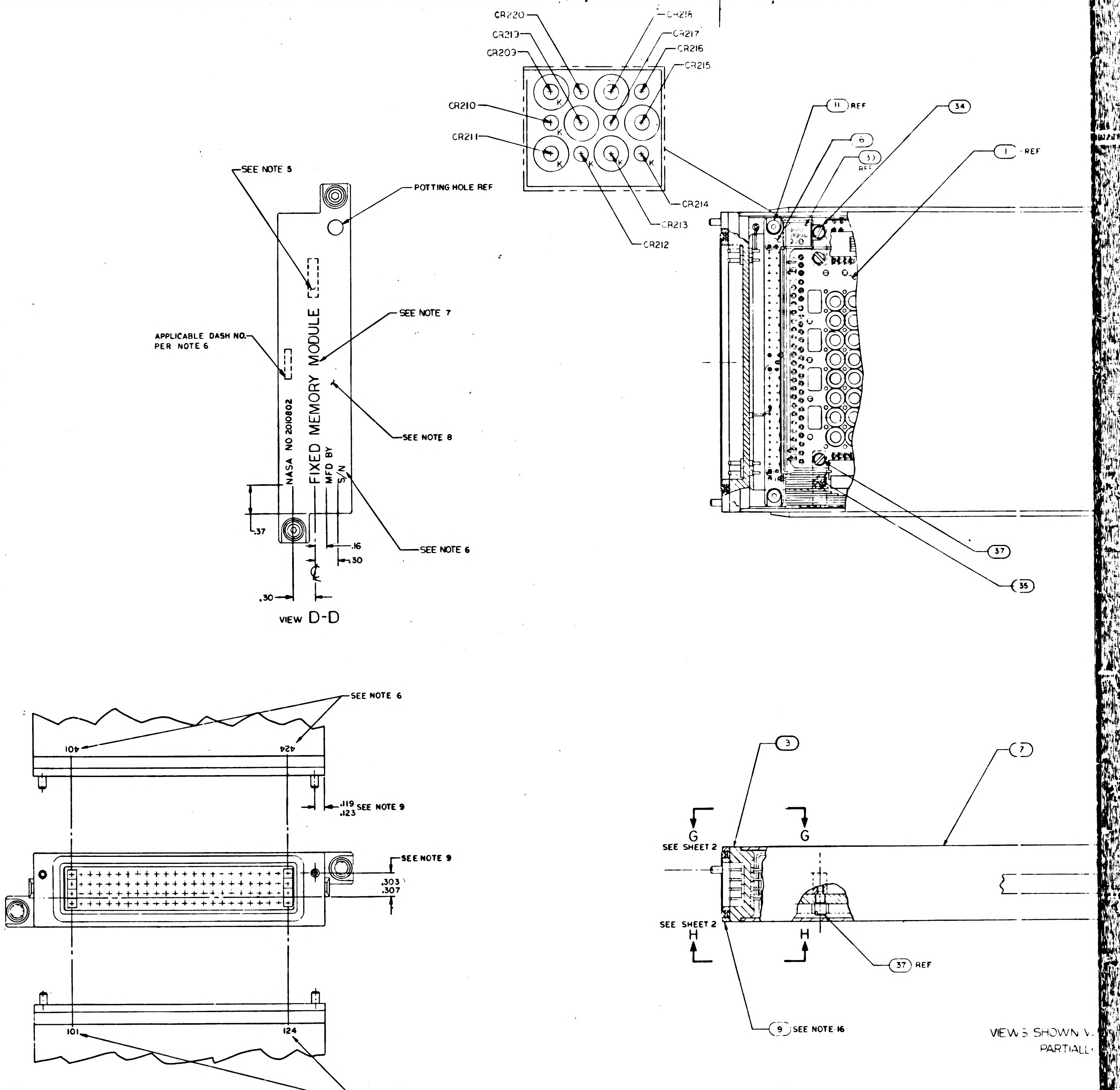
CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
SCALE NONE
SHEET 3 OF 3

5 4

2010802 J

SH 3/43 2010802 JF 2/2

PART NO.	MODULE NO	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
2010802-011	B	2010804-021	2010803-011	0321	2021113-071	PS2016036
-021	B	031	021	0322		
-031	B	041	031	0323		
-041	B	051	041	0324		
-051	B-	061	051	0325		
2010802-061	B-	2010804-071	2010803-061	0326	2021113-071	PS2016036
2010802-071	B-	2010804-081	2010803-071	0327	2021112-081	PS2016042
-081	B	091	-081	0328		
-091	B	111	-091	0329		
-111	B	121	-111	0330		
-121	B-	131	-121	0331		
2010802-131	B	2010804-141	2010803-131	0332	2021112-081	PS2016042
2010802-141	B	2010804-131	2010803-141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
-171	B-	2010804-161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804-171	2010803-181	0337	2021113-091	PS2016042
-191	B-2	-181	-191	0338		
-211	B-3	-191	-211	0339		
-221	B-4	-211	-221	0340		
-231	B-5	-221	-231	0341		
2010802-241	B-6	2010804-231	2010803-241	0342	2021113-091	PS2016042
2010802-251	B-1	2010804-241	2010803-251	0343	2021112-141	PS2016042
-261	B-2	-251	-261	0344		
-271	B-3	-261	-271	0345		
-281	B-4	-271	-281	0346		
-291	B-5	-281	-291	0347		
2010802-311	B-6	2010804-291	2010803-311	0348	2021112-141	PS2016042
-321	B-	2010804-311	2010803-321	0349	2021112-151	PS2016042
-331	B-2	-321	-331	0350		
-341	B-	-331	-341	0351		
-351	B-	-341	-351	0352		
-361	B-	-351	-361	0353		
2010802-371	B-6	2010804-361	2010803-371	0354	2021112-151	PS2016042
2010802-381	B	2010804-371	2010803-381	0355	2021114-011	PS2016042
-391	B	-381	-391	0356		
-411	B	-391	-411	0357		
-421	B-4	-41	-421	0358		
-431	B-5	421	-431	0359		
2010802-441	B	2010804-431	2010803-441	0360	2021114-011	PS2016042



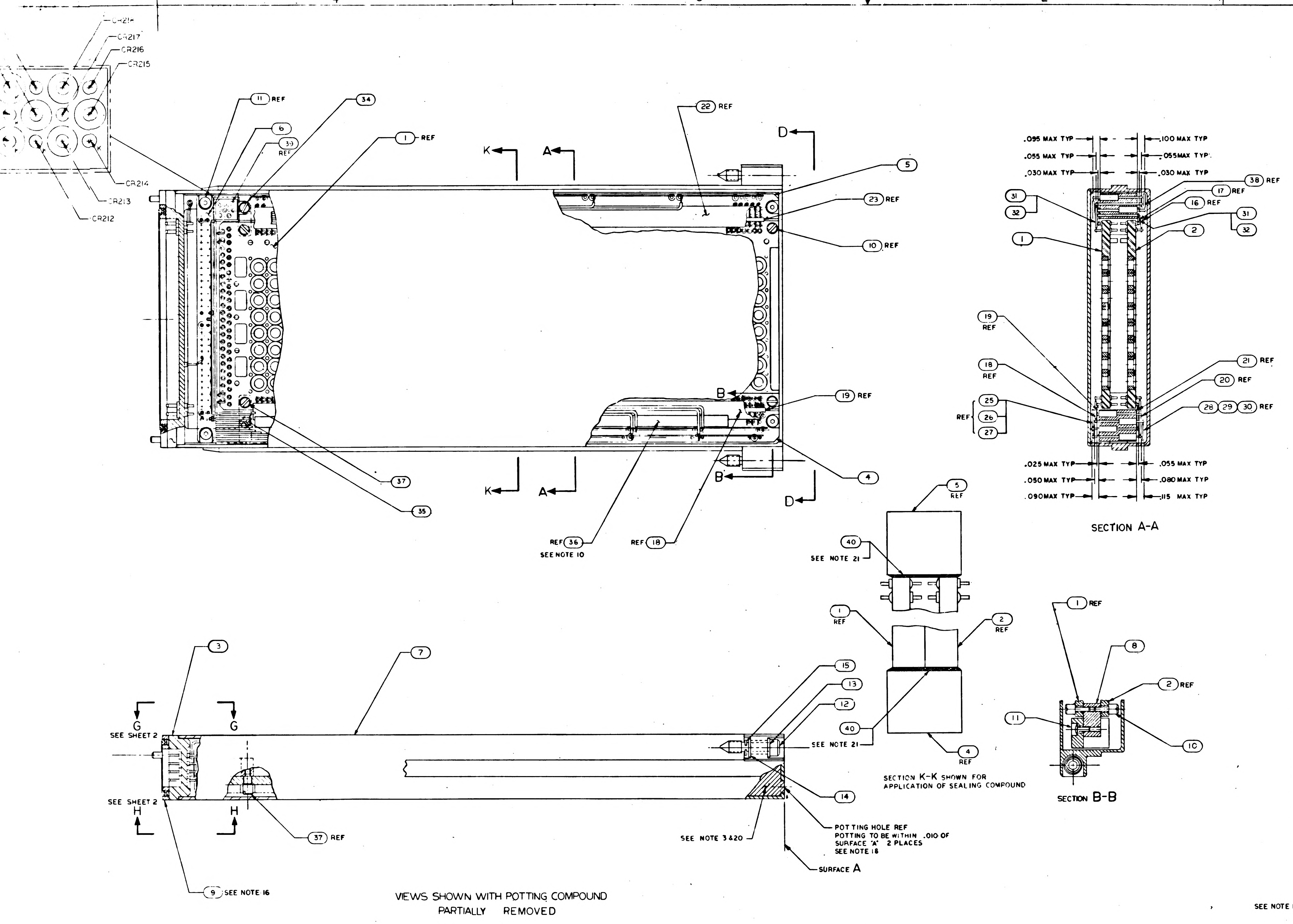
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND 002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2,&3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

SH 1/3

2010802 K

2010802K F 1/2


4
3
2
CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
11 REF
6
33 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
B
19 REF
4
37
35
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
31
32
1
2
19 REF
18 REF
21 REF
20 REF
25
26
27
REF
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
SEE SHEET 2
G
15
13
12
SEE NOTE 21
SEE SHEET 2
H
H
14
37 REF
SEE NOTE 3 &20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE 'A' 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
C
B
A

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR CHK		
B			
C	REVISED PER TDRR 379		
D	REVISED PER TDRR 37967 DR R.G. Ford CHK		
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	4/9	
F	REVISED PER TDRR 3	5/1	
G	REVISED PER TDRR 38151 DR R. Ford CHK		
H	REVISED PER TDRR 38173 DR R. Ford CHK		
J	REVISED PER TDRR 382		
K	REVISED PER TDRR 383 DR CHK	4/2/71	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW. SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	E RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

SEE NOTE 16

FOR APPLICABLE PART NO. SEE CHART

REQUIREMENTS FOR CONTROL
TION OF ROPE MEMORY ASSEMBLIES

MORY FIXTURE DWG NO. AP22500

SEE CHART		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2° DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB Cambridge Mass DWG NO CONTRACT DRAWN Tom Smith DATE 10 APR 68 CHECKED APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL		FIXED MEMORY MODULE ASSEMBLY
APPLICATION		HEAT TREATMENT FINAL FINISH	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 80230 SIZE J NASA DRAWING NO 2010802 SCALE 2/1 WT SHEET 1 OF 3

2010802

2010802 K

SH1/3

2010802K E2/2

WIRE LIST

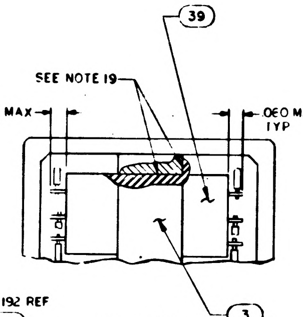
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

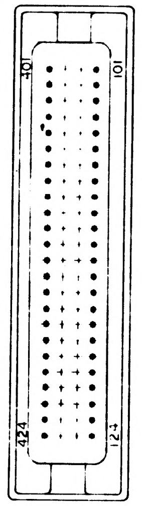
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

WIRE LIST

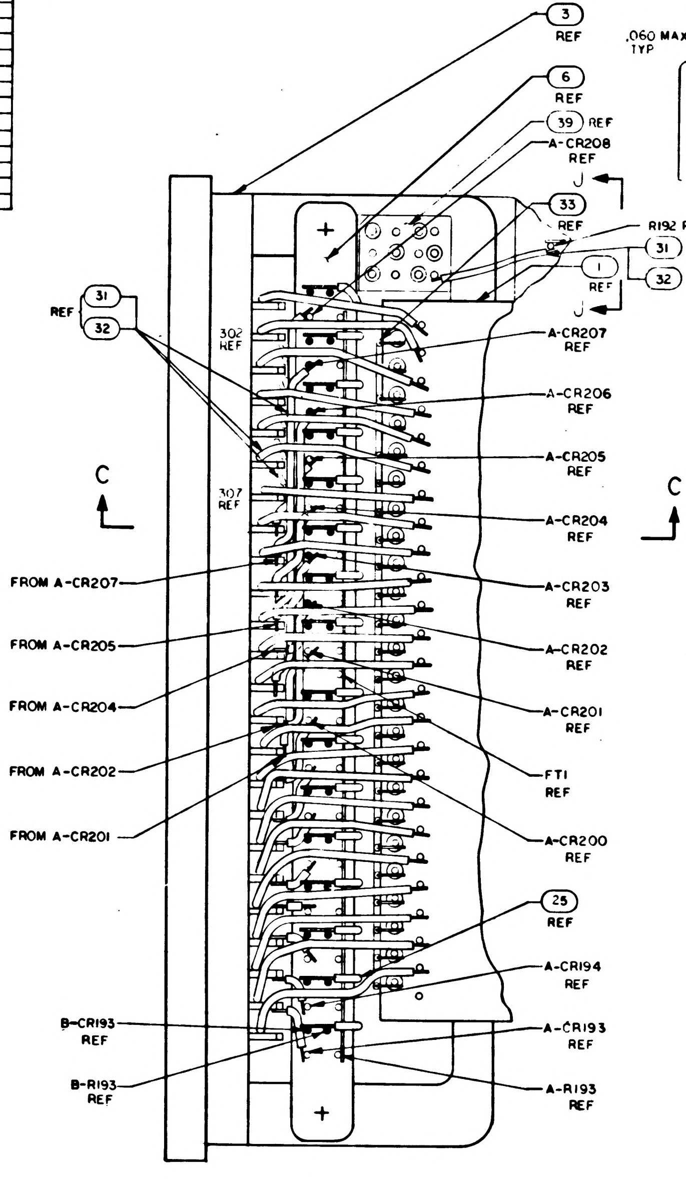
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
3 REF

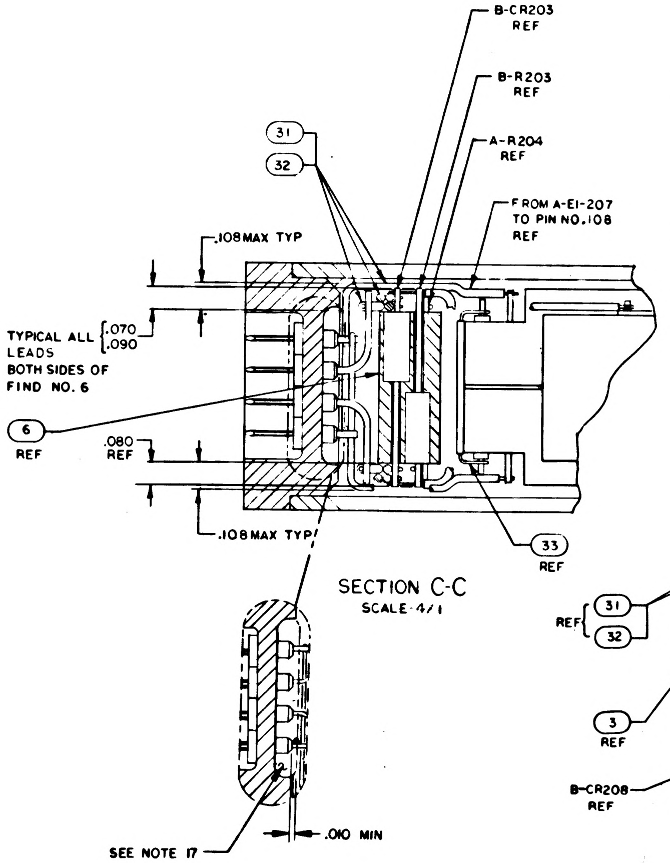
VIEW J-J


101
401
424
124

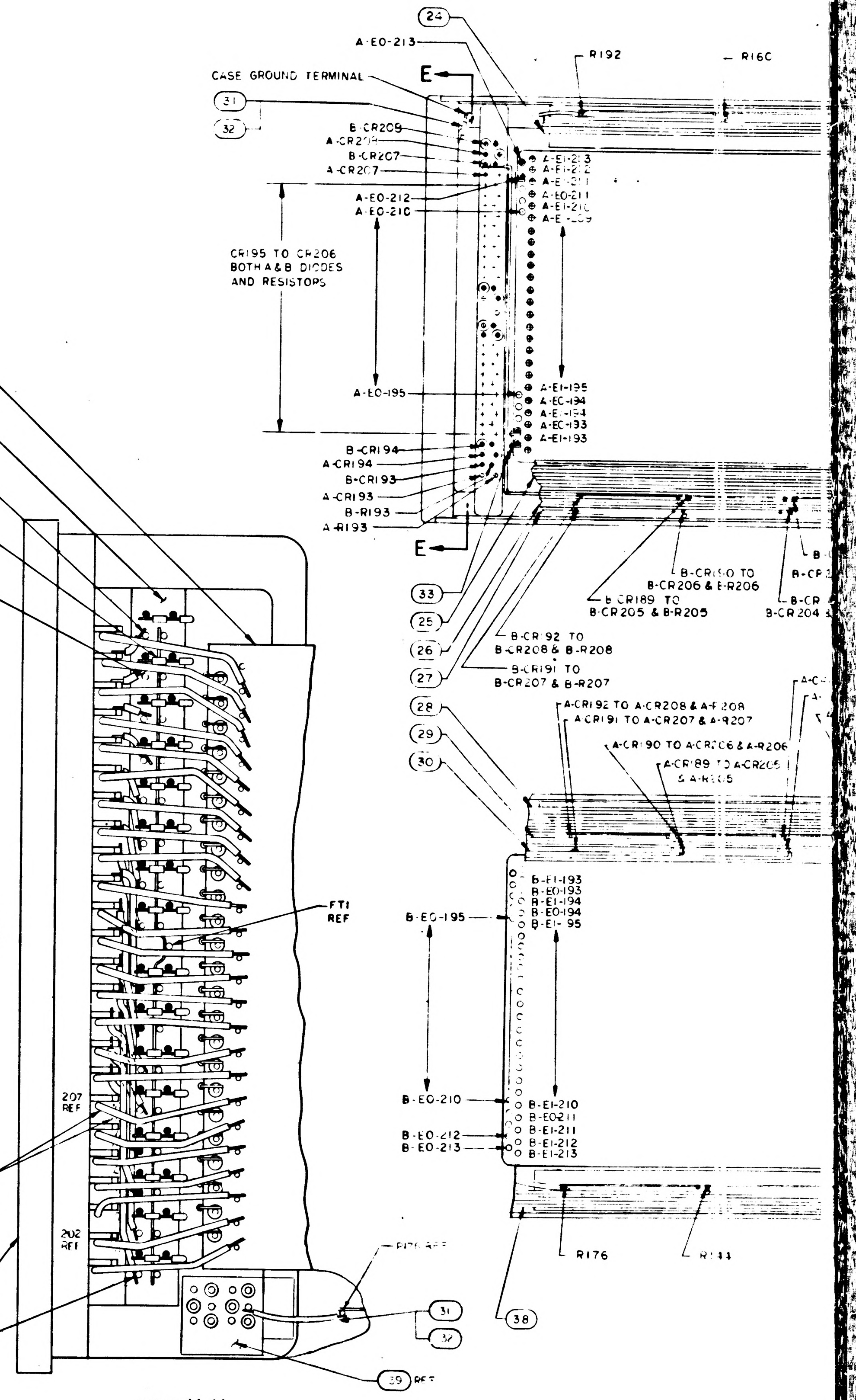
SECTION E-E


3 REF
6 REF
39 REF
A-CR208 REF
33 REF
J
R192 REF
1 REF
31
32
J
31
32
REF
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FT1 REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
C
C
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

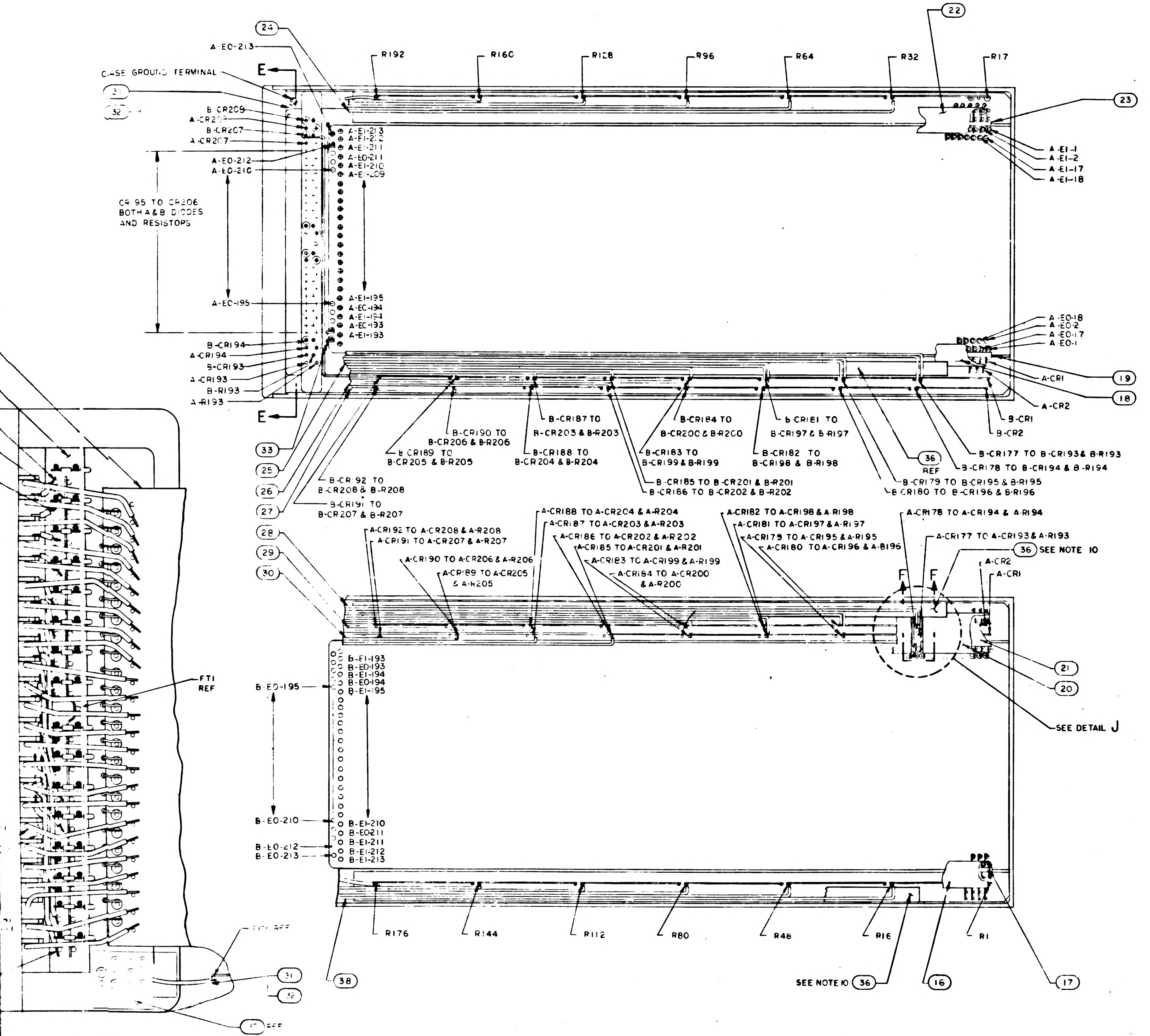

B-CR203 REF
B-R203 REF
A-R204 REF
FROM A-E1-207 TO PIN NO. 108 REF
31
32
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE 4/1


2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
31
32
REF
3 REF
B-CR208 REF
R176 REF
31
32
39 REF
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
B-CR204
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
38

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

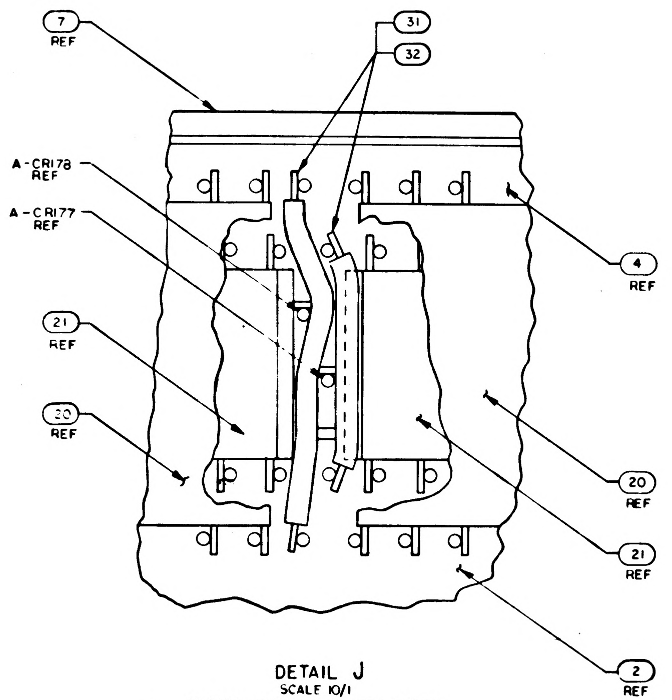
A	REVISED PER TDRR 3 915 DR CHK
B	REVISED PER TDRR 37916 DR CHK
C	REVISED PER TDRR DR CHK
D	REVISED PER TDRR 37 7 DR HK
E	REVISED PER TDRR DR CHK
F	REVISED PER TDRR 38032 DR CHK
G	REVISED PER TDRR DR CHK
H	REVISED PER TDRR DRK HK
J	REVISED PER TDRR 3 250 DR CHK
K	REVISED PER TDRR 38330 DR CHK



4
3
2
1
E
A-EO-213
CASE GROUND TERMINAL
31
32
B-CR209
A-CR208
B-CR207
A-CR207
A-EO-212
A-EO-210
CR 95 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-EO-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
24
R192
R160
R128
R96
R64
R32
R17
22
23
A-EI-213
A-EI-212
A-EI-211
A-EO-211
A-EI-210
A-EI-209
A-EI-195
A-EO-194
A-EI-194
A-EO-193
A-EI-193
A-EI-1
A-EI-2
A-EI-17
A-EI-18
A-EO-18
A-EO-2
A-EO-17
A-EO-1
A-CR1
A-CR2
B-CR1
B-CR2
19
18
33
25
26
27
B-CR190 TO
B-CR206 & B-R206
B-CR189 TO
B-CR205 & B-R205
B-CR187 TO
B-CR203 & B-R203
B-CR188 TO
B-CR204 & B-R204
B-CR184 TO
B-CR200 & B-R200
B-CR183 TO
B-CR199 & B-R199
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR181 TO
B-CR197 & B-R197
B-CR182 TO
B-CR198 & B-R198
36
REF
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR192 TO
B-CR208 & B-R208
B-CR191 TO
B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205
& A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200
& A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-R196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-EO-195
B-EI-193
B-EO-193
B-EI-194
B-EO-194
B-EI-195
B-EO-210
B-EO-212
B-EO-213
B-EI-210
B-EO-211
B-EI-211
B-EI-212
B-EI-213
FT1
REF
REF
REF
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10
36
16
17

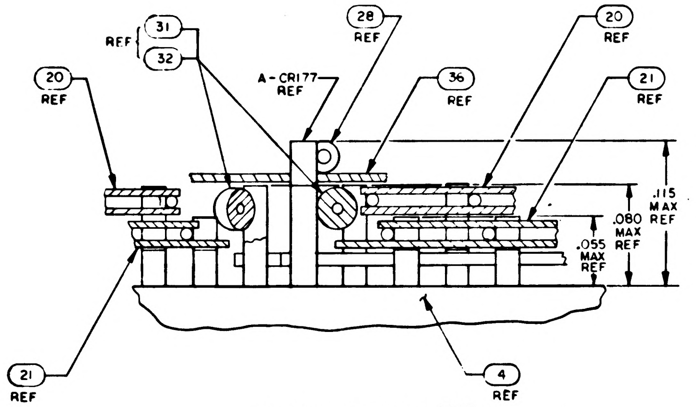
VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

2010802 K



7
REF
31
32
A-CR178
REF
A-CR177
REF
21
REF
20
REF
4
REF
20
REF
21
REF
2
REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NOS 28 AND 36 REMOVED



REF
31
32
28
REF
20
REF
A-CR177
REF
36
REF
20
REF
21
REF
.115
MAX
.080 REF
MAX
.055
MAX
REF
21
REF
4
REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO	SIZE	DRAWING NO
80230	J	2010802

SCALE 2/1 SHEET 2 OF 3

2010802

SH 2/3 2010802K F 2/2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

8 7 6 5

D

C

B

A

8 7 6 5 4

2010802 K

TDRR 7652

A	REVISED PER TDRR 37915 DR CHK
B	REVISED PER TDRR [illegible] DR CHK
C	REVISED PER TDRR [illegible] DR CHK
D	REVISED PER TDRR 37[illegible] DR CHK
E	REVISED PER TDRR 3[illegible] CHK
F	REVISED PER TDRR 38[illegible] DR CHK
G	REVISED PER TDRR [illegible] DR CHK
H	REVISED PER TDRR 38[illegible] DR CHK
J	[illegible] PER TDRR 3[illegible] CHK
K	REVISED PER TDRR 38[illegible] DR Adams CHK

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
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DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED

APPROVED

APPROVED MSC

DATE

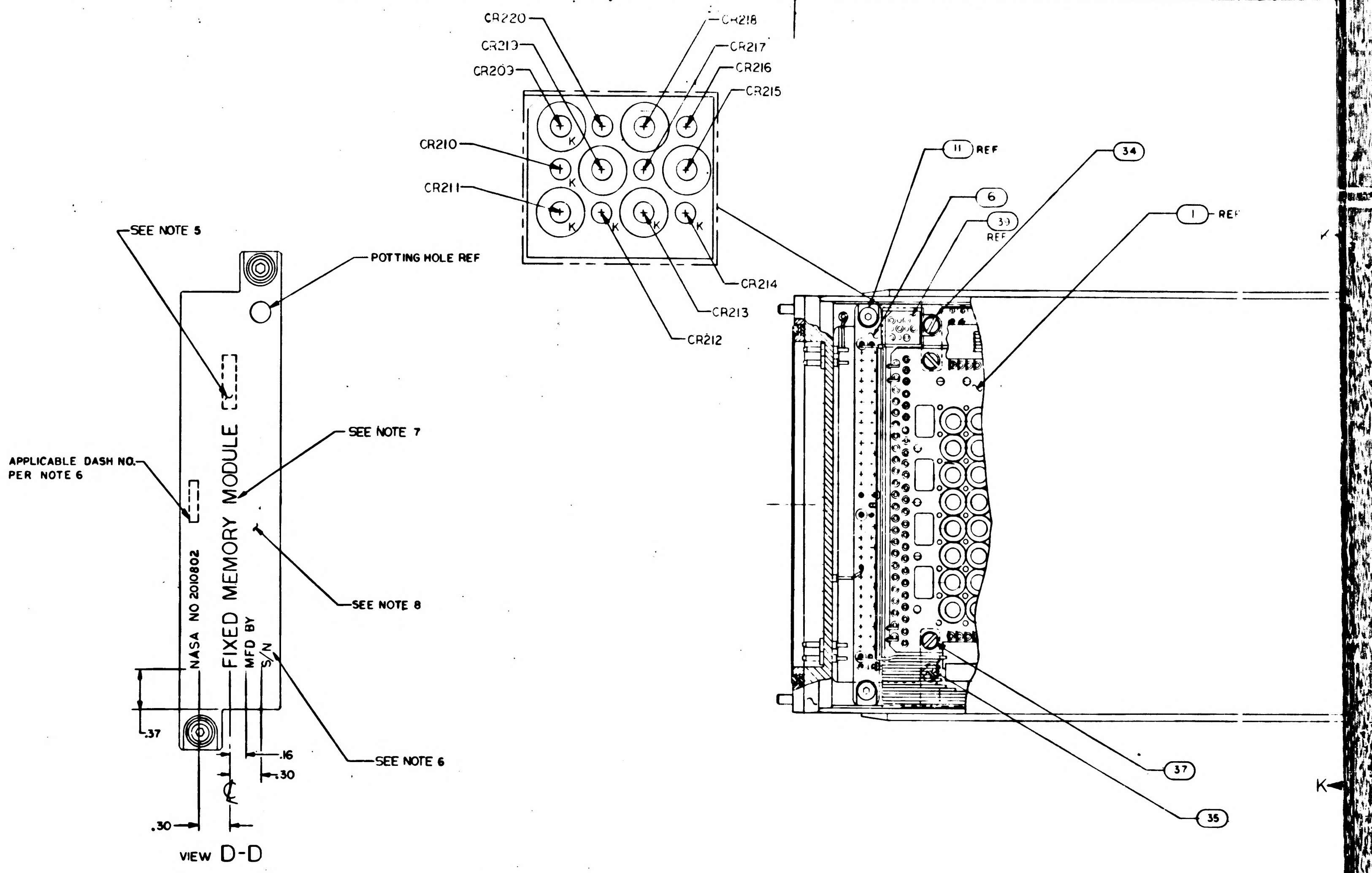
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

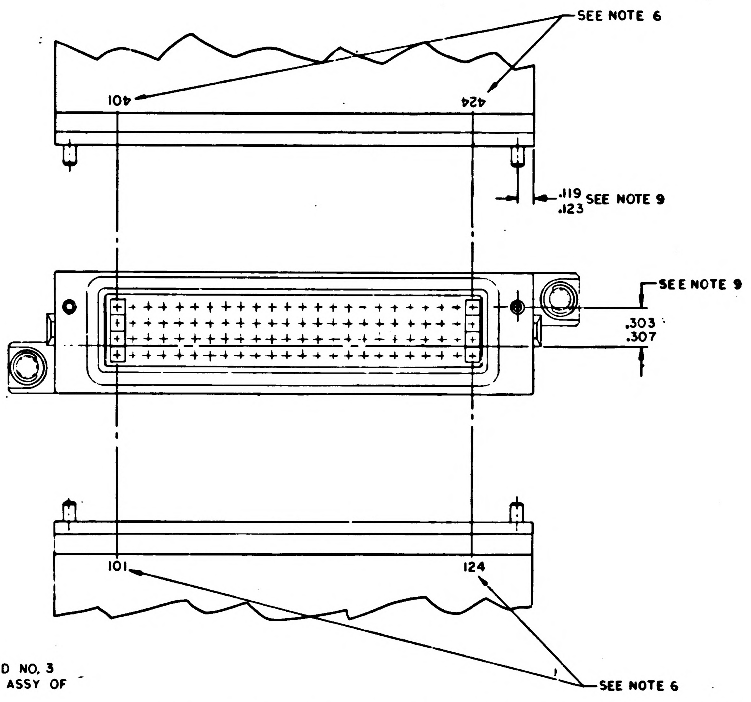
FIXED MEMORY MODULE
ASSEMBLY

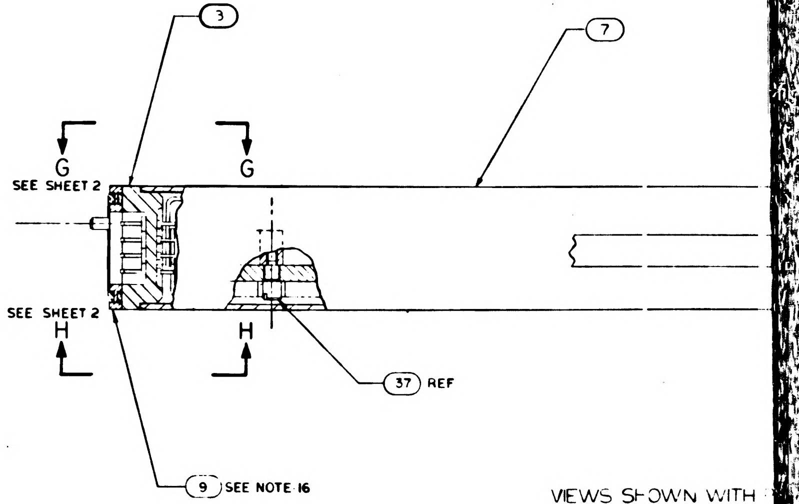
CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802
SCALE NONE
SHEET 3 OF 3

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE NO	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
20[illegible]-0[illegible]	B[illegible]	20108[illegible] 021	2010803-011	0321	2021113-071	PS2016036
-021	B-[illegible]	↑ 031	↑ -021	0322	↑	↑
-031	B-[illegible]	041	-031	0323		
-041	B-4	051	-041	0324		
-051	B-[illegible]	↓ 061	↓ -051	0325	↓	↓
201[illegible]-061	B-[illegible]	2010804 071	2010803-061	0326	2021113-071	PS2016036
201[illegible]-071	B-[illegible]	2010804 081	2010803-071	0327	2021112-081	PS2016042
-08[illegible]	B[illegible]	↑ 091	↑ -081	0328	↑	↑
-09[illegible]	B[illegible]	111	-091	0329		
-11[illegible]	B	121	-111	0330		
-121	B-[illegible]	↓ 131	↓ -121	0331	↓	↓
201[illegible]2-131	B-[illegible]	2010804 141	2010803-131	0332	2021112-081	PS2016042
201[illegible]2-141	B-[illegible]	2010804 131	2010803 141	0333	2021112-091	P[illegible]2016042
2010802-151	B-2	2010804-031	2010803-151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803-161	0335	2021112-111	PS2016042
-17[illegible]	B-[illegible]	[illegible] 161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804-171	2010803-181	0337	2021113-091	PS2016042
↑ -191	B-2	↑ -181	↑ -191	0338	↑	↑
-211	B-3	-191	-211	0339		
-221	B-4	-211	-221	0340		
↓ -231	B-5	↓ -221	↓ -231	0341	↓	↓
2010802-241	B-6	2010804-231	2010803-241	0342	2021113-091	PS2016042
2010802-251	B-1	2010804-241	2010803-251	0343	2021112-141	PS2016042
↑ -261	B-2	↑ -251	↑ -261	0344	↑	↑
-271	B-3	-261	-271	0345		
-281	B-4	-271	-281	0346		
↓ -291	B-5	↓ -281	↓ -291	0347	↓	↓
2010802-311	B-6	2010804-291	2010803-311	0348	2021112-141	PS2016042
-3[illegible]1	B-[illegible]	2010804 -311	2010803-321	0349	2021112-151	PS2016042
↑ -331	B-2	↑ -321	↑ -331	0350	↑	↑
-341	B-[illegible]	-331	-341	0351		
-351	B-1	-341	-351	0352		
↓ -361	B-[illegible]	↓ -351	↓ -361	0353	↓	↓
201[illegible]-371	B-6	2010804-361	2010[illegible]3-371	0354	2021112-151	PS2016042
[illegible]-381	B-[illegible]	2010804-371	201080[illegible] -38[illegible]	0355	2021114-011	PS2016042
↑ -391	B-2	↑ -381	↑ -391	0356	↑	↑
-411	B-3	-391	-411	0357		
-421	B-4	-411	-421	0358		
↓ -431	B-5	↓ -421	↓ -431	0359	↓	↓
201080[illegible]-441	B-6	2010804-431	2010803-441	0360	2021114-011	PS2016042
20108[illegible]2-451	B-1	2010804-441	2010803-451	0361	2021112-161	PS2016042
↑ -461	B-2	↑ -451	↑ -461	03[illegible]2	↑	↑
-471	B-3	-461	-471	0363		
-481	B-4	-471	-481	0364		
↓ -491	B-5	↓ -481	↓ -491	0365	↓	↓
2010802-511	B-6	2010804 491	2010803-511	0366	2021112-161	PS2016042







VIEWS SHOWN WITH
PARTIALLY

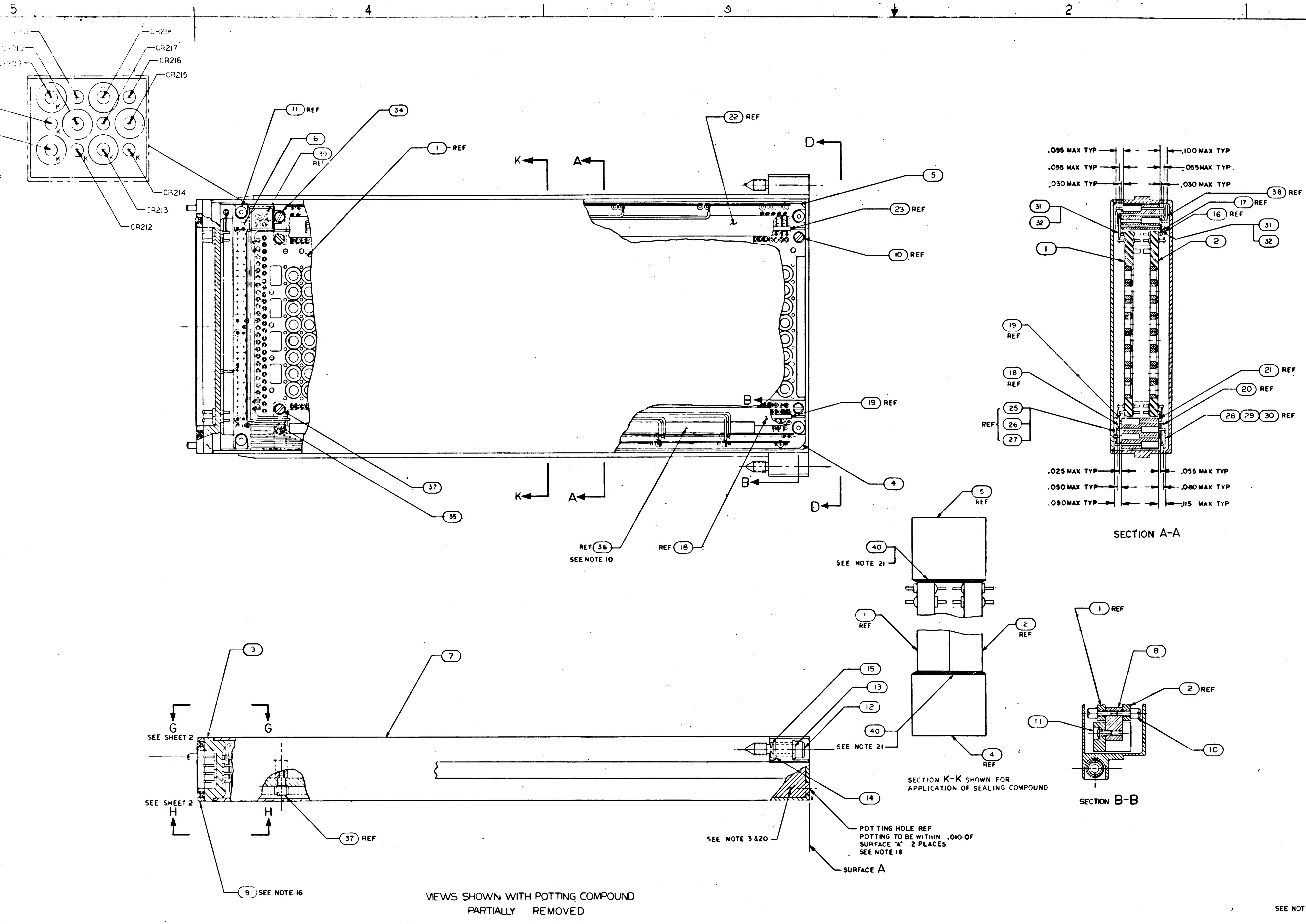
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO'S 1,2,&3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 &39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009; METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO'S 1 AND 2, AND INTERFACE BETWEEN FIND NO. 5 AND SIDE SURFACES OF FIND NO'S 1 AND 2 USING FIND NO. 40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802	L	


5
4
3
2
1
CR215
CR216
CR217
CR218
CR212
CR213
CR214
K
11 REF
6
39 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
4
37
35
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
31
32
1
2
19 REF
18 REF
21 REF
20 REF
25
26
27
28
29
30 REF
.025 MAX TYP
.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SEE NOTE 21
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
15
13
12
14
G
H
SEE SHEET 2
SEE SHEET 2
37 REF
SEE NOTE 3&20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
SEE NOTE 16

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

PROCESS REQUIREMENTS FOR CONTROL
AND INSPECTION OF ROPE MEMORY ASSEMBLIES
ND C02285
FIXED MEMORY FIXTURE DWG NO. AP22500

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	DR CHK		
D	REVISED PER TDRR 37967 DR R.G. Ford CHK		
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	4/9	
F	REVISED PER TDRR DR CHK	5/11	
G	REVISED PER TDRR 38151 DR R. Ford CHK		
H	REVISED PER TDRR 38173 DR R. Ford CHK		
J	REVISED PER TDRR DR CHK	1/4/70	
K	REVISED PER TDRR DR CHK	3/2/71	
L	REVISED PER TDRR DR CHK		

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW. SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 68
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

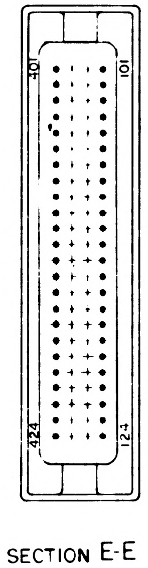
CODE IDENT NO 80230
SIZE J
NASA DRAWING NO 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802 L

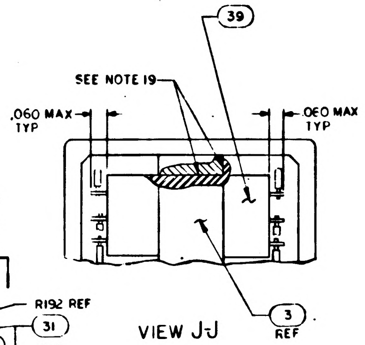
WIRE LIST			
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST	
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

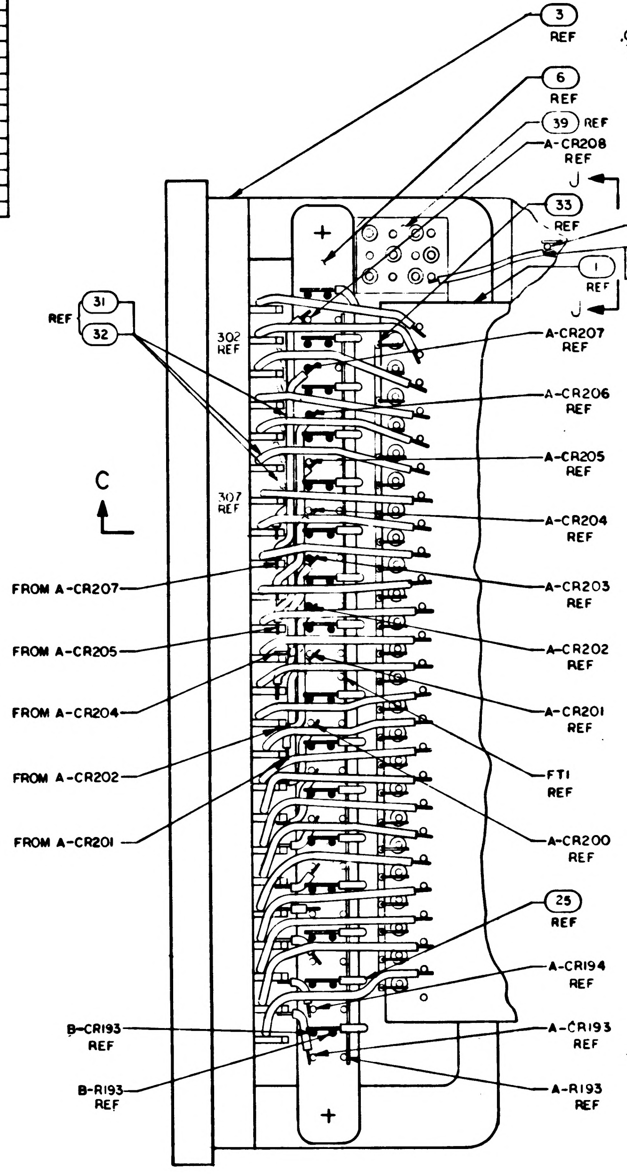
WIRE LIST	
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192


101
104
424
124

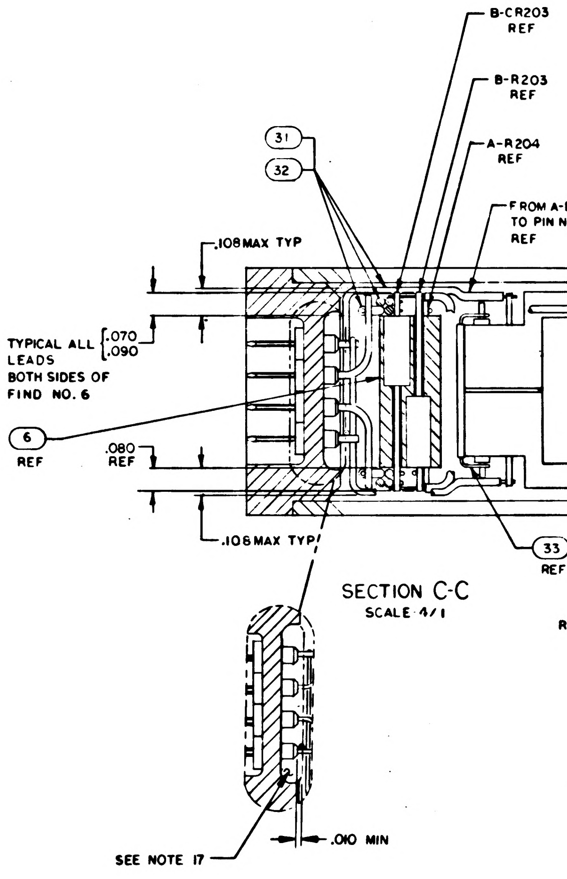
SECTION E-E


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
J
3 REF

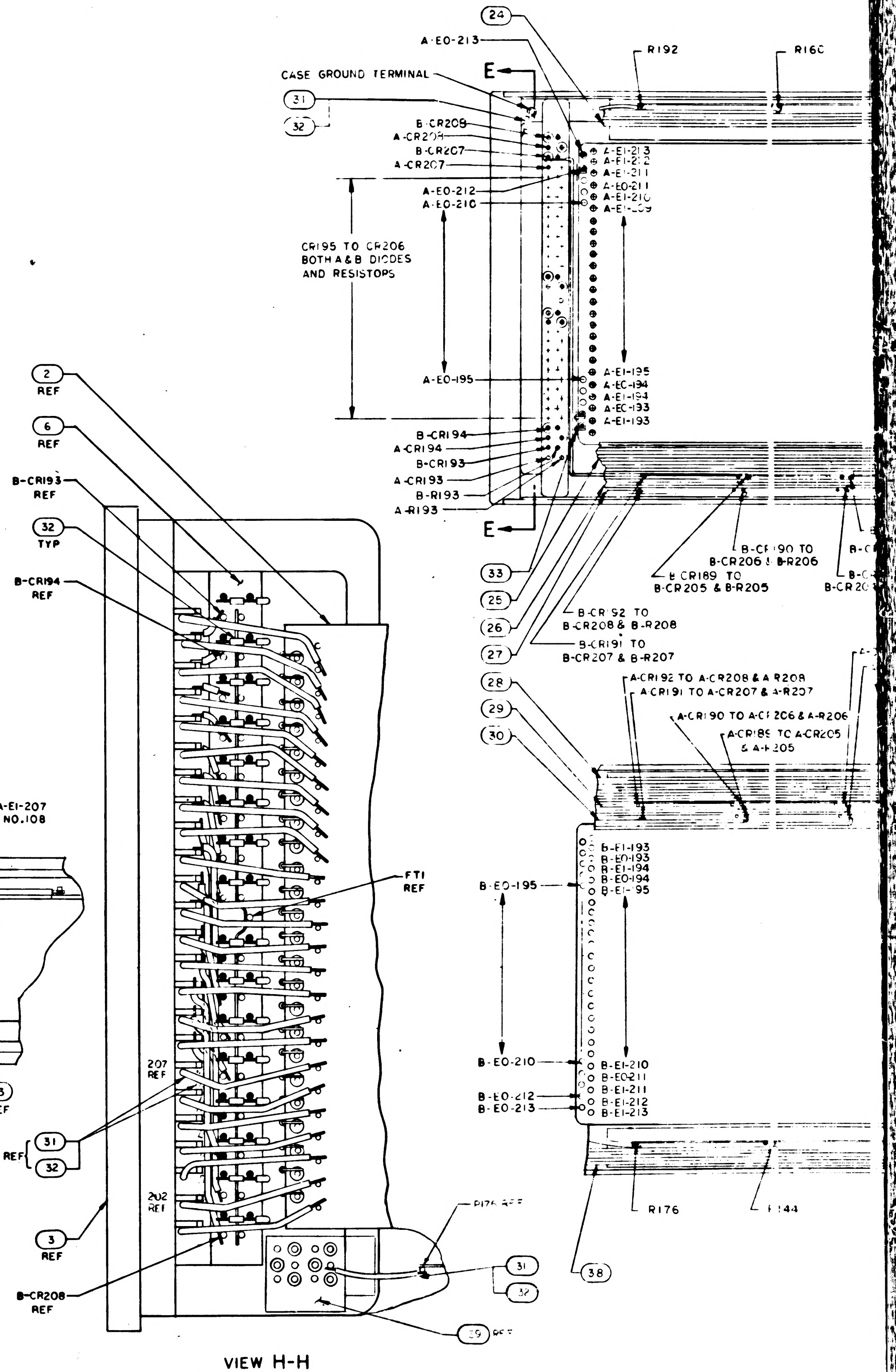
VIEW J-J


3 REF
6 REF
39 REF
A-CR208 REF
J
33 REF
R192 REF
31
32
1 REF
J
REF 31
32
302 REF
307 REF
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FT1 REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
C
C
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF
+
+

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14


B-CR203 REF
B-R203 REF
A-R204 REF
31
32
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

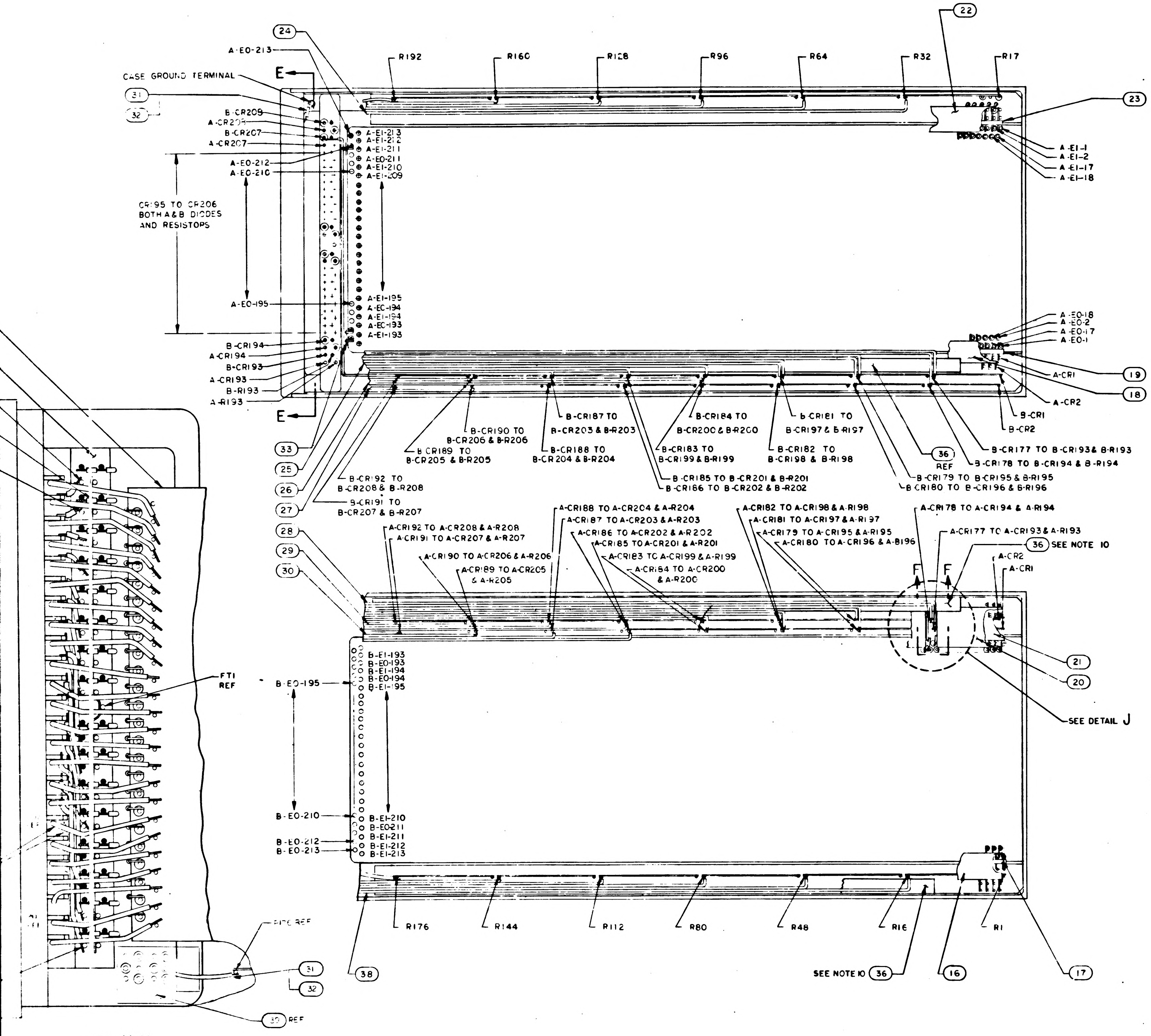
SECTION C-C
SCALE 4/1


2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
REF 31
32
3 REF
B-CR208 REF
R176 REF
31
32
39 REF
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
38

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

2010802 L

A	REVISED PER TDRR 37915 DR CHK	[illegible]	[illegible]
B	REVISED PER TDRR 37916 DR CHK	[illegible]	[illegible]
C	REVISED PER TDRR [illegible] DR CHK	[illegible]	[illegible]
D	REVISED PER TDRR 37967 DR CHK	[illegible]	[illegible]
E	REVISED PER TDRR 380[illegible] CHK	[illegible]	[illegible]
F	REVISED PER TDRR 38032 DR CHK	[illegible]	[illegible]
G	REVISED PER TDRR 381[illegible] DR CHK	[illegible]	[illegible]
H	REVISED PER TDRR 38173 DR CHK	[illegible]	
J	REVISED PER TDRR 38250 DR CHK	[illegible]	
K	REVISED PER TDRR 38380 DR CHK	[illegible]	
L	REVISED PER TDRR 38403 DR CHK	[illegible]	


24
22
A-E0-213
R192
R160
R128
R96
R64
R32
R17
E
CASE GROUND TERMINAL
31
32
23
B-CR209
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
A-E1-1
A-E1-2
A-E1-17
A-E1-18
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E0-18
A-E0-2
A-E0-17
A-E0-1
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
A-CR1
19
18
A-CR2
B-CR1
B-CR2
B-CR187 TO B-CR203 & B-R203
B-CR190 TO B-CR206 & B-R206
B-CR184 TO B-CR200 & B-R200
B-CR181 TO B-CR197 & B-R197
B-CR189 TO B-CR205 & B-R205
B-CR188 TO B-CR204 & B-R204
B-CR183 TO B-CR199 & B-R199
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
33
25
26
27
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
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29
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A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR192 TO A-CR208 & A-R208
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A-CR186 TO A-CR202 & A-R202
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A-CR190 TO A-CR206 & A-R206
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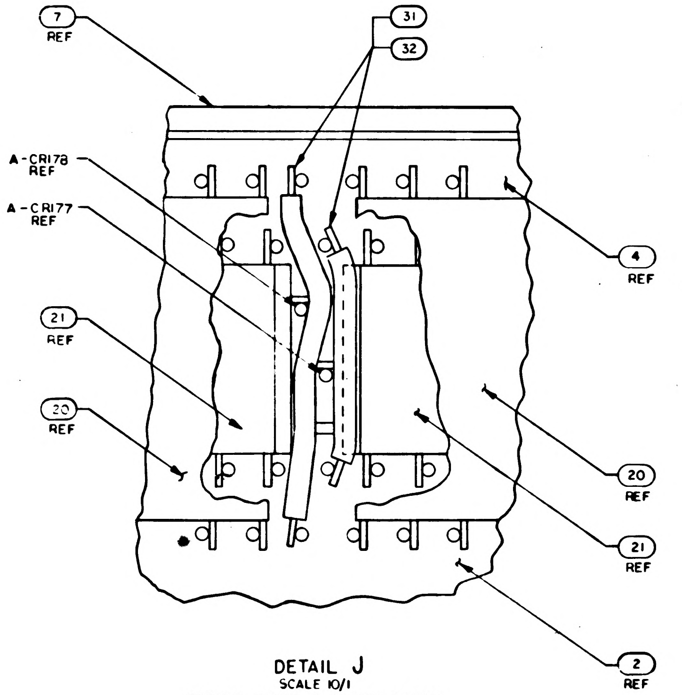
A-CR189 TO A-CR205 & A-R205
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
F
F
A-CR2
A-CR1
21
20
SEE DETAIL J
FT1 REF
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E0-212
B-E0-213
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
R176
R144
R112
R80
R48
R16
R1
FT6 REF
31
32
38
SEE NOTE 10
36
16
17
39 REF

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7 REMOVED. SEE NOTES 11,12,13 AND 14


7
REF
31
32
A-CR178
REF
A-CR177
REF
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REF
21
REF
20
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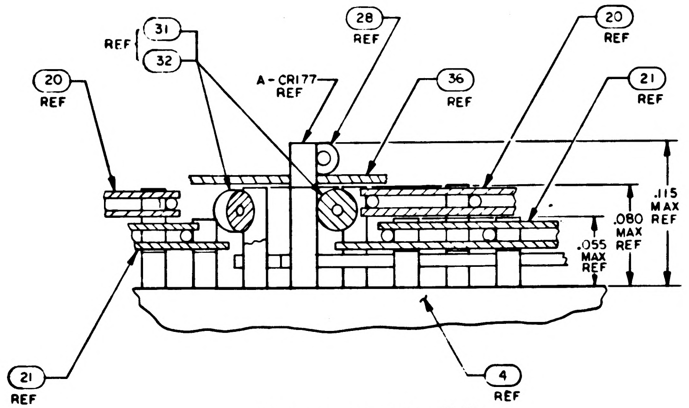
REF
2
REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN WITH FIND NOS 28 AND 36 REMOVED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REF
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32
A-CR177
REF
36
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REF
20
REF
.115
MAX
.080 REF
MAX
.055 REF
MAX
REF
21
REF
4
REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ±.005 ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MSC

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230 J
DRAWING NO 2010802
SCALE 2/1
SHEET 2 OF 3

2010802 L

2010802 L-F 2/2 SH2/3

2010802 L

2010802 LF1/2 SH3/3

4 3 2

	TDRR 7652
A	REVISED PER TDRR 37915 DR CHK
B	REVISED PER TDRR 3791[illegible] DR CHK
C	REVISED PER TDRR 37954 DR
D	REVISED PER TDRR 37267 DR CHK
E	REVISED PER TDRR 38022 DR CHK
F	REVISED PER TDRR 38032 DR CHK
G	REVISED PER TDRR 38151 DR
H	REVISED PER TDRR 38173 DR CHK
J	REVISED PER TDRR 3825[illegible] CHK
K	REVISED PER TDRR 38380 DR CHK
L	REVISED PER TDRR 38403 DR CHK

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EO-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR85	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR183	B-EO-87	B-CR87	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

C

B

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED
APPROVED MSC

FIXED MEMORY MODULE
- ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO 2010802
DATE
SCALE NONE
SHEET 3 OF 3

2010802 L

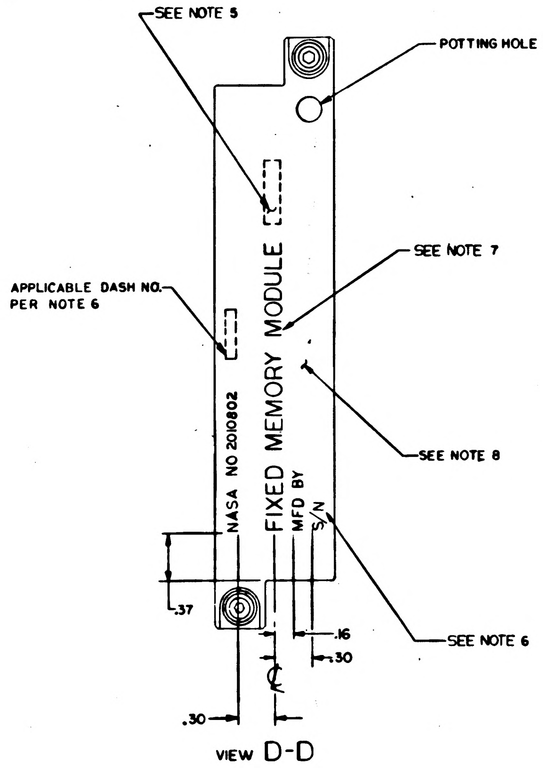
2010802 L

4

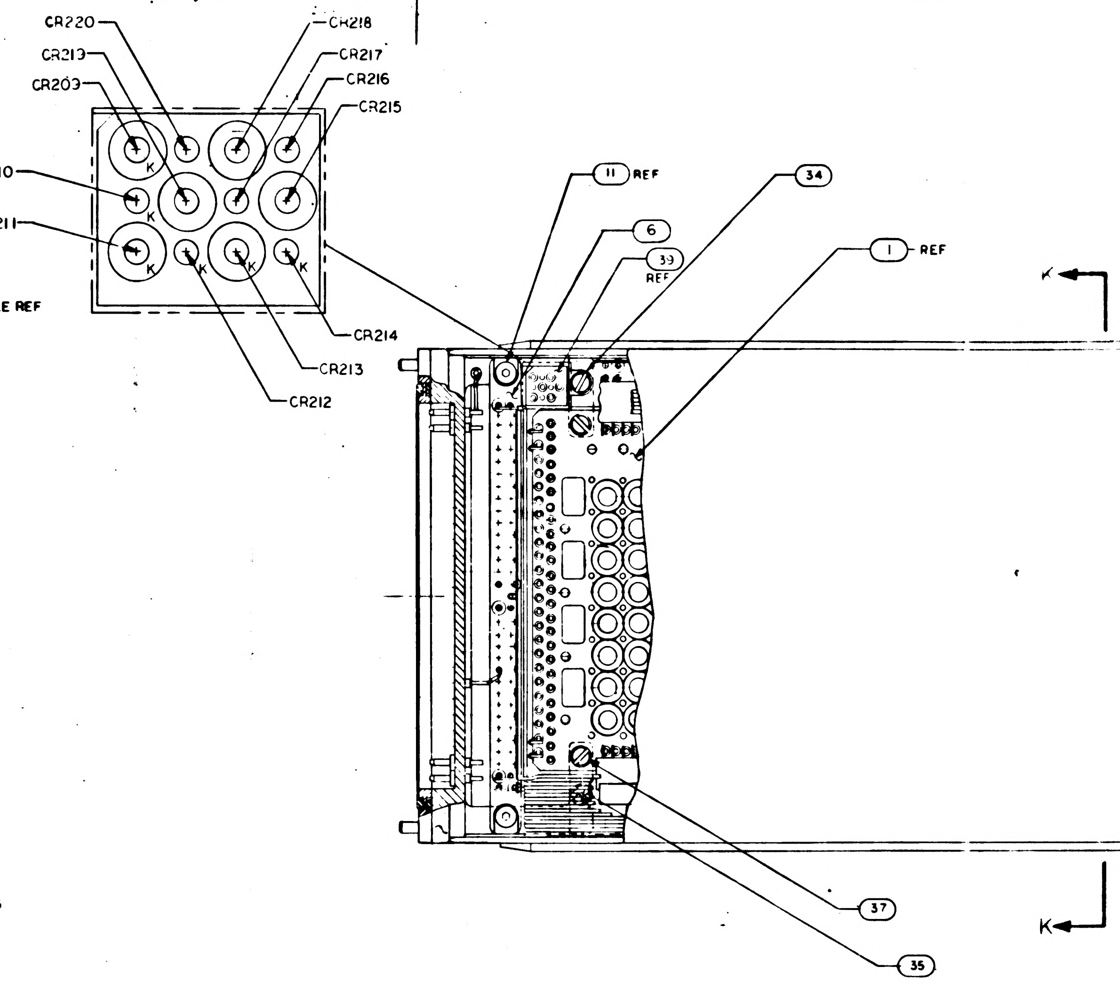
2010802 LF2/2 SH3/3

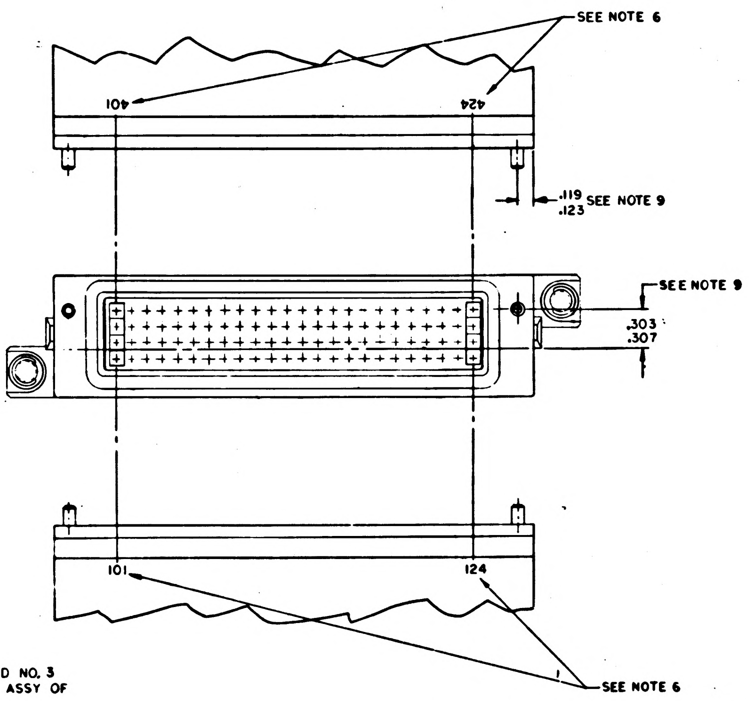
2010802 SH 1 OF 2

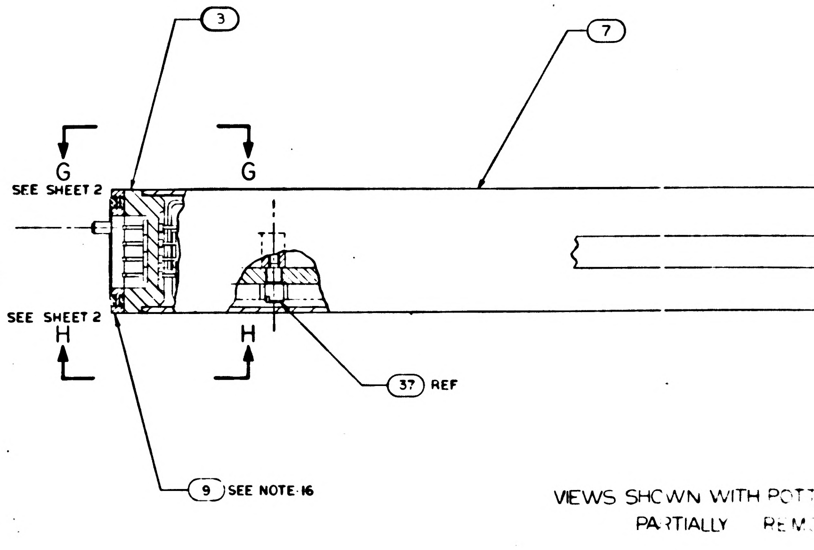
PART NO.	MODULE NO	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15
20[illegible]2-0[illegible]	B-[illegible]	2010804 021	2010803-011	0321	2021113-071	PS2016036
-021	B-2	↑ 031	↑ -021	0322	↑	↑
-031	B-3	041	-031	0323		
-041	B-4	051	-041	0324		
-051	B-5	↓ 061	↓ -051	0325	↓	↓
201[illegible]2-061	B-[illegible]	2010804 071	2010803 -061	0326	2021113-071	PS2016036
201[illegible]2-071	B-[illegible]	2010804 081	2010803 -071	0327	2021112-081	PS2016042
-081	B-[illegible]	↑ 091	↑ -081	0328	↑	↑
-091	B[illegible]	111	-091	0329		
-111	B[illegible]	121	-111	0330		
-121	B-[illegible]	↓ 131	↓ -121	0331	↓	↓
201[illegible]2-131	B[illegible]	2010804 141	2010803 -131	0332	2021112-081	PS2016042
201[illegible]2-141	B-[illegible]	2010804 131	2010803 141	0333	2021112-091	PS2016042
2010802-151	B-2	2010804-031	2010803 -151	0334	2021113-081	PS2016042
2010802-161	B-5	2010804-151	2010803 -161	0335	2021112-111	PS2016042
2[illegible]-171	B-[illegible]	[illegible] 161	2010803-171	0336	2021112-121	PS2016042
2010802-181	B-1	2010804 -171	2010803 -181	0337	2021113-091	PS2016042
↑ -191	B-2	↑ -181	↑ -191	0338	↑	↑
-211	B-3	-191	-211	0339		
-221	B-4	-211	-221	0340		
↓ -231	B-5	↓ -221	↓ -231	0341	↓	↓
2010802-241	B-6	2010804 -231	2010803 -241	0342	2021113-091	PS2016042
2010802-251	B-1	2010804 -241	2010803 -251	0343	2021112-141	PS2016042
↑ -261	B-2	↑ -251	↑ -261	0344	↑	↑
-271	B-3	-261	-271	0345		
-281	B-4	-271	-281	0346		
↓ -291	B-5	↓ -281	↓ -291	0347	↓	↓
2010802 -311	B-6	2010804 -291	2010803 -311	0348	2021112-141	PS2016042
[illegible] -321	B-1	2010804 -311	2010803 -321	0349	2021112-151	PS2016042
↑ -331	B-2	↑ -321	↑ -331	0350	↑	↑
-341	B-3	-331	-341	0351		
-351	B-1	341	-351	0352		
↓ -361	B-5	↓ -351	↓ -361	0353	↓	↓
2010[illegible]-371	B-6	2010804 -361	2010803 -371	0354	2021112-151	PS2016042
2010802-381	B-1	2010804 -371	2010803 -381	0355	2021114-011	PS2016042
↑ -391	B-2	↑ -381	↑ -391	0356	↑	↑
-411	B-3	-391	-411	0357		
-421	B-4	-411	-421	0358		
↓ -431	B-5	↓ 421	↓ -431	0359	↓	↓
2010802-441	B-6	2010804 -431	2010803 -441	0360	2021114-011	PS2016042
2010802-451	B-1	2010804 -441	2010803 -451	0361	2021112-161	PS2016042
↑ -461	B-2	↑ -451	↑ -461	0362	↑	↑
-471	B-3	-461	-471	0363		
-481	B-4	-471	-481	0364		
↓ -491	B-5	↓ -481	↓ -491	0365	↓	↓
2010802-511	B-6	2010804 -491	2010803 -511	0366	2021112-161	PS2016042
2010802-521	B-1	2010804 -511	2010803 -521	0238	2021107-021	PS2016042
2010802-531	B-2	2010804 -521	2010803 -531	0229	2021107-021	PS2016042
2010802-541	B-1	2010804 -531	2010803 -541	0367	2021115-011	PS2016042
↑ -551	B-2	↑ 541	↑ -551	0368	↑	↑
-561	B-3	-551	-561	0369		
-571	B-4	-561	571	0370		
↓ -581	B-5	↓ -571	↓ 581	0371	↓	↓
2010802-591	B-6	2010804 -581	2010803 -591	0372	2021115-011	PS2016042



VIEW D-D







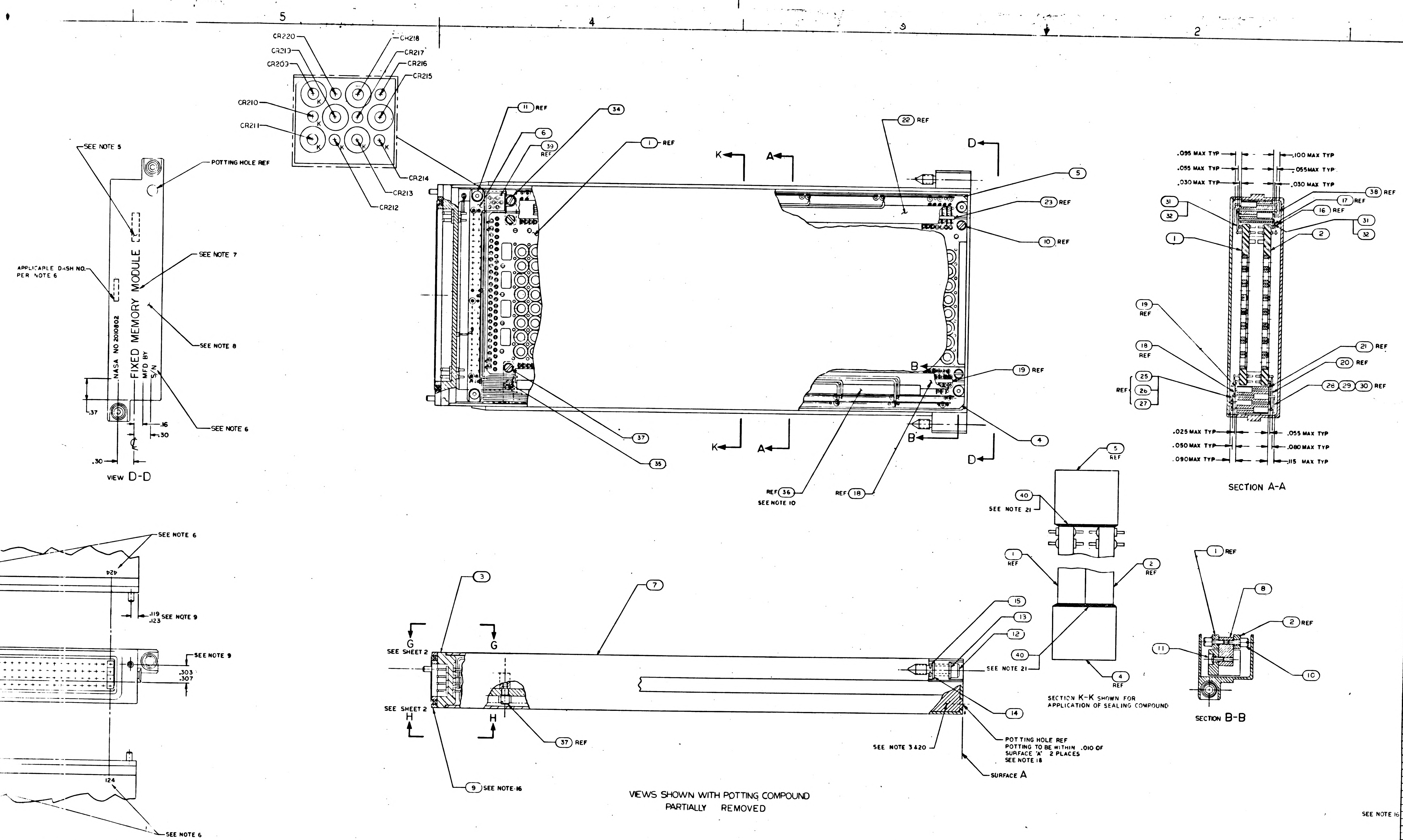
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO. 1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND1002235 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO.4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

2010802 M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4
3
2
1
CR220
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CR203
CR210
CR211
CR218
CR217
CR216
CR215
CR214
CR213
CR212
K
SEE NOTE 5
POTTING HOLE REF
SEE NOTE 7
APPLICABLE DASH NO. PER NOTE 6
NASA NO 2010802
FIXED MEMORY MODULE
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
.16
.30
.30
VIEW D-D
11 REF
6
39 REF
34
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
4
37
35
K
A
B
D
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
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32
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20 REF
REF 25 26 27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
SEE NOTE 6
424
.119
.123
SEE NOTE 9
SEE NOTE 9
.303
.307
124
SEE NOTE 6
3
7
G
SEE SHEET 2
G
SEE SHEET 2
H
H
37 REF
9 SEE NOTE-16
15
13
12
SEE NOTE 21
14
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED
SEE NOTE 16

TERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF
AND 2. AND INTERFACE BETWEEN FIND NO. 5 AND
OF FIND NO.'S 1 AND 2 USING FIND NO. 40.
TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG NO. AP22500

AR	1006[illegible]
1	2003[illegible]-021
☒	20059[illegible]0
1	2004[illegible]4
4	20041[illegible] — 003
AR	10068[illegible]5 — 26
1	20041[illegible] — 001
1	20041[illegible] — 002
1	20041[illegible]
AR	10067[illegible]-25
AR	10067[illegible]-12
1	200412[illegible]
1	200412[illegible]
1	200412[illegible]
1	200412[illegible]
1	200412[illegible]
1	200412[illegible]
1	20046[illegible]
1	200305[illegible] — 013
1	200305[illegible] — 014
8	200305[illegible] — 016
8	200305[illegible] — 015
1	200305[illegible] — 017
1	200305[illegible] — 018
1	200305[illegible] — 011
1	2003051 — 012
2	MS1663[illegible]-4015
2	100454[illegible]-3
2	100454[illegible]-1
2	100457[illegible]-1
4	100009[illegible]-1
4	200415
1	100633[illegible]
2	200407
1	200410[illegible]
1	200304[illegible]-021
1	200305[illegible]-021
1	200304[illegible]-021
1	2003973-011
1	2010803-SEE CHA
1	2010804-SEE CHA
QTY REQD	PART OR IDENTIFYING NO

FOR APPLICABLE PART NO. SEE CHART

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

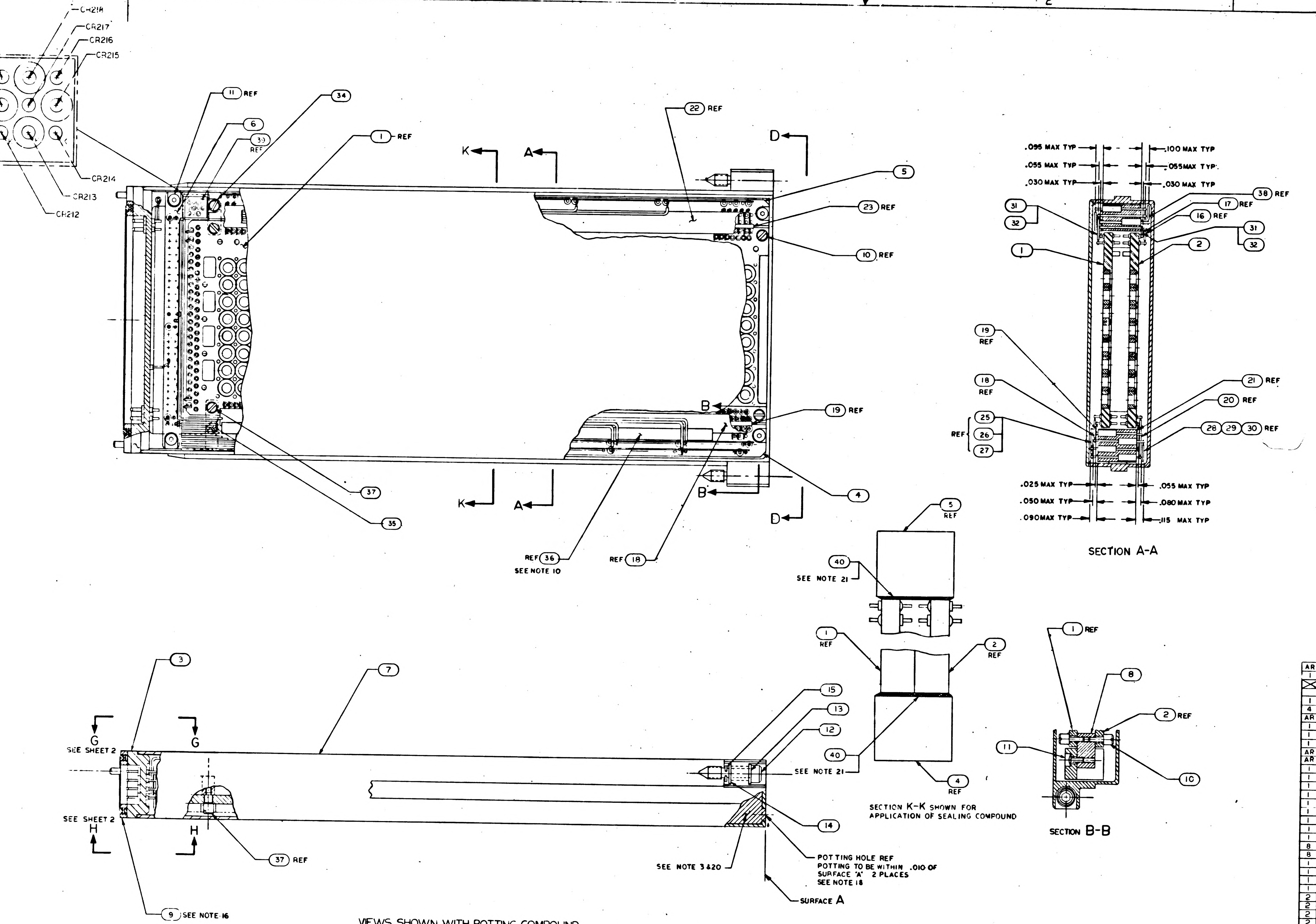
M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO
CONTRACT
DRAWN Tom Small DATE 10 A
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

2010802 M

SIH 1/3 2010802 MF 2/3

TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37915 DR H. Leonard CHK	[illegible]	[illegible]
B	REVISED PER TDRR 37916 DR H. Leonard CHK	12/11/69	PBB
C	REVISED PER TDRR 37954 DR CHK	1/8/70	PBB
D	REVISED PER TDRR 37967 DR R.G. Ford CHK	2/11/70	PBB
E	REVISED PER TDRR 38022 DR R.G. Ford CHK	4/9/70	PBB
F	REVISED PER TDRR 3[illegible]32 DR CHK	5/11/70	PBB
G	REVISED PER TDRR 38151 DR R. Ford CHK	[illegible]	PBB
H	REVISED PER TDRR 38173 DR R. Ford CHK	7/2/70	PBB
J	REVISED PER TDRR 38250 DR CHK	9/8/70	PBB
K	REVISED PER TDRR 38380 DR CHK	4/2/71	PBB
L	REVISED PER TDRR 3840[illegible] DR CHK	4/2/71	PBB
M	REVISED PER TDRR 38494 DR CHK	12/2/71	PBB



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39 REF
1 REF
22 REF
K
A
D
5
23 REF
10 REF
19 REF
B
4
37
35
REF 36
SEE NOTE 10
REF 18
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055 MAX TYP
.030 MAX TYP
31
32
1
38 REF
17 REF
16 REF
2
19 REF
18 REF
21 REF
20 REF
REF 25 26 27
28 29 30 REF
.025 MAX TYP
.050 MAX TYP
.090 MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
G
SEE SHEET 2
3
7
G
15
13
12
SEE SHEET 2
H
H
14
37 REF
SEE NOTE 3&20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE 'A' 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16

VIEWS SHOWN WITH POTTING COMPOUND
PARTIALLY REMOVED

TS FOR CONTROL
RE MEMORY ASSEMBLIES

E DWG NO AP22500

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003986-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW, SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

NEXT ASSY	USED ON
SEE CHART	

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Tom Smith DATE 10 APR 68
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802

010802

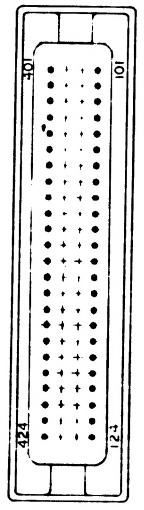
2010802 MF3/31

S080105

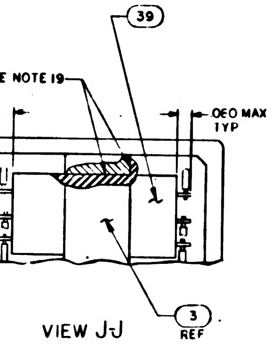
WIRE LIST			
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST	
TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

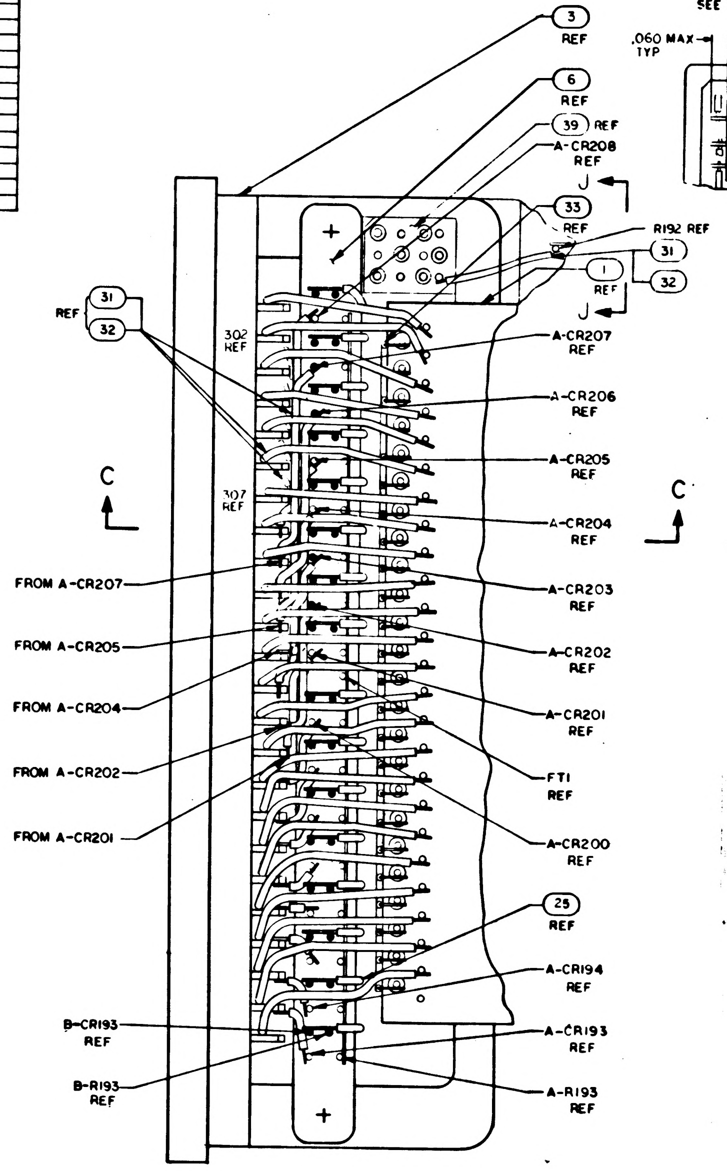
WIRE LIST	
COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R132


101
301
424
124

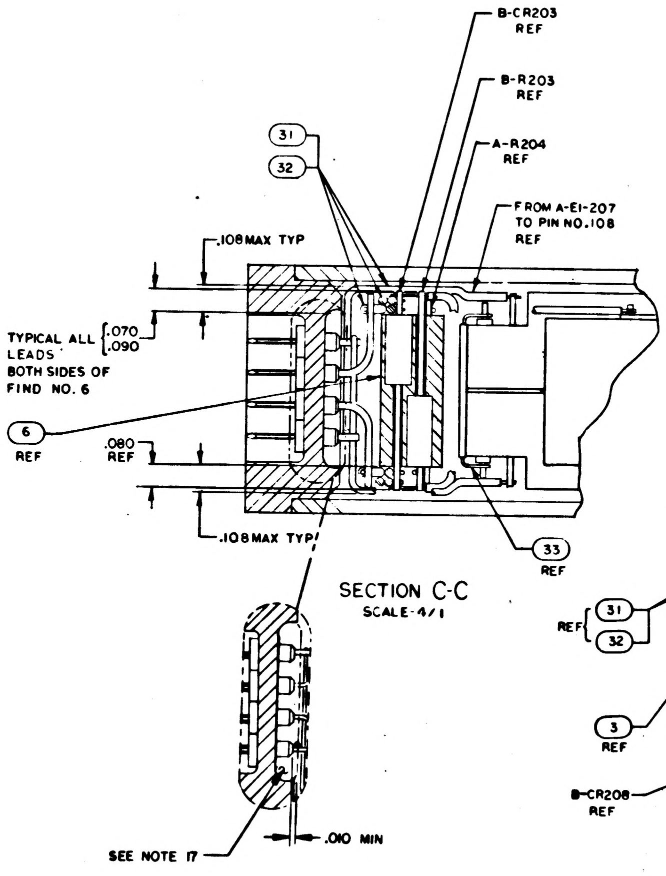
SECTION E-E


39
SEE NOTE 19
.060 MAX TYP
.060 MAX TYP
J
J
3 REF

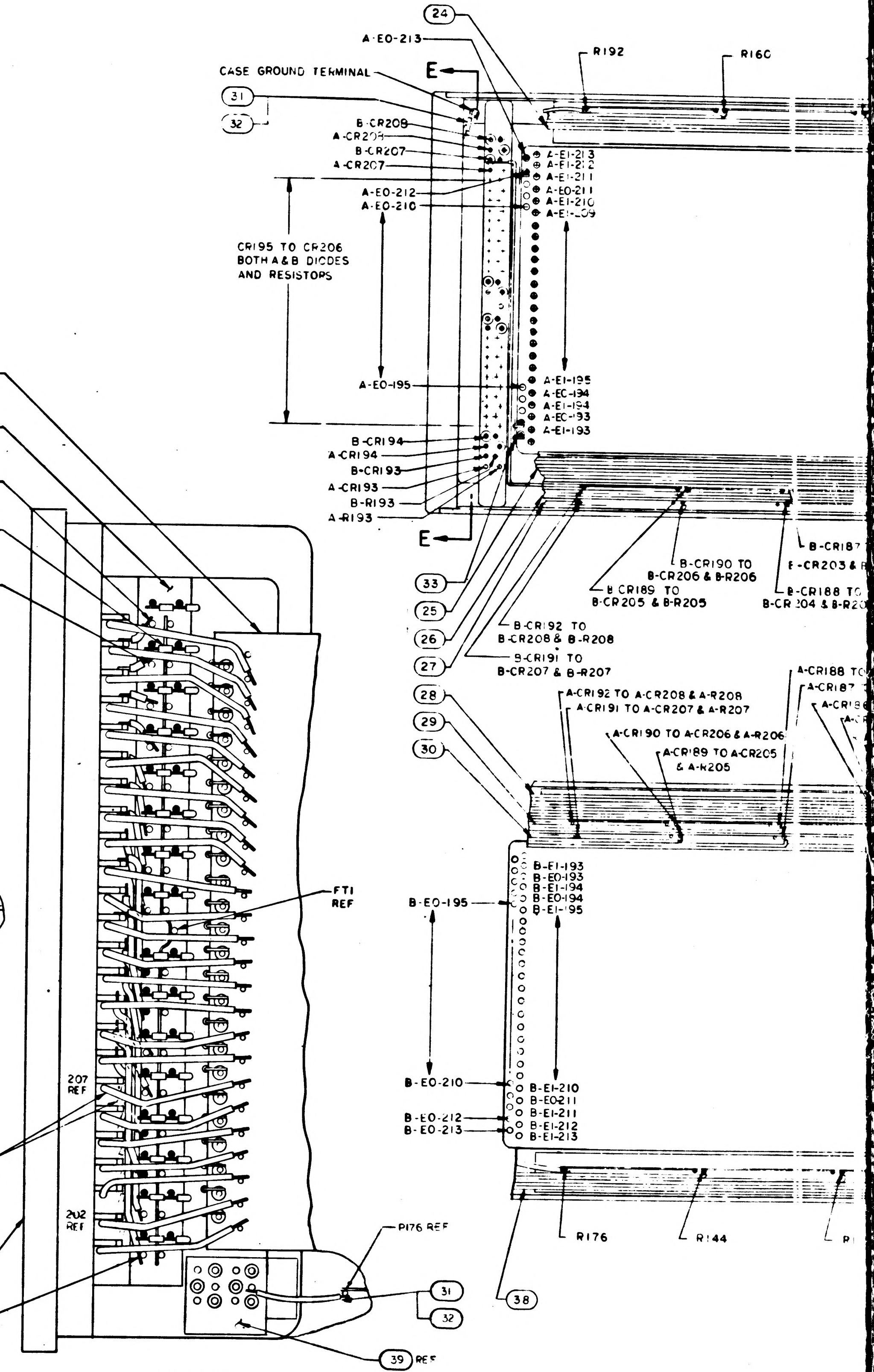
VIEW J-J


3 REF
6 REF
39 REF
A-CR208 REF
33 REF
R192 REF
1 REF
31
32
REF 31 32
302 REF
307 REF
C
C
A-CR207 REF
A-CR206 REF
A-CR205 REF
A-CR204 REF
A-CR203 REF
A-CR202 REF
A-CR201 REF
FT1 REF
A-CR200 REF
25 REF
A-CR194 REF
A-CR193 REF
A-R193 REF
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193 REF
B-R193 REF

VIEW G-G
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14


B-CR203 REF
B-R203 REF
A-R204 REF
31
32
FROM A-E1-207 TO PIN NO.108 REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6 REF
.080 REF
.108 MAX TYP
33 REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE: 4/1

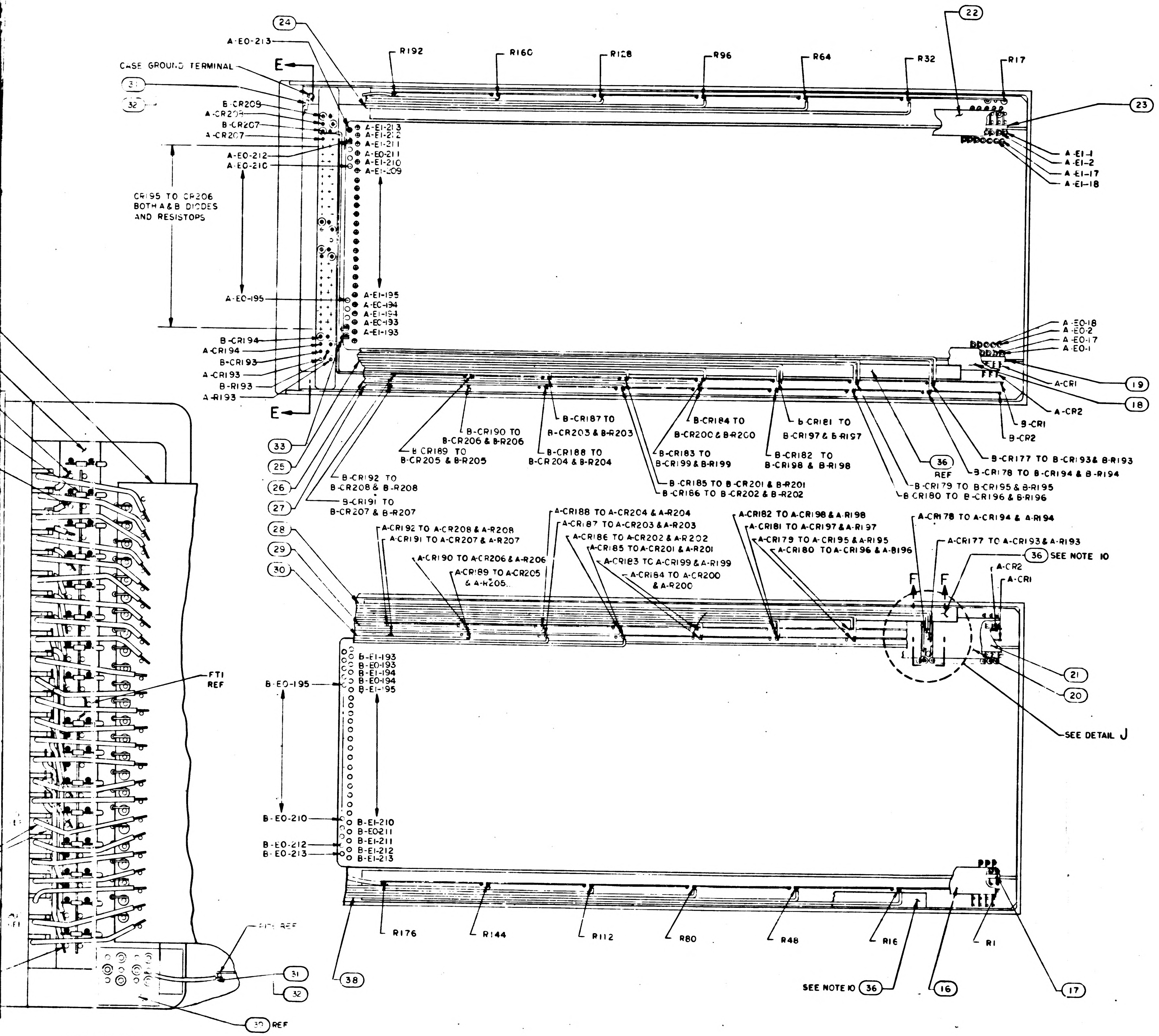

2 REF
6 REF
B-CR193 REF
32 TYP
B-CR194 REF
FT1 REF
207 REF
202 REF
3 REF
B-CR208 REF
P176 REF
31
32
39 REF
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
31
32
E
E
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206 BOTH A & B DIODES AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
33
25
26
27
28
29
30
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
B-CR187
F-CR203 &
B-CR188 TO B-CR204 & B-R20
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO
A-CR187
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
38

VIEW H-H
SCALE: 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14

2010802 M

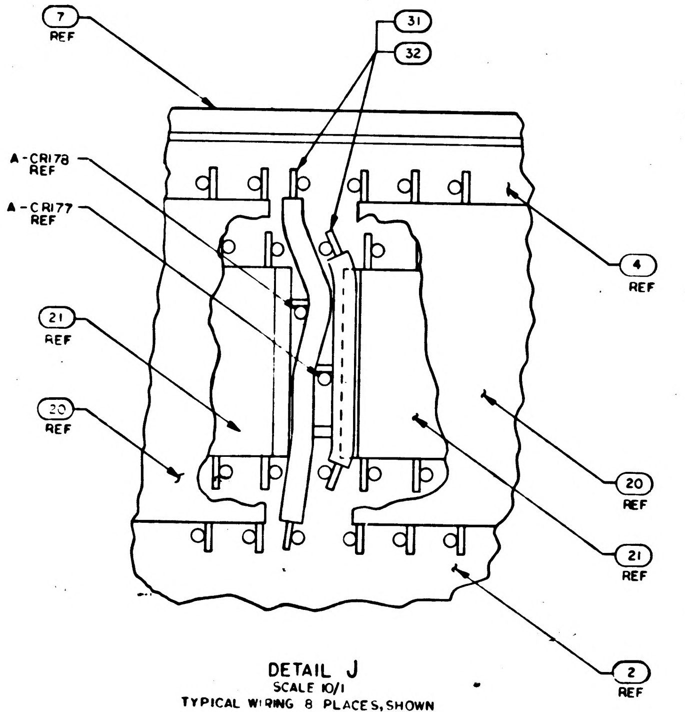
SH2/3 2010802 MF1/21

A	REVISED PER TDRR 3 DR CHK	2/6	[illegible]
B	REVISED PER TDRR 37 DR CHK	[illegible]	[illegible]
C	REVISED PER TDRR DR CHK	4/8/70	[illegible]
D	REVISED PER TDRR 3 DR CHK	4/18/70	[illegible]
E	REVISED PER TDRR DR CHK	4/9/70	[illegible]
F	REVISED PER TDRR 35 DR CHK	5/11/70	[illegible]
G	REVISED PER TDRR 3 DR CHK	6/5/70	[illegible]
H	REVISED PER TDRR 3 DR CHK	7/12/70	[illegible]
J	REVISED PER TDRR 3 DR CHK	[illegible]/2/70	[illegible]
K	REVISED PER TDRR 383 DR CHK	[illegible]/2/71	[illegible]
L	REVISED PER TDRR 384 DR CHK	6/[illegible]/71	[illegible]
M	REVISED PER TDRR 384 DR CHK	[illegible]/71	[illegible]



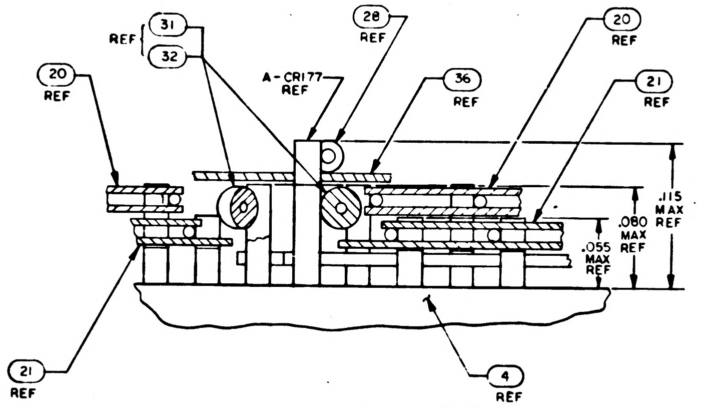
24
22
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR209
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
R192
R160
R128
R96
R64
R32
R17
23
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
A-CR2
19
18
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR188 TO A-CR204 & A-R204
A-CR192 TO A-CR208 & A-R208
A-CR187 TO A-CR203 & A-R203
A-CR191 TO A-CR207 & A-R207
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR190 TO A-CR206 & A-R206
A-CR183 TO A-CR199 & A-R199
A-CR189 TO A-CR205 & A-R205
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-B196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
FT1 REF
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E1-210
B-E0-211
B-E1-211
B-E1-212
B-E1-213
B-E0-212
B-E0-213
R176
R144
R112
R80
R48
R16
R1
FT1 REF
31
32
30 REF
38
SEE NOTE 10 36
16
17

VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO. 7
REMOVED. SEE NOTES 11, 12, 13 AND 14



7 REF
31
32
A-CR178 REF
A-CR177 REF
21 REF
20 REF
4 REF
20 REF
21 REF
2 REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NO'S 28 AND 36 REMOVED



REF
31
32
20 REF
A-CR177 REF
28 REF
36 REF
20 REF
21 REF
.115 MAX
.080 MAX REF
.055 MAX REF
21 REF
4 REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO	SIZE	DRAWING NO.
80230	J	2010802

SCALE 2/1 SHEET 2 OF 3

2010802 M

2010802 M

2010802 M-F2/21

[illegible]

4 3 2

TDRR 37652

	DESCRIPTION	DATE	
A	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]	12/[illegible]	[illegible]
B	REVISED PER TDRR 37916 DR [illegible] CHK [illegible]	12/[illegible]/69	[illegible]
C	REVISED PER TDRR 37954 DR [illegible] CHK [illegible]	1/5/70	[illegible]
D	REVISED PER TDRR 37967 DR [illegible] CHK [illegible]	2/18/7[illegible]	[illegible]
E	REVISED PER TDRR 38022 DR [illegible] CHK [illegible]	4/9/70	[illegible]
F	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]	5/11/[illegible]	[illegible]
G	REVISED PER TDRR 38151 DR [illegible] CHK [illegible]	[illegible]	[illegible]
H	REVISED PER TDRR 38173 DR [illegible] CHK [illegible]	[illegible]/12/70	[illegible]
J	REVISED PER TDRR 38250 DR [illegible] CHK [illegible]	[illegible]	[illegible]
K	REVISED PER TDRR 38380 DR [illegible] CHK [illegible]	[illegible]	[illegible]
L	REVISED PER TDRR 384[illegible] DR [illegible] CHK [illegible]	[illegible]	[illegible]
M	REVISED PER TDRR 384[illegible] DR [illegible] CHK [illegible]	[illegible]	[illegible]

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-E0-1	A-CR1	A-E0-97	A-CR97	B-E0-1	B-CR1	B-E0-97	B-CR97	A-E1-1	R1	A-E1-49	R49	A-E1-97	R97	A-E1-145	R145
A-E0-2	A-CR2	A-E0-98	A-CR98	B-E0-2	B-CR2	B-E0-98	B-CR98	B-E1-1		B-E1-49		B-E1-97		B-E1-145	
A-E0-3	A-CR3	A-E0-99	A-CR99	B-E0-3	B-CR3	B-E0-99	B-CR99	A-E1-2	R2	A-E1-50	R50	A-E1-98	R98	A-E1-146	R146
A-E0-4	A-CR4	A-E0-100	A-CR100	B-E0-4	B-CR4	B-E0-100	B-CR100	B-E1-2		B-E1-50		B-E1-98		B-E1-146	
A-E0-5	A-CR5	A-E0-101	A-CR101	B-E0-5	B-CR5	B-E0-101	B-CR101	A-E1-3	R3	A-E1-51	R51	A-E1-99	R99	A-E1-147	R147
A-E0-6	A-CR6	A-E0-102	A-CR102	B-E0-6	B-CR6	B-E0-102	B-CR102	B-E1-3		B-E1-51		B-E1-99		B-E1-147	
A-E0-7	A-CR7	A-E0-103	A-CR103	B-E0-7	B-CR7	B-E0-103	B-CR103	A-E1-4	R4	A-E1-52	R52	A-E1-100	R100	A-E1-148	R148
A-E0-8	A-CR8	A-E0-104	A-CR104	B-E0-8	B-CR8	B-E0-104	B-CR104	B-E1-4		B-E1-52		B-E1-100		B-E1-148	
A-E0-9	A-CR9	A-E0-105	A-CR105	B-E0-9	B-CR9	B-E0-105	B-CR105	A-E1-5	R5	A-E1-53	R53	A-E1-101	R101	A-E1-149	R149
A-E0-10	A-CR10	A-E0-106	A-CR106	B-E0-10	B-CR10	B-E0-106	B-CR106	B-E1-5		B-E1-53		B-E1-101		B-E1-149	
A-E0-11	A-CR11	A-E0-107	A-CR107	B-E0-11	B-CR11	B-E0-107	B-CR107	A-E1-6	R6	A-E1-54	R54	A-E1-102	R102	A-E1-150	R150
A-E0-12	A-CR12	A-E0-108	A-CR108	B-E0-12	B-CR12	B-E0-108	B-CR108	B-E1-6		B-E1-54		B-E1-102		B-E1-150	
A-E0-13	A-CR13	A-E0-109	A-CR109	B-E0-13	B-CR13	B-E0-109	B-CR109	A-E1-7	R7	A-E1-55	R55	A-E1-103	R103	A-E1-151	R151
A-E0-14	A-CR14	A-E0-110	A-CR110	B-E0-14	B-CR14	B-E0-110	B-CR110	B-E1-7		B-E1-55		B-E1-103		B-E1-151	
A-E0-15	A-CR15	A-E0-111	A-CR111	B-E0-15	B-CR15	B-E0-111	B-CR111	A-E1-8	R8	A-E1-56	R56	A-E1-104	R104	A-E1-152	R152
A-E0-16	A-CR16	A-E0-112	A-CR112	B-E0-16	B-CR16	B-E0-112	B-CR112	B-E1-8		B-E1-56		B-E1-104		B-E1-152	
A-E0-17	A-CR17	A-E0-113	A-CR113	B-E0-17	B-CR17	B-E0-113	B-CR113	A-E1-9	R9	A-E1-57	R57	A-E1-105	R105	A-E1-153	R153
A-E0-18	A-CR18	A-E0-114	A-CR114	B-E0-18	B-CR18	B-E0-114	B-CR114	B-E1-9		B-E1-57		B-E1-105		B-E1-153	
A-E0-19	A-CR19	A-E0-115	A-CR115	B-E0-19	B-CR19	B-E0-115	B-CR115	A-E1-10	R10	A-E1-58	R58	A-E1-106	R106	A-E1-154	R154
A-E0-20	A-CR20	A-E0-116	A-CR116	B-E0-20	B-CR20	B-E0-116	B-CR116	B-E1-10		B-E1-58		B-E1-106		B-E1-154	
A-E0-21	A-CR21	A-E0-117	A-CR117	B-E0-21	B-CR21	B-E0-117	B-CR117	A-E1-11	R11	A-E1-59	R59	A-E1-107	R107	A-E1-155	R155
A-E0-22	A-CR22	A-E0-118	A-CR118	B-E0-22	B-CR22	B-E0-118	B-CR118	B-E1-11		B-E1-59		B-E1-107		B-E1-155	
A-E0-23	A-CR23	A-E0-119	A-CR119	B-E0-23	B-CR23	B-E0-119	B-CR119	A-E1-12	R12	A-E1-60	R60	A-E1-108	R108	A-E1-156	R156
A-E0-24	A-CR24	A-E0-120	A-CR120	B-E0-24	B-CR24	B-E0-120	B-CR120	B-E1-12		B-E1-60		B-E1-108		B-E1-156	
A-E0-25	A-CR25	A-E0-121	A-CR121	B-E0-25	B-CR25	B-E0-121	B-CR121	A-E1-13	R13	A-E1-61	R61	A-E1-109	R109	A-E1-157	R157
A-E0-26	A-CR26	A-E0-122	A-CR122	B-E0-26	B-CR26	B-E0-122	B-CR122	B-E1-13		B-E1-61		B-E1-109		B-E1-157	
A-E0-27	A-CR27	A-E0-123	A-CR123	B-E0-27	B-CR27	B-E0-123	B-CR123	A-E1-14	R14	A-E1-62	R62	A-E1-110	R110	A-E1-158	R158
A-E0-28	A-CR28	A-E0-124	A-CR124	B-E0-28	B-CR28	B-E0-124	B-CR124	B-E1-14		B-E1-62		B-E1-110		B-E1-158	
A-E0-29	A-CR29	A-E0-125	A-CR125	B-E0-29	B-CR29	B-E0-125	B-CR125	A-E1-15	R15	A-E1-63	R63	A-E1-111	R111	A-E1-159	R159
A-E0-30	A-CR30	A-E0-126	A-CR126	B-E0-30	B-CR30	B-E0-126	B-CR126	B-E1-15		B-E1-63		B-E1-111		B-E1-159	
A-E0-31	A-CR31	A-E0-127	A-CR127	B-E0-31	B-CR31	B-E0-127	B-CR127	A-E1-16	R16	A-E1-64	R64	A-E1-112	R112	A-E1-160	R160
A-E0-32	A-CR32	A-E0-128	A-CR128	B-E0-32	B-CR32	B-E0-128	B-CR128	B-E1-16		B-E1-64		B-E1-112		B-E1-160	
A-E0-33	A-CR33	A-E0-129	A-CR129	B-E0-33	B-CR33	B-E0-129	B-CR129	A-E1-17	R17	A-E1-65	R65	A-E1-113	R113	A-E1-161	R161
A-E0-34	A-CR34	A-E0-130	A-CR130	B-E0-34	B-CR34	B-E0-130	B-CR130	B-E1-17		B-E1-65		B-E1-113		B-E1-161	
A-E0-35	A-CR35	A-E0-131	A-CR131	B-E0-35	B-CR35	B-E0-131	B-CR131	A-E1-18	R18	A-E1-66	R66	A-E1-114	R114	A-E1-162	R162
A-E0-36	A-CR36	A-E0-132	A-CR132	B-E0-36	B-CR36	B-E0-132	B-CR132	B-E1-18		B-E1-66		B-E1-114		B-E1-162	
A-E0-37	A-CR37	A-E0-133	A-CR133	B-E0-37	B-CR37	B-E0-133	B-CR133	A-E1-19	R19	A-E1-67	R67	A-E1-115	R115	A-E1-163	R163
A-E0-38	A-CR38	A-E0-134	A-CR134	B-E0-38	B-CR38	B-E0-134	B-CR134	B-E1-19		B-E1-67		B-E1-115		B-E1-163	
A-E0-39	A-CR39	A-E0-135	A-CR135	B-E0-39	B-CR39	B-E0-135	B-CR135	A-E1-20	R20	A-E1-68	R68	A-E1-116	R116	A-E1-164	R164
A-E0-40	A-CR40	A-E0-136	A-CR136	B-E0-40	B-CR40	B-E0-136	B-CR136	B-E1-20		B-E1-68		B-E1-116		B-E1-164	
A-E0-41	A-CR41	A-E0-137	A-CR137	B-E0-41	B-CR41	B-E0-137	B-CR137	A-E1-21	R21	A-E1-69	R69	A-E1-117	R117	A-E1-165	R165
A-E0-42	A-CR42	A-E0-138	A-CR138	B-E0-42	B-CR42	B-E0-138	B-CR138	B-E1-21		B-E1-69		B-E1-117		B-E1-165	
A-E0-43	A-CR43	A-E0-139	A-CR139	B-E0-43	B-CR43	B-E0-139	B-CR139	A-E1-22	R22	A-E1-70	R70	A-E1-118	R118	A-E1-166	R166
A-E0-44	A-CR44	A-E0-140	A-CR140	B-E0-44	B-CR44	B-E0-140	B-CR140	B-E1-22		B-E1-70		B-E1-118		B-E1-166	
A-E0-45	A-CR45	A-E0-141	A-CR141	B-E0-45	B-CR45	B-E0-141	B-CR141	A-E1-23	R23	A-E1-71	R71	A-E1-119	R119	A-E1-167	R167
A-E0-46	A-CR46	A-E0-142	A-CR142	B-E0-46	B-CR46	B-E0-142	B-CR142	B-E1-23		B-E1-71		B-E1-119		B-E1-167	
A-E0-47	A-CR47	A-E0-143	A-CR143	B-E0-47	B-CR47	B-E0-143	B-CR143	A-E1-24	R24	A-E1-72	R72	A-E1-120	R120	A-E1-168	R168
A-E0-48	A-CR48	A-E0-144	A-CR144	B-E0-48	B-CR48	B-E0-144	B-CR144	B-E1-24		B-E1-72		B-E1-120		B-E1-168	
A-E0-49	A-CR49	A-E0-145	A-CR145	B-E0-49	B-CR49	B-E0-145	B-CR145	A-E1-25	R25	A-E1-73	R73	A-E1-121	R121	A-E1-169	R169
A-E0-50	A-CR50	A-E0-146	A-CR146	B-E0-50	B-CR50	B-E0-146	B-CR146	B-E1-25		B-E1-73		B-E1-121		B-E1-169	
A-E0-51	A-CR51	A-E0-147	A-CR147	B-E0-51	B-CR51	B-E0-147	B-CR147	A-E1-26	R26	A-E1-74	R74	A-E1-122	R122	A-E1-170	R170
A-E0-52	A-CR52	A-E0-148	A-CR148	B-E0-52	B-CR52	B-E0-148	B-CR148	B-E1-26		B-E1-74		B-E1-122		B-E1-170	
A-E0-53	A-CR53	A-E0-149	A-CR149	B-E0-53	B-CR53	B-E0-149	B-CR149	A-E1-27	R27	A-E1-75	R75	A-E1-123	R123	A-E1-171	R171
A-E0-54	A-CR54	A-E0-150	A-CR150	B-E0-54	B-CR54	B-E0-150	B-CR150	B-E1-27		B-E1-75		B-E1-123		B-E1-171	
A-E0-55	A-CR55	A-E0-151	A-CR151	B-E0-55	B-CR55	B-E0-151	B-CR151	A-E1-28	R28	A-E1-76	R76	A-E1-124	R124	A-E1-172	R172
A-E0-56	A-CR56	A-E0-152	A-CR152	B-E0-56	B-CR56	B-E0-152	B-CR152	B-E1-28		B-E1-76		B-E1-124		B-E1-172	
A-E0-57	A-CR57	A-E0-153	A-CR153	B-E0-57	B-CR57	B-E0-153	B-CR153	A-E1-29	R29	A-E1-77	R77	A-E1-125	R125	A-E1-173	R173
A-E0-58	A-CR58	A-E0-154	A-CR154	B-E0-58	B-CR58	B-E0-154	B-CR154	B-E1-29		B-E1-77		B-E1-125		B-E1-173	
A-E0-59	A-CR59	A-E0-155	A-CR155	B-E0-59	B-CR59	B-E0-155	B-CR155	A-E1-30	R30	A-E1-78	R78	A-E1-126	R126	A-E1-174	R174
A-E0-60	A-CR60	A-E0-156	A-CR156	B-E0-60	B-CR60	B-E0-156	B-CR156	B-E1-30		B-E1-78		B-E1-126		B-E1-174	
A-E0-61	A-CR61	A-E0-157	A-CR157	B-E0-61	B-CR61	B-E0-157	B-CR157	A-E1-31	R31	A-E1-79	R79	A-E1-127	R127	A-E1-175	R175
A-E0-62	A-CR62	A-E0-158	A-CR158	B-E0-62	B-CR62	B-E0-158	B-CR158	B-E1-31		B-E1-79		B-E1-127		B-E1-175	
A-E0-63	A-CR63	A-E0-159	A-CR159	B-E0-63	B-CR63	B-E0-159	B-CR159	A-E1-32	R32	A-E1-80	R80	A-E1-128	R128	A-E1-176	R176
A-E0-64	A-CR64	A-E0-160	A-CR160	B-E0-64	B-CR64	B-E0-160	B-CR160	B-E1-32		B-E1-80		B-E1-128		B-E1-176	
A-E0-65	A-CR65	A-E0-161	A-CR161	B-E0-65	B-CR65	B-E0-161	B-CR161	A-E1-33	R33	A-E1-81	R81	A-E1-129	R129	A-E1-177	R177
A-E0-66	A-CR66	A-E0-162	A-CR162	B-E0-66	B-CR66	B-E0-162	B-CR162	B-E1-33		B-E1-81		B-E1-129		B-E1-177	
A-E0-67	A-CR67	A-E0-163	A-CR163	B-E0-67	B-CR67	B-E0-163	B-CR163	A-E1-34	R34	A-E1-82	R82	A-E1-130	R130	A-E1-178	R178
A-E0-68	A-CR68	A-E0-164	A-CR164	B-E0-68	B-CR68	B-E0-164	B-CR164	B-E1-34		B-E1-82		B-E1-130		B-E1-178	
A-E0-69	A-CR69	A-E0-165	A-CR165	B-E0-69	B-CR69	B-E0-165	B-CR165	A-E1-35	R35	A-E1-83	R83	A-E1-131	R131	A-E1-179	R179
A-E0-70	A-CR70	A-E0-166	A-CR166	B-E0-70	B-CR70	B-E0-166	B-CR166	B-E1-35		B-E1-83		B-E1-131		B-E1-179	
A-E0-71	A-CR71	A-E0-167	A-CR167	B-E0-71	B-CR71	B-E0-167	B-CR167	A-E1-36	R36	A-E1-84	R84	A-E1-132	R132	A-E1-180	R180
A-E0-72	A-CR72	A-E0-168	A-CR168	B-E0-72	B-CR72	B-E0-168	B-CR168	B-E1-36		B-E1-84		B-E1-132		B-E1-180	
A-E0-73	A-CR73	A-E0-169	A-CR169	B-E0-73	B-CR73	B-E0-169	B-CR169	A-E1-37	R37	A-E1-85	R85	A-E1-133	R133	A-E1-181	R181
A-E0-74	A-CR74	A-E0-170	A-CR170	B-E0-74	B-CR74	B-E0-170	B-CR170	B-E1-37		B-E1-85		B-E1-133		B-E1-181	
A-E0-75	A-CR75	A-E0-171	A-CR171	B-E0-75	B-CR75	B-E0-171	B-CR171	A-E1-38	R38	A-E1-86	R86	A-E1-134	R134	A-E1-182	R182
A-E0-76	A-CR76	A-E0-172	A-CR172	B-E0-76	B-CR76	B-E0-172	B-CR172	B-E1-38		B-E1-86		B-E1-134		B-E1-182	
A-E0-77	A-CR77	A-E0-173	A-CR173	B-E0-77	B-CR77	B-E0-173	B-CR173	A-E1-39	R39	A-E1-87	R87	A-E1-135	R135	A-E1-183	R183
A-E0-78	A-CR78	A-E0-174	A-CR174	B-E0-78	B-CR78	B-E0-174	B-CR174	B-E1-39		B-E1-87		B-E1-135		B-E1-183	
A-E0-79	A-CR79	A-E0-175	A-CR175	B-E0-79	B-CR79	B-E0-175	B-CR175	A-E1-40	R40	A-E1-88	R88	A-E1-136	R136	A-E1-184	R184
A-E0-80	A-CR80	A-E0-176	A-CR176	B-E0-80	B-CR80	B-E0-176	B-CR176	B-E1-40		B-E1-88		B-E1-136		B-E1-184	
A-E0-81	A-CR81	A-E0-177	A-CR177	B-E0-81	B-CR81	B-E0-177	B-CR177	A-E1-41	R41	A-E1-89	R89	A-E1-137	R137	A-E1-185	R185
A-E0-82	A-CR82	A-E0-178	A-CR178	B-E0-82	B-CR82	B-E0-178	B-CR178	B-E1-41		B-E1-89		B-E1-137		B-E1-185	
A-E0-83	A-CR83	A-E0-179	A-CR179	B-E0-83	B-CR83	B-E0-179	B-CR179	A-E1-42	R42	A-E1-90	R90	A-E1-138	R138	A-E1-186	R186
A-E0-84	A-CR84	A-E0-180	A-CR180	B-E0-84	B-CR84	B-E0-180	B-CR180	B-E1-42		B-E1-90		B-E1-138		B-E1-186	
A-E0-85	A-CR85	A-E0-181	A-CR181	B-E0-85	B-CR85	B-E0-181	B-CR181	A-E1-43	R43	A-E1-91	R91	A-E1-139	R139	A-E1-187	R187
A-E0-86	A-CR86	A-E0-182	A-CR182	B-E0-86	B-CR86	B-E0-182	B-CR182	B-E1-43		B-E1-91		B-E1-139		B-E1-187	
A-E0-87	A-CR87	A-E0-183	A-CR183	B-E0-87	B-CR87	B-E0-183	B-CR183	A-E1-44	R44	A-E1-92	R92	A-E1-140	R140	A-E1-188	R188
A-E0-88	A-CR88	A-E0-184	A-CR184	B-E0-88	B-CR88	B-E0-184	B-CR184	B-E1-44		B-E1-92		B-E1-140		B-E1-188	
A-E0-89	A-CR89	A-E0-185	A-CR185	B-E0-89	B-CR89	B-E0-185	B-CR185	A-E1-45	R45	A-E1-93	R93	A-E1-141	R141	A-E1-189	R189
A-E0-90	A-CR90	A-E0-186	A-CR186	B-E0-90	B-CR90	B-E0-186	B-CR186	B-E1-45		B-E1-93		B-E1-141		B-E1-189	
A-E0-91	A-CR91	A-E0-187	A-CR187	B-E0-91	B-CR91	B-E0-187	B-CR187	A-E1-46	R46	A-E1-94	R94	A-E1-142	R142	A-E1-190	R190
A-E0-92	A-CR92	A-E0-188	A-CR188	B-E0-92	B-CR92	B-E0-188	B-CR188	B-E1-46		B-E1-94		B-E1-142		B-E1-190	
A-E0-93	A-CR93	A-E0-189	A-CR189	B-E0-93	B-CR93	B-E0-189	B-CR189	A-E1-47	R47	A-E1-95	R95	A-E1-143	R143	A-E1-191	R191
A-E0-94	A-CR94	A-E0-190	A-CR190	B-E0-94	B-CR94	B-E0-190	B-CR190	B-E1-47		B-E1-95		B-E1-143		B-E1-191	
A-E0-95	A-CR95	A-E0-191	A-CR191	B-E0-95	B-CR95	B-E0-191	B-CR191	A-E1-48	R48	A-E1-96	R96	A-E1-144	R144	A-E1-192	R192
A-E0-96	A-CR96	A-E0-192	A-CR192	B-E0-96	B-CR96	B-E0-192	B-CR192	B-E1-48		B-E1-96		B-E1-144		B-E1-192	

C

B

2010802

A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith
CHECKED E. Urban
APPROVED
APPROVED
APPROVED [illegible]
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

FIXED MEMORY MODULE
- ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802

DATE
SCALE NONE
SHEET 3 OF 3

4 3 2

2010802 M

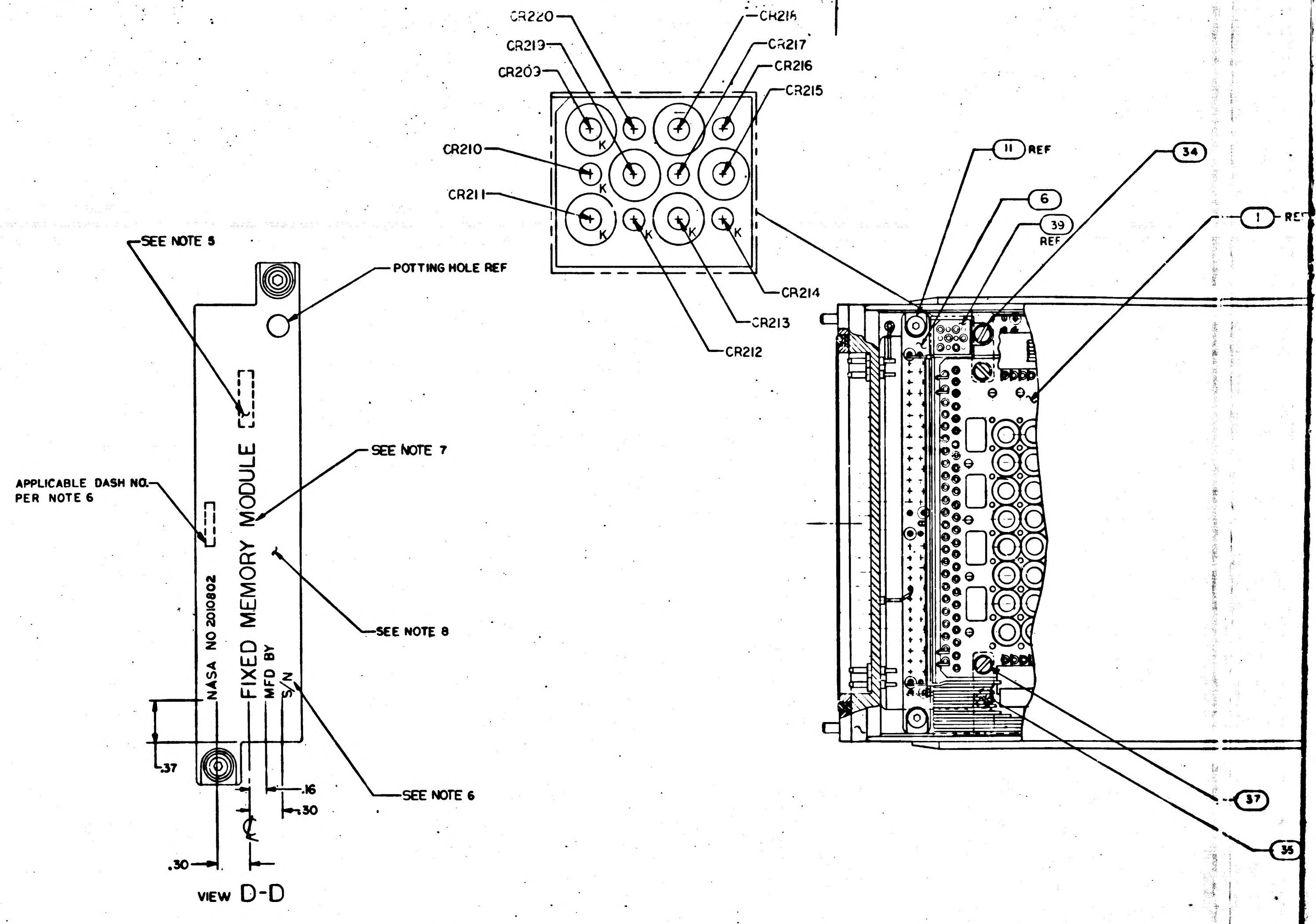
2010802 MF 2/2

SH 1 OF 2

2010802

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE NO.	FIND NO. 1	FIND NO. 2	MODULE DECK NO.	NEXT ASSEMBLY NO. (REF)	PROCUREMENT SPECIFICATION SEE NOTE 15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SEE NOTE 5
POTTING HOLE REF
SEE NOTE 7
APPLICABLE DASH NO. PER NOTE 6
NASA NO 2010802
FIXED MEMORY MODULE
MFD BY
S/N
SEE NOTE 8
SEE NOTE 6
.37
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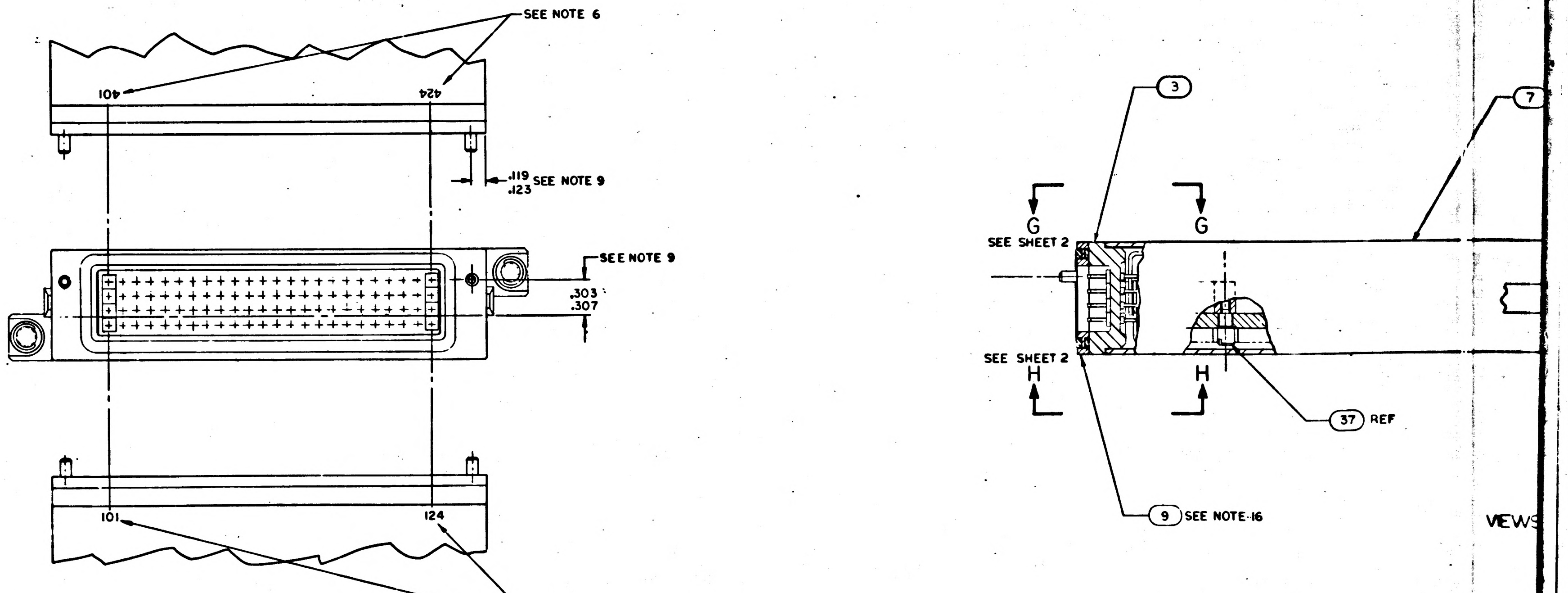
VIEW D-D


SEE NOTE 6
101
124
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SEE NOTE 9
SEE NOTE 9
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.307
101
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SEE NOTE 6
3
7
G
G
SEE SHEET 2
SEE SHEET 2
H
H
37 REF
9 SEE NOTE 16
VIEWS

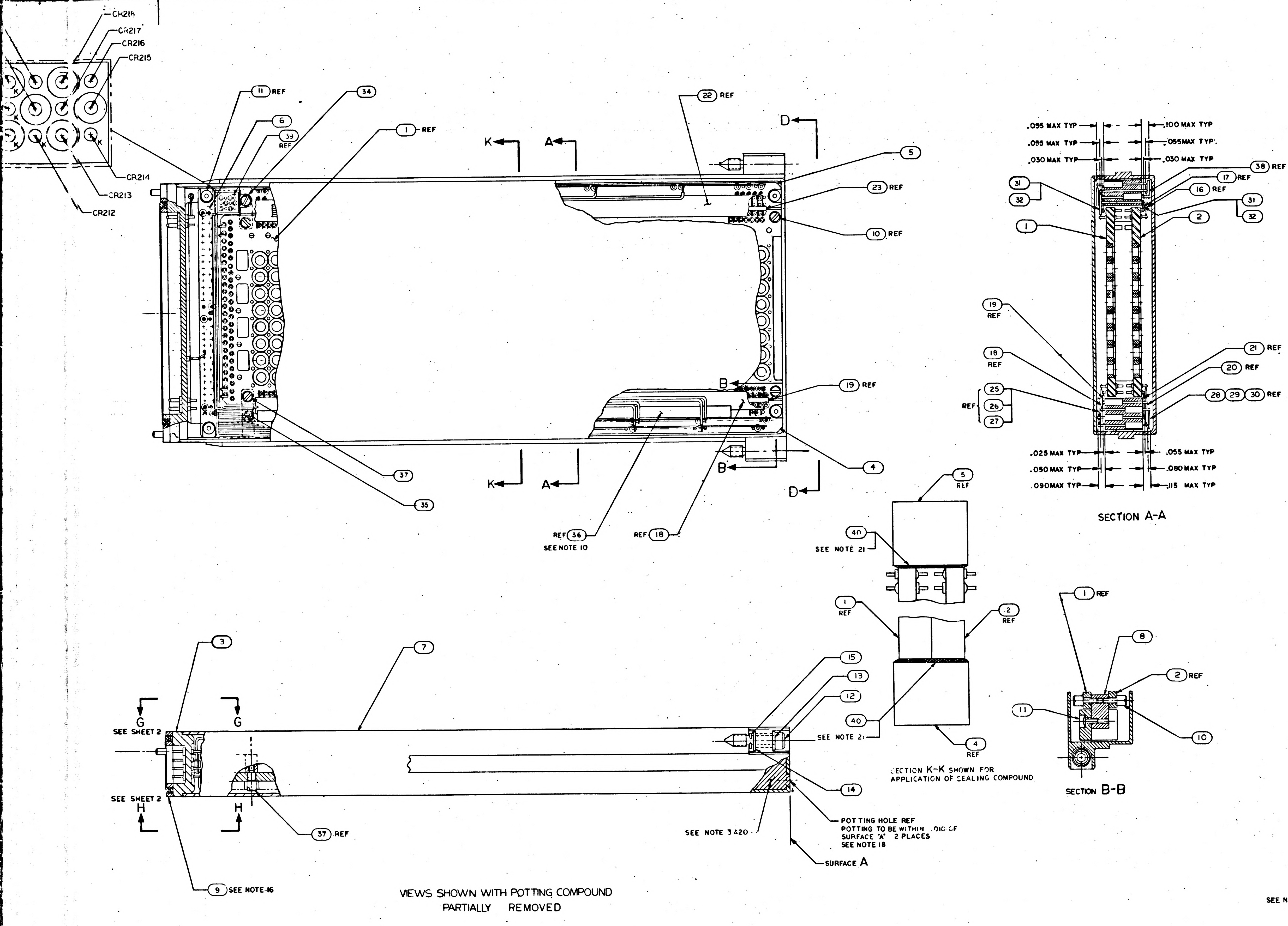
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-703[illegible]
2. UNLESS OTHERWISE SPECIFIED ALL WIRING SHALL BE IN ACCORDANCE WITH ND1002069
3. ENCAPSULATE MODULE PER ND1002226 METHOD II
4. WELD PER ND1002005
5. MARK APPROPRIATE MODULE NO. AS SHOWN IN CHART
6. MARK .08/.06 HIGH PER ND1002019 AND ND1002122, TYPE II CLASS 2 AND SERIALIZE PER ND 1002023 USING INK 1006271-1
7. MARK .14/.10 HIGH PER ND1002019 AND ND1002122 TYPE II CLASS 2 USING INK 1006271-1
8. PAINT INDICATED SURFACES OF FIND NO 7. PER ND1002279 WITH SCD NO.1008809-1 DARK GREY EPOXY RESIN ENAMEL, FINAL COAT PER ND1002277 USING 1012543-003
9. ASSEMBLE FIND NO.7 AND FIND NO.3 TO DIMENSIONS SHOWN
10. REMOVE LINER FROM NEARSIDE OF FIND NO.36 AND ASSEMBLE 3 PLACES AS SHOWN. FIND NO.36 MUST INSULATE FLAT CABLES FROM TRIMMED COMPONENT LEADS. TRIM AS REQUIRED
11. WHITE DOT AND SINGLE SOLID LEAD DENOTES FIRST LEVEL WIRING UNLESS OTHERWISE SPECIFIED
12. BLACK DOT AND SINGLE SOLID LEAD DENOTES SECOND LEVEL WIRING
13. BLACK DOT AND CROSS HATCHED LEAD DENOTES THIRD LEVEL WIRING
14. ALL LEADS FROM FIND NO.1 AND FIND NO.2 TO FIND NO.3 TO BE THIRD LEVEL WIRING
15. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPECIFICATION AS LISTED IN CHART.
16. FIND NO.9 TO BE SHIPPED UNASSEMBLED AND IDENTIFIED PER ND 1002019
17. SEAL PINS AND INSULATORS TO FIND NO. 3 PER ND1002004 TYPE VI BEFORE ASSY OF FIND NO. 6
18. FILL AS SHOWN PER ND10[illegible]75 METHOD A
19. BOND FIND NO.39 TO FIND NO.3 PER ND1002004 TYPE VI AFTER ASSY OF FIND NO.6
20. PRIOR TO ENCAPSULATION PER NOTE 3, COAT OVER ALL TERMINALS OF FIND NO.'S 1,2 & 3 AND OVER ALL WIRES, SLEEVING AND COMPONENT LEADS OF FIND NO.'S 4,5,6,16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30,31,32,33,38 & 39 WITH A .03 MAXIMUM THICKNESS OF SILICONE RUBBER PER ND1002009, METHOD A. MASK ALL OUTSIDE SURFACES OF FIND NO.3 AND ALL OTHER SURFACES OF THIS ASSEMBLY COMING IN CLOSE CONTACT WITH FIND NO.7
21. FILL INTERFACE BETWEEN FIND NO. 4 AND SIDE SURFACES OF FIND NO.'S 1 AND 2, AND INTERFACE BETWEEN FIND NO.5 AND SIDE SURFACES OF FIND NO.'S 1 AND 2 USING FIND NO.40. ROOM TEMP CURE FOR 24 HOURS MIN.

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG. NO. AP22500

REVISIONS TDRR 37452			
SYM	DESCRIPTION	DATE	APPROVAL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SEE NOTE 10
REF 18
K
A
B
D
.095 MAX TYP
.055 MAX TYP
.030 MAX TYP
.100 MAX TYP
.055MAX TYP
.030 MAX TYP
38 REF
17 REF
16 REF
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20 REF
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.050 MAX TYP
.090MAX TYP
.055 MAX TYP
.080 MAX TYP
.115 MAX TYP
SECTION A-A
5 REF
40
SEE NOTE 21
1 REF
2 REF
40
SEE NOTE 21
4 REF
SECTION K-K SHOWN FOR APPLICATION OF SEALING COMPOUND
1 REF
8
2 REF
11
10
SECTION B-B
3
7
G
SEE SHEET 2
H
SEE SHEET 2
15
13
12
14
37 REF
SEE NOTE 3 & 20
POTTING HOLE REF
POTTING TO BE WITHIN .010 OF SURFACE "A" 2 PLACES
SEE NOTE 18
SURFACE A
9 SEE NOTE 16
C

VIEWS SHOWN WITH POTTING COMPOUND PARTIALLY REMOVED

SEE NOTE 16

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006341	ADHESIVE SEALANT. SILICONE RUBBER	40
1	2003980-021	COMPONENT BLOCK DIODE ASSY	39
☒	2005980	SCHEMATIC	REF
1	2004684	FLAT. CABLE	38
4	2004150 — 003	SCREW, SHOULDERED	37
AR	1006806 — 26	INSULATION TAPE, ELECTRICAL	36
1	2004150 — 001	SCREW. SHOULDERED	35
1	2004150 — 002	SCREW, SHOULDERED	34
1	2004129	FLAT CABLE INTERCONNECTION	33
AR	1006776-25	SLEEVING	32
AR	1006757-12	WIRE, ELECRICAL	31
1	2004125	FLAT CABLE	30
1	2004122	FLAT CABLE	29
1	2004124	FLAT CABLE	28
1	2004123	FLAT CABLE	27
1	2004121	FLAT CABLE	26
1	2004120	FLAT CABLE	25
1	2004685	FLAT CABLE	24
1	2003051 — 013	MATRIX ASSY	23
1	2003051 — 014	MATRIX ASSY	22
8	2003051 — 016	MATRIX ASSY	21
8	2003051 — 015	MATRIX ASSY	20
1	2003051 — 017	MATRIX ASSY	19
1	2003051 — 018	MATRIX ASSY	18
1	2003051 — 011	MATRIX ASSY	17
1	2003051 — 012	MATRIX ASSY	16
2	MS16633-4015	"E" RING	15
2	1004546-3	WASHER	14
2	1004546-1	WASHER	13
2	1004579-1	SCREW, JACKING	12
4	1000093-1	SCREW, BUTTONHEAD	11
4	2004151	SCREW, STANDOFF	10
1	1006339	GASKET PLATE	9
2	2004071	STANDOFF	8
1	2004100	HOUSING	7
1	2003048-021	RESISTOR-DIODE BLOCK ASSY	6
1	2003052-021	COMPONENT BLOCK RESISTOR ASSY	5
1	2003045-021	COMPONENT BLOCK DIODE ASSY	4
1	2003973-011	CONNECTOR PLATE ASSY	3
1	2010803-SEE CHART	SENSE WIRING ASSY SIDE B	2
1	2010804-SEE CHART	SENSE WIRING ASSY SIDE A	1

LIST OF MATERIALS

FOR APPLICABLE PART NO. SEE CHART

2010802

B

A

...QUIREMENTS FOR CONTROL
...TION OF ROPE MEMORY ASSEMBLIES
...ORY FIXTURE DWG NO. AP22500

SEE CHART	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO CONTRACT
DRAWN Tom Smith DATE 10 APR 69
CHECKED S. Urban 10 APR 69
APPROVAL Eldon C. Hall Apr 69
APPROVAL
NASA APPROVAL
MIT APPROVAL D.G. Hoag 14 Apr 69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
NASA DRAWING NO. 2010802
SCALE 2/1
WT
SHEET 1 OF 3

2010802

2010802 SH 1

2/2010802

WIRE LIST

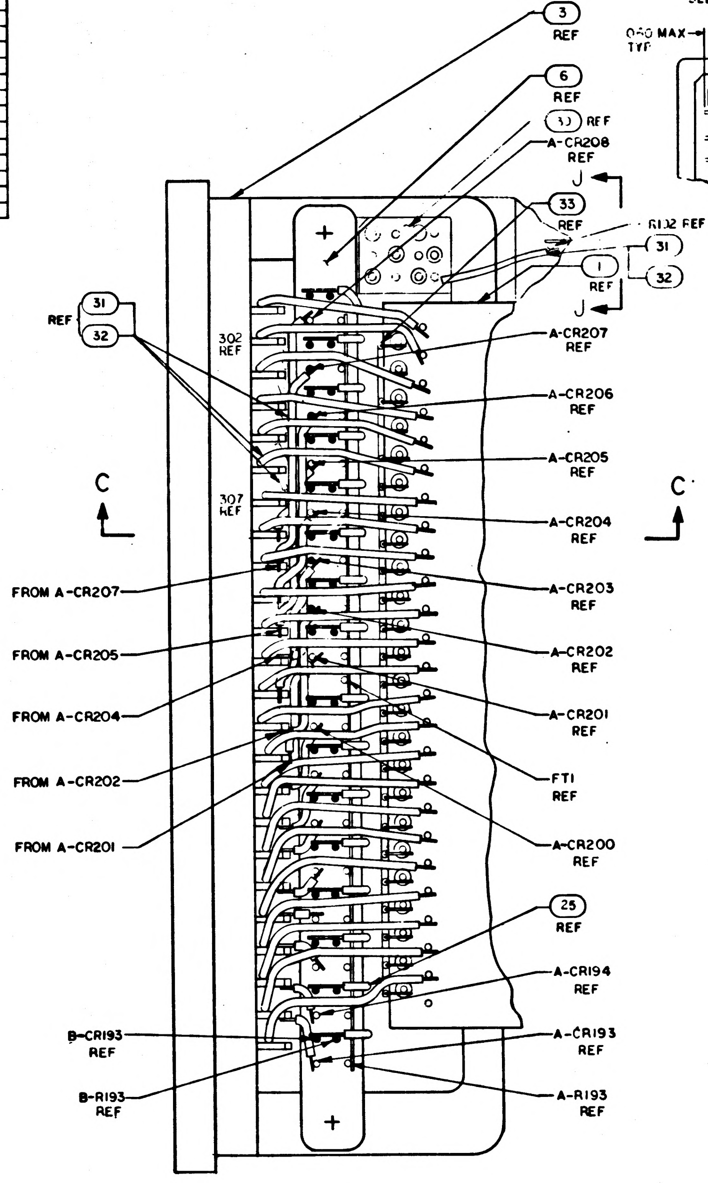
PIN NO.	COMPONENT OR TERM. NO.	PIN NO.	COMPONENT OR TERM. NO.
101	A-E1-213	301	GROUND
102	A-E1-212	302	CR209
103	A-E1-211	303	CR210
104	A-E0-211	304	CR211
105	A-E1-210	305	CR212
106	A-E1-209	306	CR213
107	A-E1-208	307	CR214
108	A-E1-207	308	A-CR208
109	A-E1-206	309	A-CR207
110	A-E1-205	310	A-CR206
111	A-E1-204	311	A-CR205
112	A-E1-203	312	A-CR204
113	A-E1-202	313	A-CR203
114	A-E1-201	314	A-CR202
115	A-E1-200	315	A-CR201
116	A-E1-199	316	A-CR200
117	A-E1-198	317	A-CR199
118	A-E1-197	318	A-CR198
119	A-E1-196	319	A-CR197
120	A-E1-195	320	A-CR196
121	A-E0-194	321	A-CR195
122	A-E1-194	322	A-CR194
123	A-E0-193	323	A-CR193
124	A-E1-193	324	SPARE
201	B-R208	401	B-E1-213
202	CR215	402	B-E1-212
203	CR216	403	B-E1-211
204	CR217	404	B-E0-211
205	CR218	405	B-E1-210
206	CR219	406	B-E1-209
207	CR220	407	B-E1-208
208	B-CR208	408	B-E1-207
209	B-CR207	409	B-E1-206
210	B-CR206	410	B-E1-205
211	B-CR205	411	B-E1-204
212	B-CR204	412	B-E1-203
213	B-CR203	413	B-E1-202
214	B-CR202	414	B-E1-201
215	B-CR201	415	B-E1-200
216	B-CR200	416	B-E1-199
217	B-CR199	417	B-E1-198
218	B-CR198	418	B-E1-197
219	B-CR197	419	B-E1-196
220	B-CR196	420	B-E1-195
221	B-CR195	421	B-E0-194
222	B-CR194	422	B-E1-194
223	B-CR193	423	B-E0-193
224	SPARE	424	B-E1-193

WIRE LIST

TERMINAL NO.	TERMINAL NO.
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
SPARE	SPARE
A-E0-195	B-E0-195
A-E0-196	B-E0-196
A-E0-197	B-E0-197
A-E0-198	B-E0-198
A-E0-199	B-E0-199
A-E0-200	B-E0-200
A-E0-201	B-E0-201
A-E0-202	B-E0-202
A-E0-203	B-E0-203
A-E0-204	B-E0-204
A-E0-205	B-E0-205
A-E0-206	B-E0-206
A-E0-207	B-E0-207
A-E0-208	B-E0-208
A-E0-209	B-E0-209
A-E0-210	B-E0-210
SPARE	SPARE
SPARE	SPARE
A-E0-212	B-E0-212
A-E0-213	B-E0-213

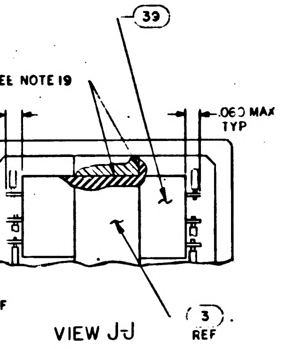
WIRE LIST

COMPONENT NO.	COMPONENT NO.
CR215	R176
CR216	R144
CR217	R112
CR218	R80
CR219	R48
CR220	R16
CR209	R32
CR210	R64
CR211	R96
CR212	R128
CR213	R160
CR214	R192



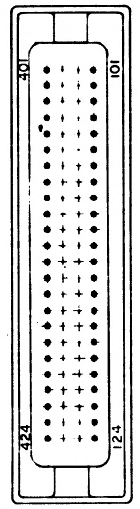
3
REF
6
REF
33 REF
A-CR208
REF
J
33
REF
R132 REF
31
1
REF
32
J
31
REF
32
302
REF
307
REF
C
C
A-CR207
REF
A-CR206
REF
A-CR205
REF
A-CR204
REF
A-CR203
REF
A-CR202
REF
A-CR201
REF
FTI
REF
A-CR200
REF
25
REF
A-CR194
REF
A-CR193
REF
A-R193
REF
FROM A-CR207
FROM A-CR205
FROM A-CR204
FROM A-CR202
FROM A-CR201
B-CR193
REF
B-R193
REF

VIEW G-G
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



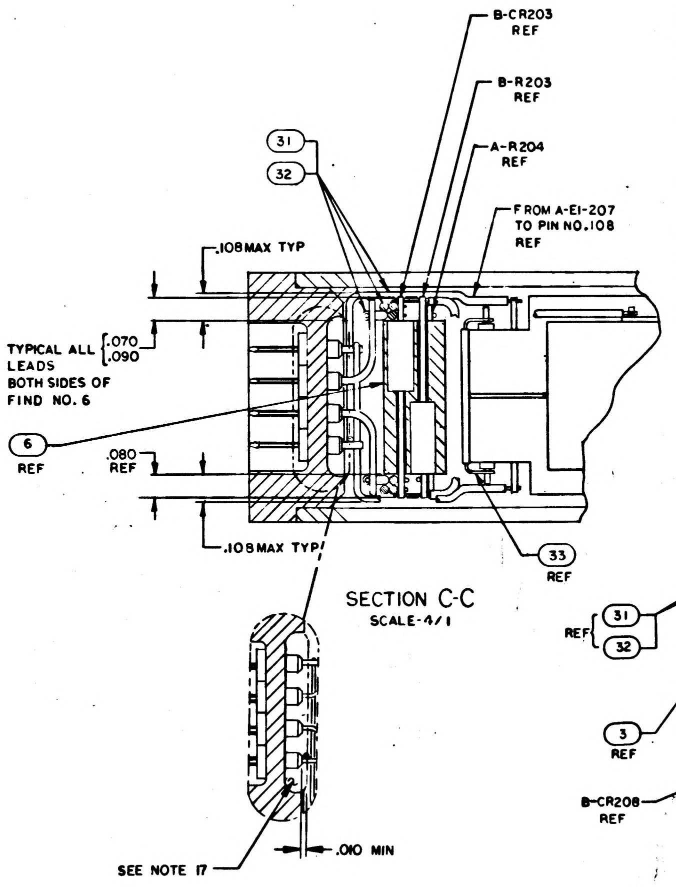
39
SEE NOTE 19
.040 MAX
TYP
.060 MAX
TYP
3
REF

VIEW J-J



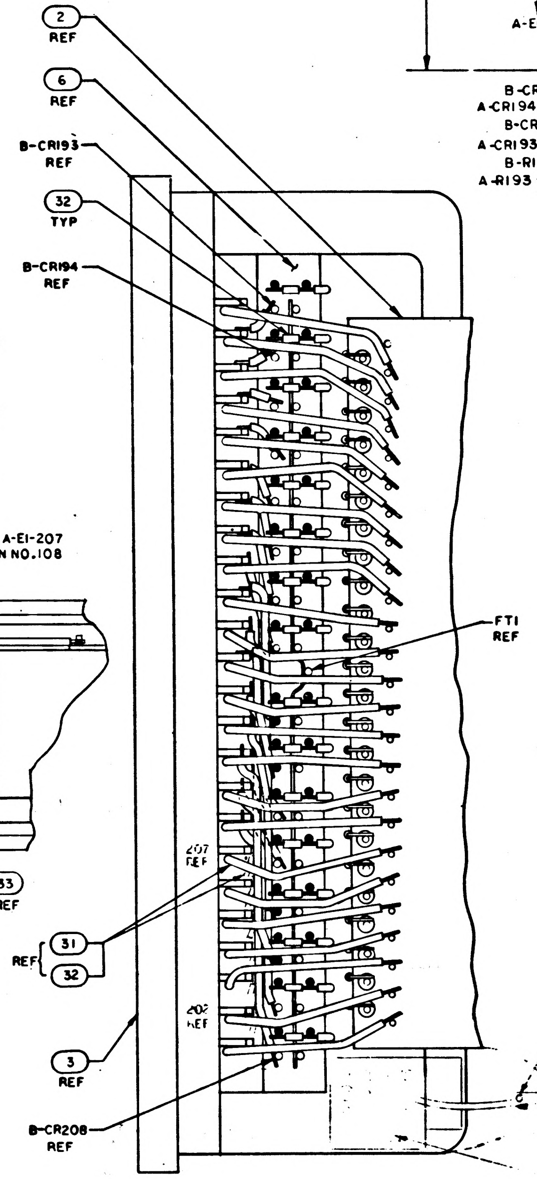
401
101
424
124

SECTION E-E



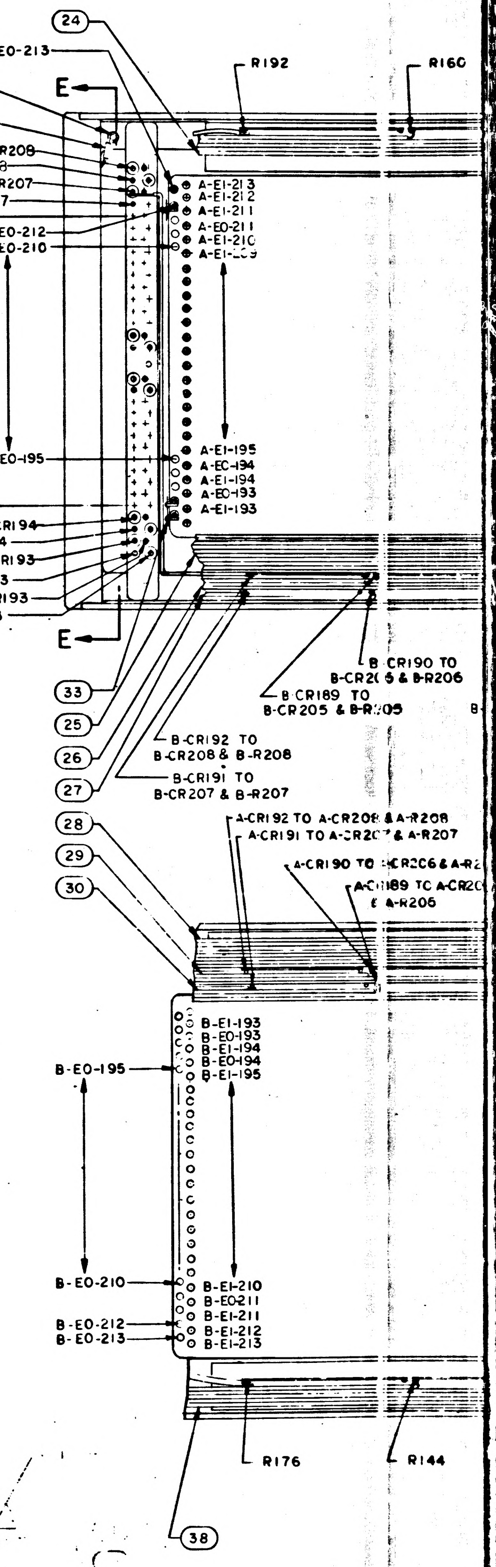
31
32
B-CR203
REF
B-R203
REF
A-R204
REF
FROM A-E1-207
TO PIN NO.108
REF
.108 MAX TYP
TYPICAL ALL LEADS BOTH SIDES OF FIND NO. 6
.070
.090
6
REF
.080
REF
.108 MAX TYP
33
REF
SEE NOTE 17
.010 MIN

SECTION C-C
SCALE 4/1



2
REF
6
REF
B-CR193
REF
32
TYP
B-CR194
REF
B-CR203
REF
FTI
REF
207
REF
31
REF
32
202
REF
3
REF
B-CR208
REF

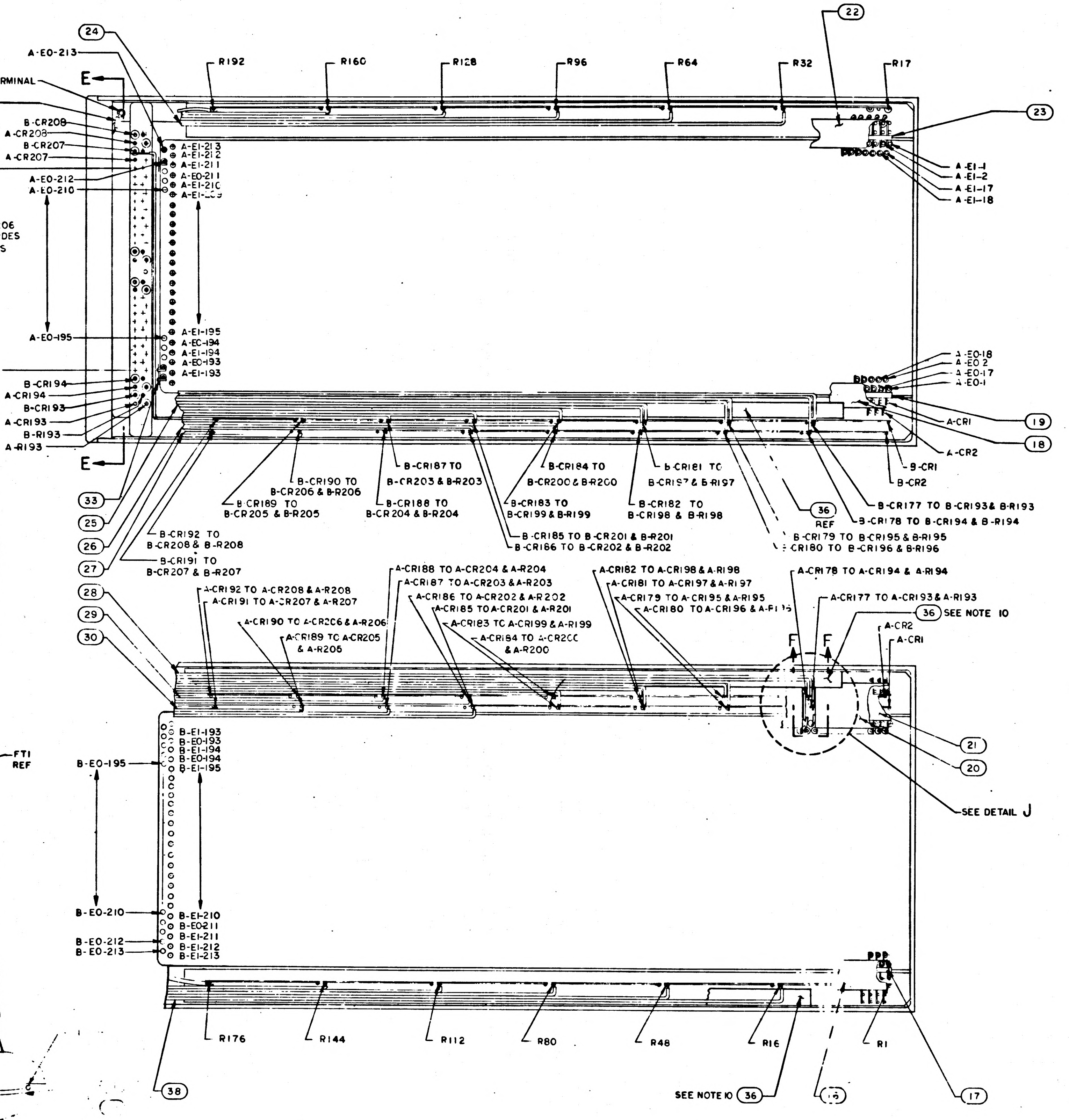
VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



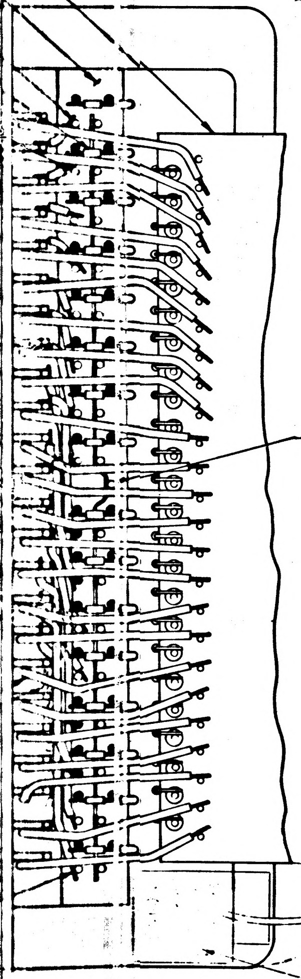
24
A-E0-213
R192
R160
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E0-212
A-E0-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-E0-195
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
33
25
26
27
B-CR190 TO
B-CR206 & B-R206
B-CR189 TO
B-CR205 & B-R205
B-CR192 TO
B-CR208 & B-R208
B-CR191 TO
B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R2
A-CR189 TO A-CR20
& A-R206
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-195
B-E0-210
B-E1-210
B-E0211
B-E1-211
B-E0-212
B-E0-213
B-E1-212
B-E1-213
R176
R144
38

REVISIONS TERR 3765

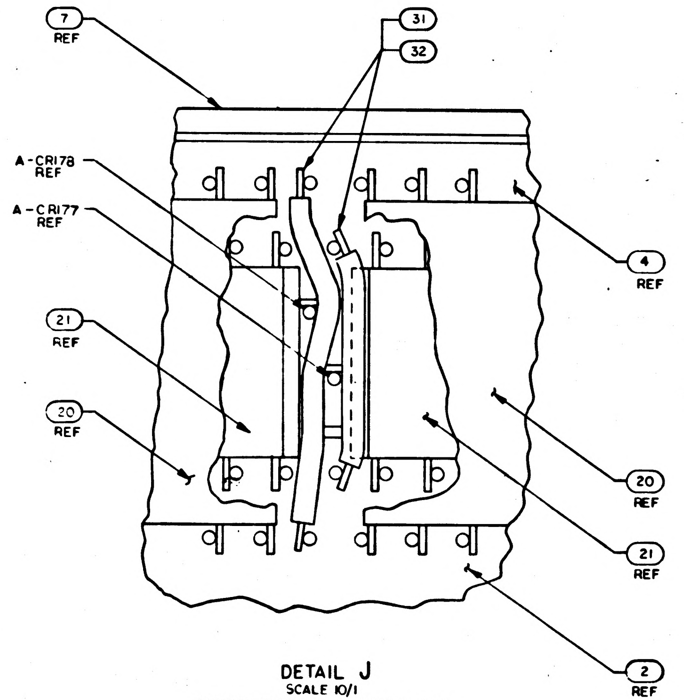
SYM	DESCRIPTION	DATE	APPROVAL



24
A-E0-213
CASE GROUND TERMINAL
E
31
32
B-CR208
A-CR208
B-CR207
A-CR207
A-E0-212
A-E0-210
CR195 TO CR206
BOTH A & B DIODES
AND RESISTORS
A-E0-195
B-CR194
A-CR194
B-CR193
A-CR193
B-R193
A-R193
E
A-E1-213
A-E1-212
A-E1-211
A-E0-211
A-E1-210
A-E1-209
A-E1-195
A-E0-194
A-E1-194
A-E0-193
A-E1-193
R192
R160
R128
R96
R64
R32
R17
22
23
A-E1-1
A-E1-2
A-E1-17
A-E1-18
A-E0-18
A-E0-2
A-E0-17
A-E0-1
A-CR1
19
18
A-CR2
B-CR1
B-CR2
33
25
26
27
B-CR190 TO B-CR206 & B-R206
B-CR189 TO B-CR205 & B-R205
B-CR187 TO B-CR203 & B-R203
B-CR188 TO B-CR204 & B-R204
B-CR184 TO B-CR200 & B-R200
B-CR183 TO B-CR199 & B-R199
B-CR181 TO B-CR197 & B-R197
B-CR182 TO B-CR198 & B-R198
B-CR185 TO B-CR201 & B-R201
B-CR186 TO B-CR202 & B-R202
36 REF
B-CR177 TO B-CR193 & B-R193
B-CR178 TO B-CR194 & B-R194
B-CR179 TO B-CR195 & B-R195
B-CR180 TO B-CR196 & B-R196
B-CR192 TO B-CR208 & B-R208
B-CR191 TO B-CR207 & B-R207
28
29
30
A-CR192 TO A-CR208 & A-R208
A-CR191 TO A-CR207 & A-R207
A-CR190 TO A-CR206 & A-R206
A-CR189 TO A-CR205 & A-R205
A-CR188 TO A-CR204 & A-R204
A-CR187 TO A-CR203 & A-R203
A-CR186 TO A-CR202 & A-R202
A-CR185 TO A-CR201 & A-R201
A-CR183 TO A-CR199 & A-R199
A-CR184 TO A-CR200 & A-R200
A-CR182 TO A-CR198 & A-R198
A-CR181 TO A-CR197 & A-R197
A-CR179 TO A-CR195 & A-R195
A-CR180 TO A-CR196 & A-R196
A-CR178 TO A-CR194 & A-R194
A-CR177 TO A-CR193 & A-R193
36 SEE NOTE 10
A-CR2
A-CR1
F
F
21
20
SEE DETAIL J
B-E0-195
B-E1-193
B-E0-193
B-E1-194
B-E0-194
B-E1-195
B-E0-210
B-E0-212
B-E0-213
B-E1-210
B-E0211
B-E1-211
B-E1-212
B-E1-213
R176
R144
R112
R80
R48
R16
R1
38
SEE NOTE 10 36
17

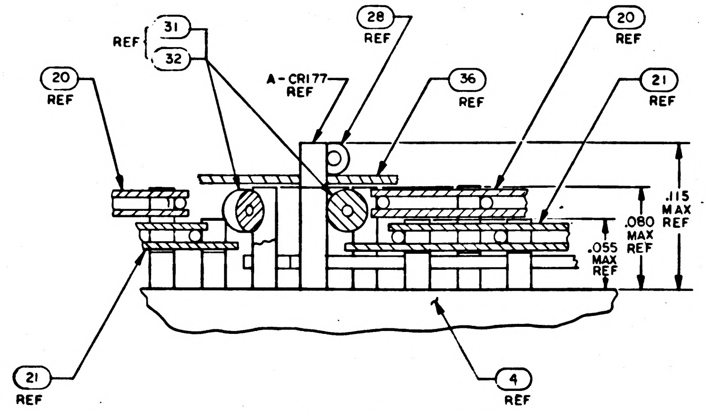


VIEW H-H
SCALE 4/1
SHOWN WITH POTTING AND FIND NO.7
REMOVED. SEE NOTES 11,12,13 AND 14



7
REF
31
32
A-CR178
REF
A-CR177
REF
21
REF
20
REF
4
REF
20
REF
21
REF
2
REF

DETAIL J
SCALE 10/1
TYPICAL WIRING 8 PLACES, SHOWN
WITH FIND NO.S 28 AND 36 REMOVED



REF
31
32
28
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A-CR177
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36
REF
21
REF
20
REF
.115
MAX
REF
.080
MAX
REF
.055
MAX
REF
21
REF
4
REF

PARTIAL SECTION F-F
SCALE: 20/1

QTY REQD	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED Edm C Hall
APPROVED
APPROVED MIT W S Maley
APPROVED MSC

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE
ASSEMBLY

CODE IDENT NO 80230
SIZE J
DRAWING NO. 2010802
SCALE 2/1
SHEET 2 OF 3

2010802

8 7 6 5

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D

C

B

A

2010802

8 7 6 5

REVISIONS TDRR 37652

SYM	DESCRIPTION	DATE	APPROVAL

WIRE LIST

TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.	TERM. NO.	COMPONENT NO.
A-EO-1	A-CR1	A-EO-97	A-CR97	B-EO-1	B-CR1	B-EO-97	B-CR97	A-EI-1	R1	A-EI-49	R49	A-EI-97	R97	A-EI-145	R145
A-EO-2	A-CR2	A-EO-98	A-CR98	B-EO-2	B-CR2	B-EO-98	B-CR98	B-EI-1		B-EI-49		B-EI-97		B-EI-145	
A-EO-3	A-CR3	A-EO-99	A-CR99	B-EO-3	B-CR3	B-EO-99	B-CR99	A-EI-2	R2	A-EI-50	R50	A-EI-98	R98	A-EI-146	R146
A-EO-4	A-CR4	A-EO-100	A-CR100	B-EO-4	B-CR4	B-EO-100	B-CR100	B-EI-2		B-EI-50		B-EI-98		B-EI-146	
A-EO-5	A-CR5	A-EO-101	A-CR101	B-EO-5	B-CR5	B-EO-101	B-CR101	A-EI-3	R3	A-EI-51	R51	A-EI-99	R99	A-EI-147	R147
A-EO-6	A-CR6	A-EO-102	A-CR102	B-EO-6	B-CR6	B-EO-102	B-CR102	B-EI-3		B-EI-51		B-EI-99		B-EI-147	
A-EO-7	A-CR7	A-EO-103	A-CR103	B-EO-7	B-CR7	B-EO-103	B-CR103	A-EI-4	R4	A-EI-52	R52	A-EI-100	R100	A-EI-148	R148
A-EO-8	A-CR8	A-EO-104	A-CR104	B-EO-8	B-CR8	B-EO-104	B-CR104	B-EI-4		B-EI-52		B-EI-100		B-EI-148	
A-EO-9	A-CR9	A-EO-105	A-CR105	B-EO-9	B-CR9	B-EO-105	B-CR105	A-EI-5	R5	A-EI-53	R53	A-EI-101	R101	A-EI-149	R149
A-EO-10	A-CR10	A-EO-106	A-CR106	B-EO-10	B-CR10	B-EO-106	B-CR106	B-EI-5		B-EI-53		B-EI-101		B-EI-149	
A-EO-11	A-CR11	A-EO-107	A-CR107	B-EO-11	B-CR11	B-EO-107	B-CR107	A-EI-6	R6	A-EI-54	R54	A-EI-102	R102	A-EI-150	R150
A-EO-12	A-CR12	A-EO-108	A-CR108	B-EO-12	B-CR12	B-EO-108	B-CR108	B-EI-6		B-EI-54		B-EI-102		B-EI-150	
A-EO-13	A-CR13	A-EO-109	A-CR109	B-EO-13	B-CR13	B-EO-109	B-CR109	A-EI-7	R7	A-EI-55	R55	A-EI-103	R103	A-EI-151	R151
A-EO-14	A-CR14	A-EO-110	A-CR110	B-EO-14	B-CR14	B-EO-110	B-CR110	B-EI-7		B-EI-55		B-EI-103		B-EI-151	
A-EO-15	A-CR15	A-EO-111	A-CR111	B-EO-15	B-CR15	B-EO-111	B-CR111	A-EI-8	R8	A-EI-56	R56	A-EI-104	R104	A-EI-152	R152
A-EO-16	A-CR16	A-EO-112	A-CR112	B-EO-16	B-CR16	B-EO-112	B-CR112	B-EI-8		B-EI-56		B-EI-104		B-EI-152	
A-EO-17	A-CR17	A-EO-113	A-CR113	B-EO-17	B-CR17	B-EO-113	B-CR113	A-EI-9	R9	A-EI-57	R57	A-EI-105	R105	A-EI-153	R153
A-EO-18	A-CR18	A-EO-114	A-CR114	B-EO-18	B-CR18	B-EO-114	B-CR114	B-EI-9		B-EI-57		B-EI-105		B-EI-153	
A-EO-19	A-CR19	A-EO-115	A-CR115	B-EO-19	B-CR19	B-EO-115	B-CR115	A-EI-10	R10	A-EI-58	R58	A-EI-106	R106	A-EI-154	R154
A-EO-20	A-CR20	A-EO-116	A-CR116	B-EO-20	B-CR20	B-EO-116	B-CR116	B-EI-10		B-EI-58		B-EI-106		B-EI-154	
A-EO-21	A-CR21	A-EO-117	A-CR117	B-EO-21	B-CR21	B-EO-117	B-CR117	A-EI-11	R11	A-EI-59	R59	A-EI-107	R107	A-EI-155	R155
A-EO-22	A-CR22	A-EO-118	A-CR118	B-EO-22	B-CR22	B-EO-118	B-CR118	B-EI-11		B-EI-59		B-EI-107		B-EI-155	
A-EO-23	A-CR23	A-EO-119	A-CR119	B-EO-23	B-CR23	B-EO-119	B-CR119	A-EI-12	R12	A-EI-60	R60	A-EI-108	R108	A-EI-156	R156
A-EO-24	A-CR24	A-EO-120	A-CR120	B-EO-24	B-CR24	B-EO-120	B-CR120	B-EI-12		B-EI-60		B-EI-108		B-EI-156	
A-EO-25	A-CR25	A-EO-121	A-CR121	B-EO-25	B-CR25	B-EO-121	B-CR121	A-EI-13	R13	A-EI-61	R61	A-EI-109	R109	A-EI-157	R157
A-EO-26	A-CR26	A-EO-122	A-CR122	B-EO-26	B-CR26	B-EO-122	B-CR122	B-EI-13		B-EI-61		B-EI-109		B-EI-157	
A-EO-27	A-CR27	A-EO-123	A-CR123	B-EO-27	B-CR27	B-EO-123	B-CR123	A-EI-14	R14	A-EI-62	R62	A-EI-110	R110	A-EI-158	R158
A-EO-28	A-CR28	A-EO-124	A-CR124	B-EO-28	B-CR28	B-EO-124	B-CR124	B-EI-14		B-EI-62		B-EI-110		B-EI-158	
A-EO-29	A-CR29	A-EO-125	A-CR125	B-EO-29	B-CR29	B-EO-125	B-CR125	A-EI-15	R15	A-EI-63	R63	A-EI-111	R111	A-EI-159	R159
A-EO-30	A-CR30	A-EO-126	A-CR126	B-EO-30	B-CR30	B-EO-126	B-CR126	B-EI-15		B-EI-63		B-EI-111		B-EI-159	
A-EO-31	A-CR31	A-EO-127	A-CR127	B-EO-31	B-CR31	B-EO-127	B-CR127	A-EI-16	R16	A-EI-64	R64	A-EI-112	R112	A-EI-160	R160
A-EO-32	A-CR32	A-EO-128	A-CR128	B-EO-32	B-CR32	B-EO-128	B-CR128	B-EI-16		B-EI-64		B-EI-112		B-EI-160	
A-EO-33	A-CR33	A-EO-129	A-CR129	B-EO-33	B-CR33	B-EO-129	B-CR129	A-EI-17	R17	A-EI-65	R65	A-EI-113	R113	A-EI-161	R161
A-EO-34	A-CR34	A-EO-130	A-CR130	B-EO-34	B-CR34	B-EO-130	B-CR130	B-EI-17		B-EI-65		B-EI-113		B-EI-161	
A-EO-35	A-CR35	A-EO-131	A-CR131	B-EO-35	B-CR35	B-EO-131	B-CR131	A-EI-18	R18	A-EI-66	R66	A-EI-114	R114	A-EI-162	R162
A-EO-36	A-CR36	A-EO-132	A-CR132	B-EO-36	B-CR36	B-EO-132	B-CR132	B-EI-18		B-EI-66		B-EI-114		B-EI-162	
A-EO-37	A-CR37	A-EO-133	A-CR133	B-EO-37	B-CR37	B-EO-133	B-CR133	A-EI-19	R19	A-EI-67	R67	A-EI-115	R115	A-EI-163	R163
A-EO-38	A-CR38	A-EO-134	A-CR134	B-EO-38	B-CR38	B-EO-134	B-CR134	B-EI-19		B-EI-67		B-EI-115		B-EI-163	
A-EO-39	A-CR39	A-EO-135	A-CR135	B-EO-39	B-CR39	B-EO-135	B-CR135	A-EI-20	R20	A-EI-68	R68	A-EI-116	R116	A-EI-164	R164
A-EO-40	A-CR40	A-EO-136	A-CR136	B-EO-40	B-CR40	B-EO-136	B-CR136	B-EI-20		B-EI-68		B-EI-116		B-EI-164	
A-EO-41	A-CR41	A-EO-137	A-CR137	B-EO-41	B-CR41	B-EO-137	B-CR137	A-EI-21	R21	A-EI-69	R69	A-EI-117	R117	A-EI-165	R165
A-EO-42	A-CR42	A-EO-138	A-CR138	B-EO-42	B-CR42	B-EO-138	B-CR138	B-EI-21		B-EI-69		B-EI-117		B-EI-165	
A-EO-43	A-CR43	A-EO-139	A-CR139	B-EO-43	B-CR43	B-EO-139	B-CR139	A-EI-22	R22	A-EI-70	R70	A-EI-118	R118	A-EI-166	R166
A-EO-44	A-CR44	A-EO-140	A-CR140	B-EO-44	B-CR44	B-EO-140	B-CR140	B-EI-22		B-EI-70		B-EI-118		B-EI-166	
A-EO-45	A-CR45	A-EO-141	A-CR141	B-EO-45	B-CR45	B-EO-141	B-CR141	A-EI-23	R23	A-EI-71	R71	A-EI-119	R119	A-EI-167	R167
A-EO-46	A-CR46	A-EO-142	A-CR142	B-EO-46	B-CR46	B-EO-142	B-CR142	B-EI-23		B-EI-71		B-EI-119		B-EI-167	
A-EO-47	A-CR47	A-EO-143	A-CR143	B-EO-47	B-CR47	B-EO-143	B-CR143	A-EI-24	R24	A-EI-72	R72	A-EI-120	R120	A-EI-168	R168
A-EO-48	A-CR48	A-EO-144	A-CR144	B-EO-48	B-CR48	B-EO-144	B-CR144	B-EI-24		B-EI-72		B-EI-120		B-EI-168	
A-EO-49	A-CR49	A-EO-145	A-CR145	B-EO-49	B-CR49	B-EO-145	B-CR145	A-EI-25	R25	A-EI-73	R73	A-EI-121	R121	A-EI-169	R169
A-EO-50	A-CR50	A-EO-146	A-CR146	B-EO-50	B-CR50	B-EO-146	B-CR146	B-EI-25		B-EI-73		B-EI-121		B-EI-169	
A-EO-51	A-CR51	A-EO-147	A-CR147	B-EO-51	B-CR51	B-EO-147	B-CR147	A-EI-26	R26	A-EI-74	R74	A-EI-122	R122	A-EI-170	R170
A-EO-52	A-CR52	A-EO-148	A-CR148	B-EO-52	B-CR52	B-EO-148	B-CR148	B-EI-26		B-EI-74		B-EI-122		B-EI-170	
A-EO-53	A-CR53	A-EO-149	A-CR149	B-EO-53	B-CR53	B-EO-149	B-CR149	A-EI-27	R27	A-EI-75	R75	A-EI-123	R123	A-EI-171	R171
A-EO-54	A-CR54	A-EO-150	A-CR150	B-EO-54	B-CR54	B-EO-150	B-CR150	B-EI-27		B-EI-75		B-EI-123		B-EI-171	
A-EO-55	A-CR55	A-EO-151	A-CR151	B-EO-55	B-CR55	B-EO-151	B-CR151	A-EI-28	R28	A-EI-76	R76	A-EI-124	R124	A-EI-172	R172
A-EO-56	A-CR56	A-EO-152	A-CR152	B-EO-56	B-CR56	B-EO-152	B-CR152	B-EI-28		B-EI-76		B-EI-124		B-EI-172	
A-EO-57	A-CR57	A-EO-153	A-CR153	B-EO-57	B-CR57	B-EO-153	B-CR153	A-EI-29	R29	A-EI-77	R77	A-EI-125	R125	A-EI-173	R173
A-EO-58	A-CR58	A-EO-154	A-CR154	B-EO-58	B-CR58	B-EO-154	B-CR154	B-EI-29		B-EI-77		B-EI-125		B-EI-173	
A-EO-59	A-CR59	A-EO-155	A-CR155	B-EO-59	B-CR59	B-EO-155	B-CR155	A-EI-30	R30	A-EI-78	R78	A-EI-126	R126	A-EI-174	R174
A-EO-60	A-CR60	A-EO-156	A-CR156	B-EO-60	B-CR60	B-EO-156	B-CR156	B-EI-30		B-EI-78		B-EI-126		B-EI-174	
A-EO-61	A-CR61	A-EO-157	A-CR157	B-EO-61	B-CR61	B-EO-157	B-CR157	A-EI-31	R31	A-EI-79	R79	A-EI-127	R127	A-EI-175	R175
A-EO-62	A-CR62	A-EO-158	A-CR158	B-EO-62	B-CR62	B-EO-158	B-CR158	B-EI-31		B-EI-79		B-EI-127		B-EI-175	
A-EO-63	A-CR63	A-EO-159	A-CR159	B-EO-63	B-CR63	B-EO-159	B-CR159	A-EI-32	R32	A-EI-80	R80	A-EI-128	R128	A-EI-176	R176
A-EO-64	A-CR64	A-EO-160	A-CR160	B-EO-64	B-CR64	B-EO-160	B-CR160	B-EI-32		B-EI-80		B-EI-128		B-EI-176	
A-EO-65	A-CR65	A-EO-161	A-CR161	B-EO-65	B-CR65	B-EO-161	B-CR161	A-EI-33	R33	A-EI-81	R81	A-EI-129	R129	A-EI-177	R177
A-EO-66	A-CR66	A-EO-162	A-CR162	B-EO-66	B-CR66	B-EO-162	B-CR162	B-EI-33		B-EI-81		B-EI-129		B-EI-177	
A-EO-67	A-CR67	A-EO-163	A-CR163	B-EO-67	B-CR67	B-EO-163	B-CR163	A-EI-34	R34	A-EI-82	R82	A-EI-130	R130	A-EI-178	R178
A-EO-68	A-CR68	A-EO-164	A-CR164	B-EO-68	B-CR68	B-EO-164	B-CR164	B-EI-34		B-EI-82		B-EI-130		B-EI-178	
A-EO-69	A-CR69	A-EO-165	A-CR165	B-EO-69	B-CR69	B-EO-165	B-CR165	A-EI-35	R35	A-EI-83	R83	A-EI-131	R131	A-EI-179	R179
A-EO-70	A-CR70	A-EO-166	A-CR166	B-EO-70	B-CR70	B-EO-166	B-CR166	B-EI-35		B-EI-83		B-EI-131		B-EI-179	
A-EO-71	A-CR71	A-EO-167	A-CR167	B-EO-71	B-CR71	B-EO-167	B-CR167	A-EI-36	R36	A-EI-84	R84	A-EI-132	R132	A-EI-180	R180
A-EO-72	A-CR72	A-EO-168	A-CR168	B-EO-72	B-CR72	B-EO-168	B-CR168	B-EI-36		B-EI-84		B-EI-132		B-EI-180	
A-EO-73	A-CR73	A-EO-169	A-CR169	B-EO-73	B-CR73	B-EO-169	B-CR169	A-EI-37	R37	A-EI-85	R85	A-EI-133	R133	A-EI-181	R181
A-EO-74	A-CR74	A-EO-170	A-CR170	B-EO-74	B-CR74	B-EO-170	B-CR170	B-EI-37		B-EI-85		B-EI-133		B-EI-181	
A-EO-75	A-CR75	A-EO-171	A-CR171	B-EO-75	B-CR75	B-EO-171	B-CR171	A-EI-38	R38	A-EI-86	R86.	A-EI-134	R134	A-EI-182	R182
A-EO-76	A-CR76	A-EO-172	A-CR172	B-EO-76	B-CR76	B-EO-172	B-CR172	B-EI-38		B-EI-86		B-EI-134		B-EI-182	
A-EO-77	A-CR77	A-EO-173	A-CR173	B-EO-77	B-CR77	B-EO-173	B-CR173	A-EI-39	R39	A-EI-87	R87	A-EI-135	R135	A-EI-183	R183
A-EO-78	A-CR78	A-EO-174	A-CR174	B-EO-78	B-CR78	B-EO-174	B-CR174	B-EI-39		B-EI-87		B-EI-135		B-EI-183	
A-EO-79	A-CR79	A-EO-175	A-CR175	B-EO-79	B-CR79	B-EO-175	B-CR175	A-EI-40	R40	A-EI-88	R88	A-EI-136	R136	A-EI-184	R184
A-EO-80	A-CR80	A-EO-176	A-CR176	B-EO-80	B-CR80	B-EO-176	B-CR176	B-EI-40		B-EI-88		B-EI-136		B-EI-184	
A-EO-81	A-CR81	A-EO-177	A-CR177	B-EO-81	B-CR81	B-EO-177	B-CR177	A-EI-41	R41	A-EI-89	R89	A-EI-137	R137	A-EI-185	R185
A-EO-82	A-CR82	A-EO-178	A-CR178	B-EO-82	B-CR82	B-EO-178	B-CR178	B-EI-41		B-EI-89		B-EI-137		B-EI-185	
A-EO-83	A-CR83	A-EO-179	A-CR179	B-EO-83	B-CR83	B-EO-179	B-CR179	A-EI-42	R42	A-EI-90	R90	A-EI-138	R138	A-EI-186	R186
A-EO-84	A-CR84	A-EO-180	A-CR180	B-EC-84	B-CR84	B-EO-180	B-CR180	B-EI-42		B-EI-90		B-EI-138		B-EI-186	
A-EO-85	A-CR95	A-EO-181	A-CR181	B-EO-85	B-CR85	B-EO-181	B-CR181	A-EI-43	R43	A-EI-91	R91	A-EI-139	R139	A-EI-187	R187
A-EO-86	A-CR86	A-EO-182	A-CR182	B-EO-86	B-CR86	B-EO-182	B-CR182	B-EI-43		B-EI-91		B-EI-139		B-EI-187	
A-EO-87	A-CR87	A-EO-183	A-CR193	B-EO-87	B-CR67	B-EO-183	B-CR183	A-EI-44	R44	A-EI-92	R92	A-EI-140	R140	A-EI-188	R188
A-EO-88	A-CR88	A-EO-184	A-CR184	B-EO-88	B-CR88	B-EO-184	B-CR184	B-EI-44		B-EI-92		B-EI-140		B-EI-188	
A-EO-89	A-CR89	A-EO-185	A-CR185	B-EO-89	B-CR89	B-EO-185	B-CR185	A-EI-45	R45	A-EI-93	R93	A-EI-141	R141	A-EI-189	R189
A-EO-90	A-CR90	A-EO-186	A-CR186	B-EO-90	B-CR90	B-EO-186	B-CR186	B-EI-45		B-EI-93		B-EI-141		B-EI-189	
A-EO-91	A-CR91	A-EO-187	A-CR187	B-EO-91	B-CR91	B-EO-187	B-CR187	A-EI-46	R46	A-EI-94	R94	A-EI-142	R142	A-EI-190	R190
A-EO-92	A-CR92	A-EO-188	A-CR188	B-EO-92	B-CR92	B-EO-188	B-CR188	B-EI-46		B-EI-94		B-EI-142		B-EI-190	
A-EO-93	A-CR93	A-EO-189	A-CR189	B-EO-93	B-CR93	B-EO-189	B-CR189	A-EI-47	R47	A-EI-95	R95	A-EI-143	R143	A-EI-191	R191
A-EO-94	A-CR94	A-EO-190	A-CR190	B-EO-94	B-CR94	B-EO-190	B-CR190	B-EI-47		B-EI-95		B-EI-143		B-EI-191	
A-EO-95	A-CR95	A-EO-191	A-CR191	B-EO-95	B-CR95	B-EO-191	B-CR191	A-EI-48	R48	A-EI-96	R96	A-EI-144	R144	A-EI-192	R192
A-EO-96	A-CR96	A-EO-192	A-CR192	B-EO-96	B-CR96	B-EO-192	B-CR192	B-EI-48		B-EI-96		B-EI-144		B-EI-192	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Jom Smith 10APR69
CHECKED E. Urbano 10APR69
APPROVED Eldon C Hall 11 Apr 69
APPROVED
APPROVED MSC M6 Merley 14 Apr 69
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FIXED MEMORY MODULE ASSEMBLY

CODE IDENT NO. 80230
SIZE J
DRAWING NO. 2010802
SCALE NONE
SHEET 3 OF 3

20·0802

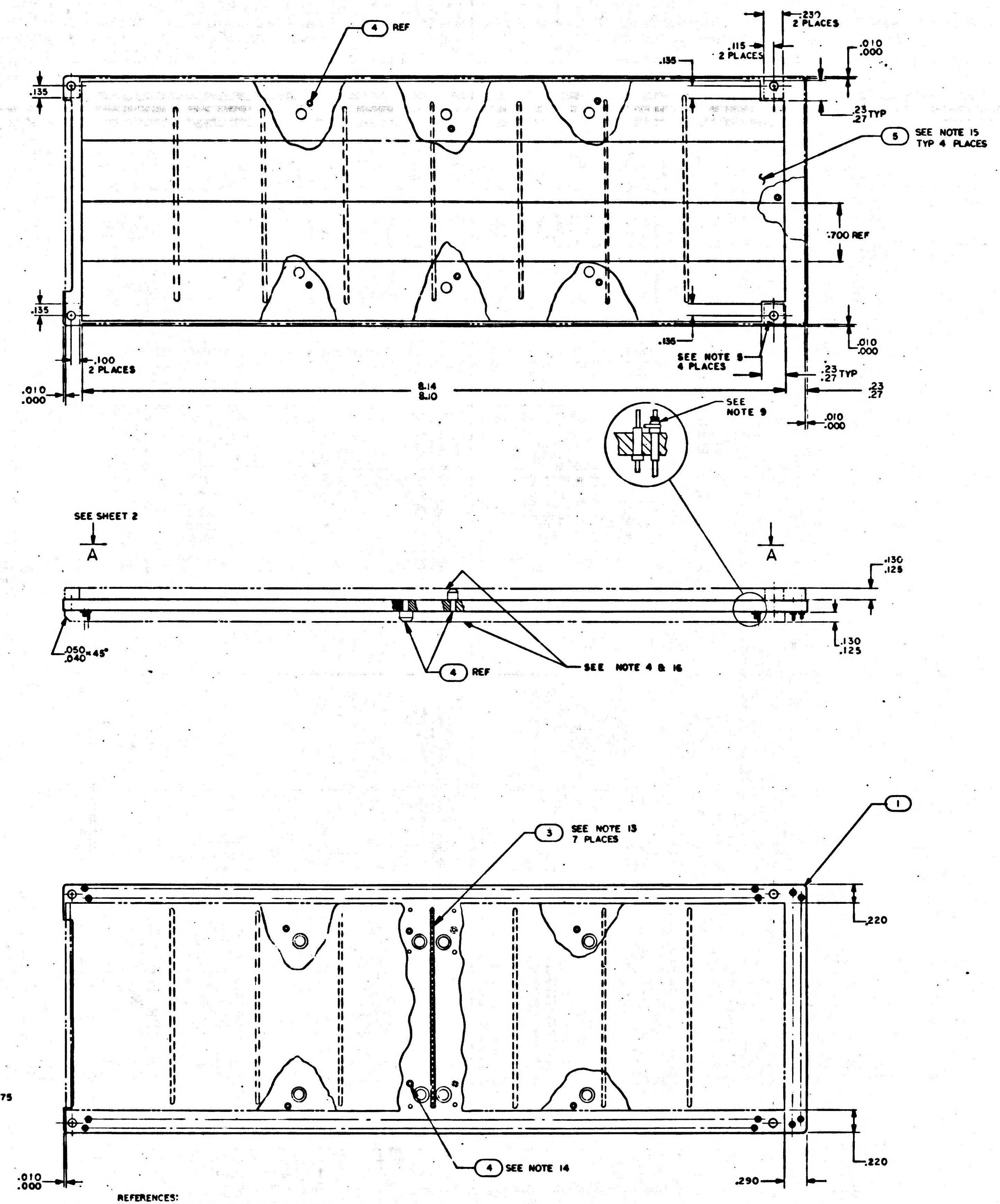
2/2010802

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR 37915				

REVISIONS TDRR 37652



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

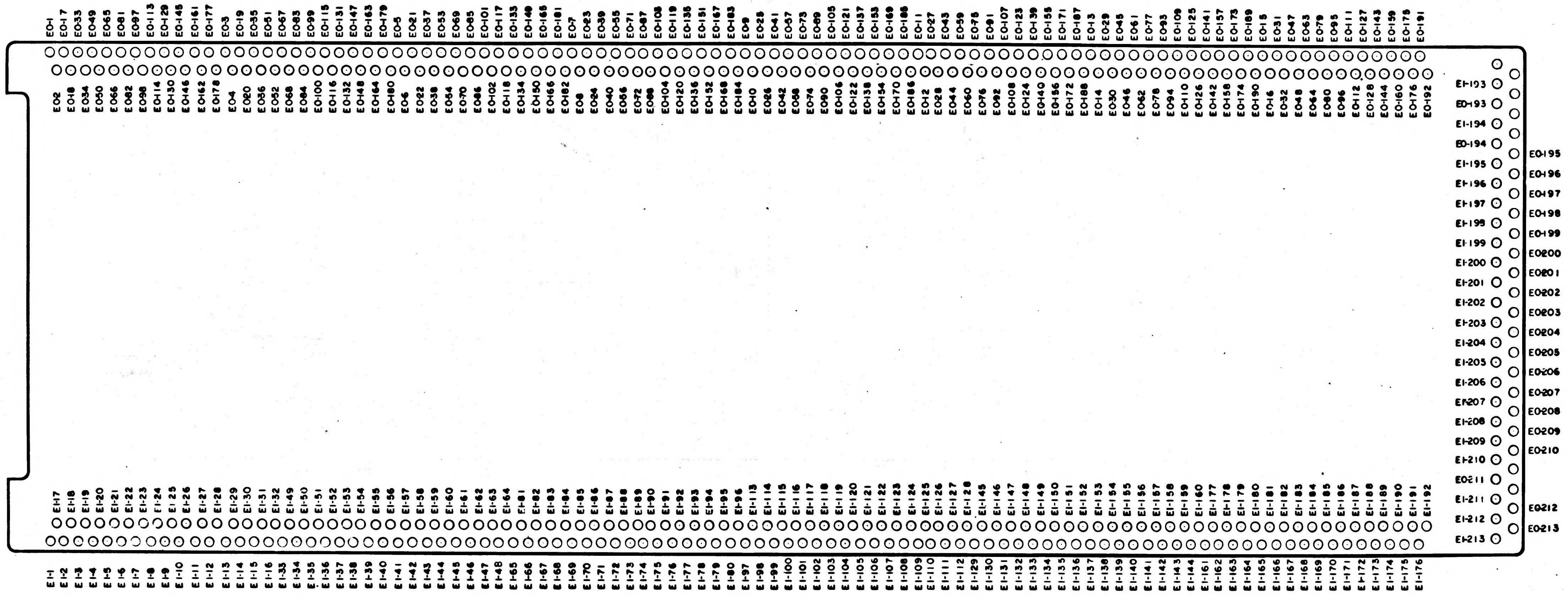
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED Edw C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 2 / 1
SHEET 1 OF 2

REVISIONS TDRR 37652						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37915				



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Christian
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

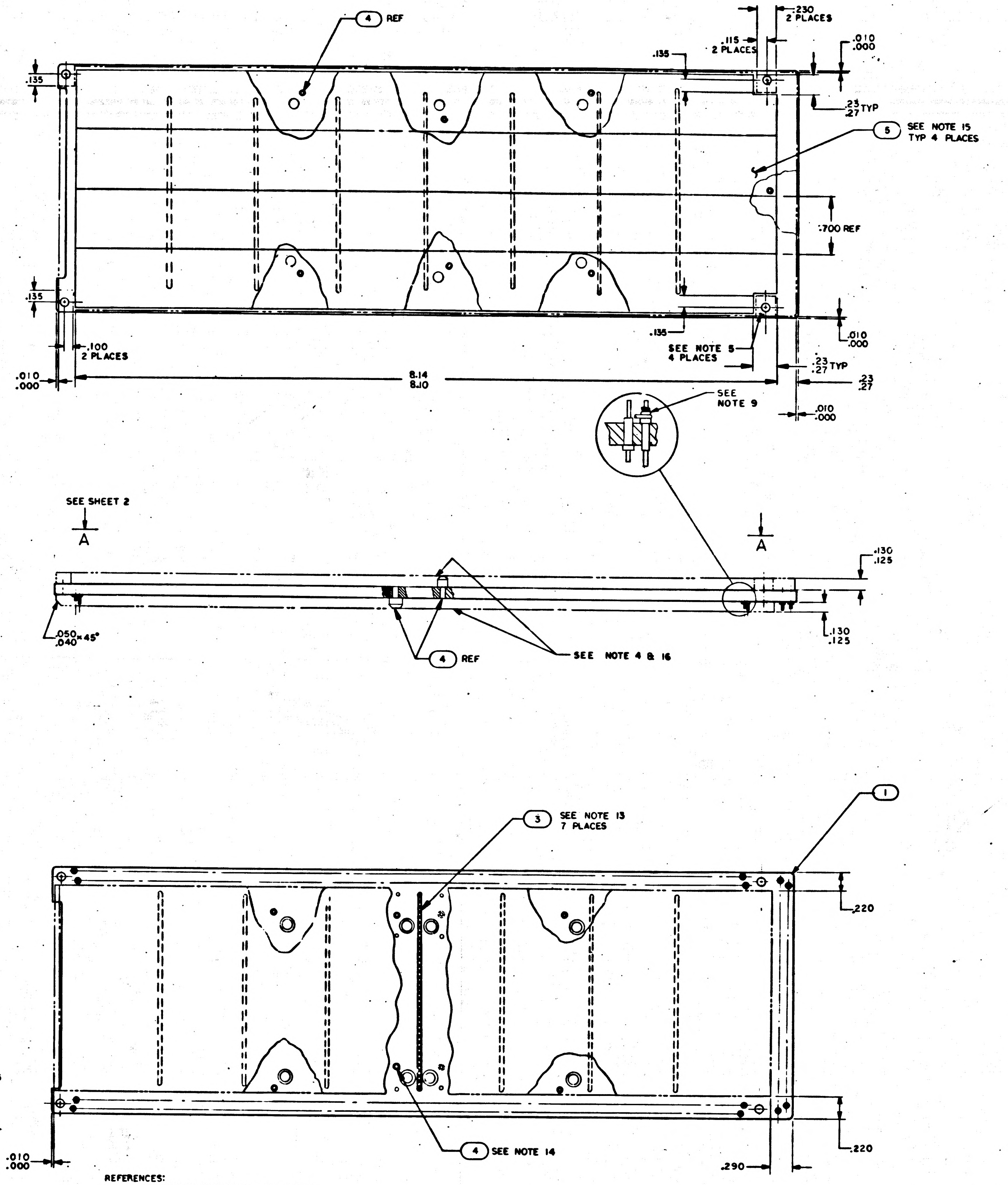
2010803

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803-071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803-131	0332

REVISIONS TDRR 37

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR 37915				
B		REVISED PER TDRR 37916				



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	10-2507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

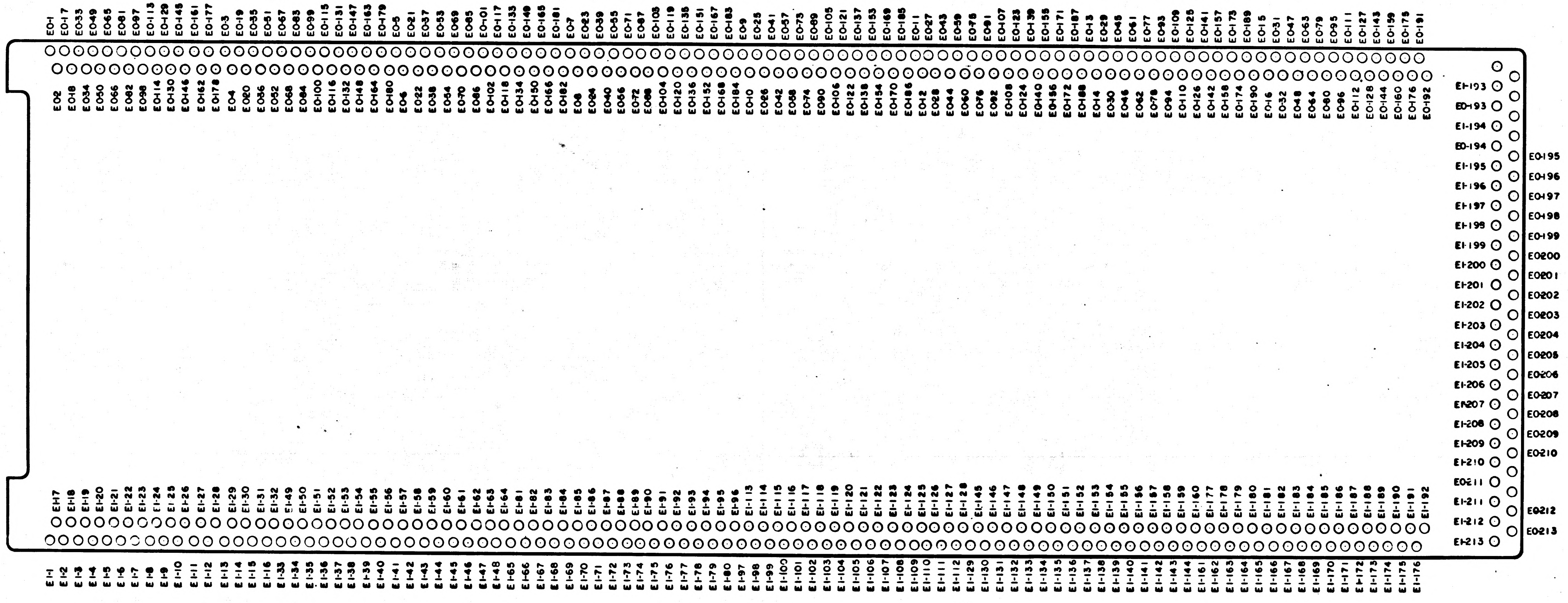
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010803
SCALE 2/1
SHEET 1 OF 2

2010803

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 3765

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37915	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 37916	[illegible]	[illegible]	[illegible]	[illegible]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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Clinton
CHECKED [illegible]
APPROVED Eldon C. Hall
APPROVED
APPROVED MIT [illegible]
APPROVED MSC [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

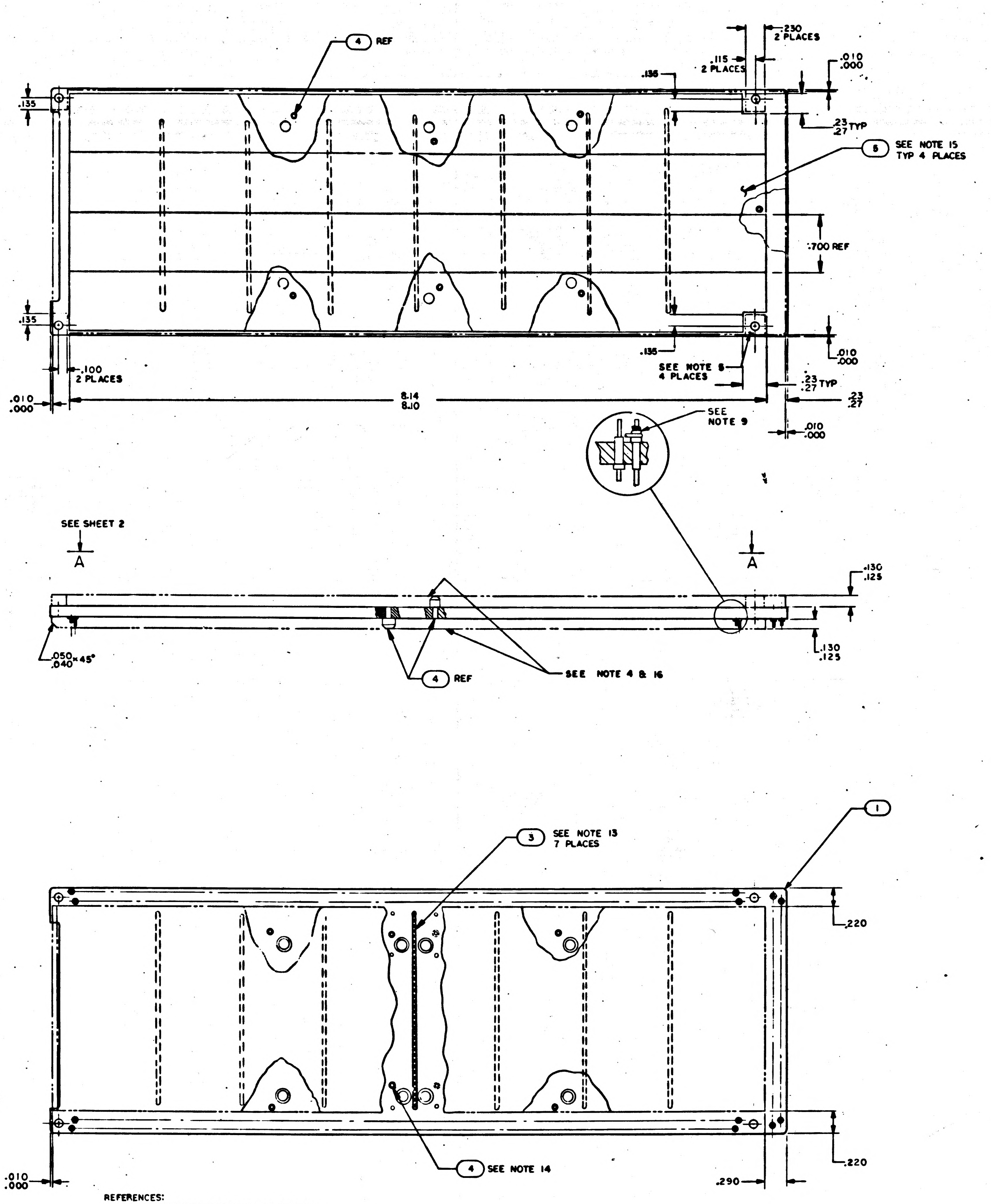
2010803

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010803 -011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803 -061	0326
2010803 -071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803 -131	0332
2010803 -141	0333

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR 37915				
B		REVISED PER TDRR 37916				
C		REVISED PER TDRR 37954			1/8/70	



NOTES:

1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1 PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	10-2507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Olivetti
CHECKED
APPROVED Eldon C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

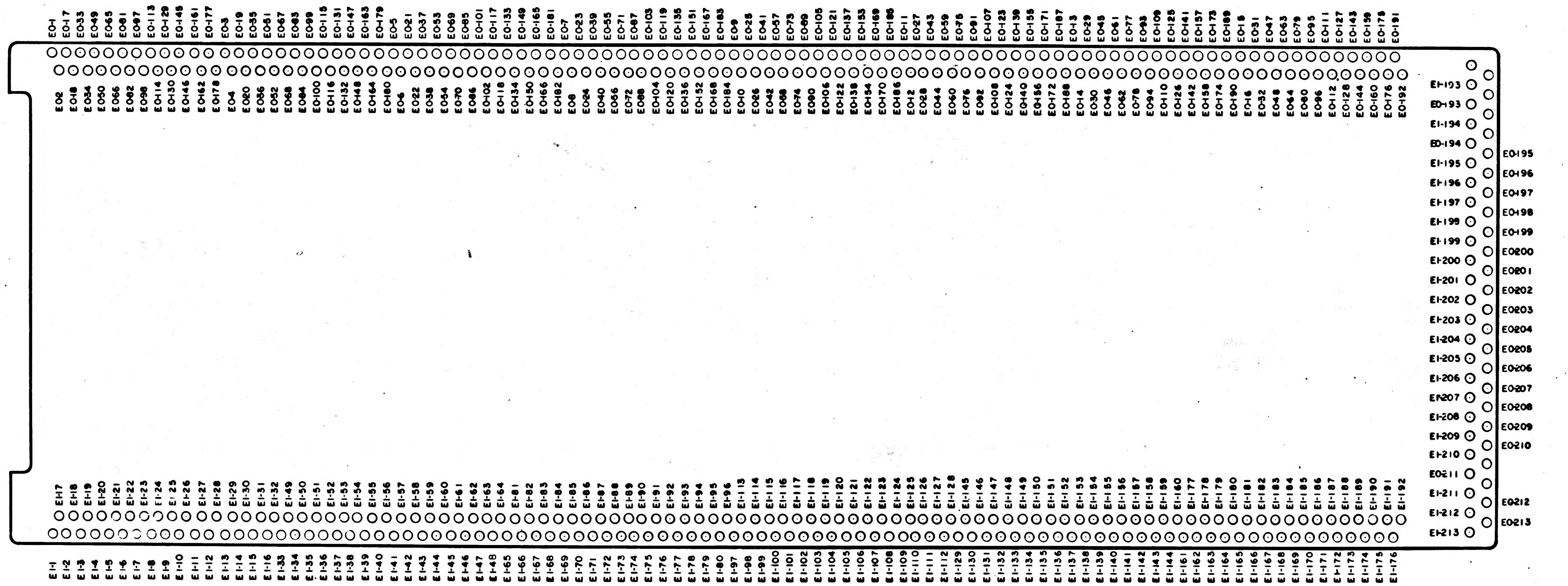
SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 2 / 1
SHEET 1 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY, NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISEC PER TDRR 37915				
B		REVISED PER TDRR 37916			12/11/69	
C		REVISED PER TDRR 37954			1/6/70	



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E0212
E0213

VIEW A-A

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± ——— ± ——— ± ———
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INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Chaston
CHECKED
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DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010803
SCALE 4/1		SHEET 2 OF 2

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PART NO.	MODULE DECK NO.
2010803 -011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803 -071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803 -131	0332
2010803 -141	0333
2010803 -151	0334

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
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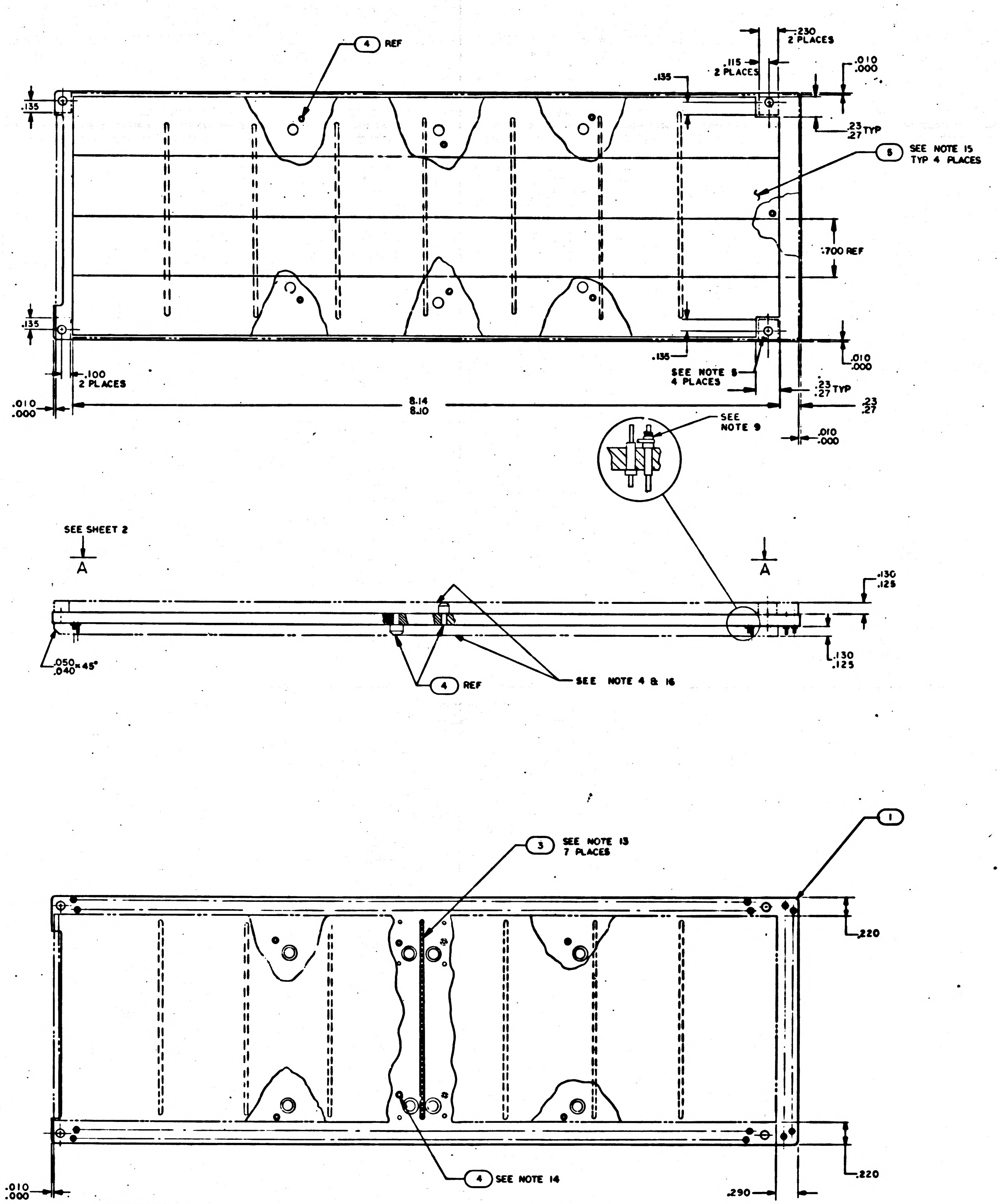
B		REVISED PER TDRR 37916				
C		REVISED PER TDRR 37954			1/8/70	
D		REVISED PER TDRR 37967				PBB



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AR	1012507-001	TAPE, LACING & TYING	3
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MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED Alan C Hall
APPROVED

APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010803
SCALE 2/1
SHEET 1 OF 2

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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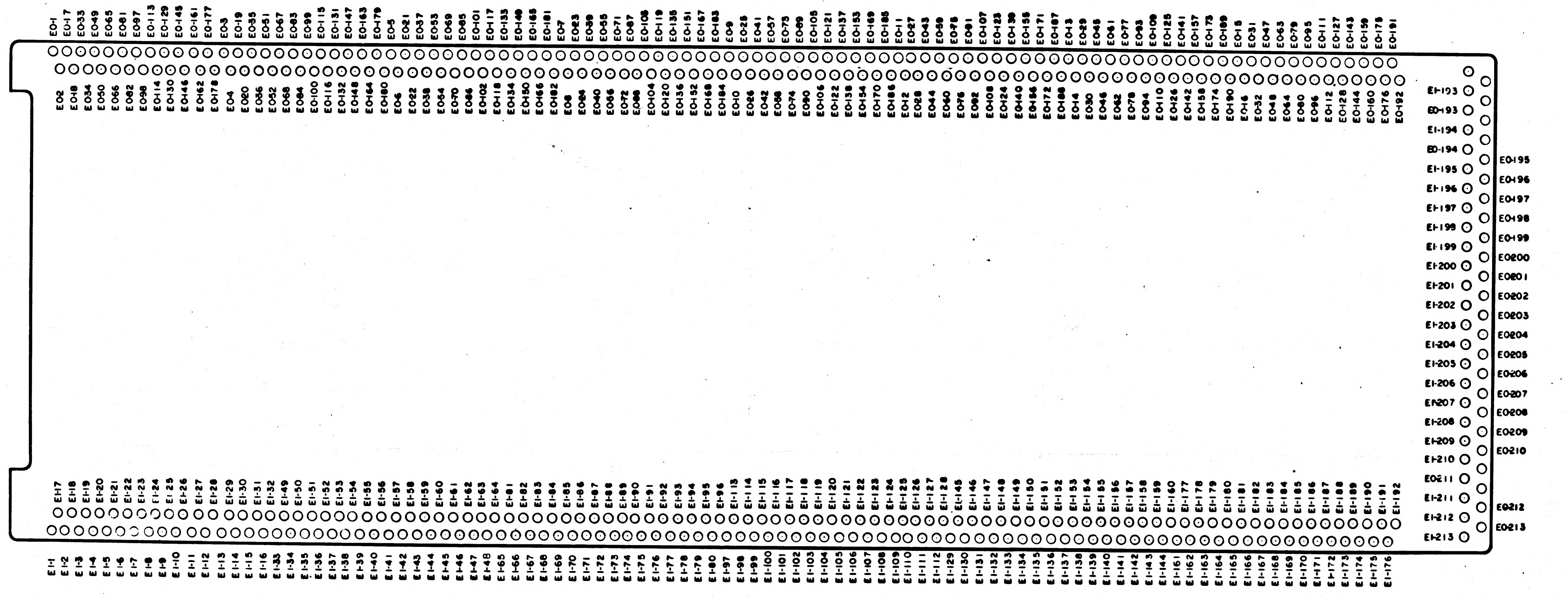
C		REVISED PER TDRR 37954			1/9/70	
D		REVISED PER TDRR 37967			3/18/70	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VIEW A-A

2010803

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

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SENSE WIRING ASSY
SIDE B
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CODE IDENT NO 80230
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SHEET 2 OF 2

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REVISIONS TDRR 37652						
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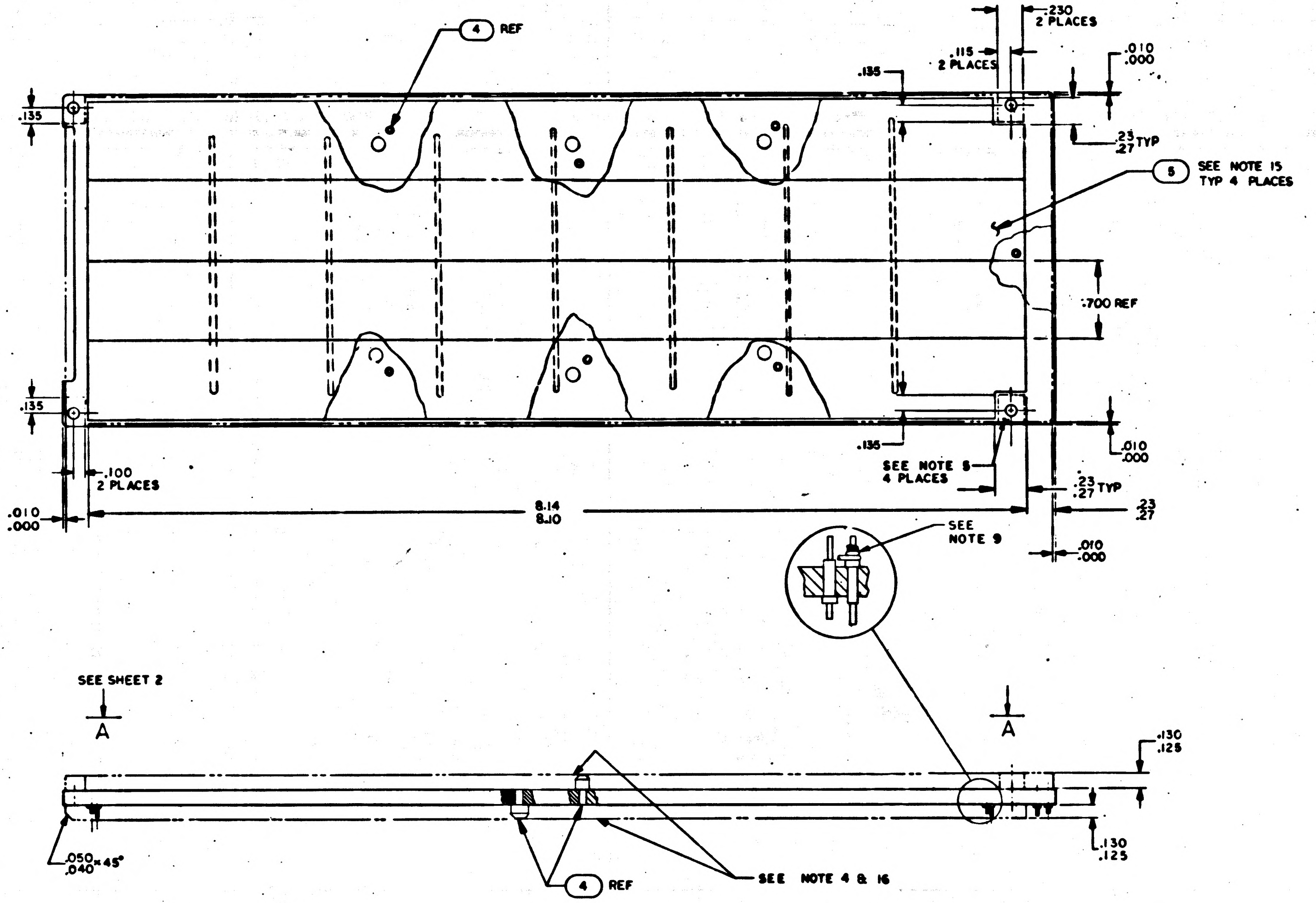

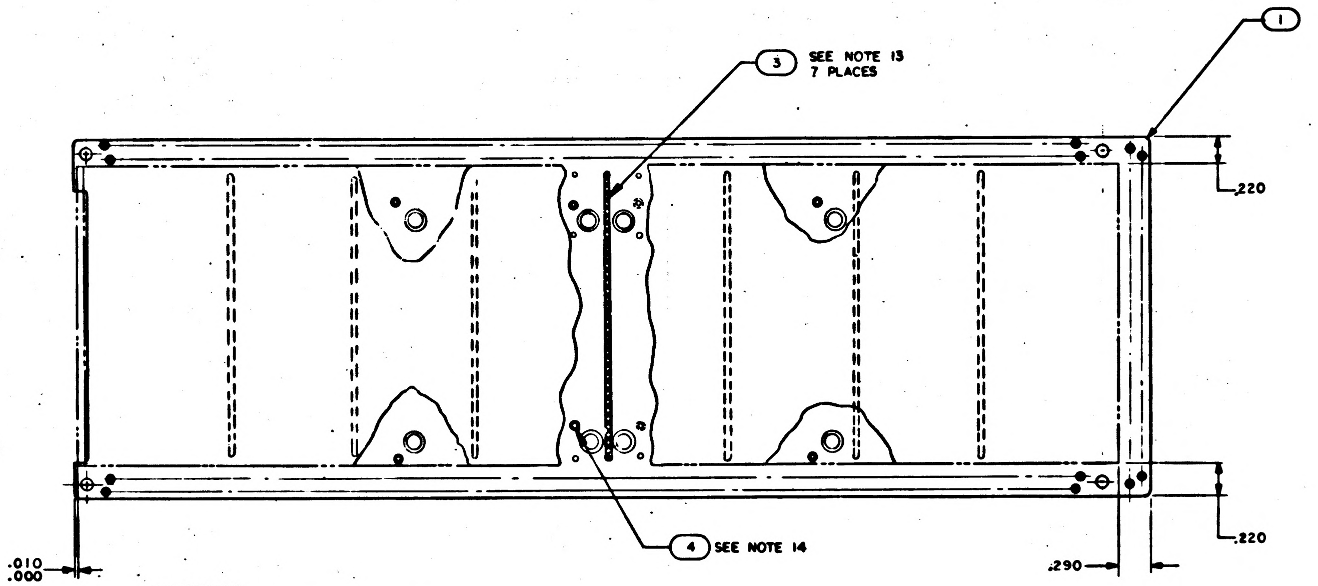

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DRAWN
CHECKED 10 APR 69
APPROVED Ivan C Hall 10 Apr 69
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
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SCALE 2/1
SHEET 1 OF 2

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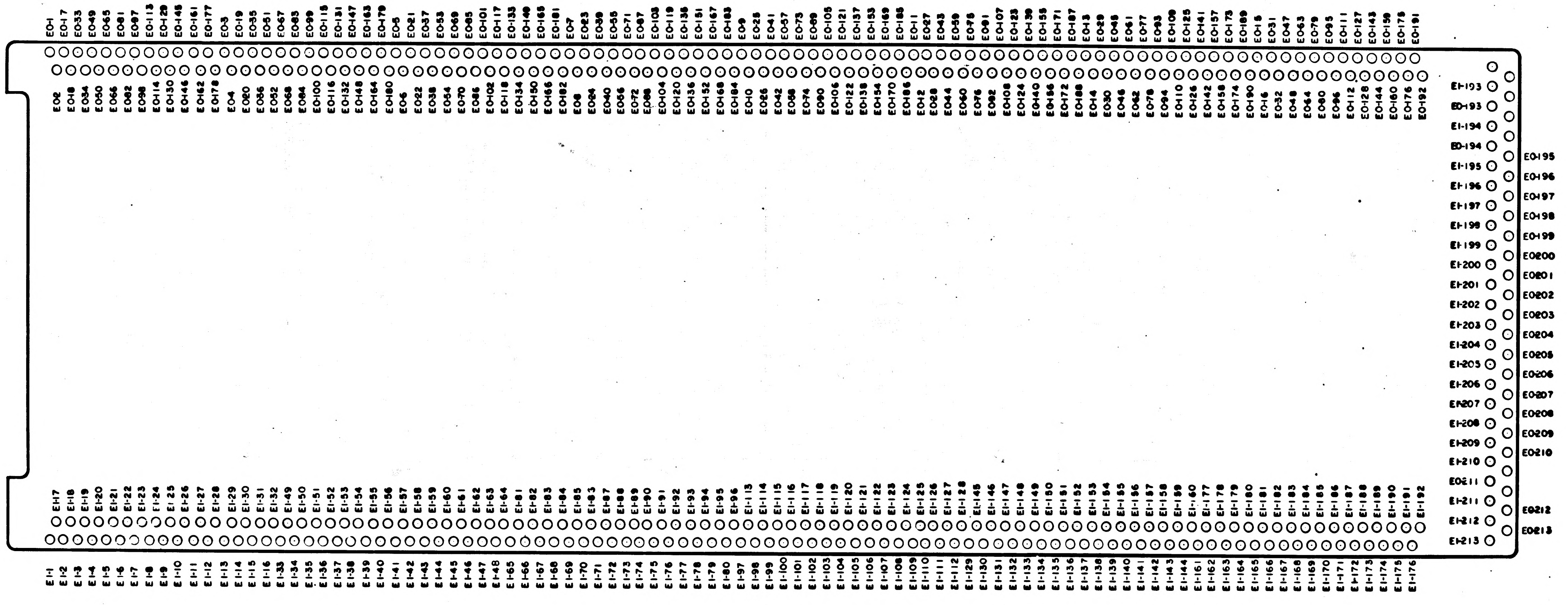
C		REVISED PER TDRR 37954			1/9/70	
D		REVISED PER TDRR 37967			2/18/70	
E		REVISED PER TDRR 38022			4/9/70	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E02 E018 E034 E050 E066 E082 E098 E0-114 E0-130 E0-146 E0-162 E0-178 E04 E020 E036 E052 E068 E084 E0-100 E0-116 E0-132 E0-148 E0-164 E0-180 E06 E0-22 E038 E054 E070 E086 E0-102 E0-118 E0-134 E0-150 E0-166 E0-182 E08 E024 E040 E056 E0-72 E088 E0-104 E0-120 E0-136 E0-152 E0-168 E0-184 E0-10 E026 E042 E058 E074 E090 E0-106 E0-122 E0-138 E0-154 E0-170 E0-186 E0-12 E028 E044 E060 E076 E092 E0-108 E0-124 E0-140 E0-156 E0-172 E0-188 E0-14 E030 E046 E062 E0-78 E094 E0-110 E0-126 E0-142 E0-158 E0-174 E0-190 E0-16 E0-32 E048 E064 E080 E096 E0-112 E0-128 E0-144 E0-160 E0-176 E0-192
E1-193 E0-193 E1-194 E0-194 E1-195 E1-196 E1-197 E1-198 E1-199 E1-200 E1-201 E1-202 E1-203 E1-204 E1-205 E1-206 E1-207 E1-208 E1-209 E1-210 E0211 E1-211 E1-212 E1-213
E0195 E0196 E0197 E0198 E0199 E0200 E0201 E0202 E0203 E0204 E0205 E0206 E0207 E0208 E0209 E0210 E0212 E0213
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E1-1 E1-2 E1-3 E1-4 E1-5 E1-6 E1-7 E1-8 E1-9 E1-10 E1-11 E1-12 E1-13 E1-14 E1-15 E1-16 E1-33 E1-34 E1-35 E1-36 E1-37 E1-38 E1-39 E1-40 E1-41 E1-42 E1-43 E1-44 E1-45 E1-46 E1-47 E1-48 E1-65 E1-66 E1-67 E1-68 E1-69 E1-70 E1-71 E1-72 E1-73 E1-74 E1-75 E1-76 E1-77 E1-78 E1-79 E1-80 E1-97 E1-98 E1-99 E1-100 E1-101 E1-102 E1-103 E1-104 E1-105 E1-106 E1-107 E1-108 E1-109 E1-110 E1-111 E1-112 E1-129 E1-130 E1-131 E1-132 E1-133 E1-134 E1-135 E1-136 E1-137 E1-138 E1-139 E1-140 E1-141 E1-142 E1-143 E1-144 E1-161 E1-162 E1-163 E1-164 E1-165 E1-166 E1-167 E1-168 E1-169 E1-170 E1-171 E1-172 E1-173 E1-174 E1-175 E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Chr[illegible]
CHECKED E. [illegible]
APPROVED [illegible]
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010803

SCALE 4/1 SHEET 2 OF 2

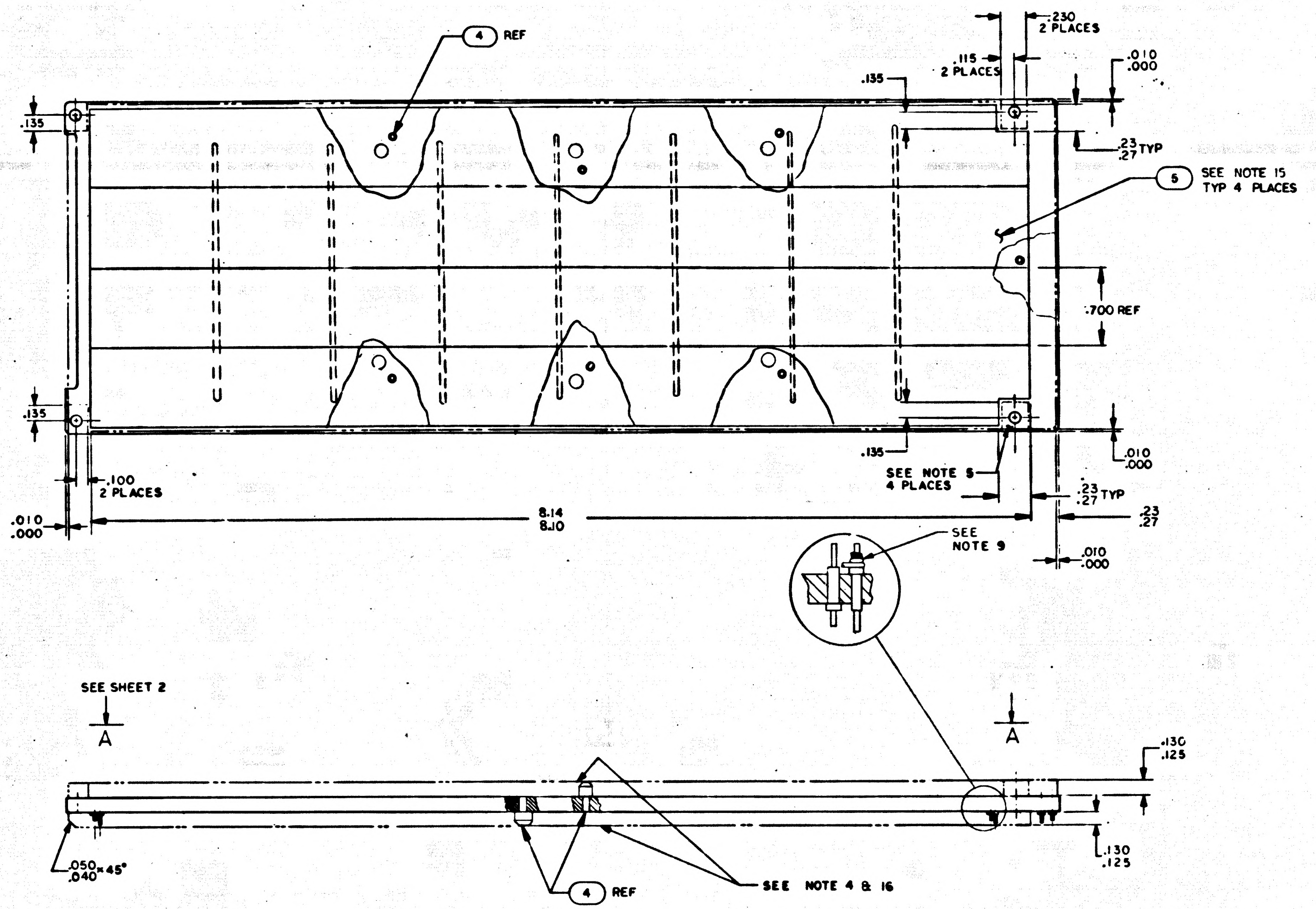
2010803

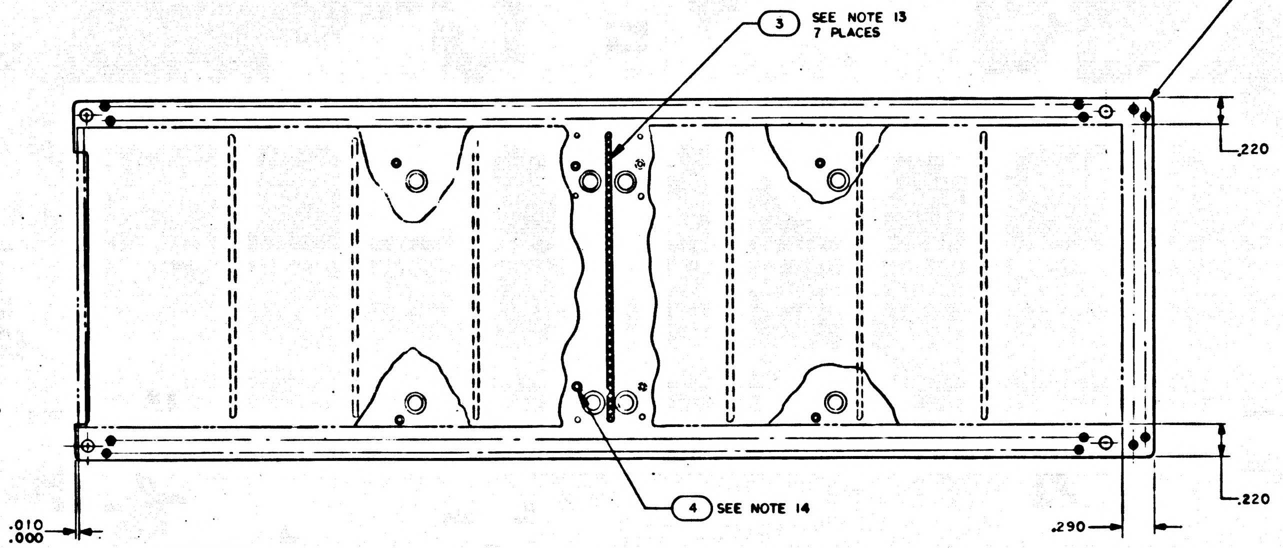
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 3765

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR 3791[illegible]				
B		REVISED PER TDRR 37916				
C		REVISED PER TDRR 37954				
D		REVISED PER TDRR 37967				
E		REVISED PER TDRR 38022				
F		REVISED PER TDRR 3803[illegible]				

PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803-071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803-131	0332
2010803-141	0333
2010803-151	0334
2010803-161	0335
2010803-171	0336





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	10-2507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R.F. [illegible]
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

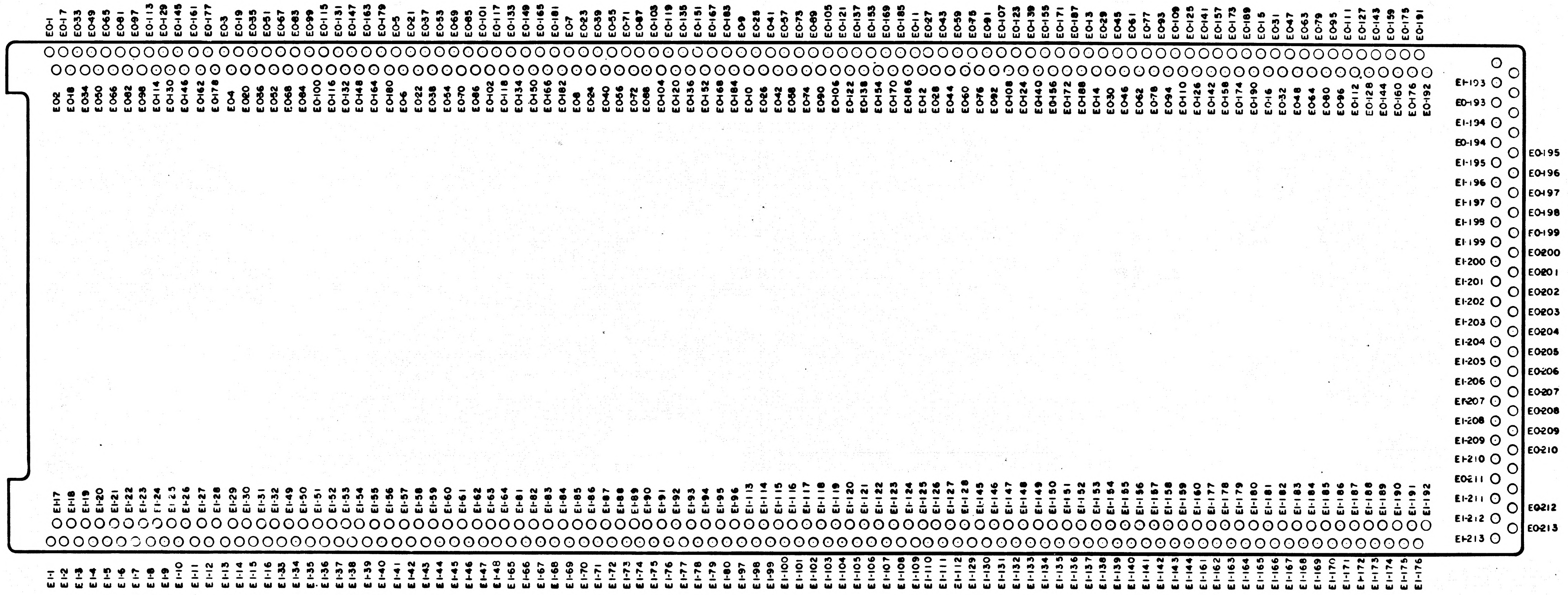
SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010803
SCALE 2 / 1
SHEET 1 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDPR 37				
B		REVISED PER TDPP 37				
C		REVISED PER TDRR 379				
D		REVISED PER TDRR 37				
E		REVISED PER TDRR [illegible]022				
F		REVISED PER TDRR 3[illegible]032				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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R.F.Cheston
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

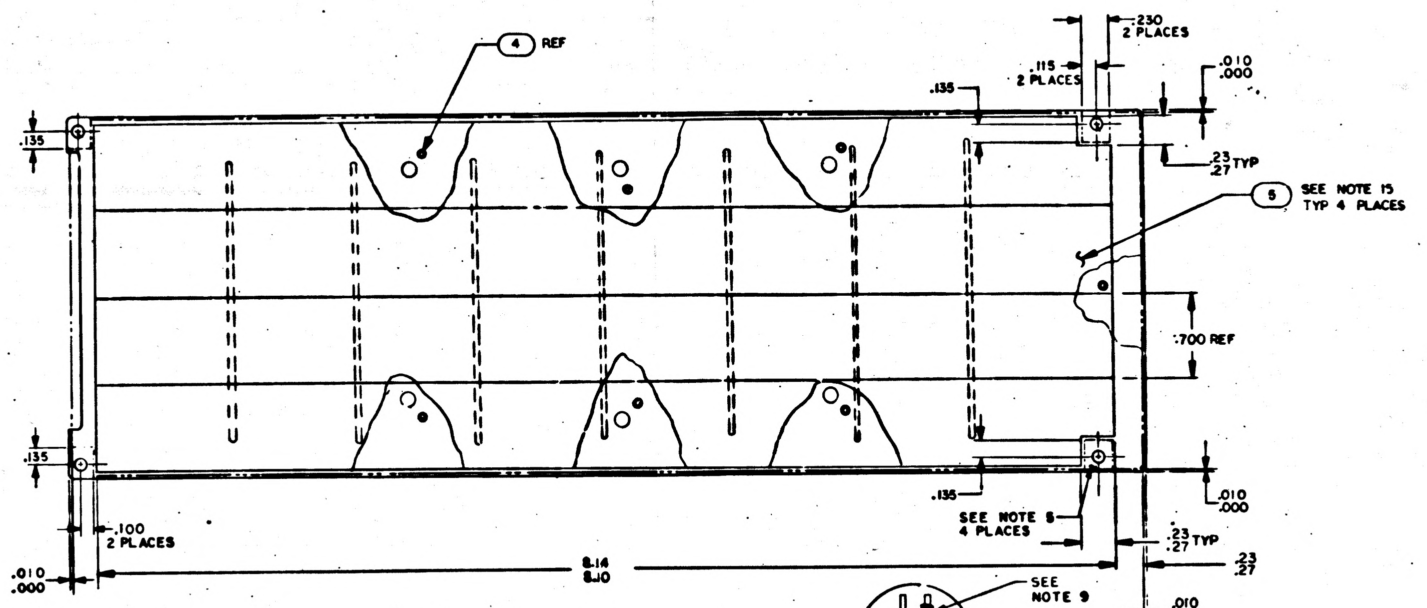
2010803

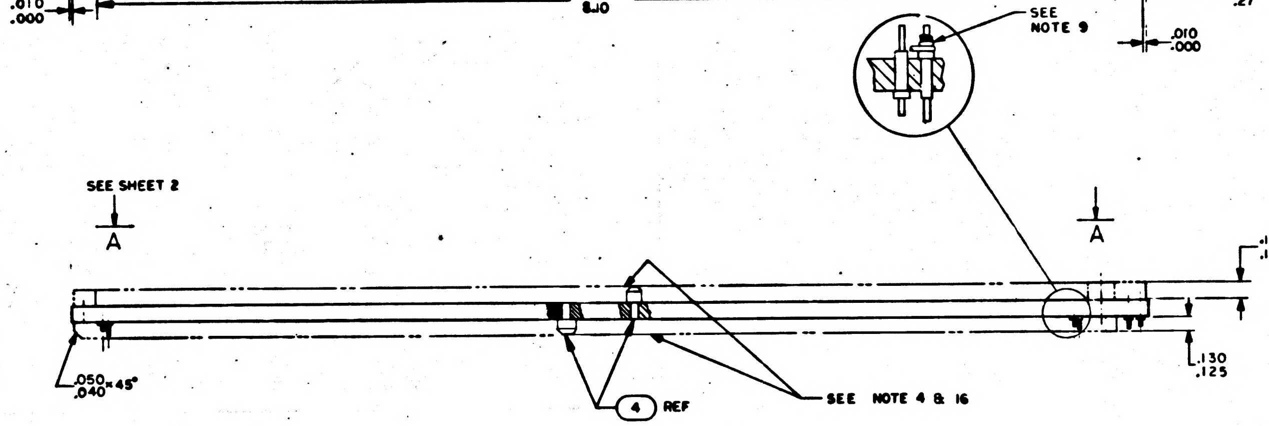
NOTICE - WHEN GOVERNMENT [illegible] DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

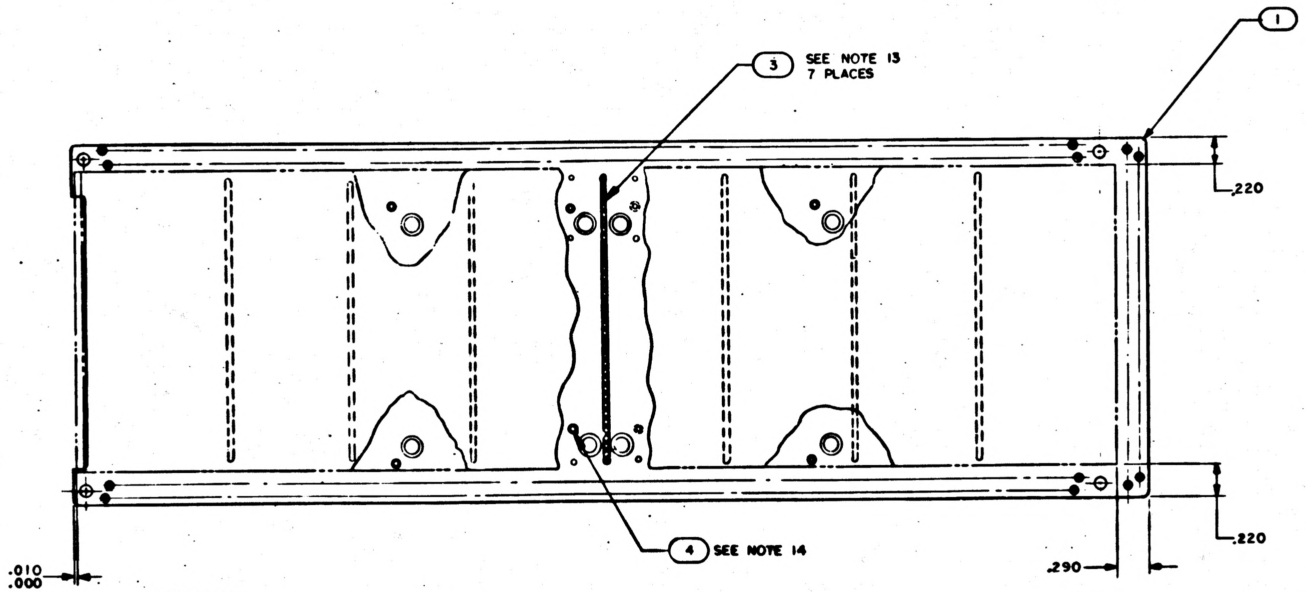
PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803-071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803-131	0332
2010803-141	0333
2010803-151	0334
2010803-161	0335
2010803-171	0336
2010803-181	0337
-191	0338
-211	0339
-221	0340
-231	0341
2010803-241	0342

REVISIONS [illegible]DRR 1765

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER [illegible]15	[illegible]	[illegible]	[illegible]	PBB
B		REVISED PER [illegible]16	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER [illegible]R 37954	[illegible]	[illegible]	1/8/70	[illegible]
D		REVISED PER [illegible] 37967	[illegible]	[illegible]	2/18/70	PBB
E		REVISED PER DRR 38022	[illegible]	[illegible]	4 [illegible]/70	PBB
F		REVISED PER [illegible]RR 3[illegible]032	[illegible]	[illegible]	[illegible]	PBB
G		REVISED PER [illegible]RR 38151	[illegible]	[illegible]	[illegible]	[illegible]







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE X
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	10-2507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

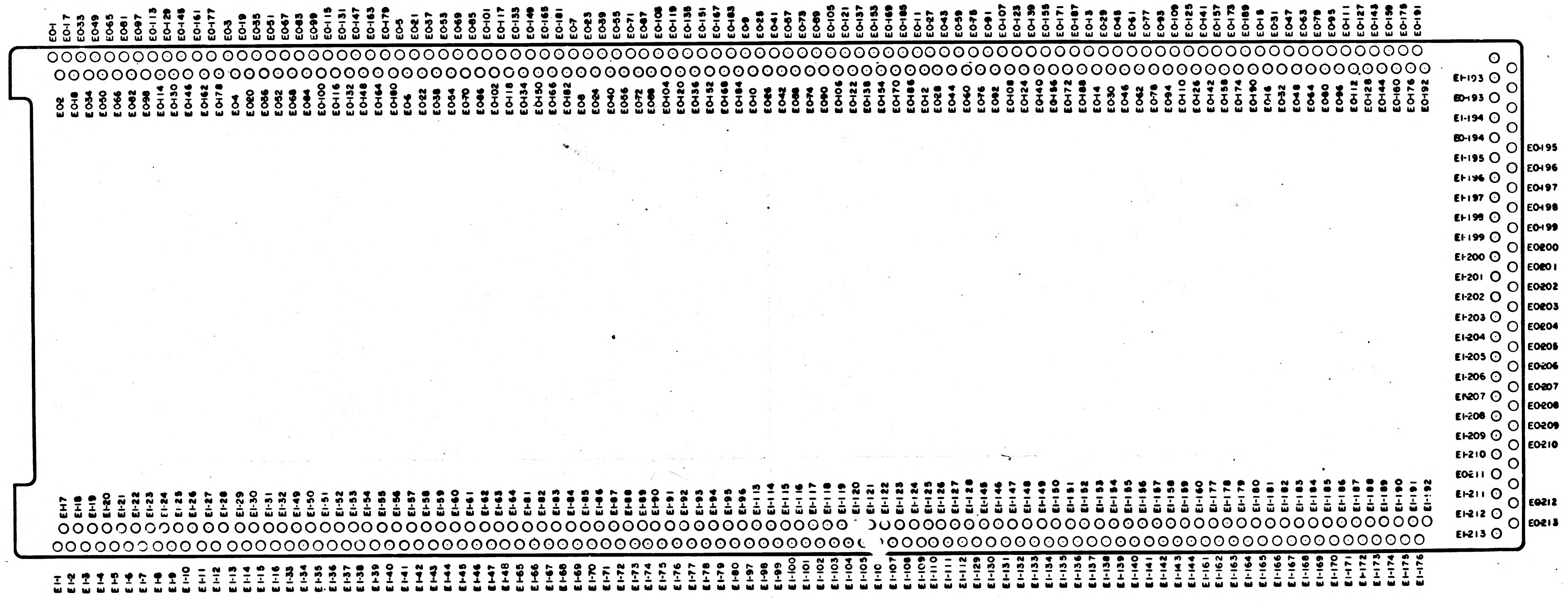
DRAWN [illegible] [illegible]
CHECKED [illegible] 10 APR 69
APPROVED [illegible] C Hall [illegible]/69
APPROVED
APPROVED MIT [illegible] Morley [illegible]/69
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 2/1
SHEET 1 OF 2

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR [illegible]				
B		REVISED PER TDRR [illegible]				
C		REVISED PER TDRR [illegible]				
D		REVISED PER TDRR [illegible]				
E		REVISED PER TDRR 380				
F		REVISED PER TDRR 38032				
G		REVISED PER TDRR 38				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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Christian
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

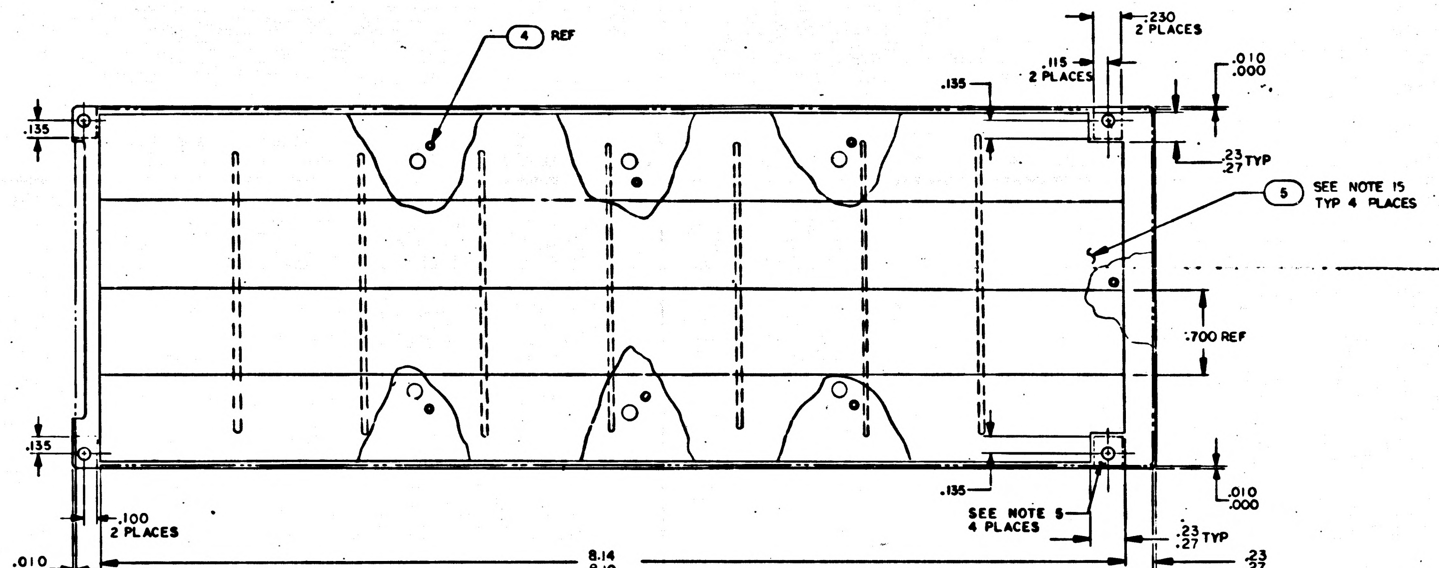
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

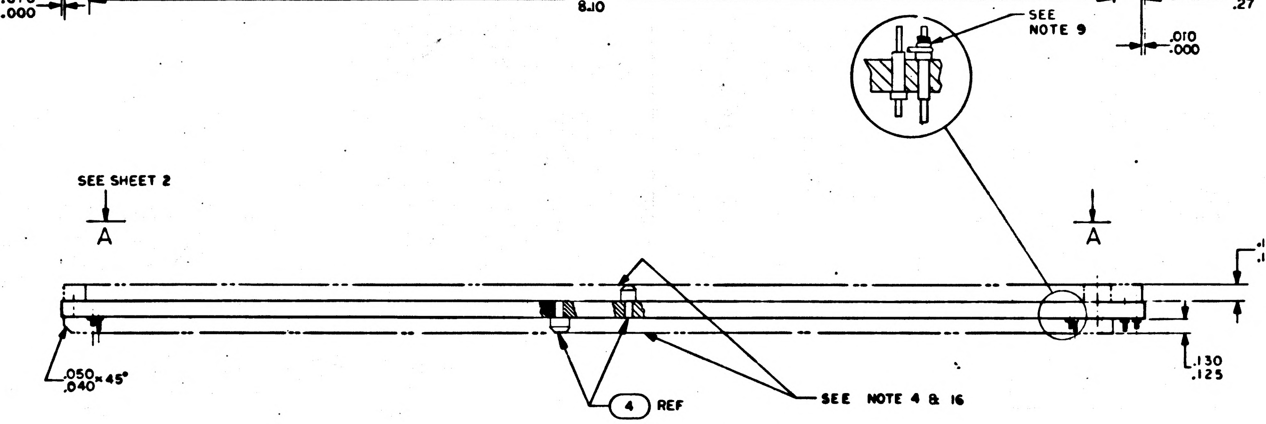
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

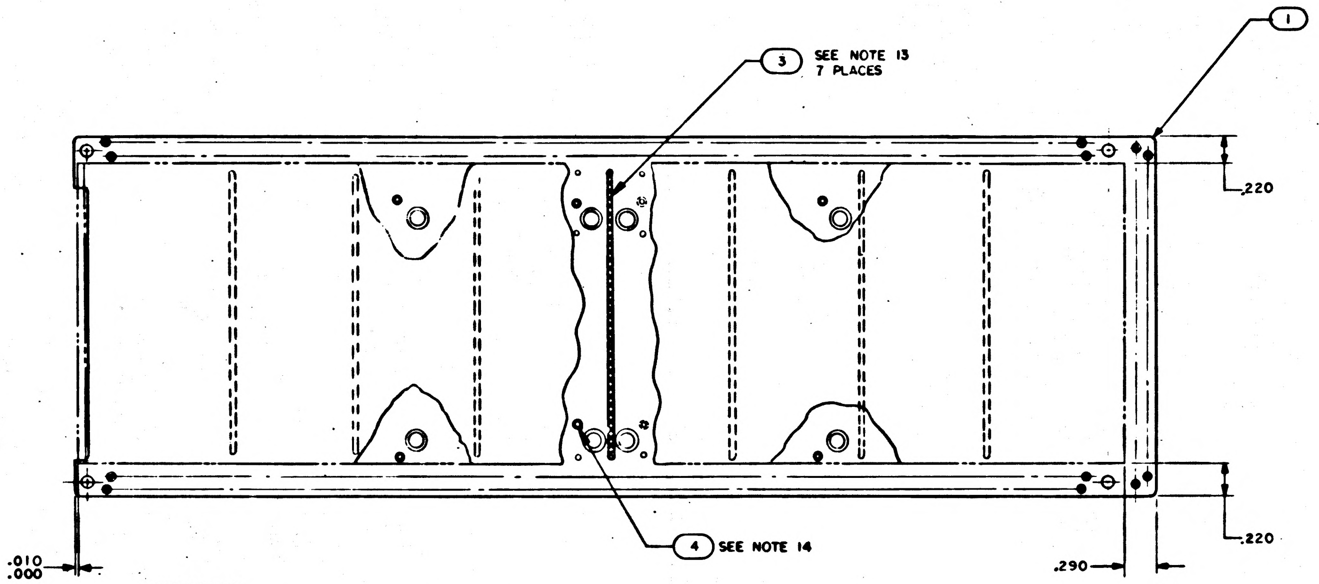
PART NO.	MODULE DECK NO.
2010803 - 011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803 -071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803 - 131	0332
2010803 - 141	0333
2010803 - 151	0334
2010803 - 161	0335
2010803 - 171	0336
2010803 - 181	0337
- 191	0338
- 211	0339
- 221	0340
- 231	0341
2010803 - 241	0342
2010803 - 251	0343
- 261	0344
- 271	0345
- 281	0346
- 291	0347
2010803 - 311	0348

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
A		REVISED PER TDRR [illegible]	[illegible]	[illegible]	12-4-69	PEB
B		REVISED PER TDRR [illegible]	[illegible]	[illegible]	12/11/69	[illegible]
C		REVISED PER TDRR 37[illegible]54	[illegible]	[illegible]	1/8/70	PBB
D		REVISED PER TDRR 37967	[illegible]	[illegible]	2/12/70	PBB
E		REVISED PER TDRR 38022	[illegible]	[illegible]	4/9/70	PBB
F		REVISED PER TDRR 38032	[illegible]	[illegible]	5/11/70	PBB
G		REVISED PER TDRR 38151	[illegible]	[illegible]	6/5/70	[illegible]
H		REVISED PER TDRR 38173	[illegible]	[illegible]	7/12/70	PBS







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
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13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
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LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R. F. Christie
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 2 / 1
SHEET 1 OF 2

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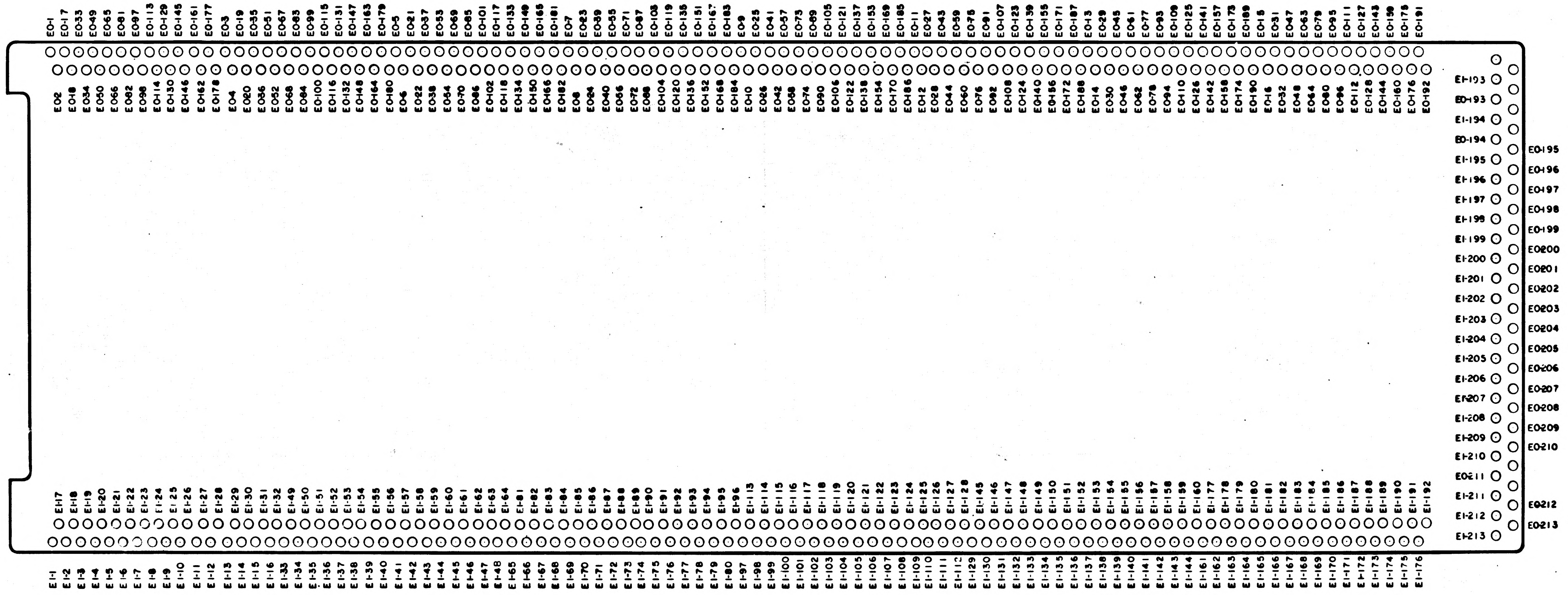
REVISIONS DRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 3791	[illegible]	[illegible]	12/[illegible]	[illegible]
B		REVISED PER TDRR 3791	[illegible]	[illegible]	12/11/69	[illegible]
C		REVISED PER TDRR 379[illegible]	[illegible]	[illegible]	1/8/70	[illegible]
D		REVISED PER TDRR [illegible]	[illegible]	[illegible]	2/18/70	[illegible]
E		REVISED PER TDRR 380[illegible]	[illegible]	[illegible]	4/9/[illegible]	[illegible]
F		REVISED PER TDRR 38[illegible]	[illegible]	[illegible]	5/[illegible]	[illegible]
G		REVISED PER TDRR 38[illegible]	[illegible]	[illegible]	6/15/7[illegible]	[illegible]
H		REVISED PER TDRR [illegible]	[illegible]	[illegible]	7/12/7[illegible]	[illegible]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E1-1 E1-2 E1-3 E1-4 E1-5 E1-6 E1-7 E1-8 E1-9 E1-10 E1-11 E1-12 E1-13 E1-14 E1-15 E1-16 E1-33 E1-34 E1-35 E1-36 E1-37 E1-38 E1-39 E1-40 E1-41 E1-42 E1-43 E1-44 E1-45 E1-46 E1-47 E1-48 E1-65 E1-66 E1-67 E1-68 E1-69 E1-70 E1-71 E1-72 E1-73 E1-74 E1-75 E1-76 E1-77 E1-78 E1-79 E1-80 E1-97 E1-98 E1-99 E1-100 E1-101 E1-102 E1-103 E1-104 E1-105 E1-106 E1-107 E1-108 E1-109 E1-110 E1-111 E1-112 E1-129 E1-130 E1-131 E1-132 E1-133 E1-134 E1-135 E1-136 E1-137 E1-138 E1-139 E1-140 E1-141 E1-142 E1-143 E1-144 E1-161 E1-162 E1-163 E1-164 E1-165 E1-166 E1-167 E1-168 E1-169 E1-170 E1-171 E1-172 E1-173 E1-174 E1-175 E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Chan[illegible]
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 3765[illegible]						
SYM	ZONE	DESCRIPTION	DR	CK	DATE	APPROVE
A		REVISED PER TDRR 37915	[illegible]		[illegible]	[illegible]
B		REVISED PER TDRR 37916	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 37954	[illegible]	[illegible]	1/8/70	[illegible]
D		REVISED PER TDRR 37967	[illegible]	[illegible]	2/18/70	[illegible]
E		REVISED PER TDRR 38022		[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 3803[illegible]	[illegible]	[illegible]	[illegible]	RBB
G		REVISED PER TDRR 38151	[illegible]	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 3817[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
J		REVISED PER TDRR 38250	[illegible]	[illegible]	[illegible]	[illegible]

PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803-071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803-131	0332
2010803-141	0333
2010803-151	0334
2010803-161	0335
2010803-171	0336
2010803-181	0337
-191	0338
-211	0339
-221	0340
-231	0341
2010803-241	0342
2010803-251	0343
-261	0344
-271	0345
-281	0346
-291	0347
2010803-311	0348
2010803-321	0349
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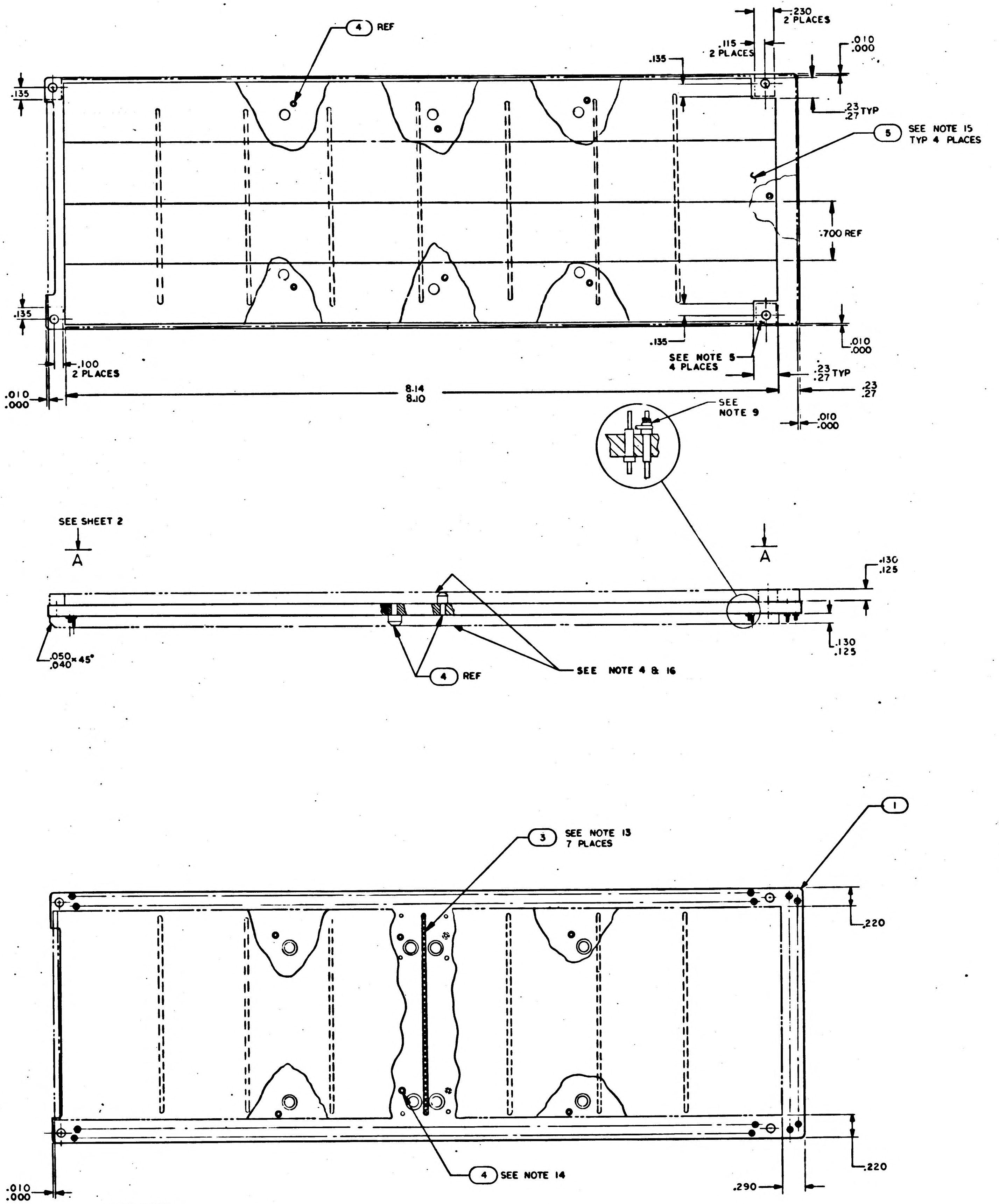
-341	0351
-351	0352
-361	0353
2010803-371	0354



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN R. F. [illegible]
CHECKED [illegible]
APPROVED [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010803
SCALE 2/1
SHEET 1 OF 2

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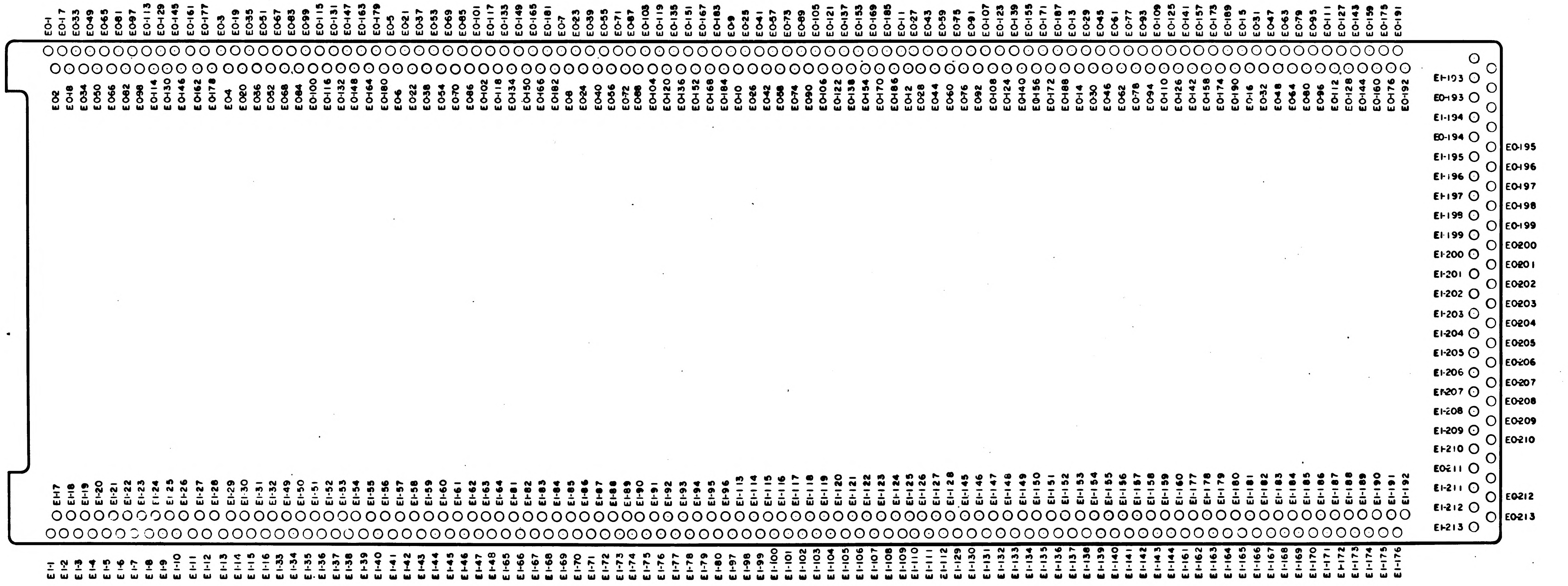
REVISIONS TDRR 3765

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 3791	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 3791	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 3795	[illegible]	[illegible]	[illegible]	[illegible]
D		REVISED PER TDRR 379	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 38022	[illegible]	[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 38032	[illegible]		[illegible]	[illegible]
G		REVISED PER TDRR 38151	[illegible]		5/70	[illegible]
H		REVISED PER TDRR 36173	[illegible]		7/12/70	[illegible]
J		REVISED PER TDRR 30250	[illegible]	[illegible]	[illegible]	[illegible]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E1-175
E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

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MATERIAL

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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R.F. Chaston
CHECKED
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DATE

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

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2010803-371	0354
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-421	0358
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2010803-441	0360

REVISIONS TDRR 3765						
SYM	ZONE	DESCRIPTION	DR		DATE	APPROVE
A		REVISED PER TDRR 37915			[illegible]	
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C		REVISED PER TDRR 37954			1/8/70	
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E		REVISED PER TDRR 38022				
F		REVISED PER TDRR 38113				
G		REVISED PER TDRR 38151			5/5/70	
H		REVISED PER TDRR 38173			12/70	
J		REVISED PER TDRR 38250				
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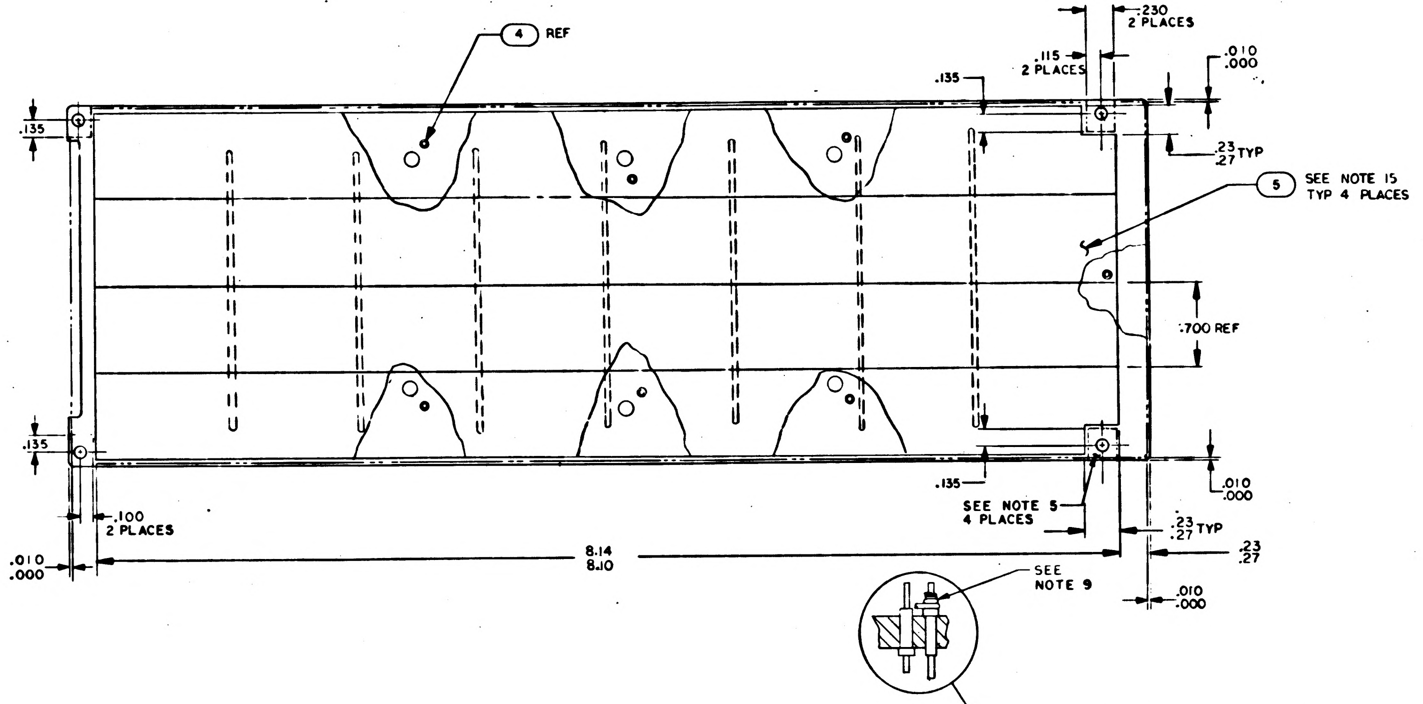

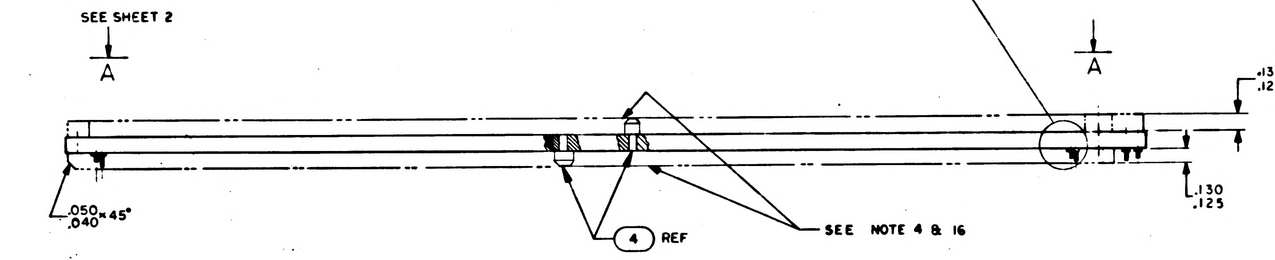

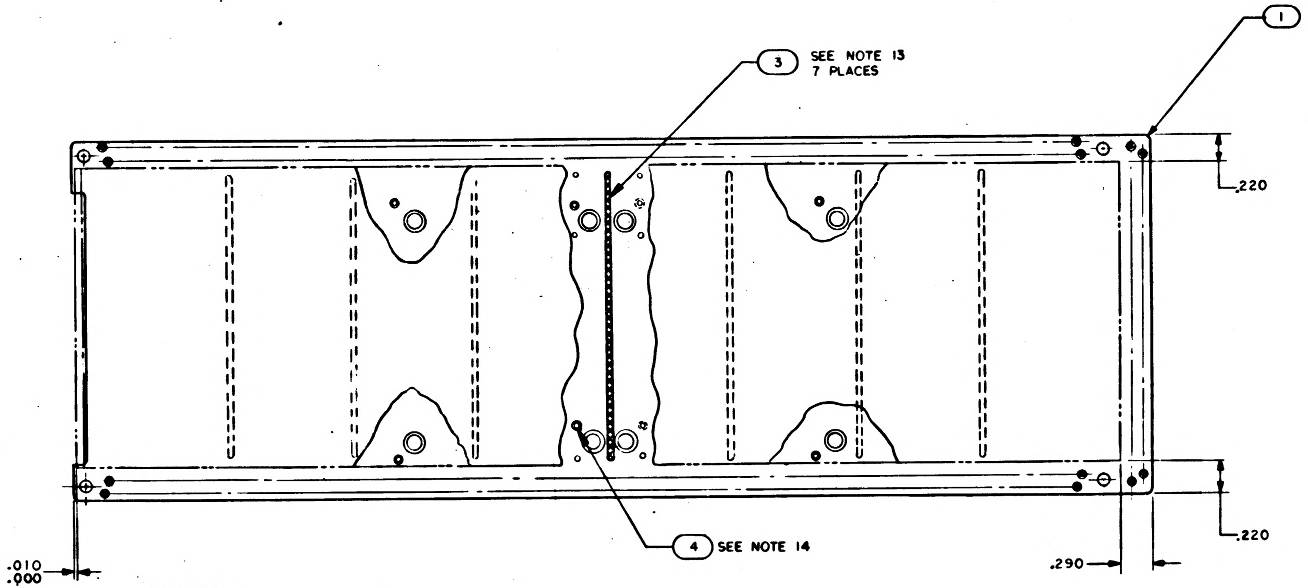

NOTES:

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3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
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17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	10-2507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

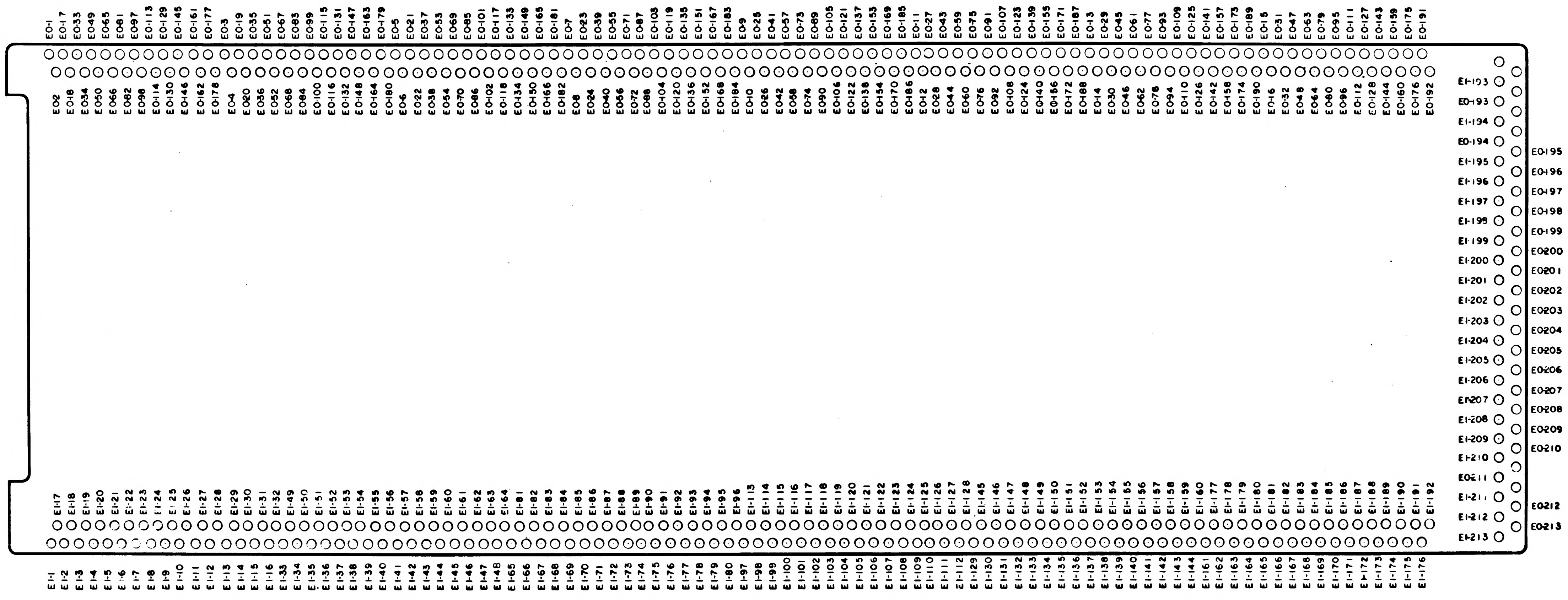
DRAWN R.F. Chu[illegible]
CHECKED [illegible]
APPROVED Alan C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010803
SCALE 2/1
SHEET 1 OF 2

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS TDRR 3755						
–		REVISED PER TDRR 3791	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 3791	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 3795	[illegible]	[illegible]	1/8/[illegible]	[illegible]
D		REVISED PER TDRR [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 36022	[illegible]	[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 36032	[illegible]			[illegible]
G		REVISED PER TDRR 38151	[illegible]	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 3613	[illegible]		[illegible]	[illegible]
J		REVISED PER TDRR 38260	[illegible]	[illegible]	[illegible]	[illegible]
K		REVISED PER TDRR 3638C	[illegible]		[illegible]	[illegible]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E0-2 E0-18 E0-34 E0-50 E0-66 E0-82 E0-98 E0-114 E0-130 E0-146 E0-162 E0-178 E0-4 E0-20 E0-36 E0-52 E0-68 E0-84 E0-100 E0-116 E0-132 E0-148 E0-164 E0-180 E0-6 E0-22 E0-38 E0-54 E0-70 E0-86 E0-102 E0-118 E0-134 E0-150 E0-166 E0-182 E0-8 E0-24 E0-40 E0-56 E0-72 E0-88 E0-104 E0-120 E0-136 E0-152 E0-168 E0-184 E0-10 E0-26 E0-42 E0-58 E0-74 E0-90 E0-106 E0-122 E0-138 E0-154 E0-170 E0-186 E0-12 E0-28 E0-44 E0-60 E0-76 E0-92 E0-108 E0-124 E0-140 E0-156 E0-172 E0-188 E0-14 E0-30 E0-46 E0-62 E0-78 E0-94 E0-110 E0-126 E0-142 E0-158 E0-174 E0-190 E0-16 E0-32 E0-48 E0-64 E0-80 E0-96 E0-112 E0-128 E0-144 E0-160 E0-176 E0-192
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E1-1 E1-2 E1-3 E1-4 E1-5 E1-6 E1-7 E1-8 E1-9 E1-10 E1-11 E1-12 E1-13 E1-14 E1-15 E1-16 E1-33 E1-34 E1-35 E1-36 E1-37 E1-38 E1-39 E1-40 E1-41 E1-42 E1-43 E1-44 E1-45 E1-46 E1-47 E1-48 E1-65 E1-66 E1-67 E1-68 E1-69 E1-70 E1-71 E1-72 E1-73 E1-74 E1-75 E1-76 E1-77 E1-78 E1-79 E1-80 E1-97 E1-98 E1-99 E1-100 E1-101 E1-102 E1-103 E1-104 E1-105 E1-106 E1-107 E1-108 E1-109 E1-110 E1-111 E1-112 E1-129 E1-130 E1-131 E1-132 E1-133 E1-134 E1-135 E1-136 E1-137 E1-138 E1-139 E1-140 E1-141 E1-142 E1-143 E1-144 E1-161 E1-162 E1-163 E1-164 E1-165 E1-166 E1-167 E1-168 E1-169 E1-170 E1-171 E1-172 E1-173 E1-174 E1-175 E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ——— DECIMALS ± ——— ANGLES ± ———
DO NOT SCALE THIS DRAWING

MATERIAL ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN R.F. Clanton
CHECKED [illegible]
APPROVED [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

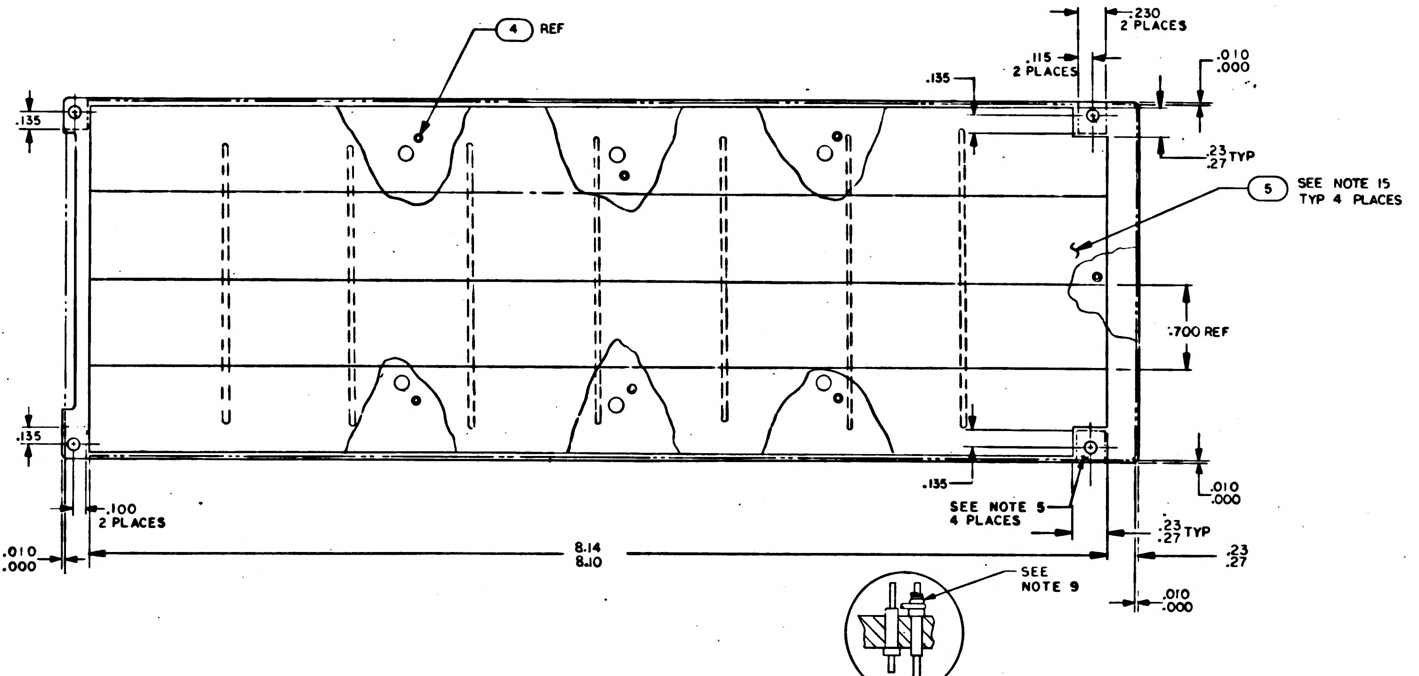
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

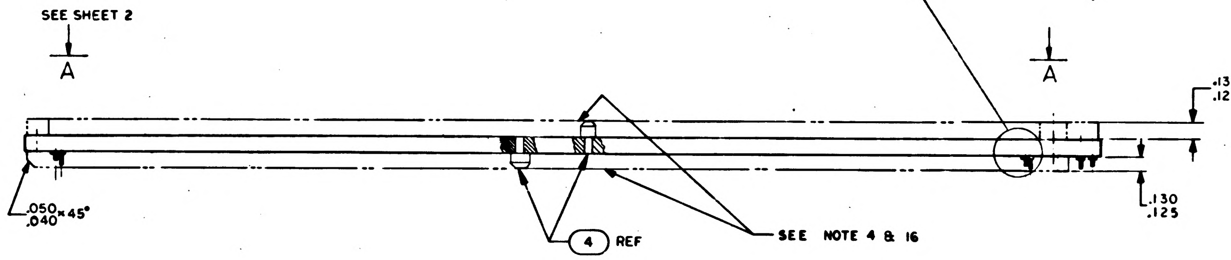
NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

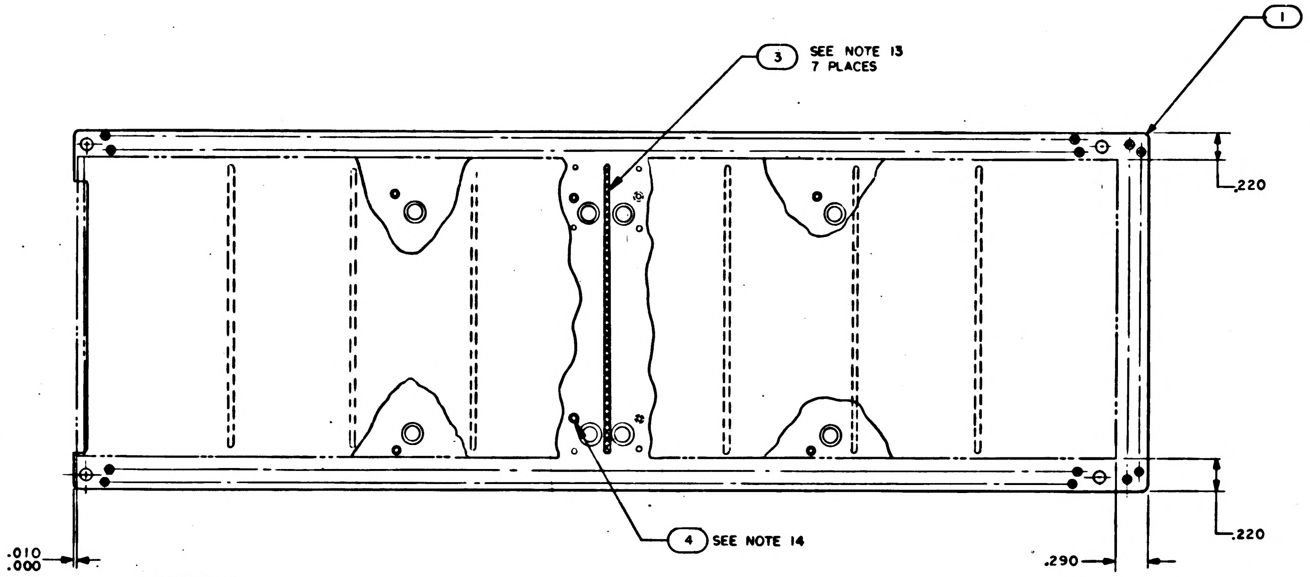
PART NO.	MODULE DECK NO.
2010803 -011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803 -061	0326
2010803 -071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803 -131	0332
2010803 -141	0333
2010803 -151	0334
2010803 -161	0335
2010803 -171	0336
2010803 -181	0337
-191	0338
-211	0339
-221	0340
-231	0341
2010803 - 241	0342
2010803 - 251	0343
- 261	0344
- 271	0345
- 281	0346
- 291	0347
2010803 - 311	0348
2010803 - 321	0349
- 331	0350
- 341	0351
- 351	0352
- 361	0353
2010803- 371	0354
2010803 - 381	0355
-391	0356
-411	0357
-421	0358
-431	0359
2010803 - 441	0360
2010803 - 451	0361
-461	0362
-471	0363
-481	0364
-491	0365
2010803 - 511	0366

REVISIONS TDRR 37656

SYM	ZONE	DESCRIPTION	DR	CK	DATE	APPROVE
A		REVISED PER TDRR 37915	[illegible]		[illegible]	[illegible]
B		REVISED PER TDRR 37916	[illegible]	[illegible]	12/11/	[illegible]
C		REVISED PER TDRR 37954	[illegible]	[illegible]	1/8/70	FBB
D		REVISED PER TDRR 37967	[illegible]	[illegible]	2/18/70	FBB
E		REVISED PER TDRR 38022	[illegible]	[illegible]	[illegible]	FBB
F		REVISED PER TDRR 38073	[illegible]	[illegible]	[illegible]	FBB
G		REVISED PER TDRR 38151	[illegible]	[illegible]	5/5/70	FBB
H		REVISED PER TDRR 38173	[illegible]	[illegible]	7/12/70	FBB
J		REVISED PER TDRR 38250	[illegible]	[illegible]	[illegible]	FBB
K		REVISED PER TDRR 38380	[illegible]	[illegible]	4/2/71	FBB
L		REVISED PER TDRR 38403	[illegible]	[illegible]	4/2/71	FBB







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE X
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

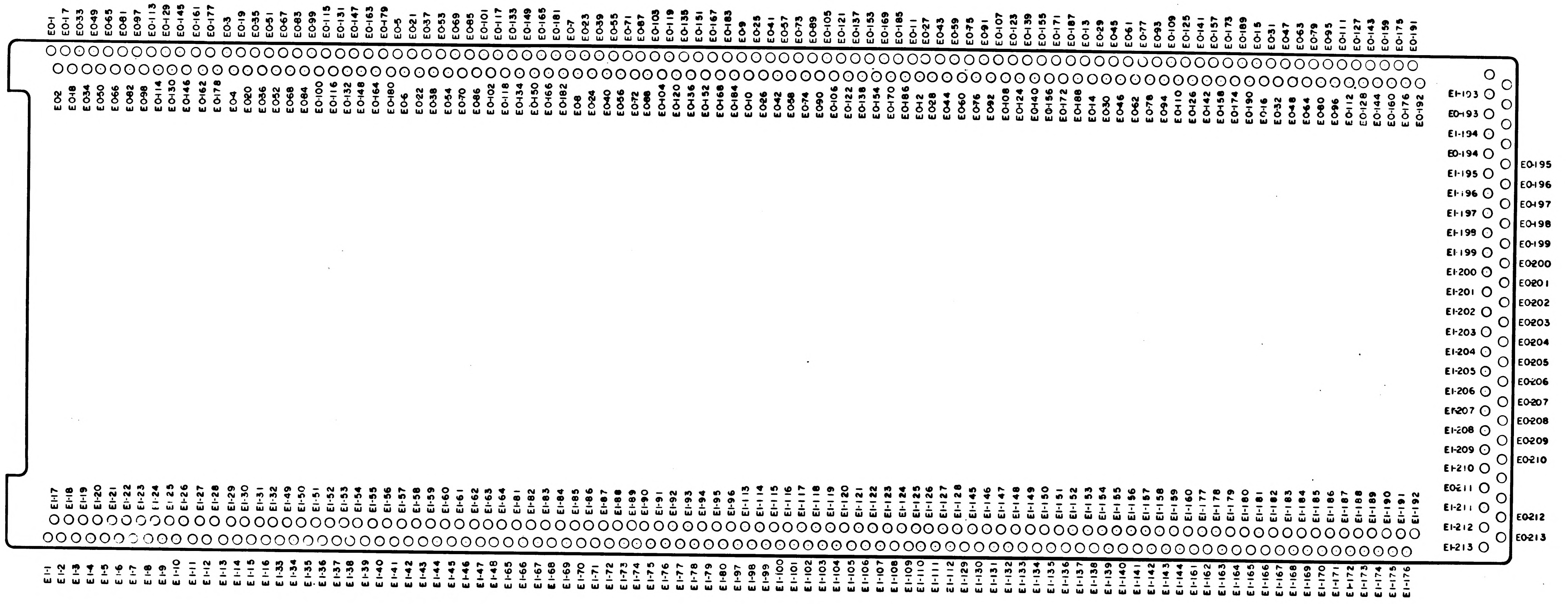
DRAWN R.F. Chester
CHECKED
APPROVED Alan C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010803
SCALE 2/1
SHEET 1 OF 2

REVISIONS						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
–		REVISED PER TDRR 379[illegible]			[illegible]	[illegible]
B		REVISED PER TDRR [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR [illegible]	[illegible]	[illegible]	1/8/70	[illegible]
D		REVISED PER TDRR [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 38[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 38[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
G		REVISED PER TDRR 381[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 38[illegible]	[illegible]	[illegible]	7/12[illegible]	[illegible]
J		REVISED PER TDRR 382[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
K		REVISED PER TDRR 385[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
L		REVISED PER TDRR 38403	[illegible]	[illegible]	[illegible]	[illegible]



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN R.F. Chuton
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010803

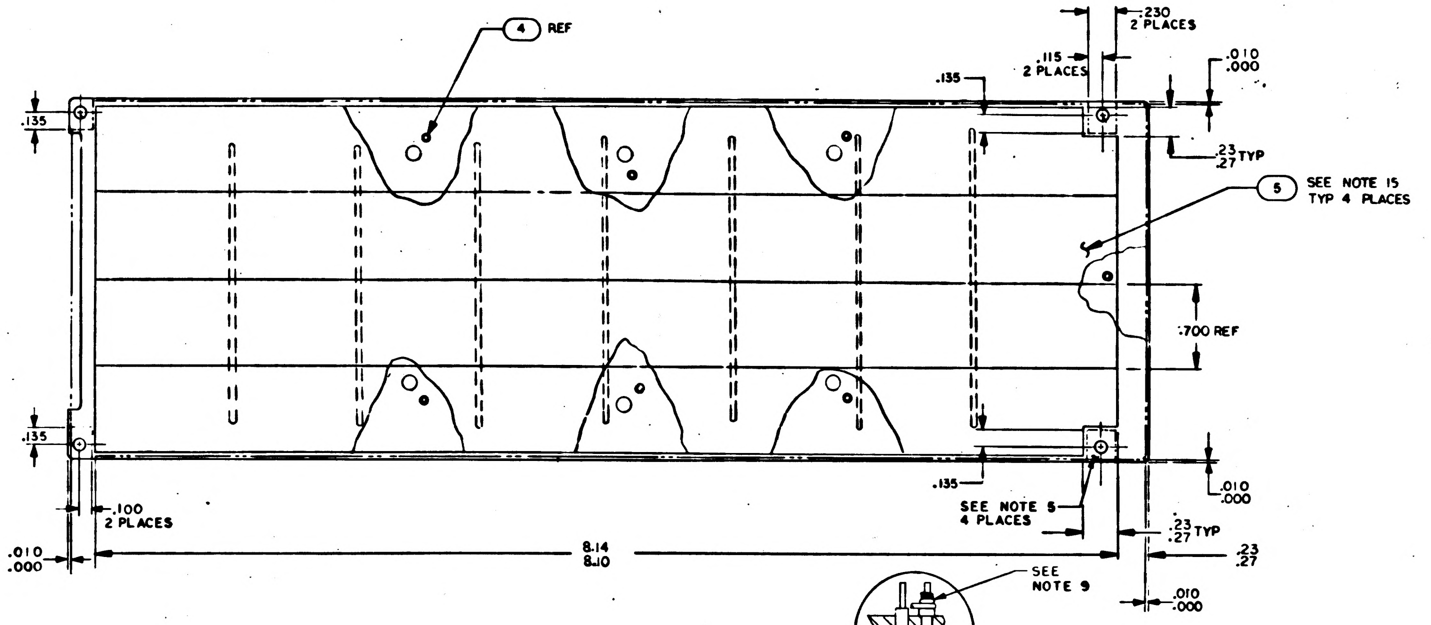
SCALE 4/1
SHEET 2 OF 2

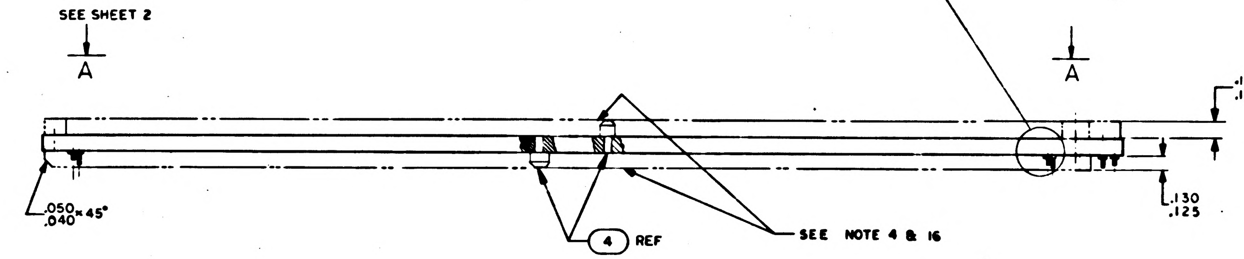
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

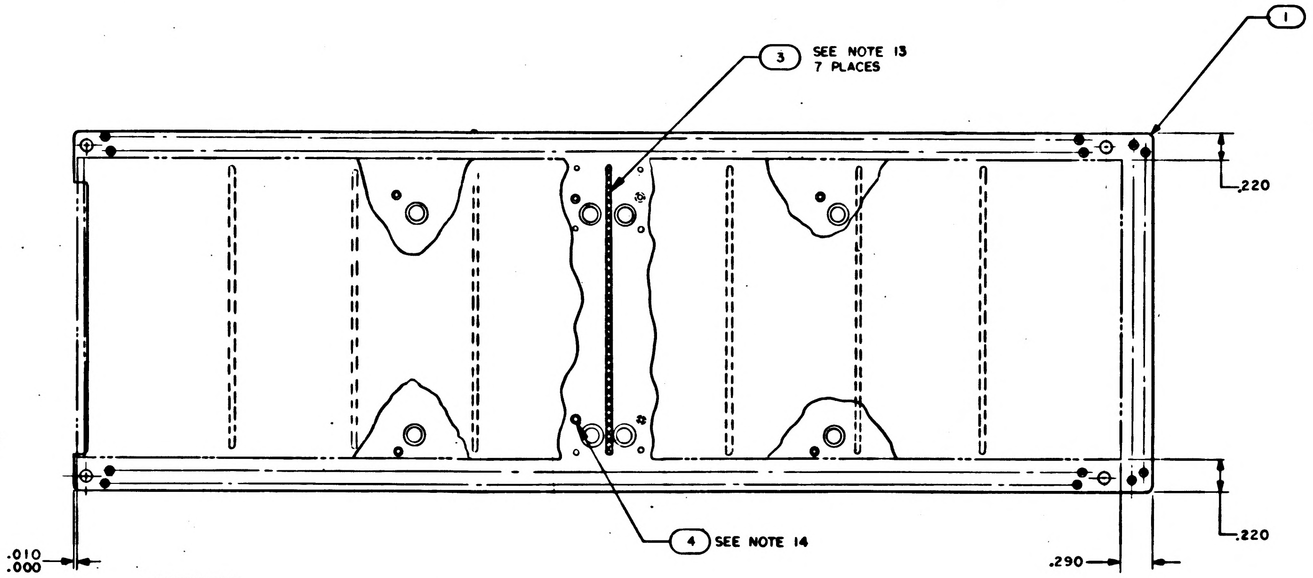
PART NO.	MODULE DECK NO.
2010803-011	0321
-021	0322
-031	0323
-041	0324
-051	0325
2010803-061	0326
2010803-071	0327
-081	0328
-091	0329
-111	0330
-121	0331
2010803-131	0332
2010803-141	0333
2010803-151	0334
2010803-161	0335
2010803-171	0336
2010803-181	0337
-191	0338
-211	0339
-221	0340
-231	0341
2010803-241	0342
2010803-251	0343
-261	0344
-271	0345
-281	0346
-291	0347
2010803-311	0348
2010803-321	0349
-331	0350
-341	0351
-351	0352
-361	0353
2010803-371	0354
2010803-381	0355
-391	0356
-411	0357
-421	0358
-431	0359
2010803-441	0360
2010803-451	0361
-461	0362
-471	0363
-481	0364
-491	0365
2010803-511	0366
2010803-521	0238
2010803-531	0229
2010803-541	0367
-551	0368
-561	0369
-571	0370
-581	0371
2010803-591	0372

REVISIONS TDRR 37650

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE
–		REVISED PER TDRR 37915	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 37916	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 37954	[illegible]	[illegible]	1/8/70	PBB
D		REVISED PER TDRR 37967	[illegible]	[illegible]	2/18/70	PBB
E		REVISED PER TDRR 38022	[illegible]	[illegible]	[illegible]	PBB
F		REVISED PER TDRR 38103	[illegible]	[illegible]	5/11/70	PBB
G		REVISED PER TDRR 38151	[illegible]	[illegible]	6/5/70	PBB
H		REVISED PER TDRR 38173	[illegible]	[illegible]	7/12/70	PBB
J		REVISED PER TDRR 38250	[illegible]	[illegible]	[illegible]	PBB
K		REVISED PER TDRR 38380	[illegible]	[illegible]	[illegible]	PBB
L		REVISED PER TDRR 38403	[illegible]	[illegible]	[illegible]	PBB
M		REVISED PER TDRR 38494	[illegible]	[illegible]	[illegible]	[illegible]







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN [illegible]
CHECKED [illegible] 9 APR [illegible]
APPROVED [illegible] [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC [illegible] DATE

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

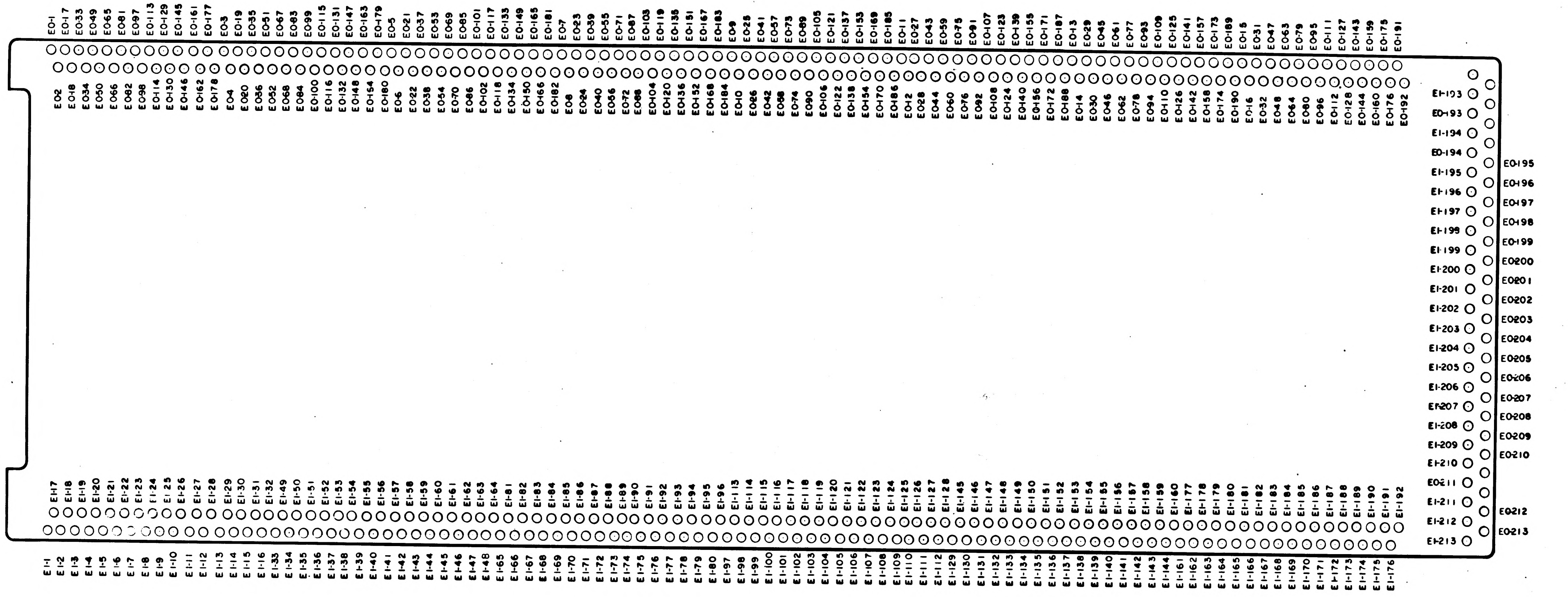
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010803
SCALE 2/1
SHEET 1 OF 2

2010803 M

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 3765[illegible]

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37915	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 3791[illegible]	[illegible]	[illegible]	12/11/69	[illegible]
C		REVISED PER TDRR 3795[illegible]	[illegible]	[illegible]	1/8/70	[illegible]
D		REVISED PER TDRR 3[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 38022	[illegible]	[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 38032	[illegible]		[illegible]	[illegible]
G		REVISED PER TDRR 38151	[illegible]	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 38173	[illegible]		[illegible]	[illegible]
J		REVISED PER TDRR 38250	[illegible]	[illegible]	[illegible]	[illegible]
K		REVISED PER TDRR 38380	[illegible]	[illegible]	[illegible]	[illegible]
L		REVISED PER TDRR 38403	[illegible]	[illegible]	[illegible]	[illegible]
M		REVISED PER TDRR 38494	[illegible]	[illegible]	[illegible]	[illegible]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E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN R.F. Chist[illegible]
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

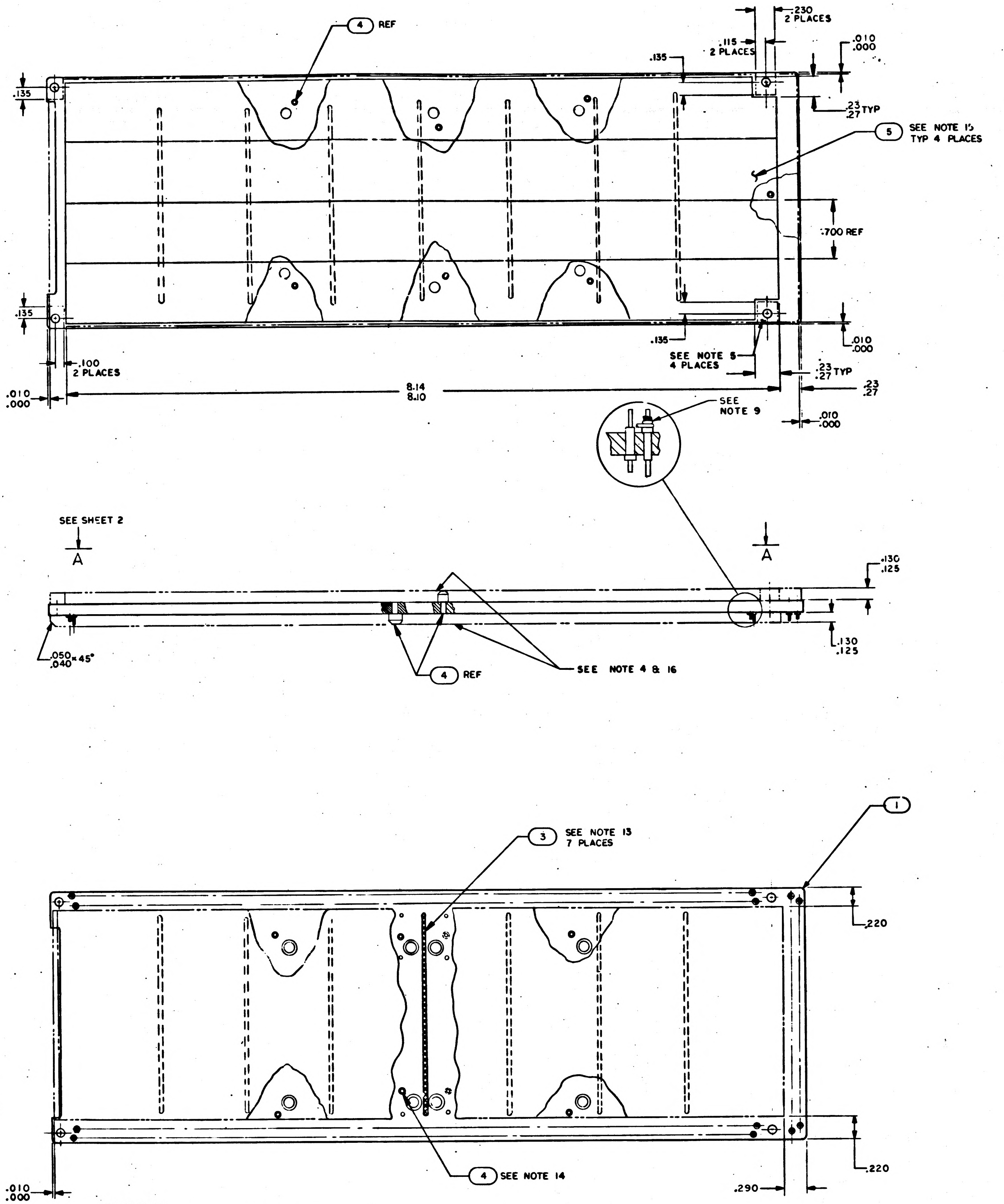
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010803
SCALE 4/1
SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS EDRR 37654						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVE



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002, REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENINGS
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD 1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. BOND FIND NO. 5 TO SURFACE OF ENCAPSULATION CENTRALIZE AS SHOWN.
16. VISIBLE COMPONENTS, FIND NO. 2, 3 & 4 SHALL NOT EXCEED ENCAPSULATED SURFACE
17. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES:

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND 1002285
2. FIXED MEMORY FIXTURE DWG NO AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006806-8	INSULATION TAPE, ELECTRICAL	5
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE, ELECTRICAL	2
1	2003050-021	COREHOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
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FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

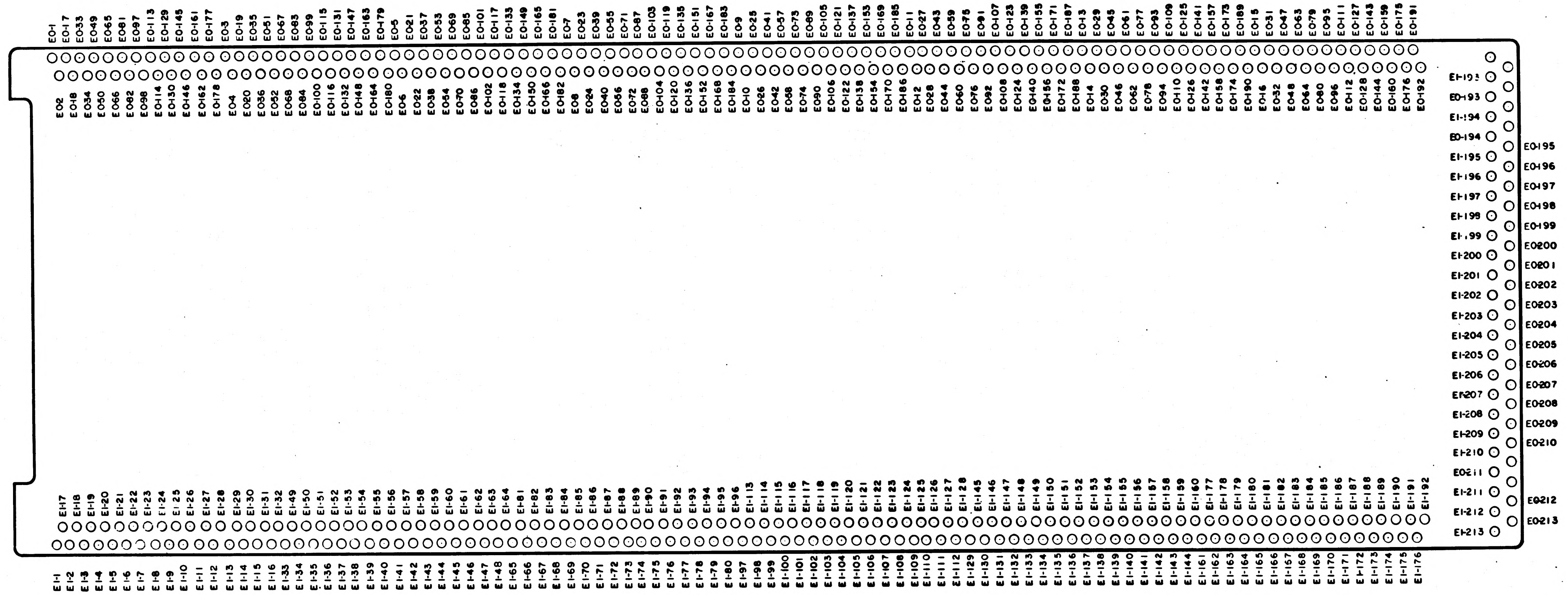
DRAWN R.F. Christie
CHECKED E. Urban 10 APR 69
APPROVED Eldon C Hall 11 Apr 69
APPROVED
APPROVED MIT
APPROVED MSC DATE 4/14/69

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO. 80230 SIZE E DRAWING NO. 2010803
SCALE 2/1 SHEET 1 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS IDRR 37						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



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QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS.
		MATERIAL	DRAWN R.F. Christen CHECKED E. Uhlm APPROVED APPROVED
NEXT ASSY	USED ON		APPROVED MIT APPROVED MSC
APPLICATION			DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE B
FIXED MEMORY MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010803
SCALE 4/1		SHEET 2 OF 2

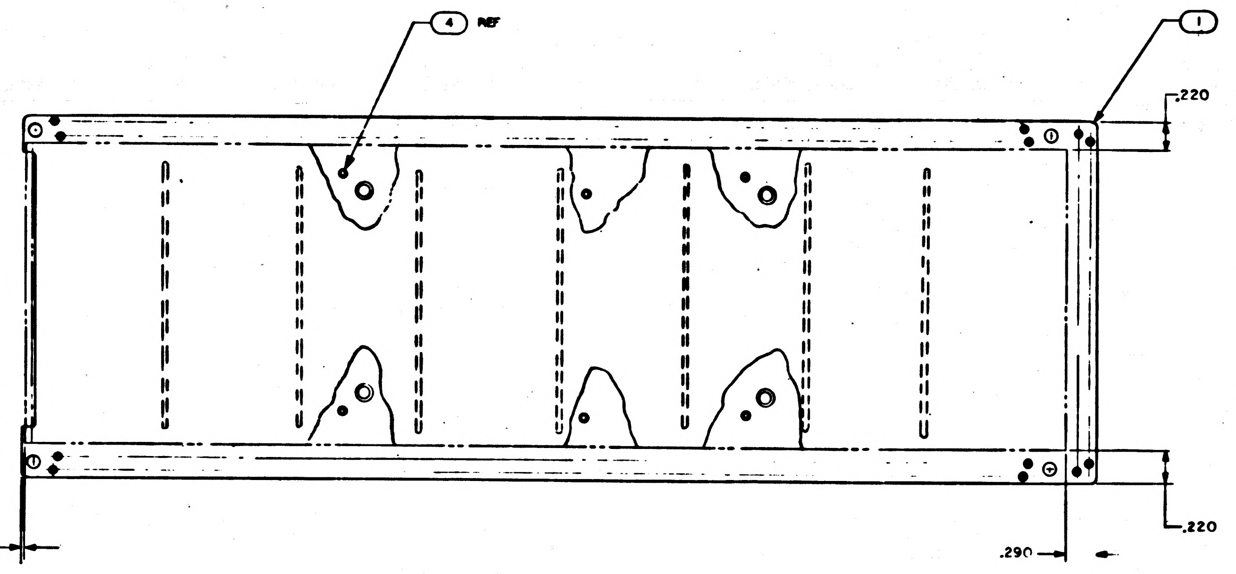
2010803

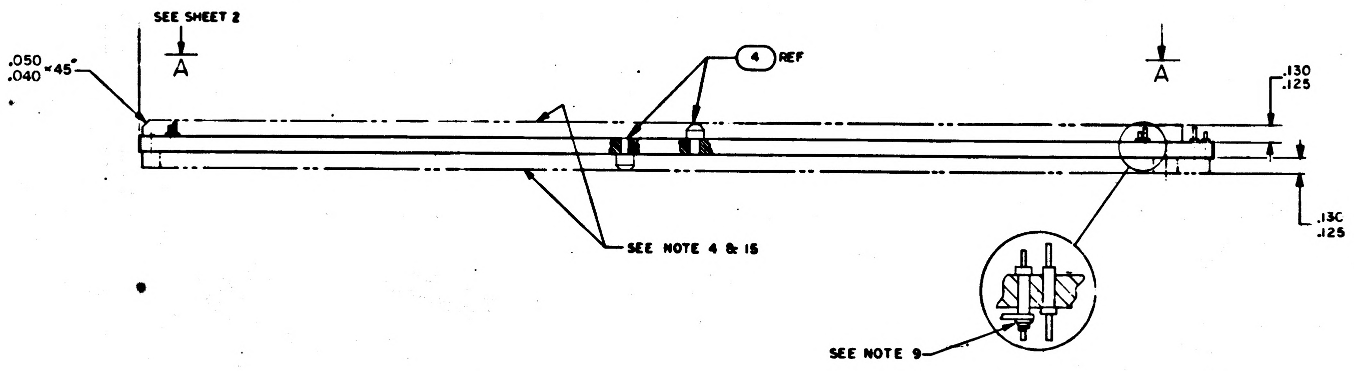
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

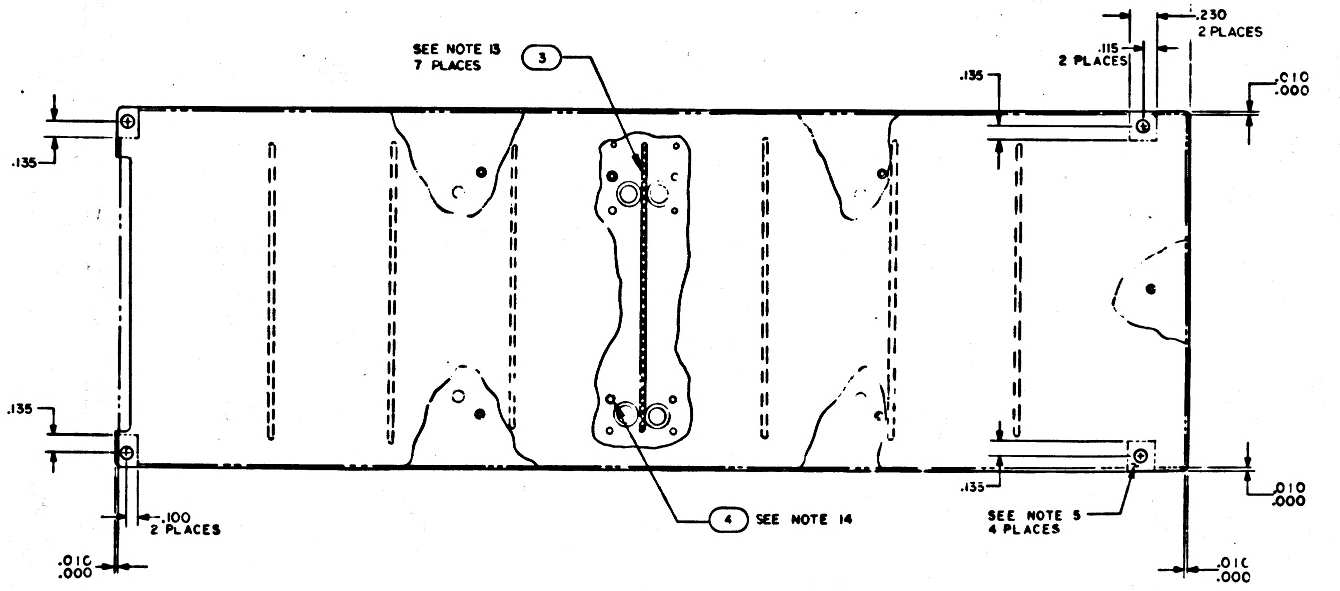
PART NO.	MODULE DECK NO.
2010804-011	0316

REVISIONS TORR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TORR 37878			1/14/69	







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

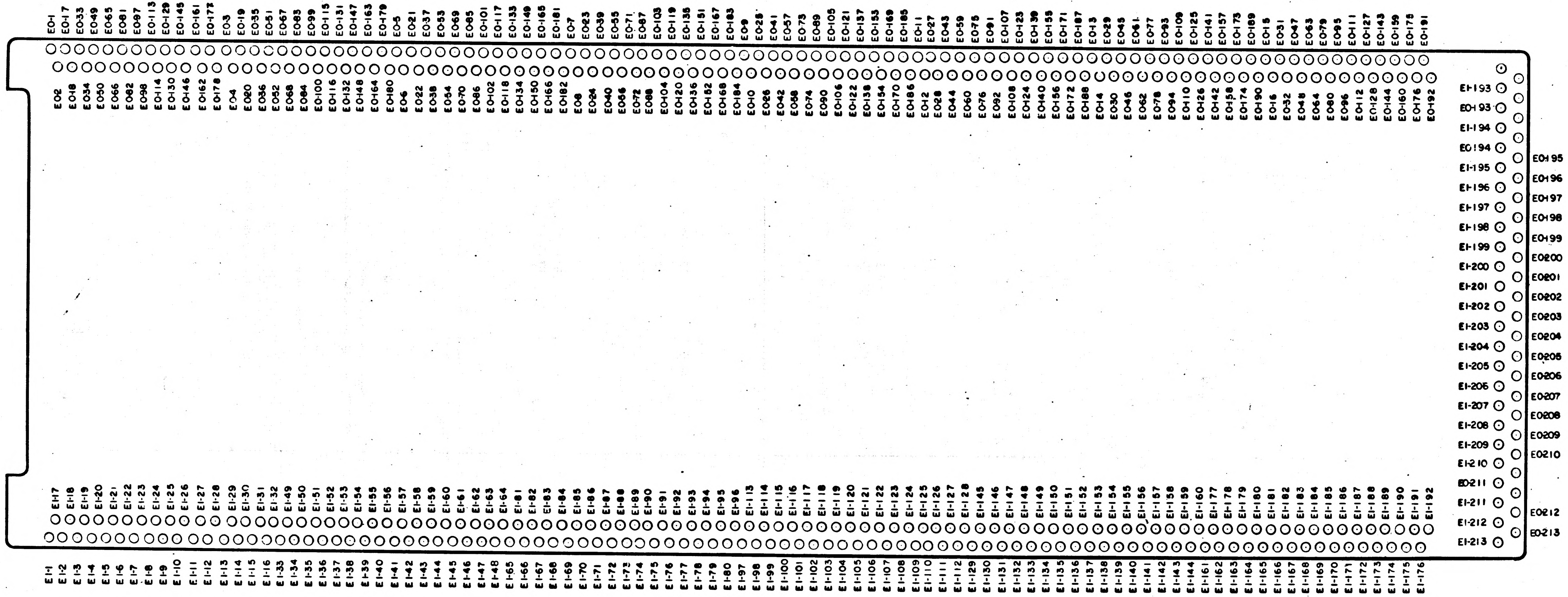
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010804

SCALE 2/1 SHEET 1 OF 2



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VIEW A-A

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 37878 DR CHK	11/4/69	

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

NEXT ASSY | USED ON

APPLICATION

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED 10 APR 69
APPROVED Eldon C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

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PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326

REVISIONS TDRR 37 52

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
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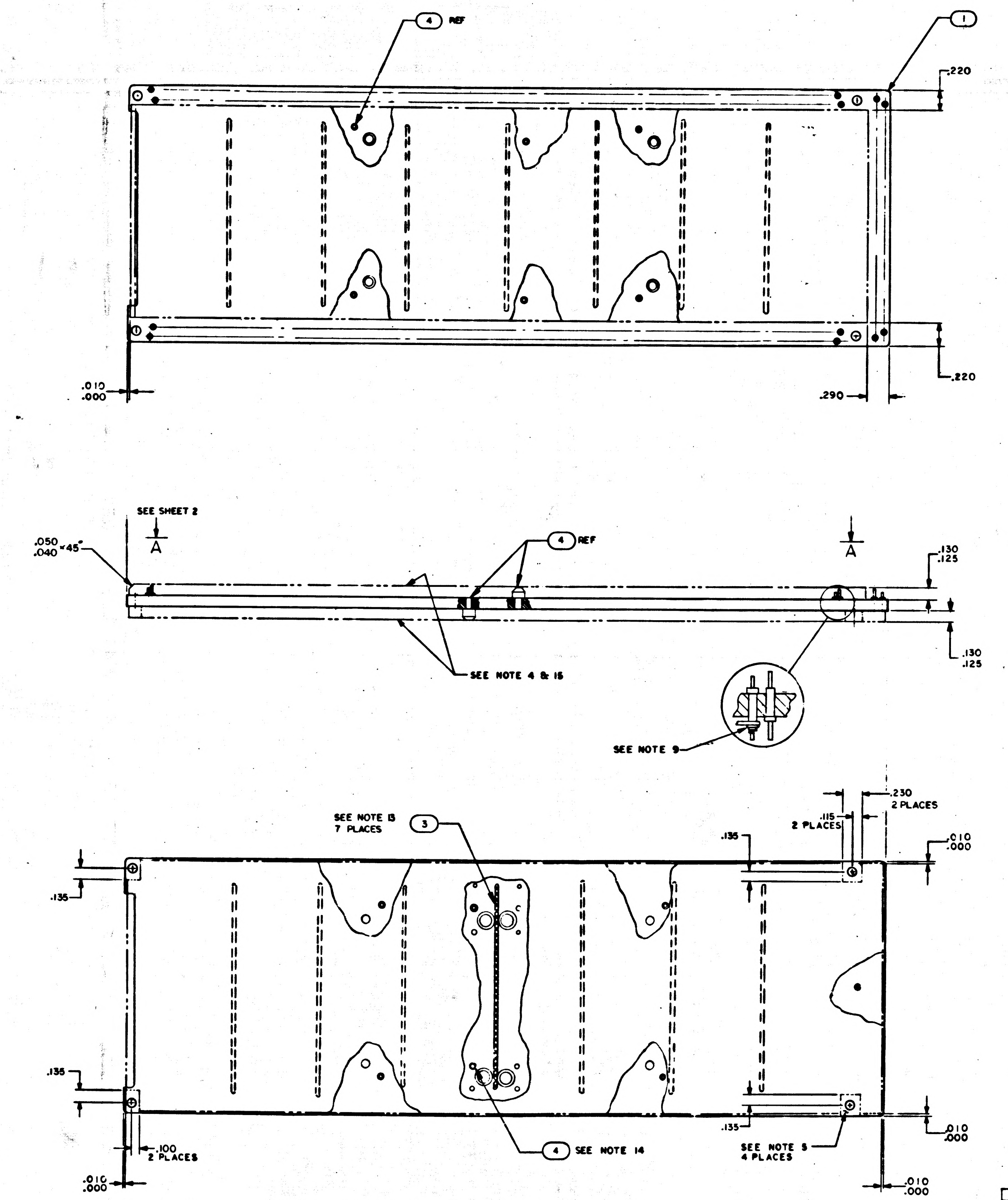
B		REVISED PER TDRR 37915				



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND 1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE II
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

LIST OF MATERIALS

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
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CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010804

SCALE 2/1
SHEET 1 OF 2

[illegible]

TCRR 3765

SYM	DESCRIPTION	DATE	
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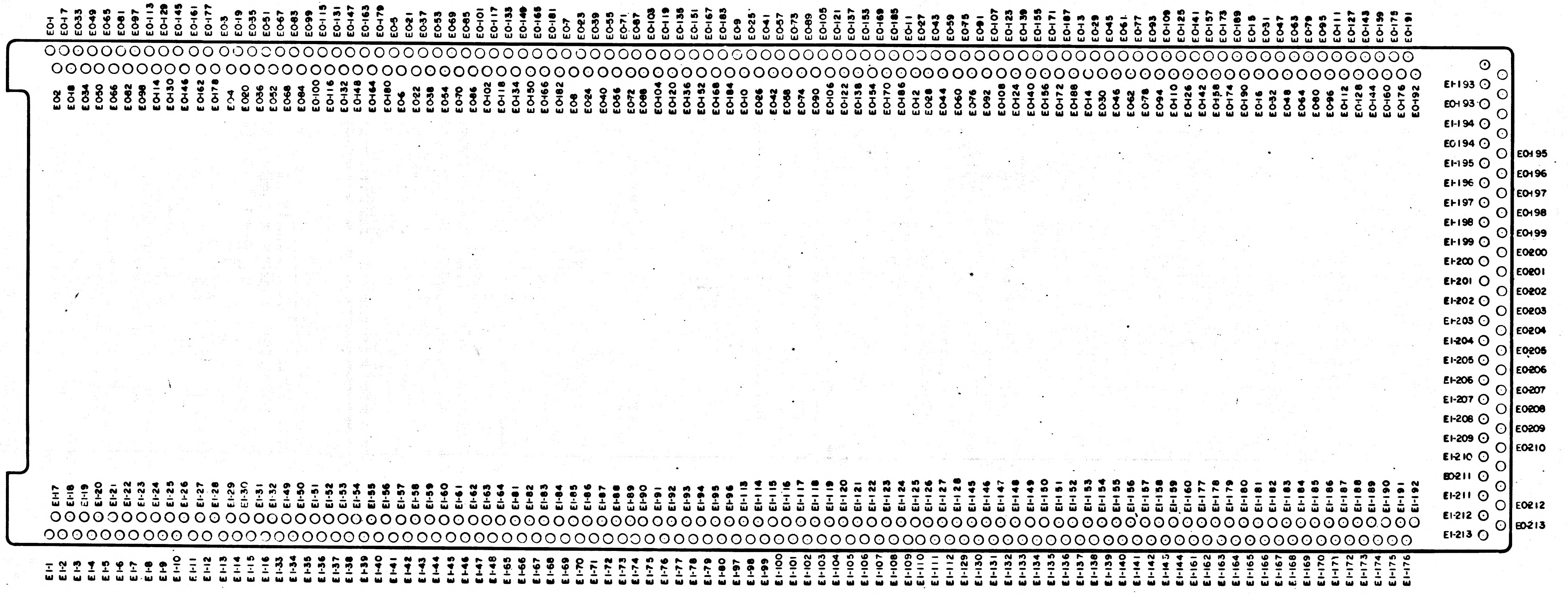
B	REVISED PER TDRR 37915 DR CHK		TRB



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 68
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO	SIZE	DRAWING NO.
80230	E	2010804

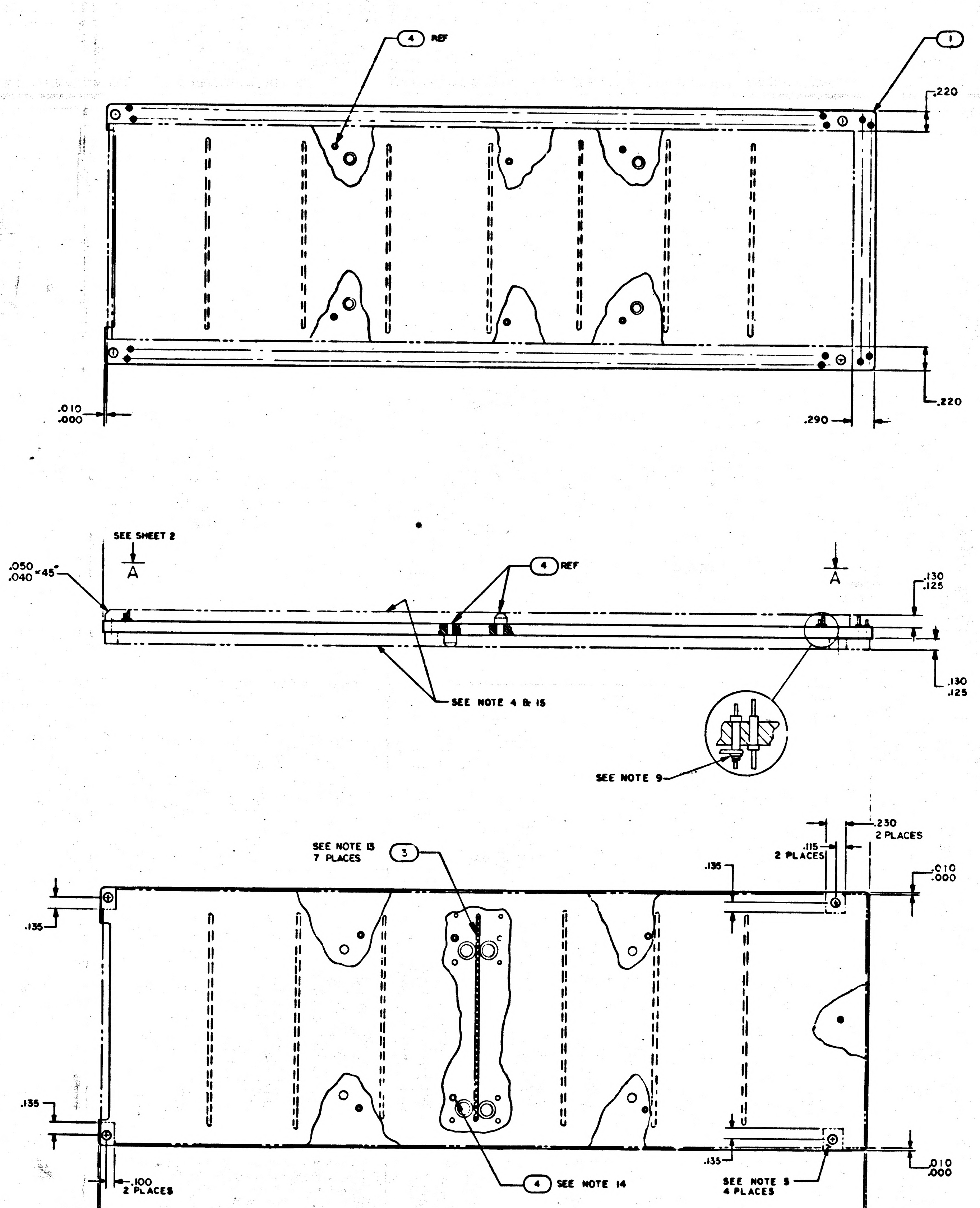
SCALE 4/1 SHEET 2 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010804-0[illegible]	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
[illegible]0804-0[illegible]	0326
[illegible]0804-08[illegible]	0327
-0[illegible]	0328
-[illegible]	0329
-12	0330
-13	0331
2010804-141	0332

REVISIONS TORR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TORR 37878			11/4/69	
B		REVISED PER TORR 37915			12/4/69	
C		REVISED PER TORR 37916			12/11/69	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND 1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE II
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

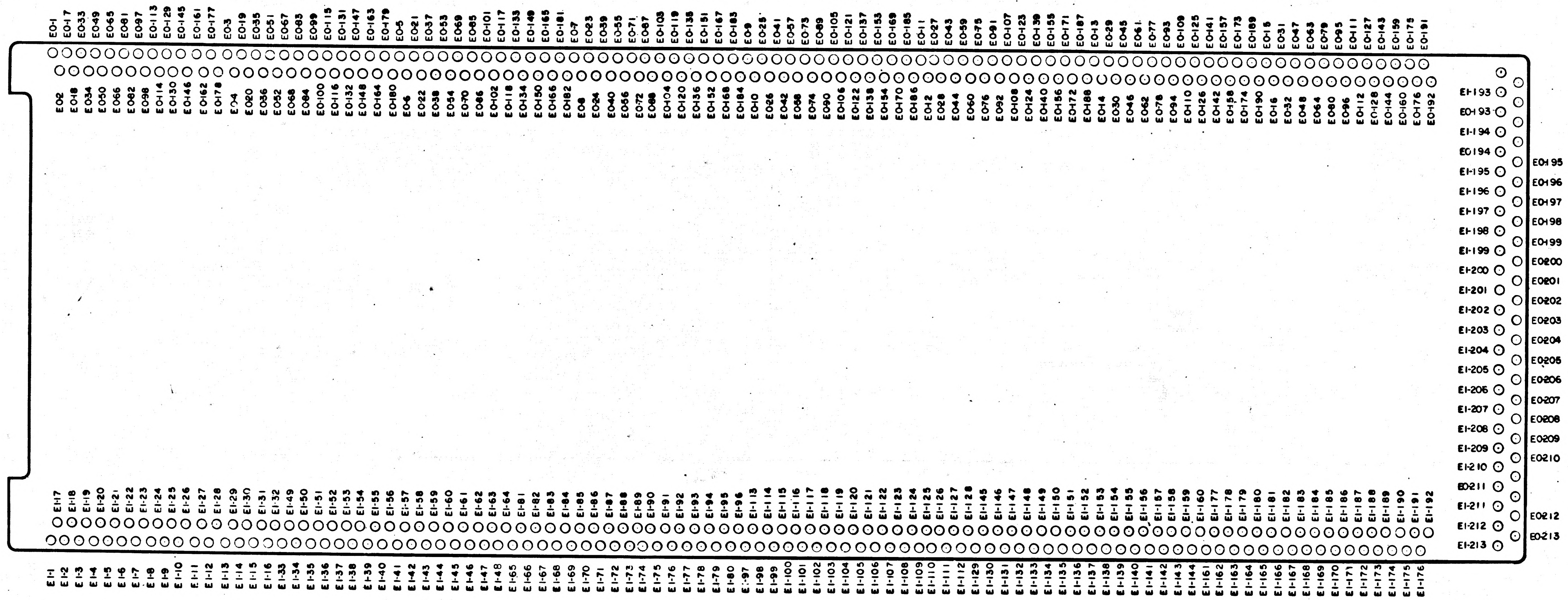
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230 SIZE E DRAWING NO. 2010804
SCALE 2/1 SHEET 1 OF 2

REVISIONS TDRR 3765

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 37878 DR CHK	11/4/69	FFB
B	REVISED PER TDRR 37915 DR CHK		FFB
C	REVISED PER TDRR 37916 DR CHK	11/4/69	FFR



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E0-2 E0-18 E0-34 E0-50 E0-66 E0-82 E0-98 E0-114 E0-130 E0-146 E0-162 E0-178 E0-4 E0-20 E0-36 E0-52 E0-68 E0-84 E0-100 E0-116 E0-132 E0-148 E0-164 E0-180 E0-6 E0-22 E0-38 E0-54 E0-70 E0-86 E0-102 E0-118 E0-134 E0-150 E0-166 E0-182 E0-8 E0-24 E0-40 E0-56 E0-72 E0-88 E0-104 E0-120 E0-136 E0-152 E0-168 E0-184 E0-10 E0-26 E0-42 E0-58 E0-74 E0-90 E0-106 E0-122 E0-138 E0-154 E0-170 E0-186 E0-12 E0-28 E0-44 E0-60 E0-76 E0-92 E0-108 E0-124 E0-140 E0-156 E0-172 E0-188 E0-14 E0-30 E0-46 E0-62 E0-78 E0-94 E0-110 E0-126 E0-142 E0-158 E0-174 E0-190 E0-16 E0-32 E0-48 E0-64 E0-80 E0-96 E0-112 E0-128 E0-144 E0-160 E0-176 E0-192
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E1-1 E1-2 E1-3 E1-4 E1-5 E1-6 E1-7 E1-8 E1-9 E1-10 E1-11 E1-12 E1-13 E1-14 E1-15 E1-16 E1-33 E1-34 E1-35 E1-36 E1-37 E1-38 E1-39 E1-40 E1-41 E1-42 E1-43 E1-44 E1-45 E1-46 E1-47 E1-48 E1-65 E1-66 E1-67 E1-68 E1-69 E1-70 E1-71 E1-72 E1-73 E1-74 E1-75 E1-76 E1-77 E1-78 E1-79 E1-80 E1-97 E1-98 E1-99 E1-100 E1-101 E1-102 E1-103 E1-104 E1-105 E1-106 E1-107 E1-108 E1-109 E1-110 E1-111 E1-112 E1-129 E1-130 E1-131 E1-132 E1-133 E1-134 E1-135 E1-136 E1-137 E1-138 E1-139 E1-140 E1-141 E1-142 E1-143 E1-144 E1-161 E1-162 E1-163 E1-164 E1-165 E1-166 E1-167 E1-168 E1-169 E1-170 E1-171 E1-172 E1-173 E1-174 E1-175 E1-176

VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED Eldon C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

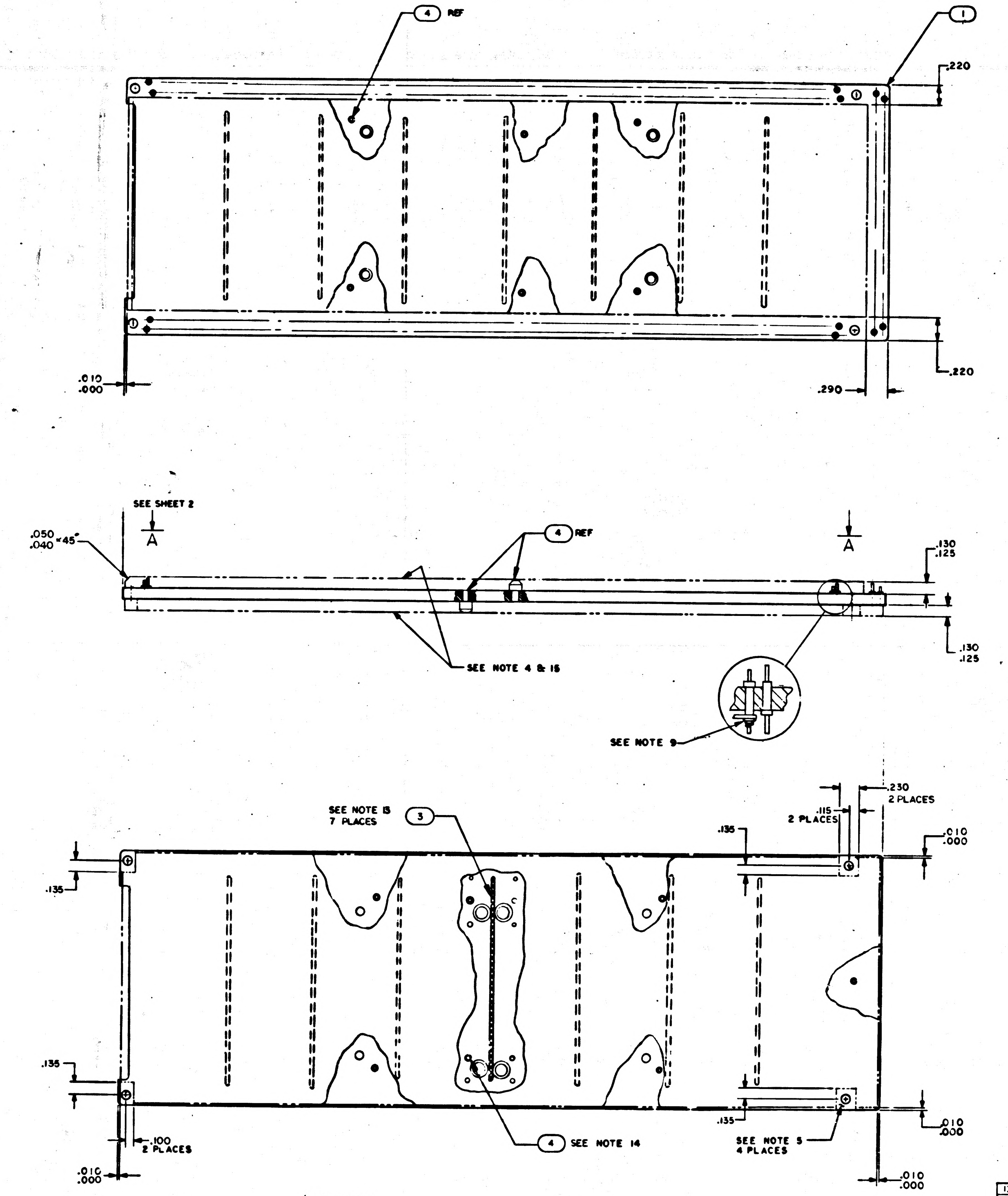
2010804

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326
2010804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37878	JH		11/4/69	TTB
B		REVISED PER TDRR 37915	JH		12/4/69	TTB
C		REVISED PER TDRR 37916	JH		12/11/69	TTB
D		REVISED PER TDRR 38022	JF		4/9/70	TTB



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND 1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
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13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE II
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

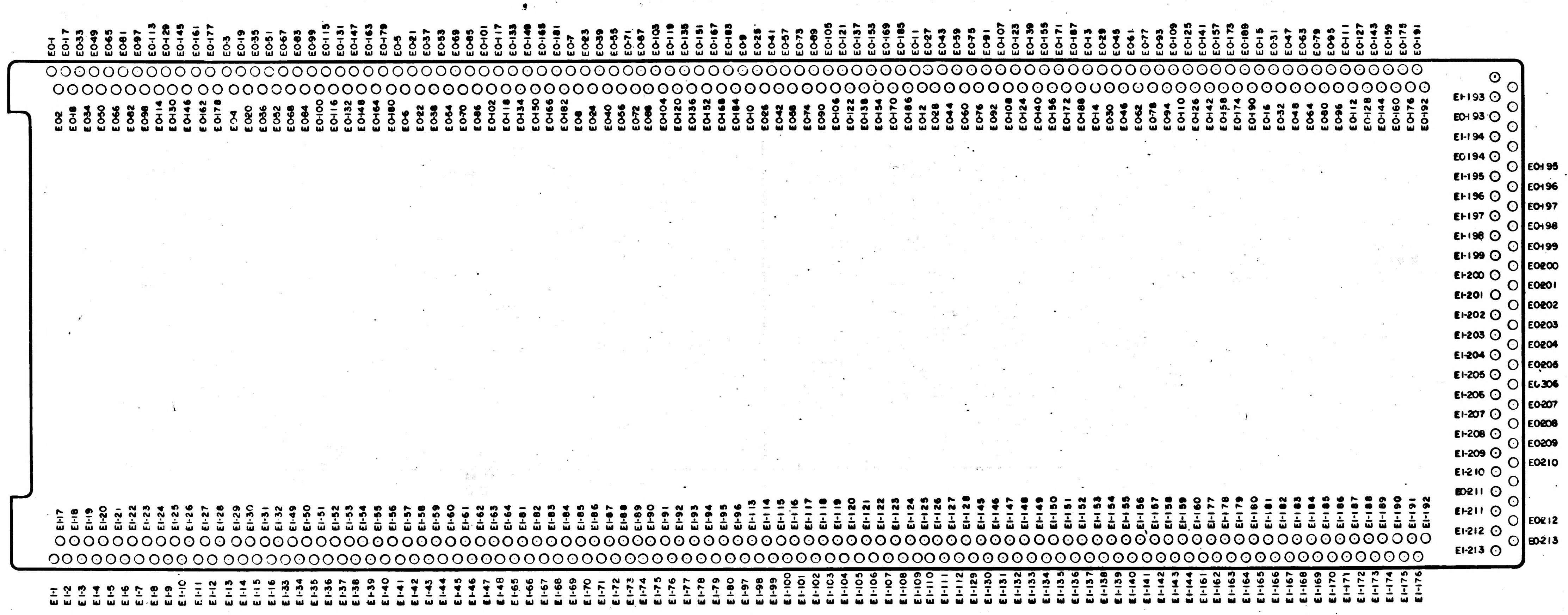
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 2/1
SHEET 1 OF 2

REVISIONS TDRR 37682

SYM	DESCRIPTION	DATE	APPROVED
A	REVISED PER TDRR 37878 DR CHK	11/4/69	PBR
B	REVISED PER TDRR 37915 DR CHK	12/	PBR
C	REVISED PER TDRR 37916 DR CHK	1/4/69	PBR
D	REVISED PER TDRR 38022 DR CHK	4/9/70	PBR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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN 30 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

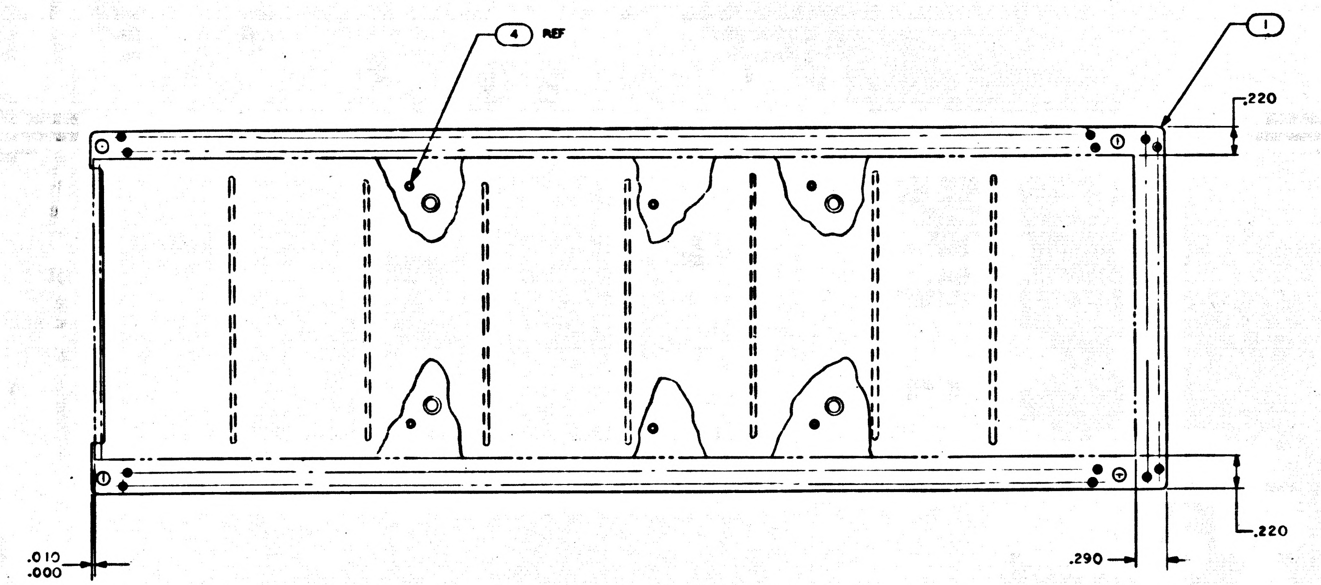
CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

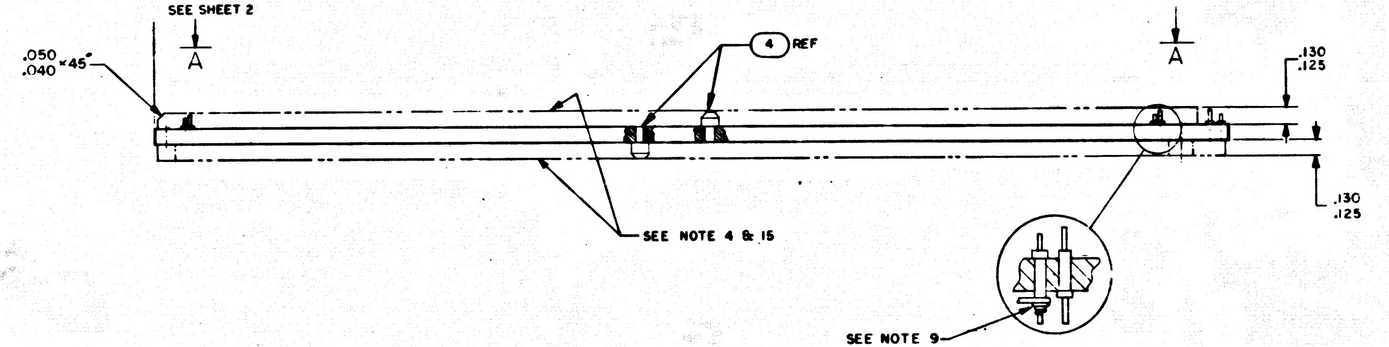
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

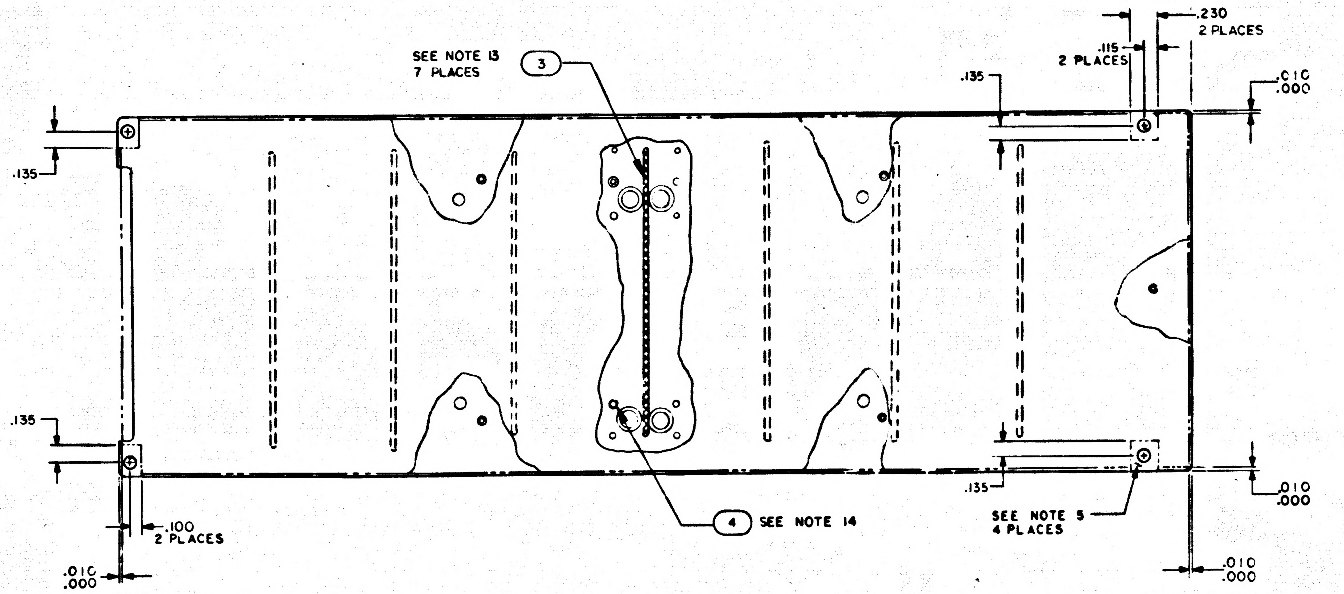
REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 37915	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D		REVISED PER TDRR [illegible]5022	[illegible]	[illegible]	4/9/7[illegible]	[illegible]
E		REVISED PER TDRR 35032	[illegible]	[illegible]	3/11	[illegible]

PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326
2010804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
2010804-161	0336







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± —— DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL ——

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

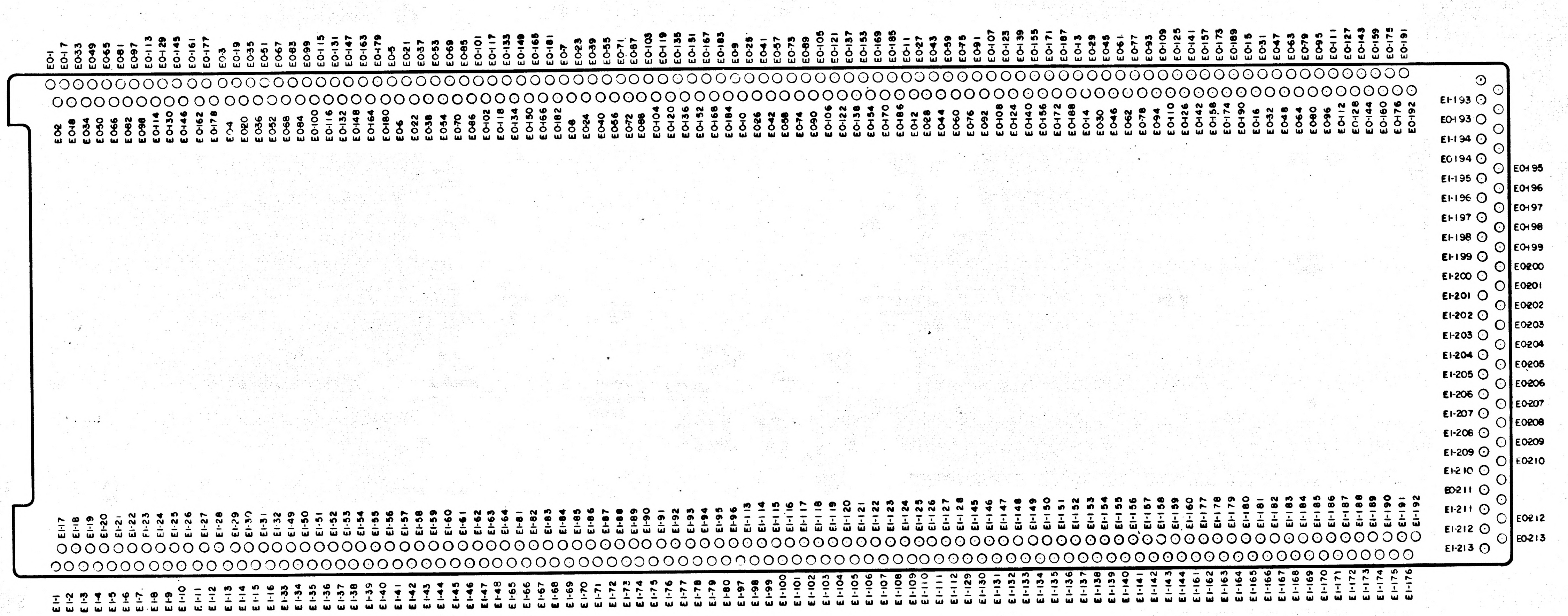
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 2/1
SHEET 1 OF 2

2010804

SYM	DESCRIPTION		
A	REVISED PER TDRR 37875 DR CHK		
B	REVISED PER TDRR 37915 DR CHK		
C	REVISED PER TDRR 37916 DR CHK		
D	REVISED PER TDRR 380 DR CHK		PBB
E	REVISED PER TDRR 38 DR CHK		PAB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VIEW A-A

QTY RLQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

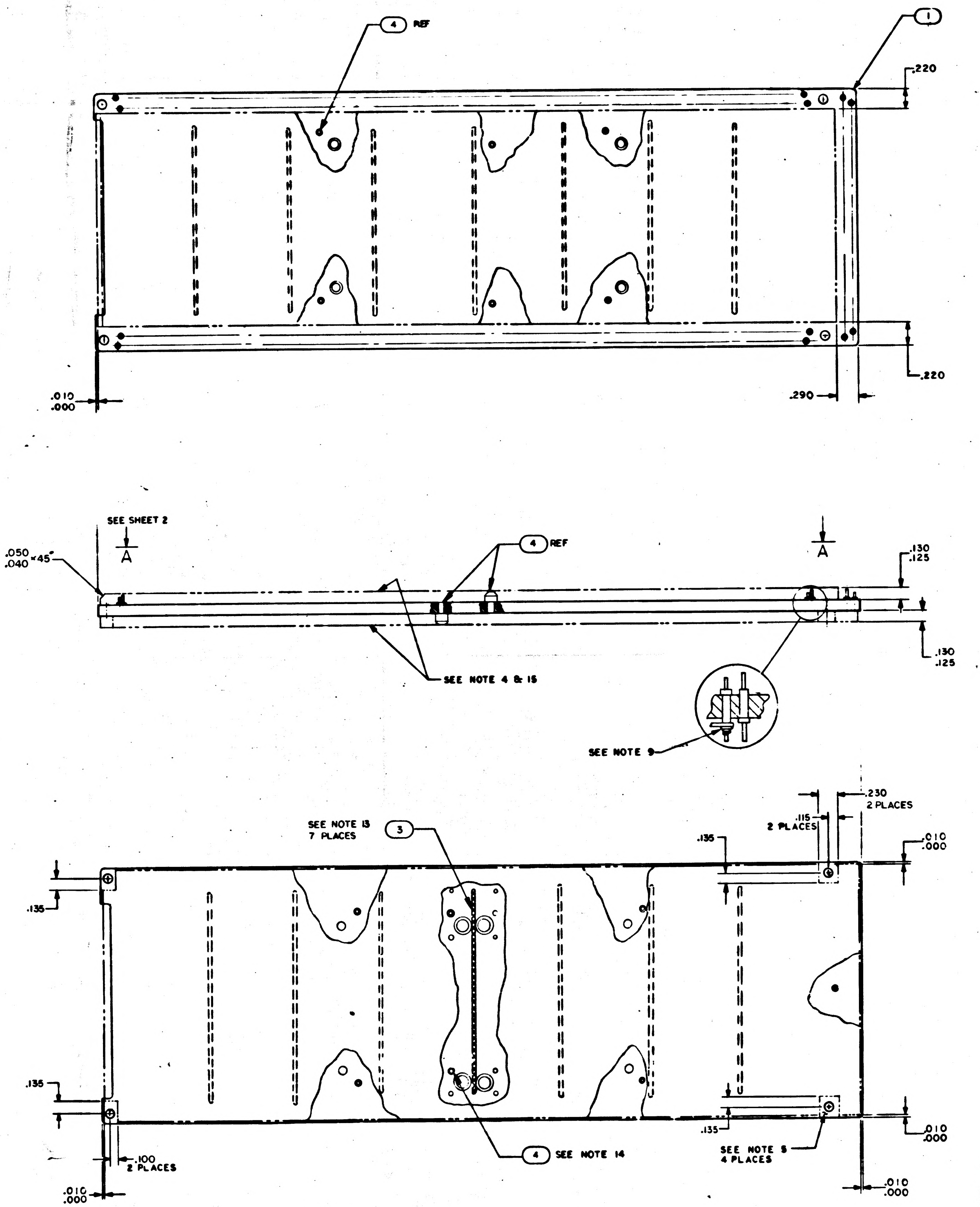
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010804-01	0318
2010804-02	0321
-03	0322
-04	0323
-05	0324
-06	0325
2010804-071	0326
2010804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
2010804-161	0336
2010804-171	0337
-181	0338
-191	0339
-211	0340
-221	0341
2010804-231	0342

REVISIONS TDRR 37152

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37[illegible]				
B		REVISED PER TDRR 37915				
C		REVISED PER TDRR 37915				
D		REVISED PER TDRR 3802[illegible]				
E		REVISED PER TDRR 38032				
F		REVISED PER TDRR 38151				



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE II
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYI	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
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TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
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MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

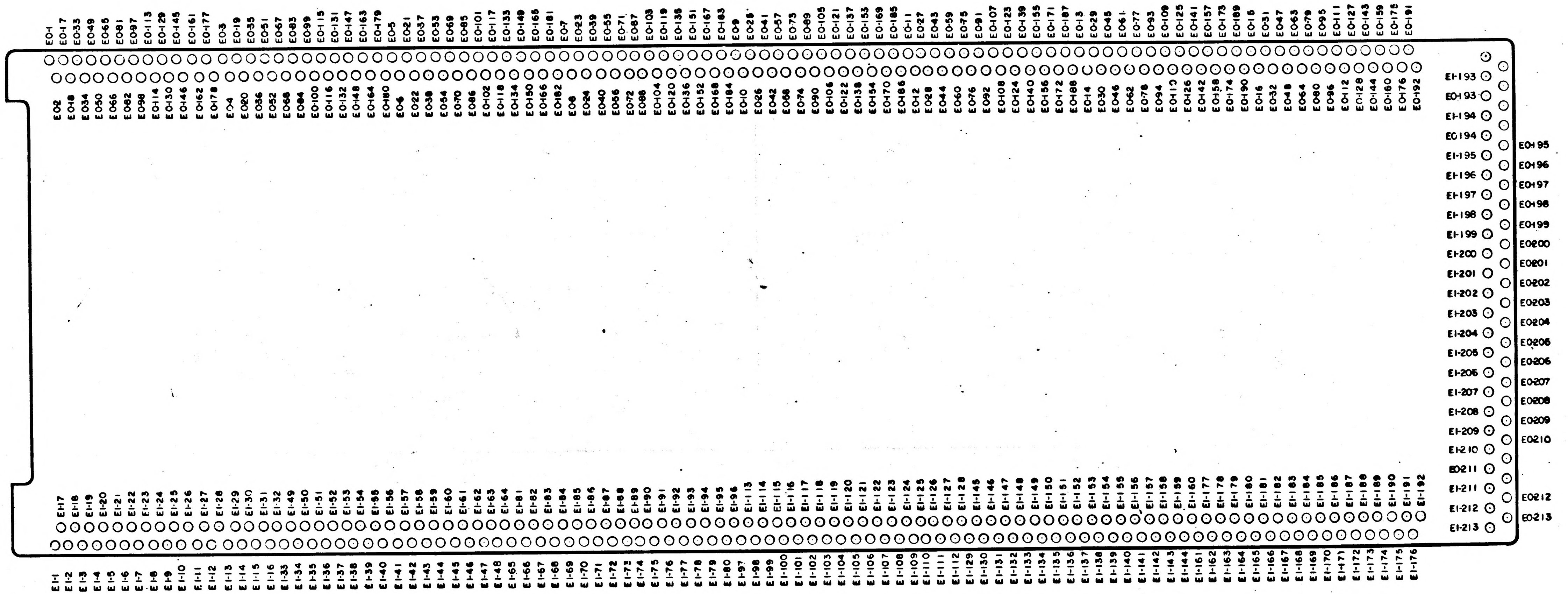
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 2/1
SHEET 1 OF 2

2010804

TCRR 3763

SYM	DESCRIPTION	DATE	
A	REVISED PER TDRR 37878 DR CHK	11/4/69	
B	REVISED PER TDRR 37915 DR CHK		
C	REVISED PER TDRR 37916 DR CHK		
D	REVISED PER TDRR 38022 DR CHK		
E	REVISED PER TDRR 38032 DR CHK	5/11/70	
F	REVISED PER TDRR 38151 DR CHK	5/70	



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith 10 APR 69
CHECKED E Urban 10 APR 69
APPROVED Eldon C Hall 11 Apr 69
APPROVED
APPROVED MIT W G Marley
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

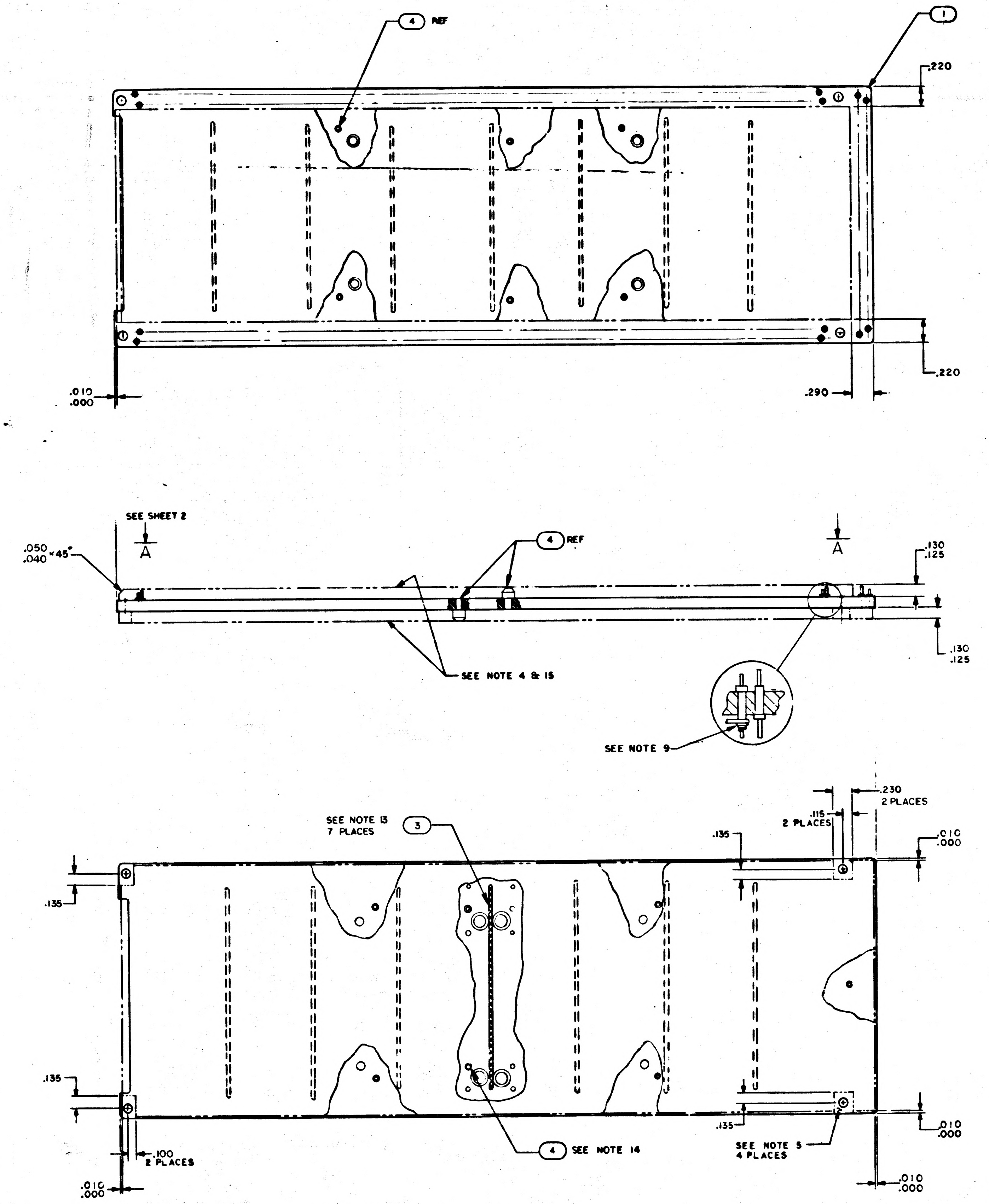
CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010804
SCALE 4/1		SHEET 2 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326
2010804-081	0327
-091	0328
-11[illegible]	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
2010804-161	0336
2010804-171	0337
-181	0338
-191	0339
-211	0340
-221	0341
2010804-231	0342
2010804-241	0343
-251	0344
-261	0345
-271	0346
-281	0347
2010804-291	0348

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDPR 37878				
B		REVISED PER TDPR 37915				
C		REVISED PER TDRR 37916				
D		REVISED PER TDRR 38022				
E		REVISED PER TDRR 38032				
F		REVISED PER TDRR 38151				
G		REVISED PER TDRR 38173				



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND-NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYIN	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

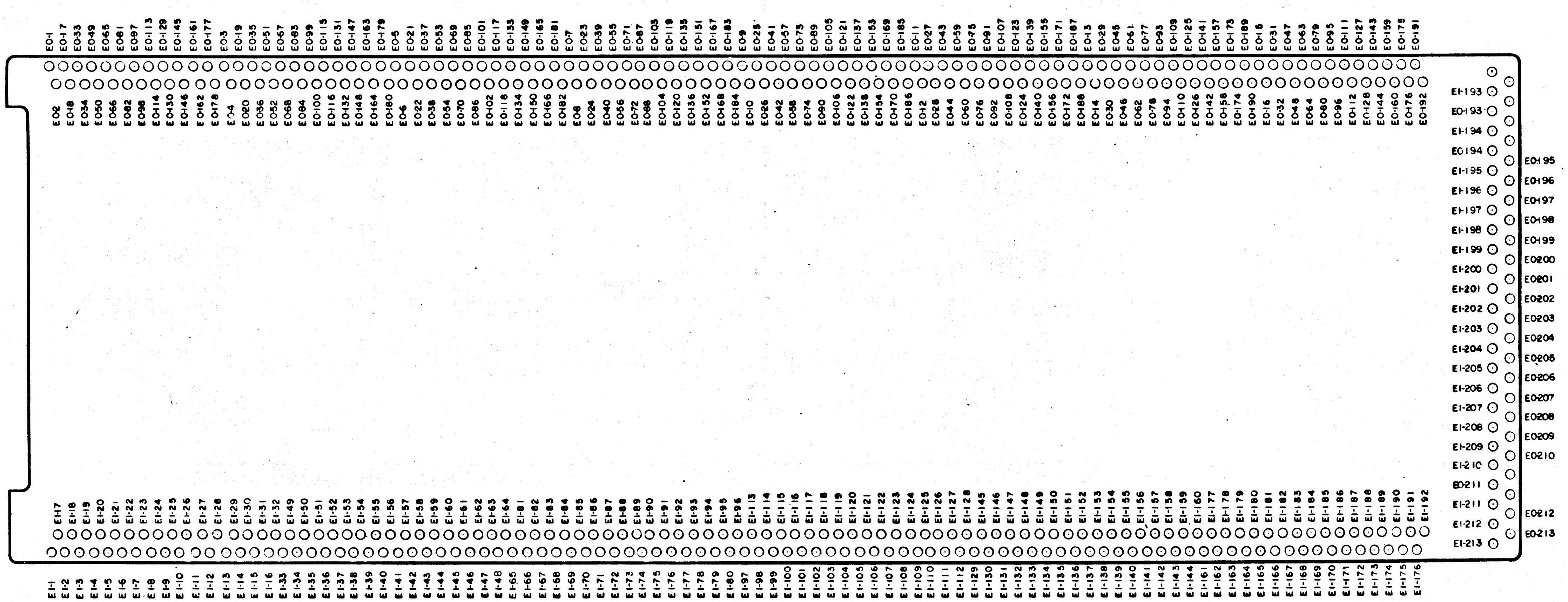
DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 2/1
SHEET 1 OF 2

2010804

SYM	DESCRIPTION	DATE	
A	REVISED PER TDRR 37573 DR [illegible] CHK [illegible]	[illegible]/69	PEB
B	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]	[illegible]	PBB
C	REVISED PER TDRR 37916 DR [illegible] CHK [illegible]	[illegible]/69	PEB
D	REVISED PER TDRR 3802[illegible] DR [illegible] CHK [illegible]	[illegible]	PEB
E	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]	[illegible]	PEB
F	REVISED PER TDRR 38151 DR [illegible] CHK [illegible]	[illegible]	PEB
G	REVISED PER TDRR 38173 DR [illegible] CHK [illegible]	[illegible]/70	PBB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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED E Urban [illegible]
APPROVED Eldon C Hall [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

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REVISIONS TORR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37978				
B		REVISED PER TDRR 37915				
C		REVISED PER TDRR 37916				
D		REVISED PER TDRR 38022				
E		REVISED PER TDRR 38032				
F		REVISED PER TDRR 38151				
G		REVISED PER TDRR 38173				
H		REVISED PER TDRR 38250				

PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326
2010804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
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-211	0340
-221	0341
2010804-231	0342
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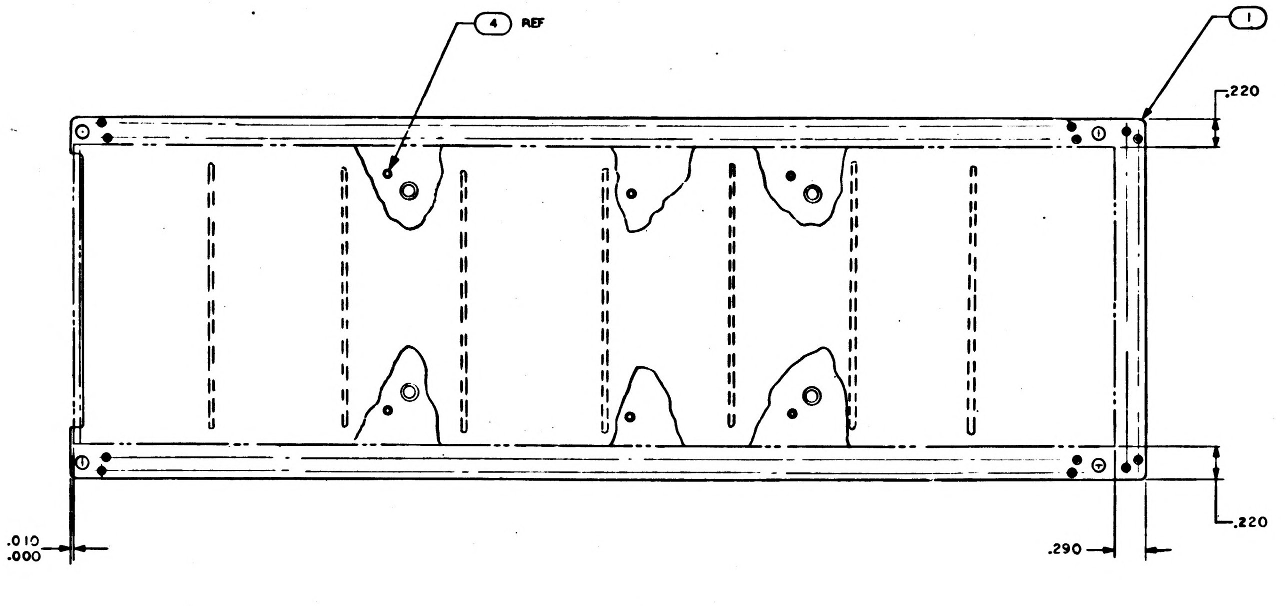

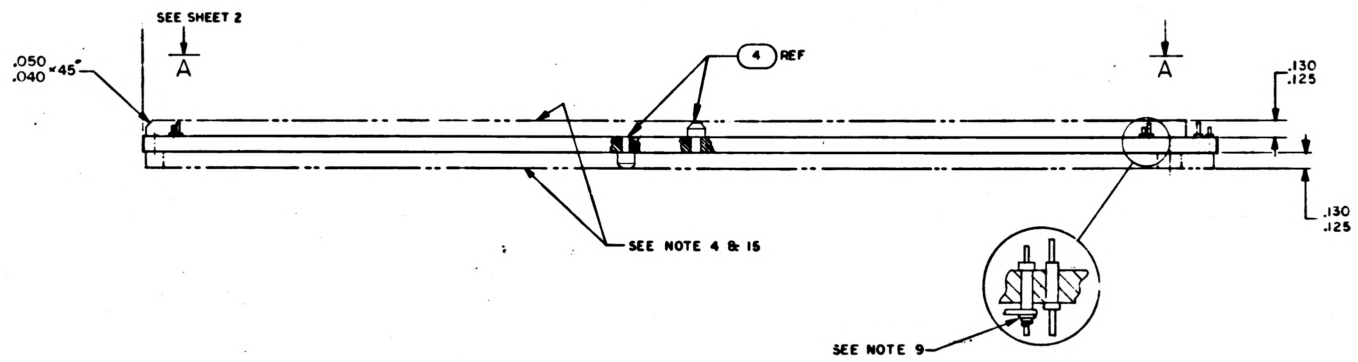

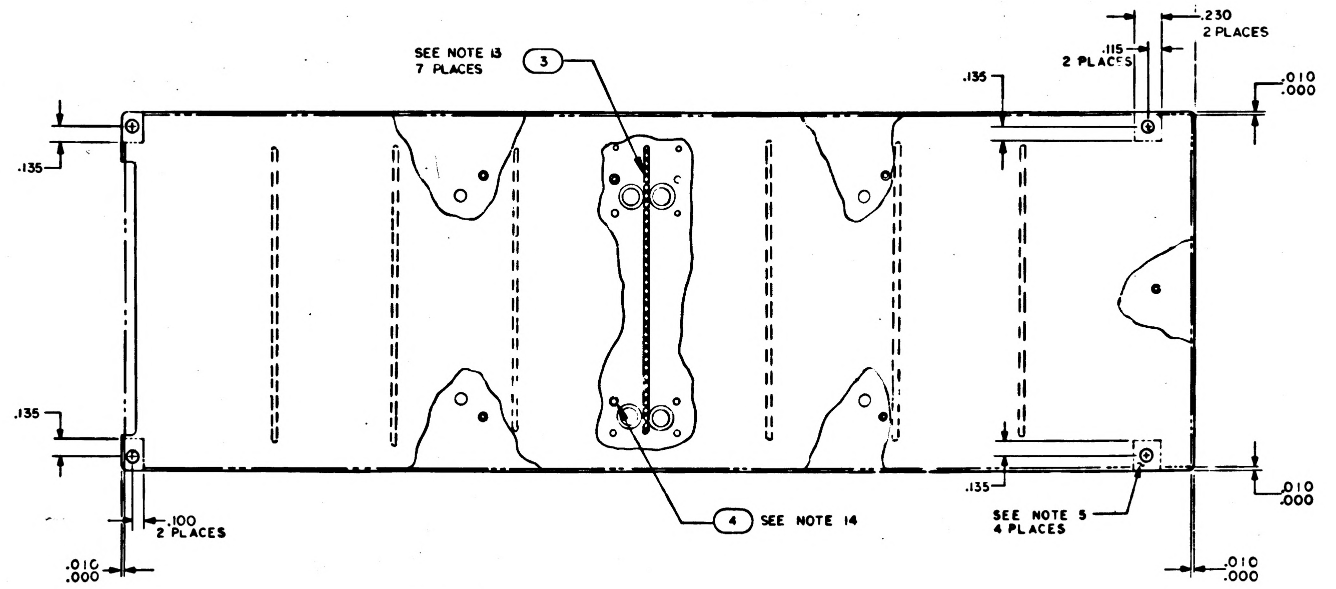

NOTES:

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2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO.2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO.4 TO FIND NO.1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO.1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

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2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL
—

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

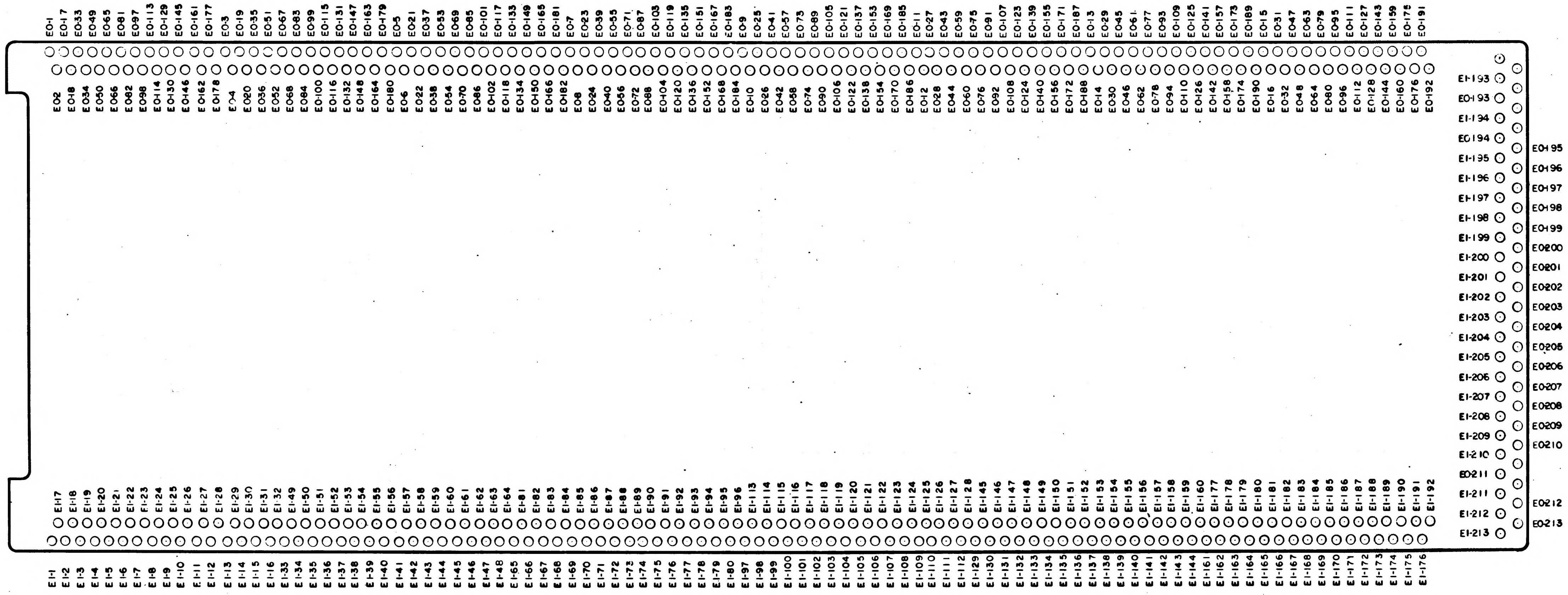
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230 SIZE E DRAWING NO 2010804

SCALE 2/1 SHEET 1 OF 2

TDRR37652

	DESCRIPTION	DATE	
A	REVISED PER TDRR 37878 DR CHK	11/4/69	PPB
B	REVISED PER TDRR 37915 DR CHK	12-4	PPB
C	REVISED PER TDRR 37916 DR CHK	12/4/69	PPB
D	REVISED PER TDRR 38022 DR CHK	4/9/70	PPB
E	REVISED PER TDRR 38032 DR Pollan CHK	5/	PPB
F	REVISED PER TDRR 38151 DR CHK	5/70	PPB
G	REVISED PER TDRR 38[illegible] DR CHK	7/2/70	PPB
H	REVISED PER TDRR 38250 DR CHK	11/2/70	PPB



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith 10 APR 69
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

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REVISIONS TDRR 3765

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR [illegible]				
B		REVISED PER TDRR 37915				
C		REVISED PER TDRR 37916				
D		REVISED PER TDRR 38022				
E		REVISED PER TDRR 38032				
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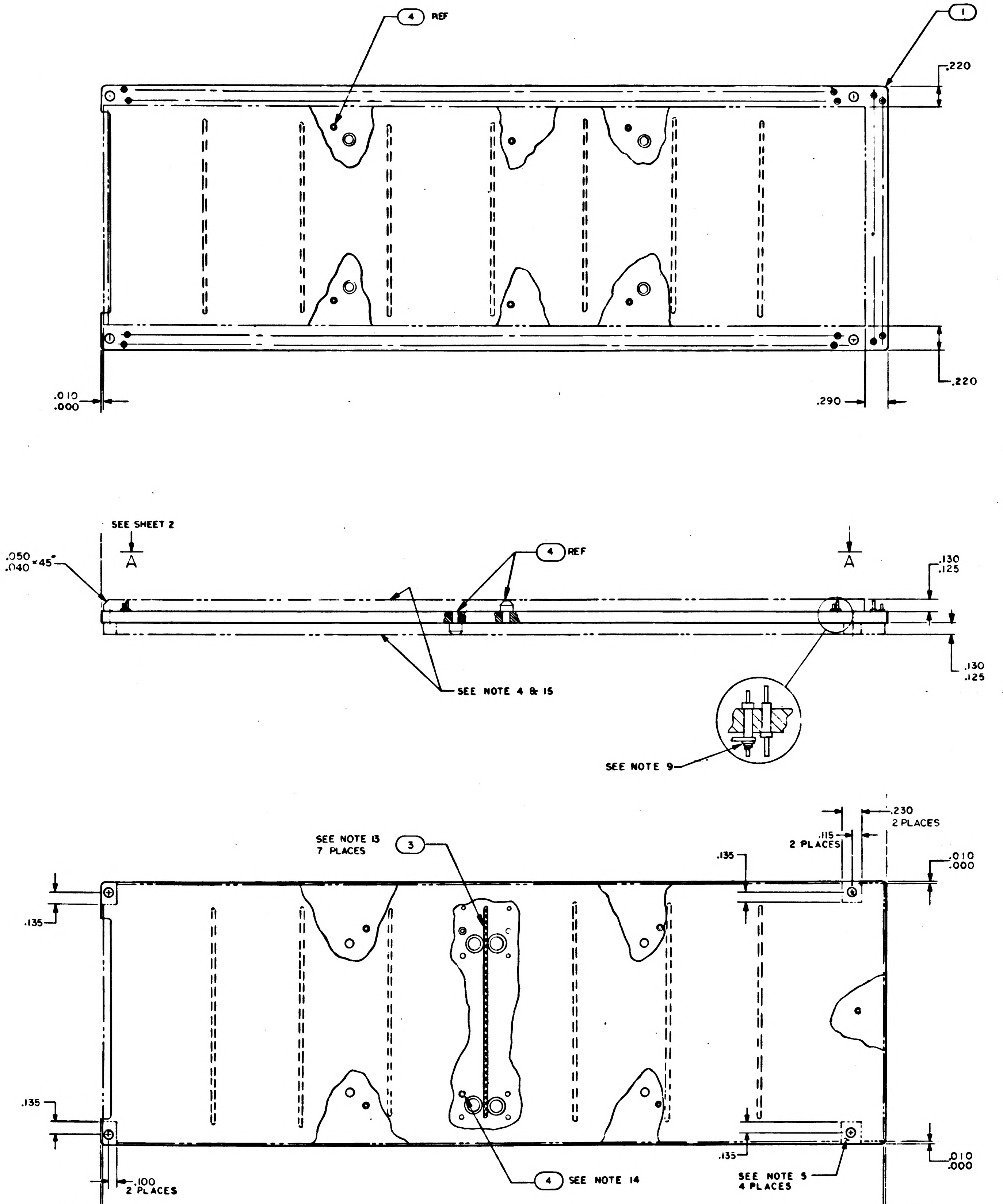
G		REVISED PER TDRR 38173				
H		REVISED PER TDRR 38250				
J		REVISED PER TDRR 38360				



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSE WIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
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2. FIXED MEMORY FIXTURE DWG AP 22500

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AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

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NEXT ASSY	USED ON
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2010802	

APPLICATION

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RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO 2010804
SCALE 2/1
SHEET 1 OF 2

TDRR 37652

A	REVISED PER TDRR 37575 DR [illegible] CHK [illegible]	11/.. 69	PBB
B	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]	[illegible]	PBB
C	REVISED PER TDRR 37916 DR [illegible] CHK [illegible]	[illegible]	PBB
D	REVISED PER TDRR 38022 DR [illegible] CHK [illegible]	[illegible]	PBB
E	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]	[illegible]	PBB
F	REVISED PER TDRR 38151 DR [illegible] CHK [illegible]	[illegible]	PBB
G	REVISED PER TDRR 38[illegible] DR [illegible] CHK [illegible]	[illegible]	PBB
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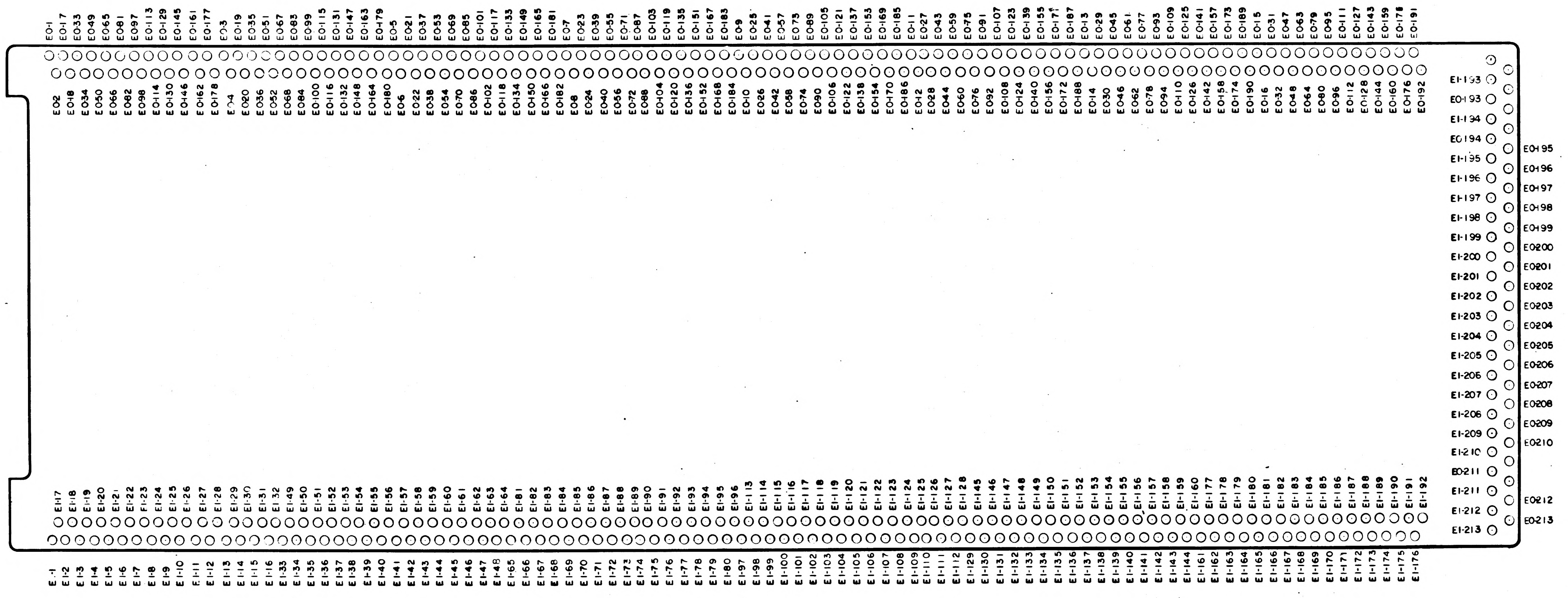
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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED [illegible]
APPROVED [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

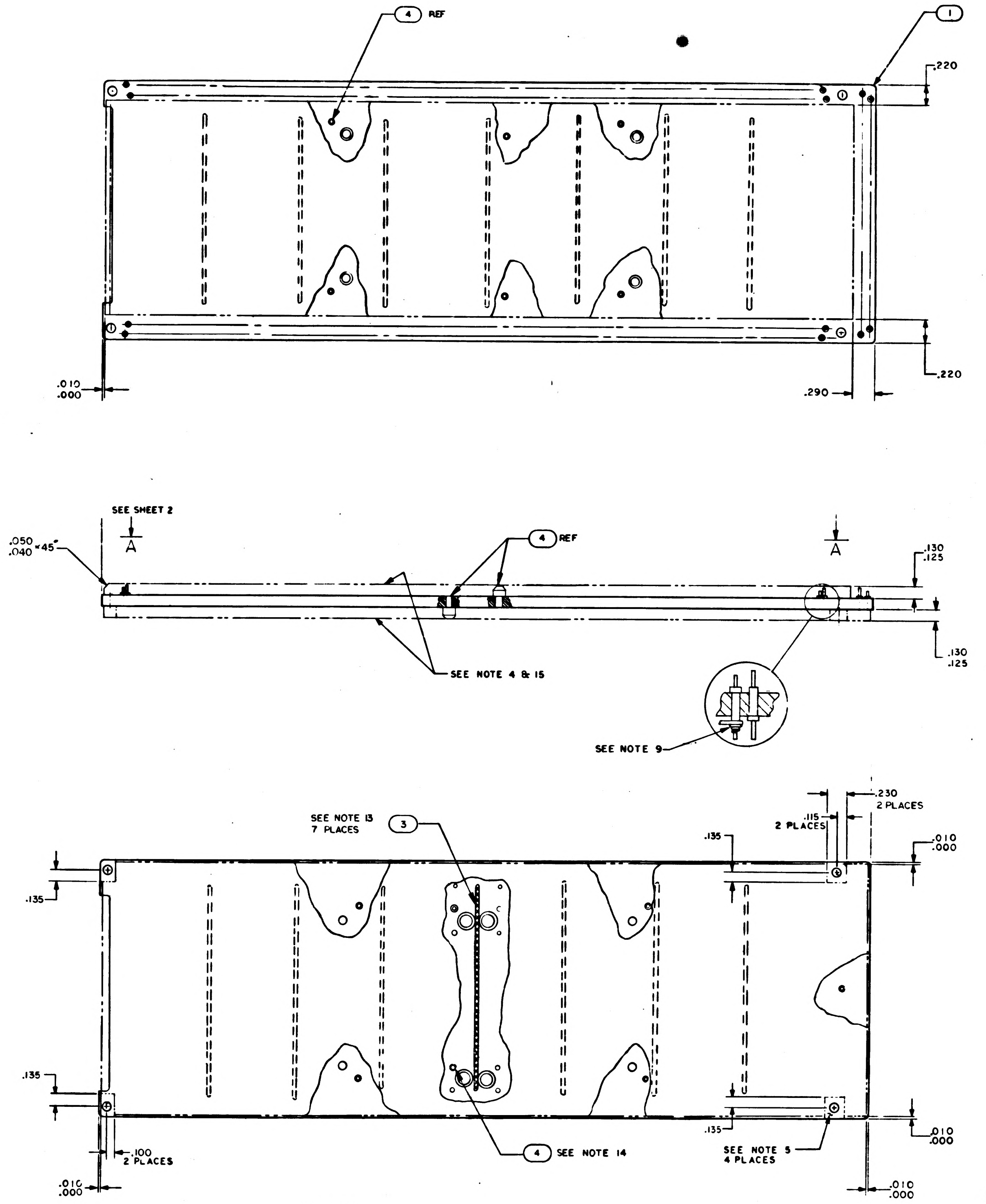
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.
[illegible]	0318
[illegible]804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
[illegible]-071	0326
[illegible]804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
2010804-161	0336
2010804-171	0337
-181	0338
-191	0339
-211	0340
-221	0341
2010804-231	0342
2010804-241	0343
-251	0344
-261	0345
-271	0346
-281	0347
2010804-291	0348
2010804-311	0349
-321	0350
-331	0351
-341	0352
-351	0353
2010804-361	0354
2010804-371	0355
-381	0356
-391	0357
-411	0358
-421	0359
2010804-431	0360
2010804-441	0361
-451	0362
-461	0363
-471	0364
-481	0365
2010804-491	0366

REVISIONS TDRR 3765[illegible]

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37[illegible]				
B		REVISED PER TDRR 37915				
C		REVISED PER TDRR 37916				
D		REVISED PER TDRR 3802[illegible]				
E		REVISED PER TDRR 3[illegible]32				
F		REVISED PER TDRR 38151				
G		REVISED PER TDRR 38173				
H		REVISED PER TDRR 38250				
J		REVISED PER TDRR 38390				
K		REVISED PER TDRR 38403				



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND 1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES
1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

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DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

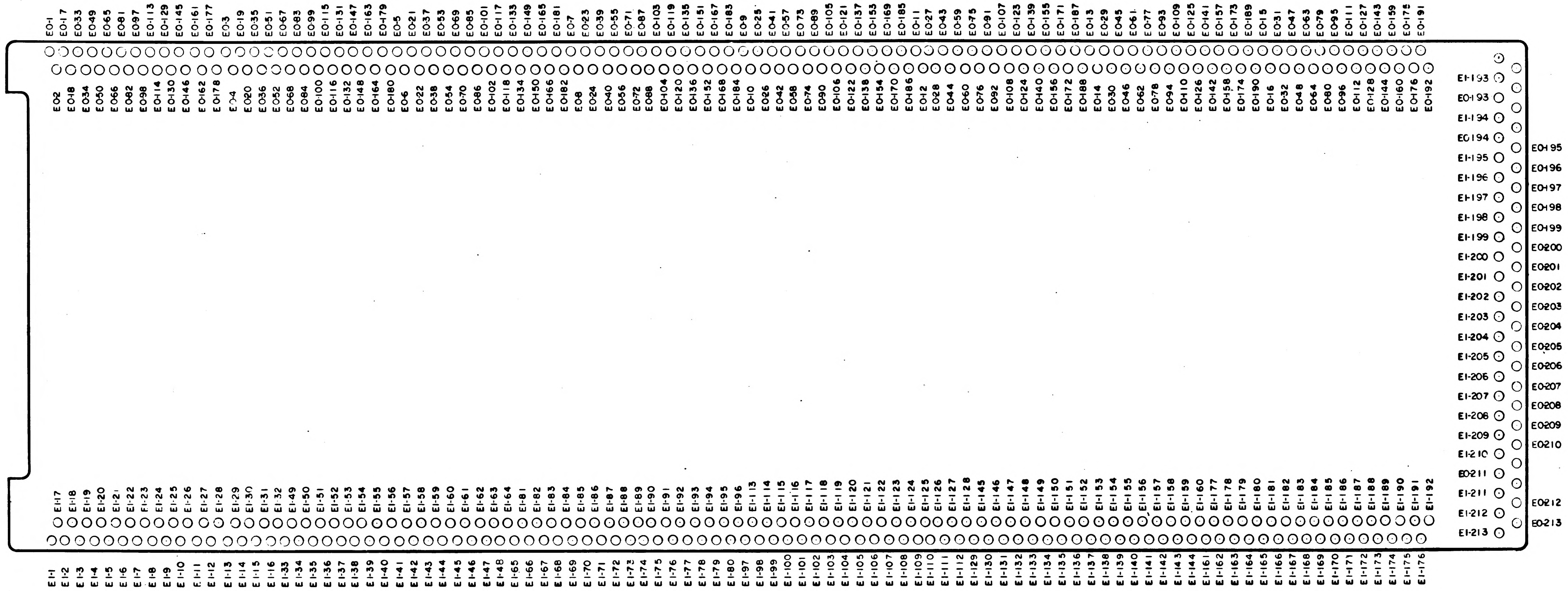
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230 SIZE E DRAWING NO. 2010804
SCALE 2/1 SHEET 1 OF 2

2010804

TDRR 3765

A	REVISED PER TDRR 37878 DR [illegible] CHK [illegible]	11/…/69	PBB
B	REVISED PER TDRR 37915 DR [illegible] CHK [illegible]	12/…	PBB
C	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	…/…/69	PBB
D	REVISED PER TDRR [illegible] DR [illegible] CHK [illegible]	4/9/70	PBB
E	REVISED PER TDRR 38032 DR [illegible] CHK [illegible]	5/…	PBB
F	REVISED PER TDRR 38151 DR [illegible] CHK [illegible]	…	PBB
G	REVISED PER TDRR 38173 DR [illegible] CHK [illegible]	7/…/70	PBB
H	REVISED PER TDRR 3825 DR [illegible] CHK [illegible]	…/70	PBB
J	REVISED PER TDRR 3830C DR [illegible] CHK [illegible]	…/2/71	PBB
K	REVISED PER TDRR 38403 DR [illegible] CHK [illegible]	…/2/71	PBB



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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Tom Smith 10 APR 69
CHECKED [illegible]
APPROVED [illegible]
APPROVED
APPROVED MIT [illegible]
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

PART NO.	MODULE DECK NO.
2010804-011	0318
2010804-021	0321
-031	0322
-041	0323
-051	0324
-061	0325
2010804-071	0326
2010804-081	0327
-091	0328
-111	0329
-121	0330
-131	0331
2010804-141	0332
2010804-151	0333
2010804-161	0336
2010804-171	0337
-181	0338
-191	0339
-211	0340
-221	0341
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-391	0357
-411	0358
-421	0359
2010804-431	0360
2010804-441	0361
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2010804-511	0238
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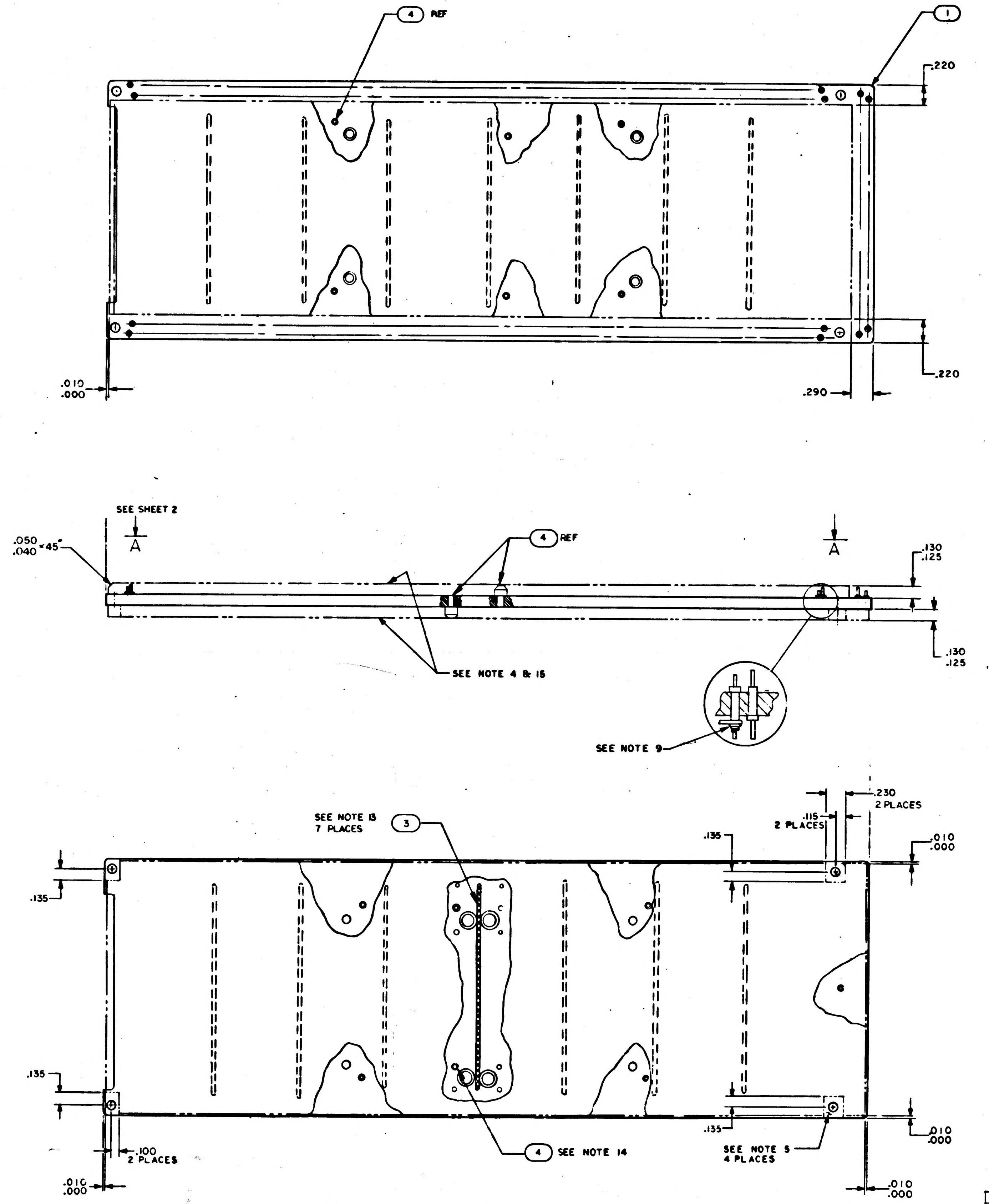
-551	0369
-561	0370
-571	0371
2010804-581	0372

REVISIONS TDRR 37652

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 37878	[illegible]	[illegible]	[illegible]	[illegible]
B		REVISED PER TDRR 37915	[illegible]	[illegible]	[illegible]	[illegible]
C		REVISED PER TDRR 37916	[illegible]	[illegible]	[illegible]	[illegible]
D		REVISED PER TDRR 38022	[illegible]	[illegible]	[illegible]	[illegible]
E		REVISED PER TDRR 38032	[illegible]	[illegible]	[illegible]	[illegible]
F		REVISED PER TDRR 38151	[illegible]	[illegible]	[illegible]	[illegible]
G		REVISED PER TDRR 38173	[illegible]	[illegible]	[illegible]	[illegible]
H		REVISED PER TDRR 38250	[illegible]	[illegible]	[illegible]	[illegible]
J		REVISED PER TDRR 38380	[illegible]	[illegible]	[illegible]	[illegible]
K		REVISED PER TDRR 38403	[illegible]	[illegible]	[illegible]	[illegible]
L		REVISED PER TDRR 38494	[illegible]	[illegible]	[illegible]	[illegible]



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO. 2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO. 4 TO FIND NO. 1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO. 1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2003972	
2010802	

APPLICATION

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MATERIAL —

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INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

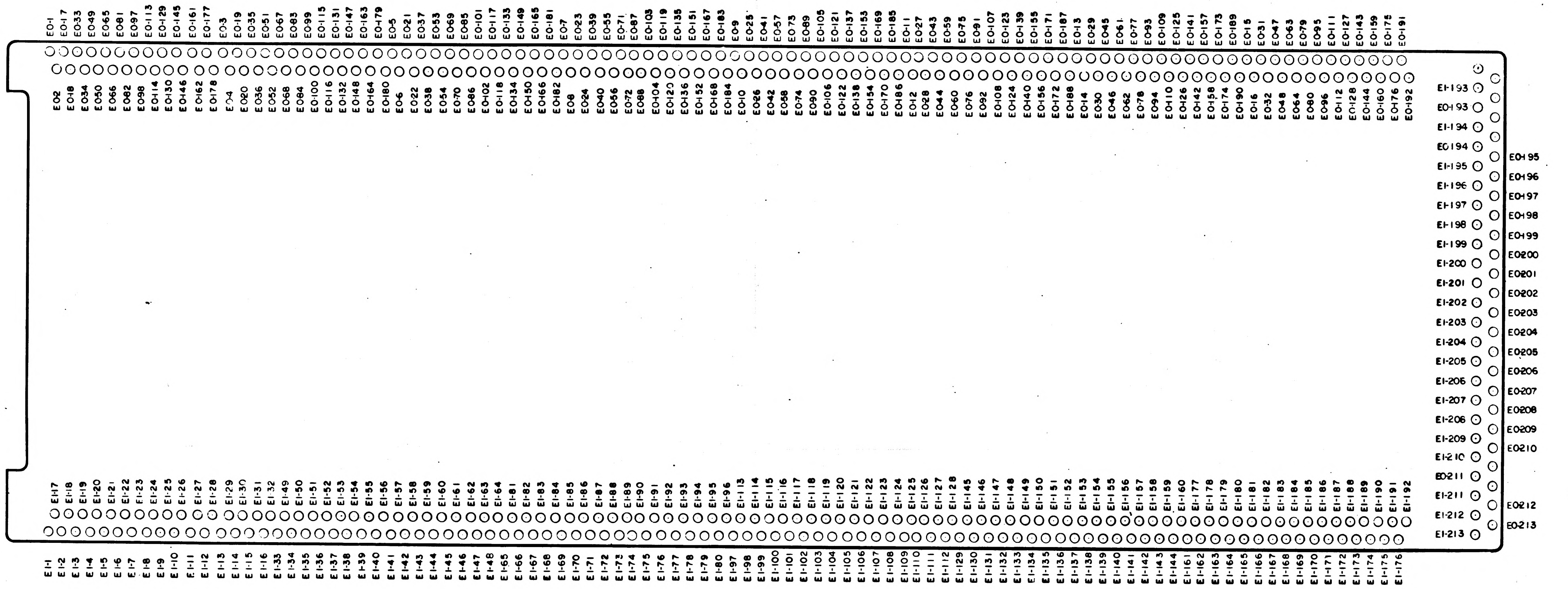
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 2/1
SHEET 1 OF 2

2010804

TDRR 37765

A	REVISED PER TDRR 37878 DR CHK	11/2/69	PBB
B	REVISED PER TDRR 379__ DR CHK	12/__/69	PBB
C	REVISED PER TDRR 37916 DR CHK	12/4/69	PBB
D	REVISED PER TDRR 38022 DR CHK	4/9/70	PBB
E	REVISED PER TDRR 38032 DR CHK	5/	PBB
F	REVISED PER TDRR 38151 DR CHK	6/5/70	PBB
G	REVISED PER TDRR 39___ DR CHK	7/2/70	PBB
H	REVISED PER TDRR 3825_ DR CHK	11/2/70	PBB
J	REVISED PER TDRP 38_30 DR CHK	1/2/71	PBB
K	REVISED PER TDRR 38403 DR CHK	1/21/71	PBB
L	REVISED PER TDRR 38494 DR CHK	12/3/71	PBB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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

DRAWN Tom Smith 10 APR 69
CHECKED 2 APR 69
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

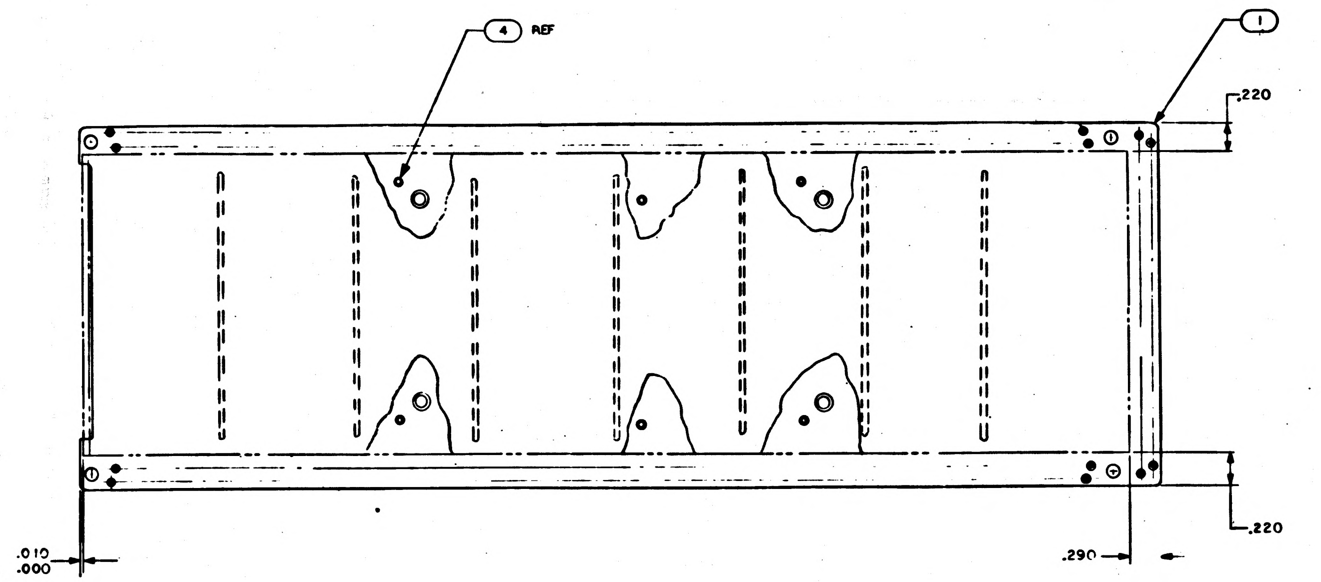
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

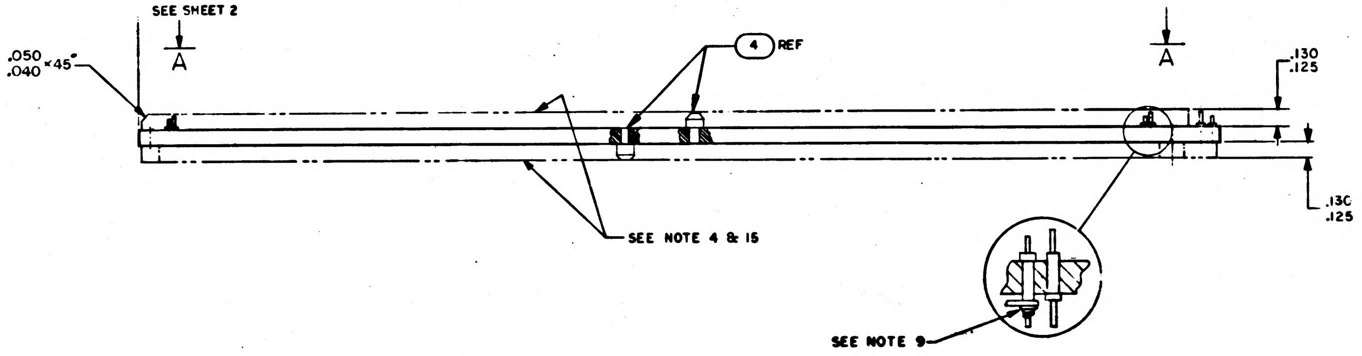
CODE IDENT NO 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

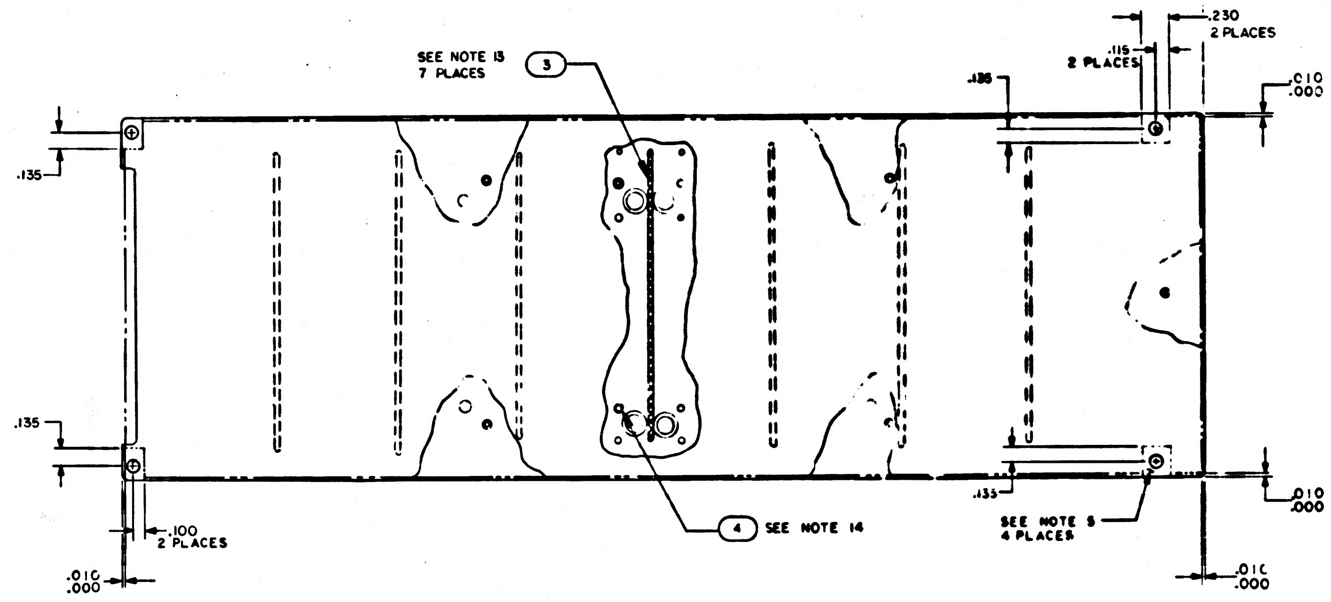
NOTICE - WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

PART NO.	MODULE DECK NO.

REVISIONS TORR 37652						
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED







NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND1002071, USING SOLDER COMP SN60 WIRE FORM SOLID PER ND1002075
3. SENSEWIRE USING FIND NO. 2 PER MODULE DECK NO. AS SHOWN IN CHART
4. ENCAPSULATE PER ND1002002 REMOVE FLASHING
5. INDICATED AREAS TO BE FREE OF ENCAPSULATING COMPOUND
6. IDENTIFY WITH PART NO. PER ND1002019
7. AR DENOTES AS REQUIRED
8. SEE SHEET 2 FOR TERMINAL IDENTIFICATION
9. DO NOT TIN LEADS OF FIND NO.2. SOLDER WRAPS TO BE 2 TO 4 TURNS OF UNINSULATED WIRE AND 3/4 TO 1 1/2 TURNS OF INSULATED WIRE AROUND TERMINAL AS SHOWN. PROVIDE SERVICE LOOP
10. AS LITTLE SLACK AS POSSIBLE SHALL BE MAINTAINED WITHOUT THE SENSE WIRES CROSSING ANY CORE OPENING
11. THE MAXIMUM NUMBER OF SENSE WIRES PER SIDE INCLUDING INCORRECT WIRES WHICH HAVE BEEN REPLACED SHALL BE 210
12. INSULATION ON THE SENSE WIRE RUNS SHALL BE INTACT EXCEPT AT SOLDER JOINTS. THE CUT ENDS OF INCORRECT WIRES SHALL BE COATED WITH CLEAR INSULATING COMPOUND PER SCD1006303
13. WRAP & TIE AROUND WIRED ASSY APPROXIMATELY AS SHOWN WITH ONE WRAP OF FIND NO. 3
14. STAKE FIND NO.4 TO FIND NO.1 PER ND1002004 TYPE V
15. VISIBLE COMPONENTS, FIND NO. 2, 3, & 4, SHALL NOT EXCEED ENCAPSULATED SURFACE
16. DUMMY SENSE WIRE LINES, IF REQUIRED, RUNNING ADJACENT AND ON THE SAME SIDE OF FIND NO.1 SHALL BE ROUTED IN OPPOSITE DIRECTIONS

REFERENCES

1. PROCESS REQUIREMENTS FOR CONTROL AND INSPECTION OF ROPE MEMORY ASSEMBLIES ND1002285
2. FIXED MEMORY FIXTURE DWG AP 22500

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
13	2004896	SPACER	4
AR	1012507-001	TAPE, LACING & TYING	3
AR	1006275-2	WIRE ELECTRICAL	2
1	2003049-021	CORE HOLDER ASSY	1

LIST OF MATERIALS

2010802	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.010 ANGLES ± 5°
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	Van Smith	10APR69
CHECKED		10APR69
APPROVED		
APPROVED		
APPROVED MIT	W. C. Mueller	14 Apr 69
APPROVED MSC		
		DATE

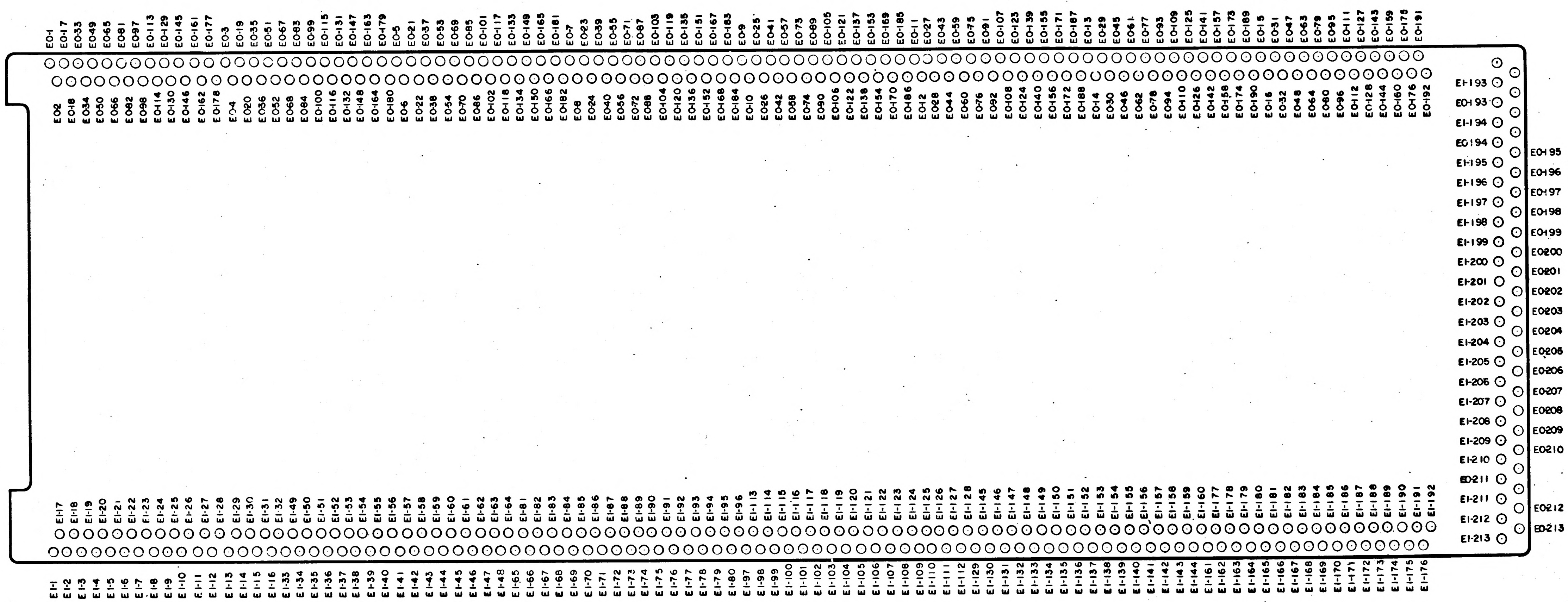
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO.	SIZE	DRAWING NO.
80230	E	2010804
SCALE 2/1		SHEET 1 OF 2

REVISIONS TDM 3765

SYM	DESCRIPTION	DATE	APPROVAL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VIEW A-A

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN Tom Smith 10 APR 69
CHECKED E Urban 10 APR 69
APPROVED Eldon C Hall
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

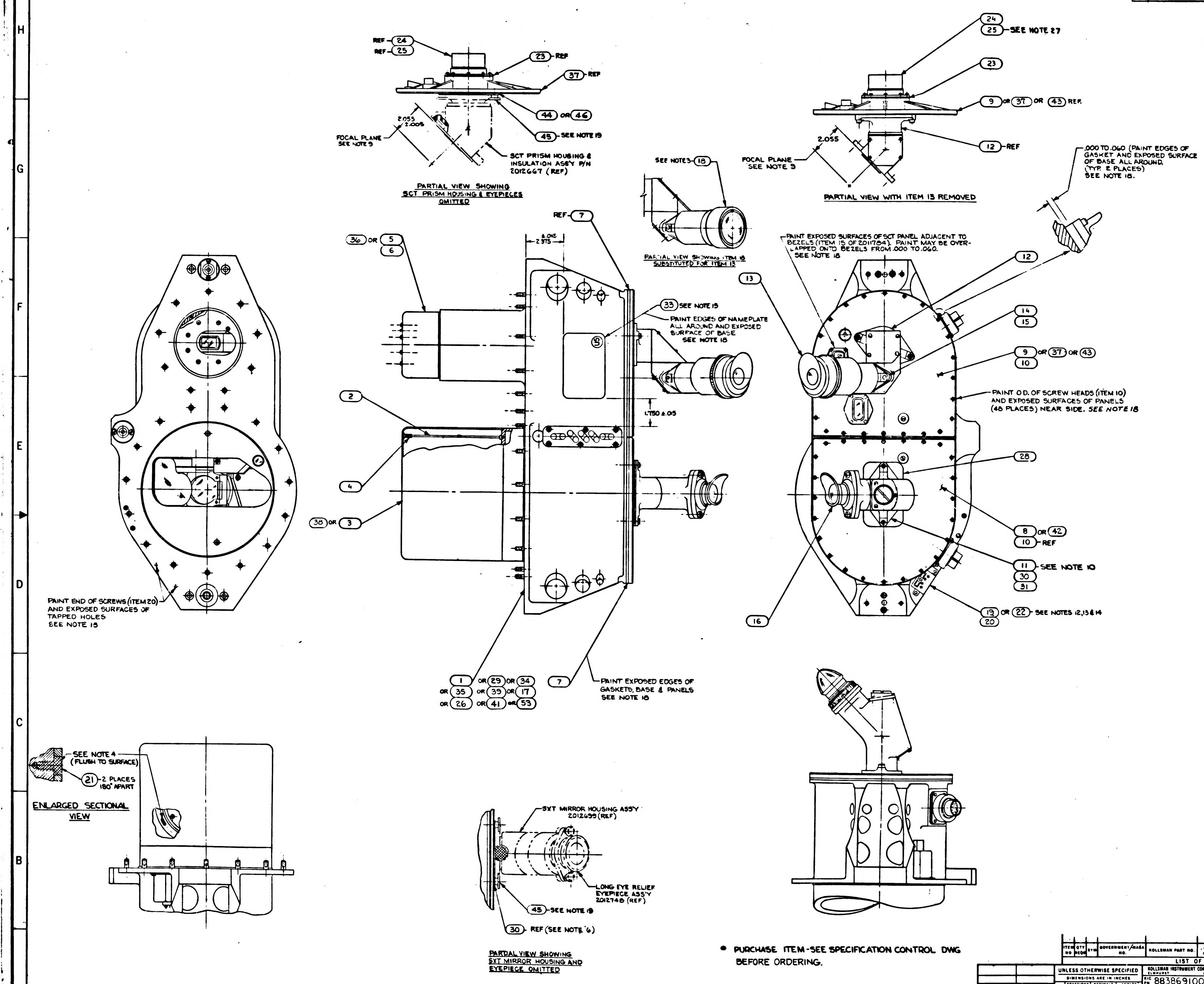
SENSE WIRING ASSY
SIDE A
FIXED MEMORY MODULE

CODE IDENT NO. 80230
SIZE E
DRAWING NO. 2010804
SCALE 4/1
SHEET 2 OF 2

2010804

2011000 AA

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	WK
B		REVISED PER TDRR NO. 19197	[illegible]	WK
C		REVISED PER TDRR NO. 19851	[illegible]	WK
D		REVISED PER TDRR NO. 20186	[illegible]	WK
E		REVISED PER TDRR 20691	7/13/65	WK
F		REVISED PER TDRR 22642	[illegible]	WK
G		REVISED PER TDRR 22628	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	2/8/66	WK
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/1/66	WK
P		REVISED PER TDRR 27722	4/1/66	WK
R		REVISED PER TDRR 28088	[illegible]	WK
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	WCM
V		REVISED PER TDRR 29302	6-21-66	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]


REF 24
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23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
SEE NOTE 3 18
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
12 REF
2.055
FOCAL PLANE SEE NOTE 9
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 19
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 15
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

PARTIAL VIEW WITH ITEM 13 REMOVED

ENLARGED SECTIONAL VIEW

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED [illegible] 8-4-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 1 OF 4

2011000 AA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.

8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD I. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 27

A/	2011000

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22623 SHEET 2 REDRAWN	[illegible]	[illegible]
H		REVISED PER TDRR [illegible]	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]

TABLE I (SCHEMATIC REF)

DWG.SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA;	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*

SEE CHART TABLE III SH4

LIST OF PARTS AND MATERIALS

QTY REQD

051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT.
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS. SENS. TYPE MFT-2.5			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																	32									
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																	27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7358691 0601 0606		SPACER			
1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 0486		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		#	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R6L	—— " ——		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON
APPLICATION.	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Maynard 9/16/65
APPROVAL
APPROVAL E. Thorup 9/16/65
NASA APPROVAL NOT REQUIRED PER LETTER NASA 117-65-312
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC. ACTUAL
SHEET 2 OF [illegible]

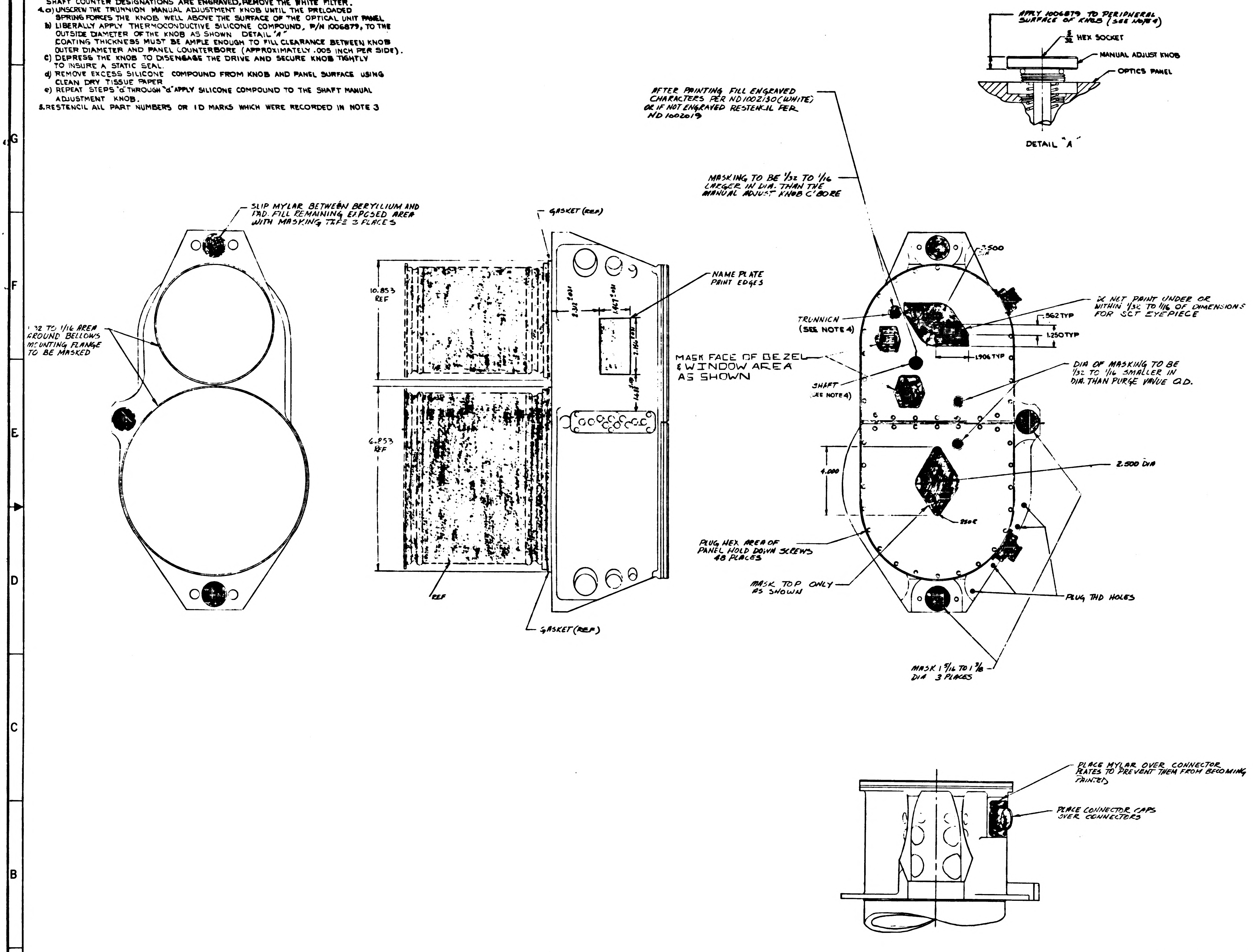
2011000 AA

2011000 AA

NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

SYM	ZONE	DESCRIPTION	DATE	APPROVED
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	6-7-66	
U		REVISED PER TDRR 29152	6-17-66	
V		REVISED PER TDRR 29300	6-28-66	
W		REVISED PER TDRR 29558	7-12-66	
Y		REVISED PER TDRR 29560	7-26-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-15-66	


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
10.853 REF
6.853 REF
REF
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.608 ±.031
GASKET (REF)
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
2.500 DIA
.562 TYP
1.250 TYP
1.906 TYP
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES
PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT.	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
ENG
PM
DRAWN AMB DATE 4-5-66
CHECKED
APPROVAL 4-8-66
APPROVAL
NASA APPROVAL 5/1/66
MIT APPROVAL 5-19-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

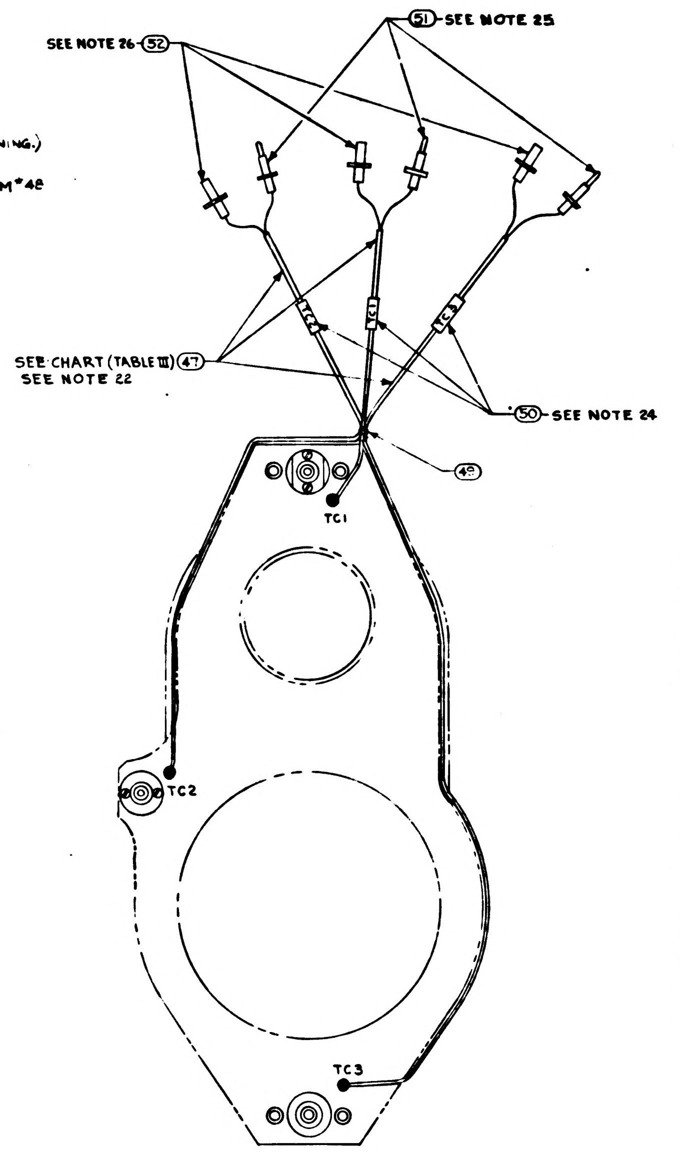
TITLE
OPTICAL UNIT

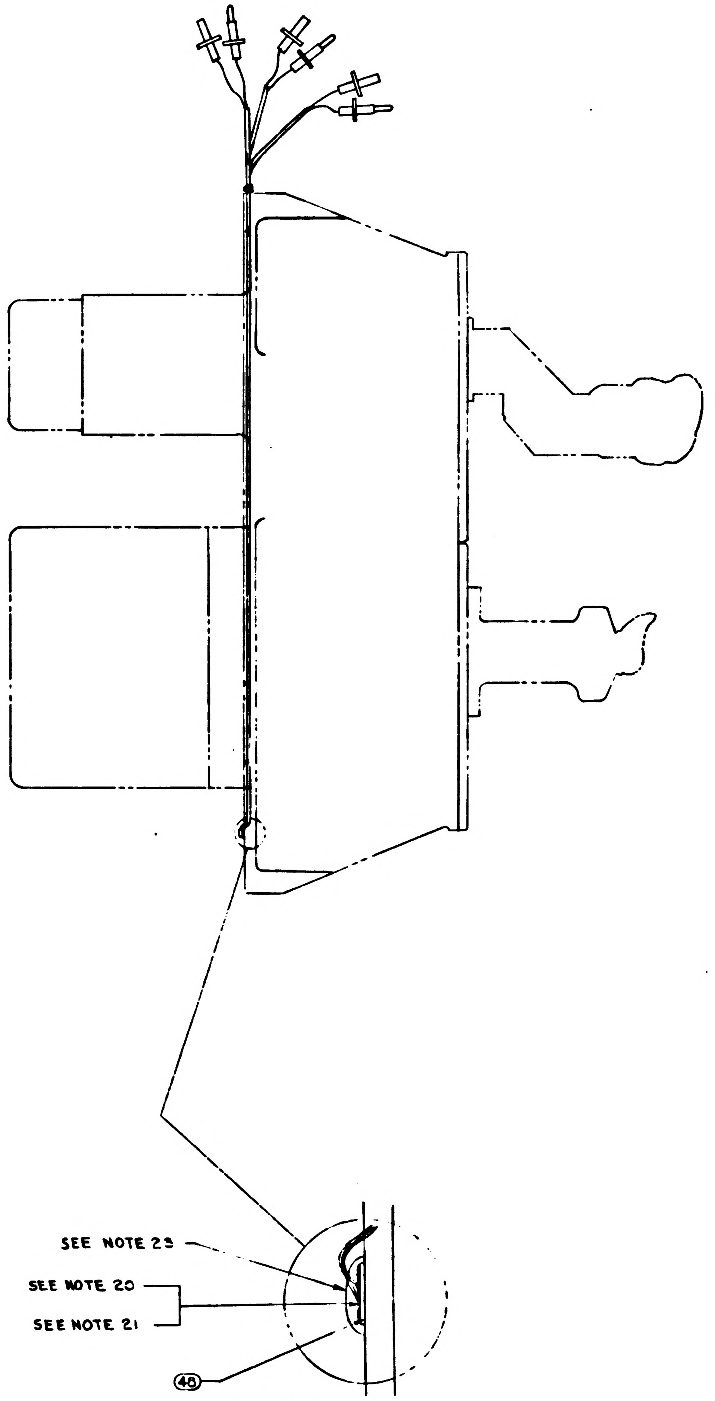
CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 4

2011000 AA

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
Y		THIS SHEET ADDED PER TDRR 29560	6-D-66	
Z		REVISEDPER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-8-66	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al Rhodes DATE 5-18-66
CHECKED R Jackson 5-19-66
APPROVAL
APPROVAL E. Thorp 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

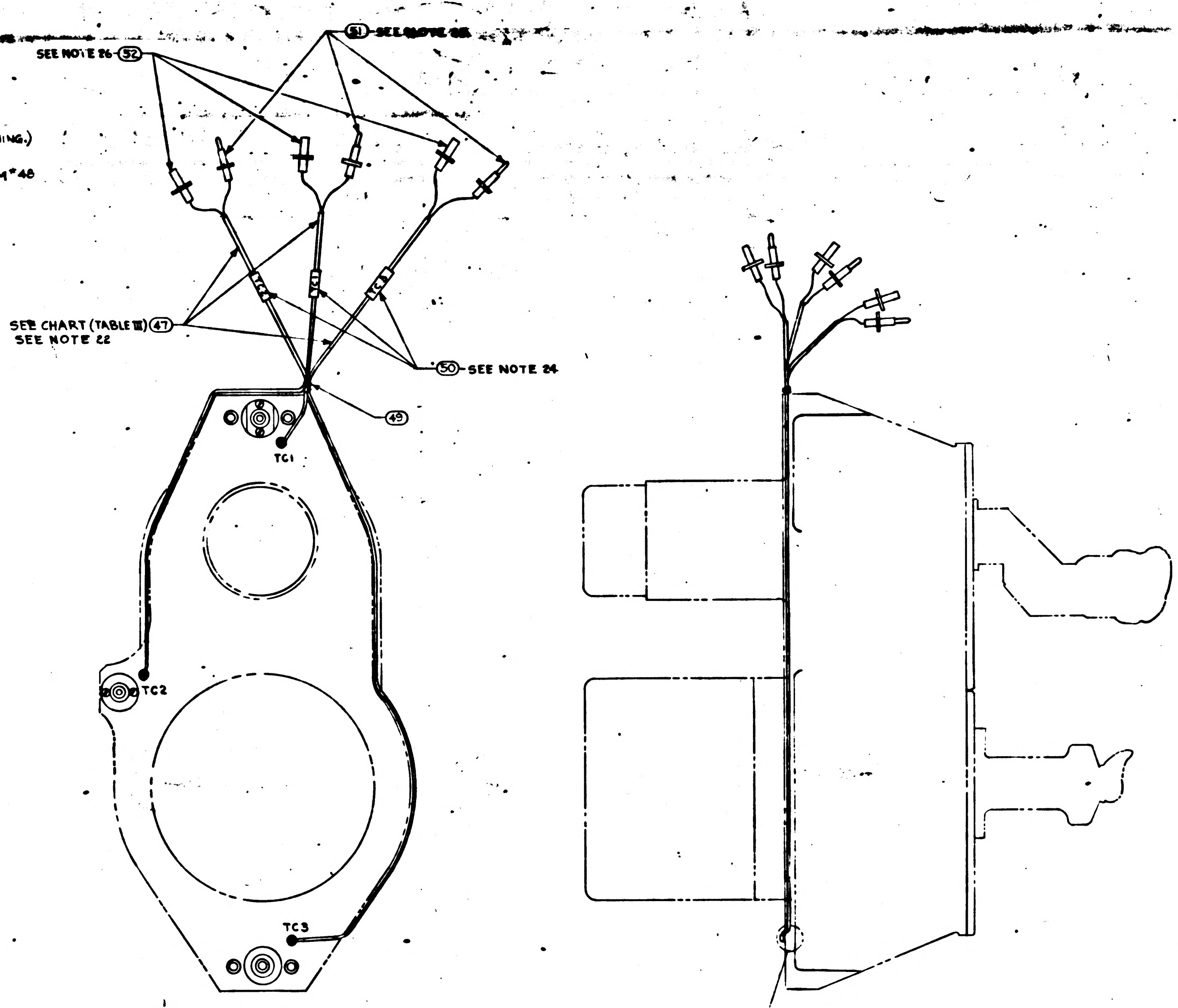
2011000

AA	2011000

REVISIONS

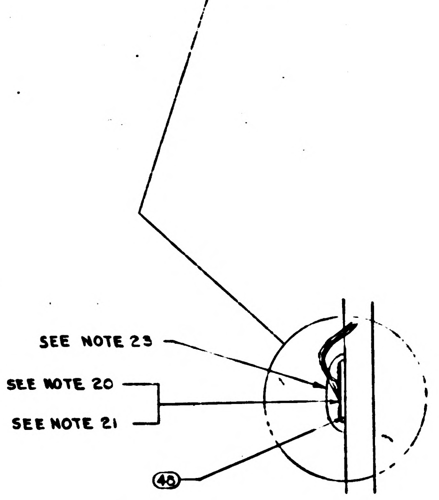
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-DH	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR [illegible]	[illegible]	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC1, TC2, TC3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.



THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES



FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al Rhodes DATE 5-18-66
CHECKED R. Jackson 5-18-66
APPROVAL
APPROVAL E. Oberg 6-9-66
A. C. METZLER
NASA APPROVAL
MIT APPROVAL

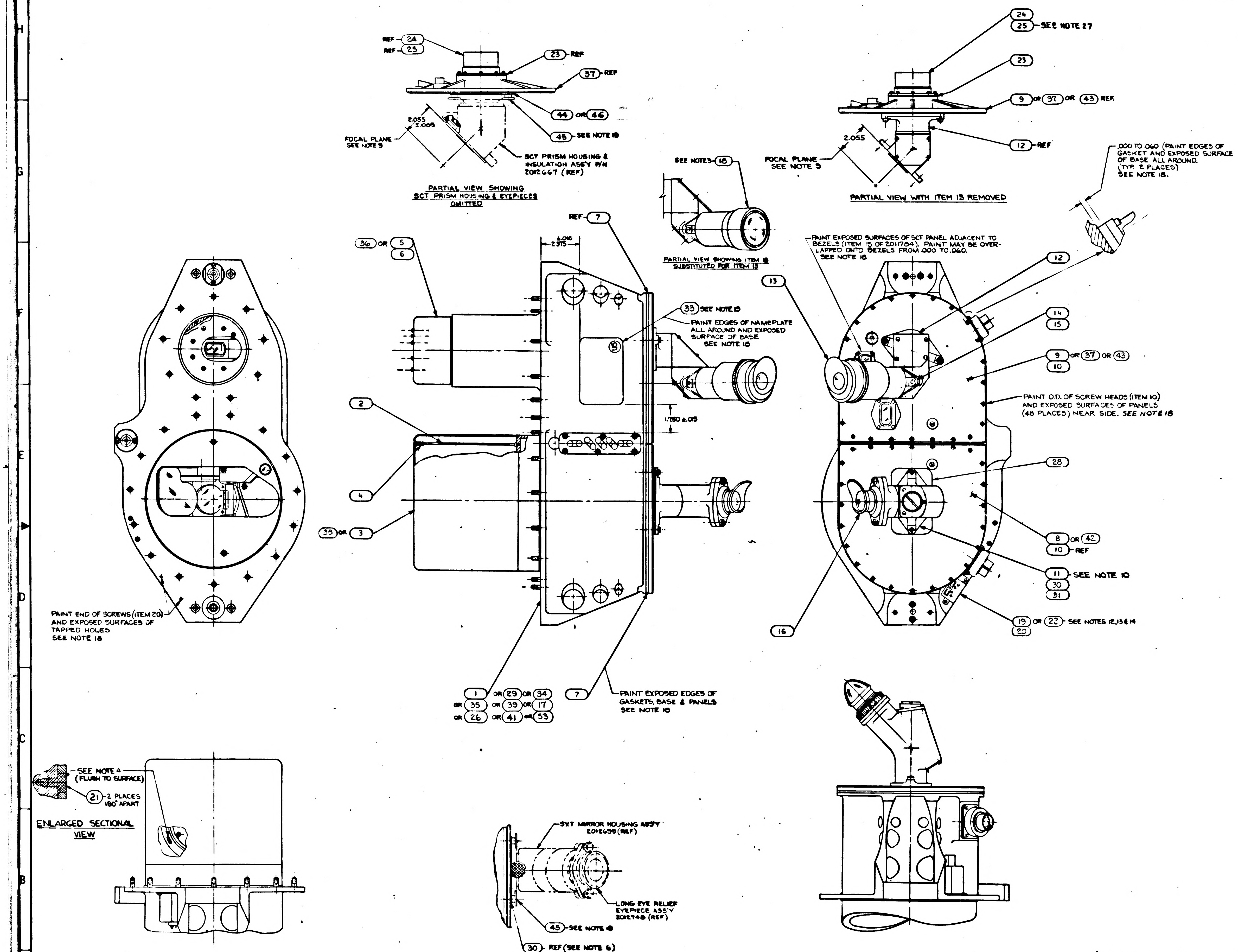
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC
ACTUAL
SHEET 4 OF

2011000

2011000 AB


REF - 24
REF - 25
23 - REF
37 - REF
44 OR 46
45 - SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
24
25 - SEE NOTE 27
23
9 OR 37 OR 43 REF.
12 - REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 - 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF - 7
±.015 2.375
36 OR 5
6
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
35 OR 3
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 - REF
11 - SEE NOTE 10
30
31
19 OR 22 - SEE NOTES 12, 13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 - 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012659 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 - SEE NOTE 18
30 - REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

REVISIONS 12217

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390	[illegible]	WK
B		REVISED PER TDRR NO. 19197	[illegible]	WK
C		REVISED PER TDRR NO. 19851	[illegible]	WK
D		REVISED PER TDRR NO. 20186	[illegible]	WK
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 257[illegible]	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-8-66	[illegible]
AA		REVISED PER TDRR 31106	9-[illegible]-66	[illegible]
AB		REVISED PER TDRR 3[illegible]08	[illegible]	[illegible]

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible] 8-[illegible]-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 1964

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 4

AB 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ± .025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2016000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.

8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ± .005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
  B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ± .005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 8 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22:23 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23557	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	7-2	[illegible]
Y		REVISED PER TDRR 29560		[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 3.06	9-15-66	[illegible]
AB		REVISED PER TDRR 3.08	[illegible]	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*

SEE CHART TABLE III SH4 (item 47)

051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PR (81" TOT)			
0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASSY SXT			
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																	32									
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																	27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC.HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7358691 0601 / 0606		SPACER			
1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC.HD., SELF-LOCKING			
0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 / 0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC.HD., SELF-LOCKING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		#	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P4L	—#—		SCREW, SELF-LOCKING PAN HD FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 8538691[illegible]000

DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED F. Haymond 9/20/65
APPROVAL
APPROVAL E. Thomas 10/65
NOT REQUIRED PER LETTER NASA PP7/65-012
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

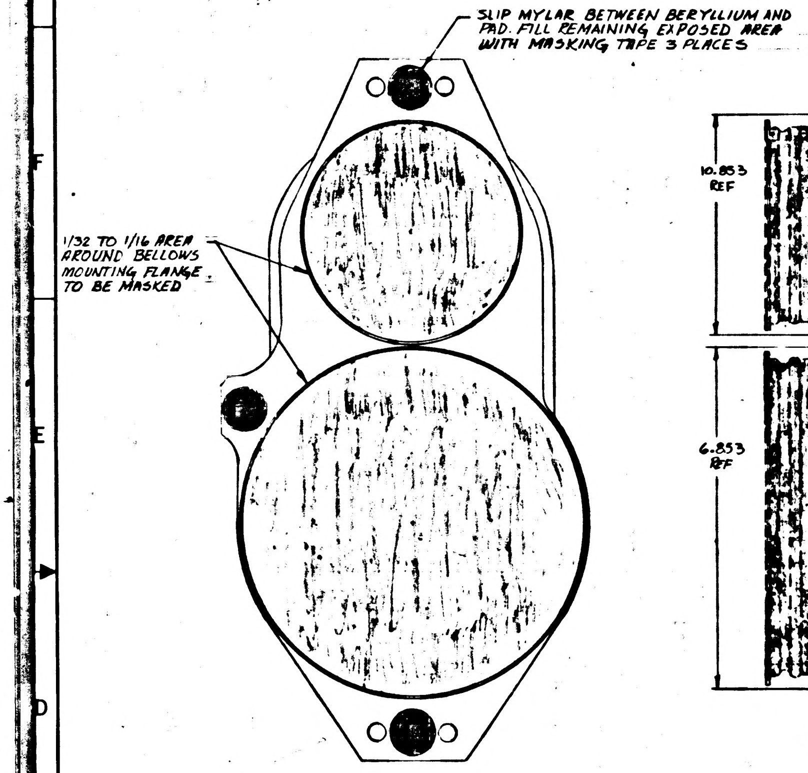
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF

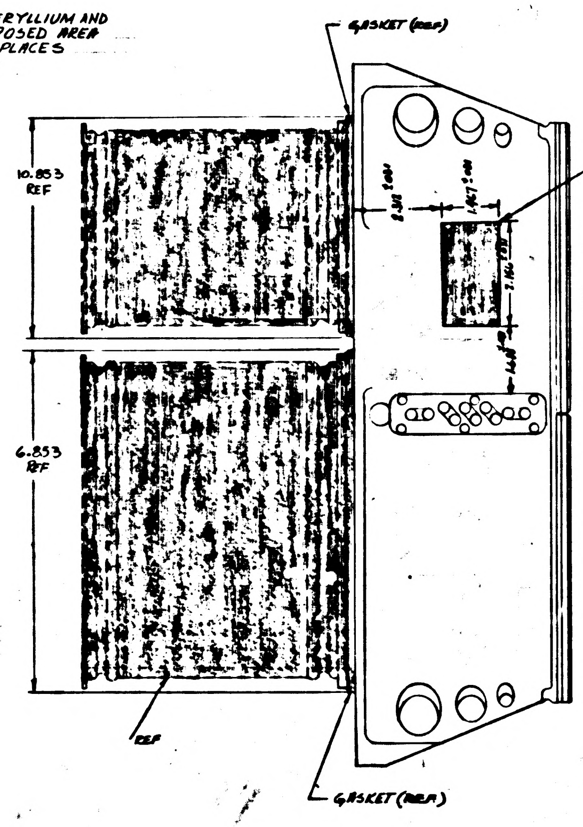
2011000 AB

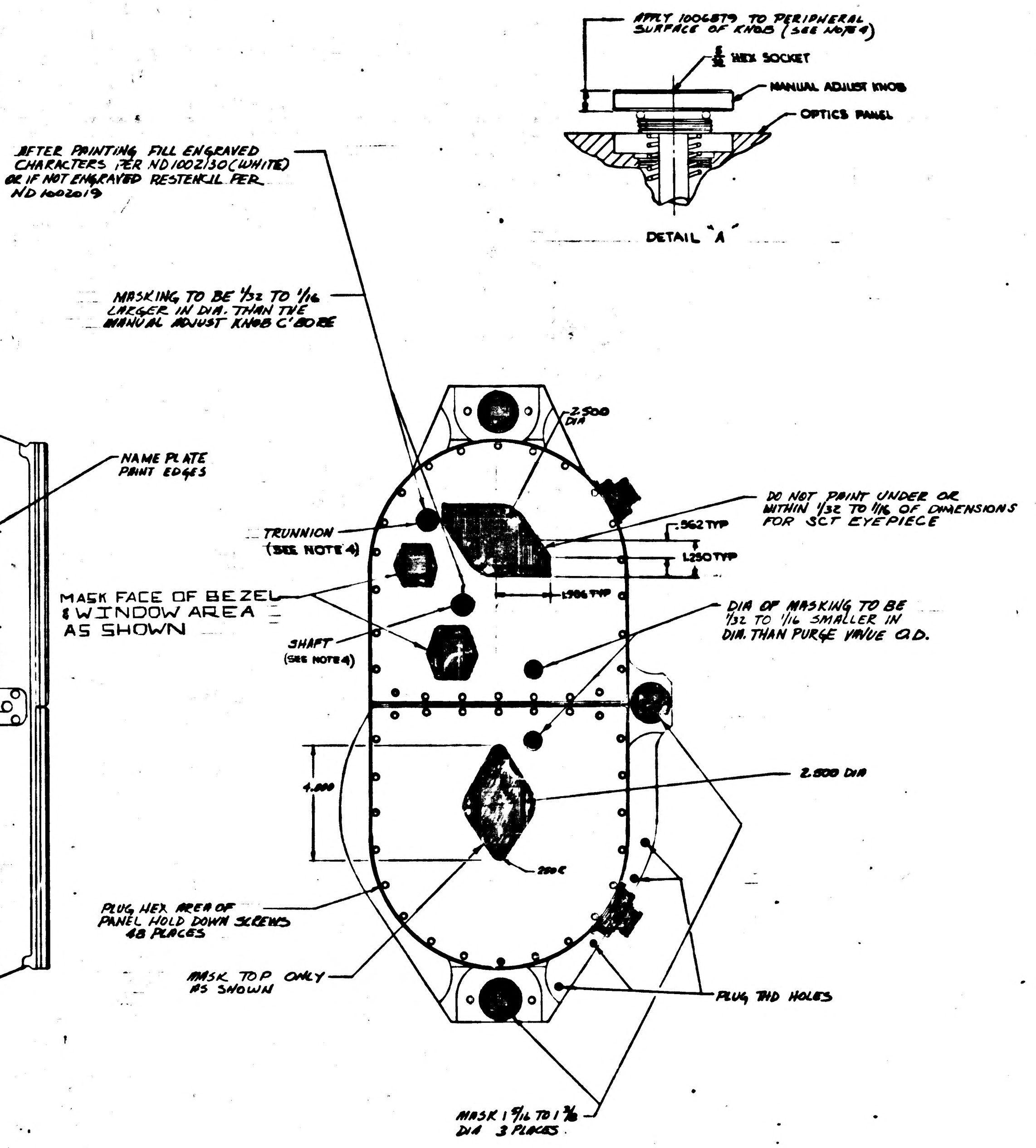
NOTES:

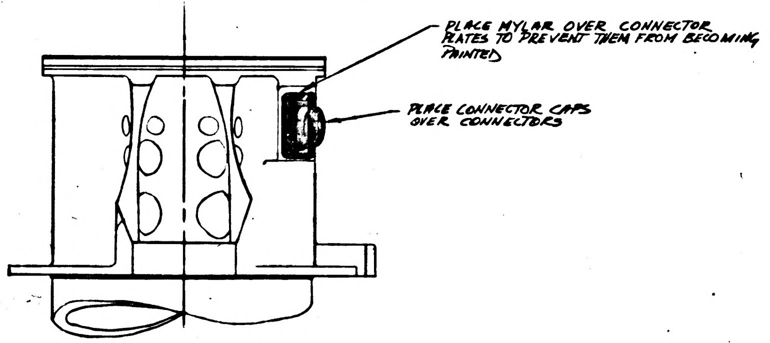
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	6-1-66	[illegible]
U		REVISED PER TDRR 29152	6-14-66	[illegible]
V		REVISED PER TDRR 29300	6-2[illegible]	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	7-25-[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-19-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


GASKET (REF)
10.853 REF
6.853 REF
REF
GASKET (REF)
NAME PLATE PAINT EDGES


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± —; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL E. Brunelle 4-8-66
APPROVAL [illegible]
NASA APPROVAL [illegible] 5/[illegible]
MIT APPROVAL [illegible] 5-1966

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

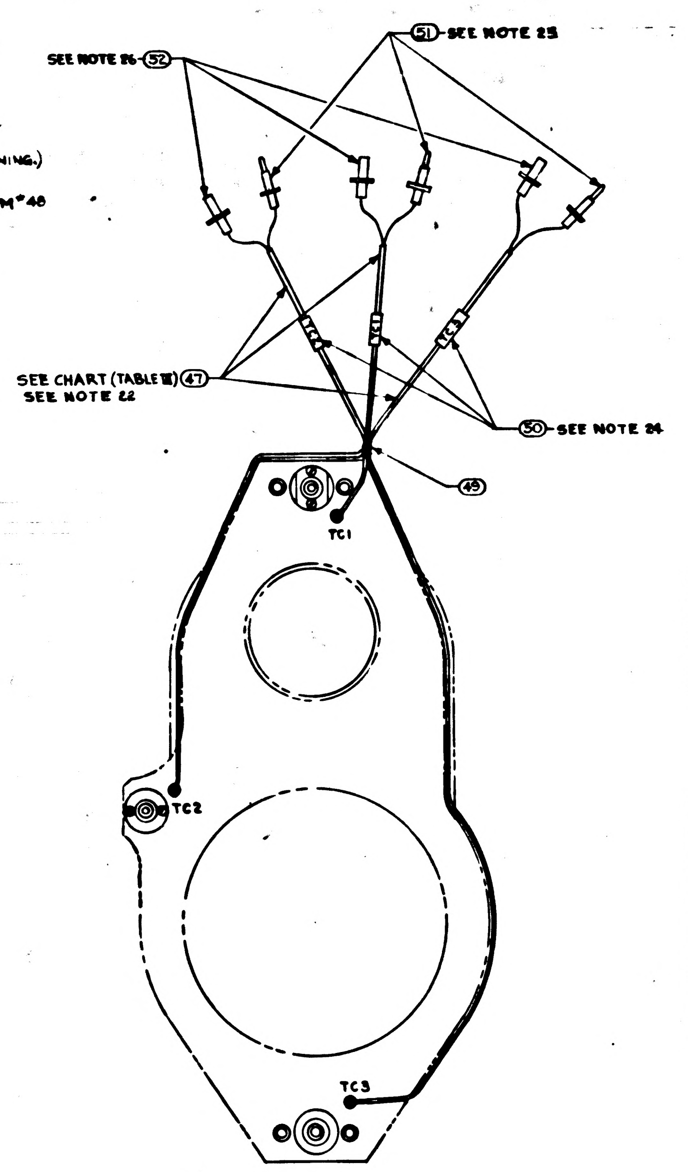
TITLE
OPTICAL UNIT

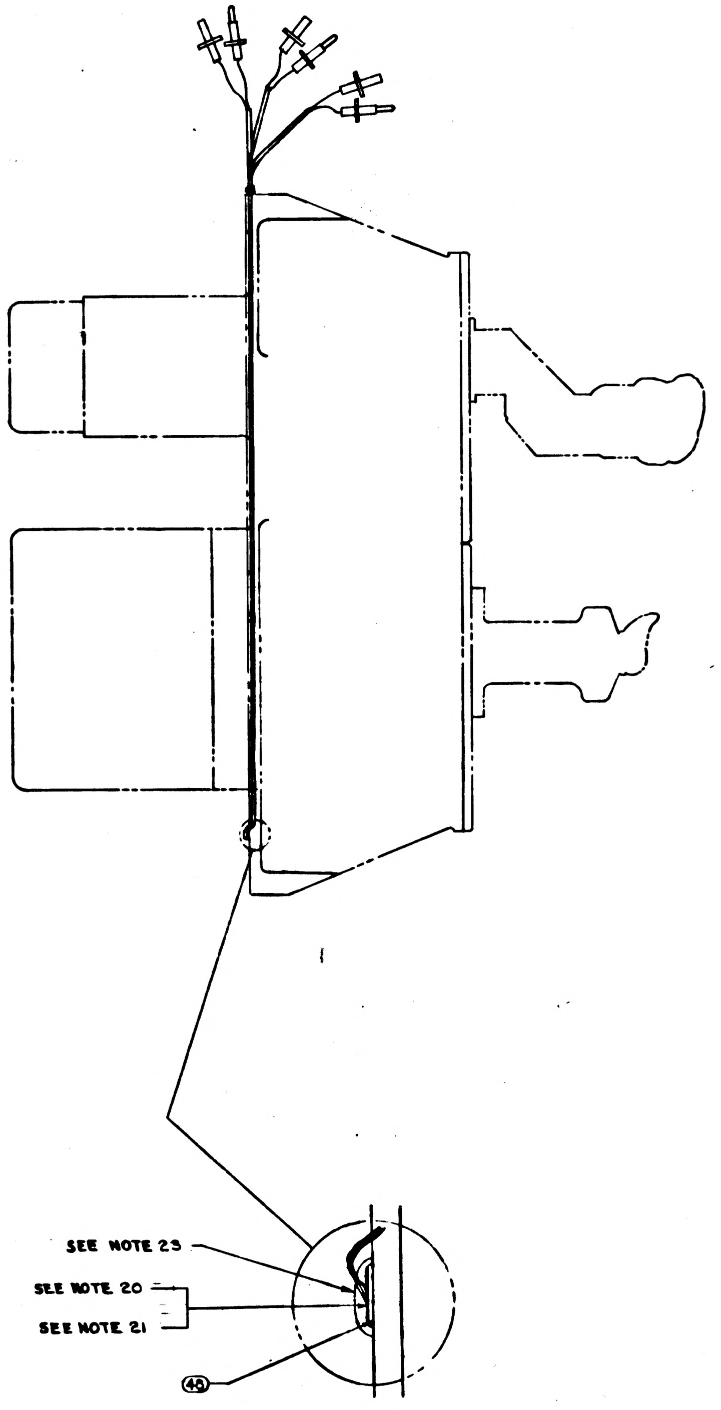
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 3 OF

2011000 AB

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-13-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-5-66	
AB		REVISED PER TDRR 31108	9-6-66	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.
28. TORQUE 48 NAS1352C04LLB SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

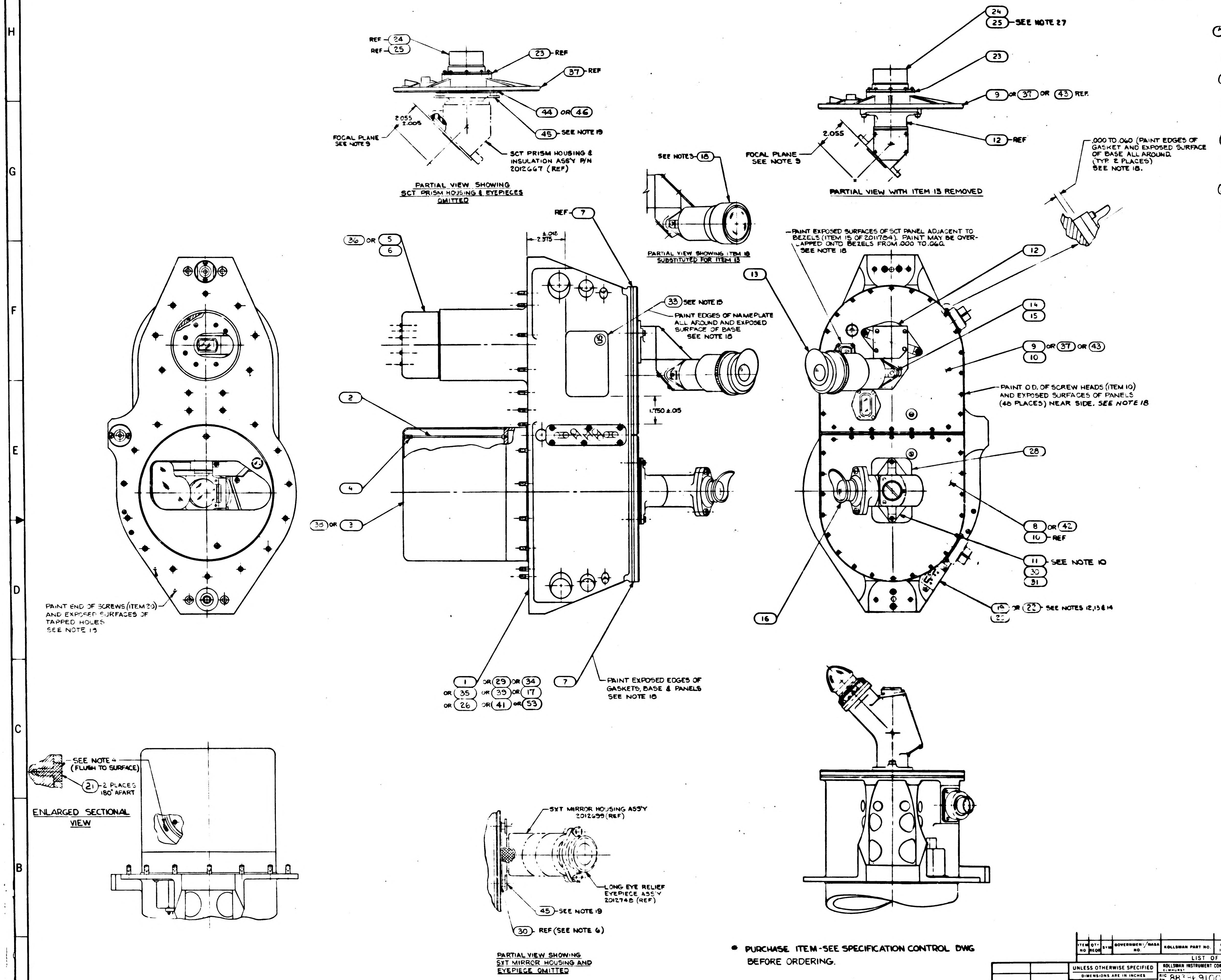
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al Rhodes DATE 5-18-66
CHECKED R Jackson 5-19-66
APPROVAL
APPROVAL 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT
CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000

2011000 AC

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	WK
B		REVISED PER TDRR NO.19197	[illegible]	[illegible]
C		REVISED PER TDRR NO.19851	[illegible]	WK
D		REVISED PER TDRR NO.20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	4/24/66	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-15-66	
AB		REVISED PER TDRR 31108	9-15-66	
AC		REVISED PER TDRR 31646	10-20-66	



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
2.055
FOCAL PLANE SEE NOTE 9
12 REF
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.018 2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 19
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

- PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASS'Y	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88336-910000
DRAWN DATE 7-22-64
CHECKED 8-25-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF

2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   - A. +1.0 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   - B. +1.00 ± .025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
7. AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.

B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

2. REMOVE COVER FROM ITEM 19 OR 22
   - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.

13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE 'A' OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*

SEE CHART TABLE III SH4

051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																	32									
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																	27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7958691 .0601 .0686		SPACER			
1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 .0400 .0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD., SELF-LOCKING			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P4L	—		SCREW, SELF-LOCKING PAN HD FULL THD .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	58386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN D. WILLIAMS DATE
CHECKED F. Meyernich
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE
WEIGHT CALC ACTUAL
SHEET OF

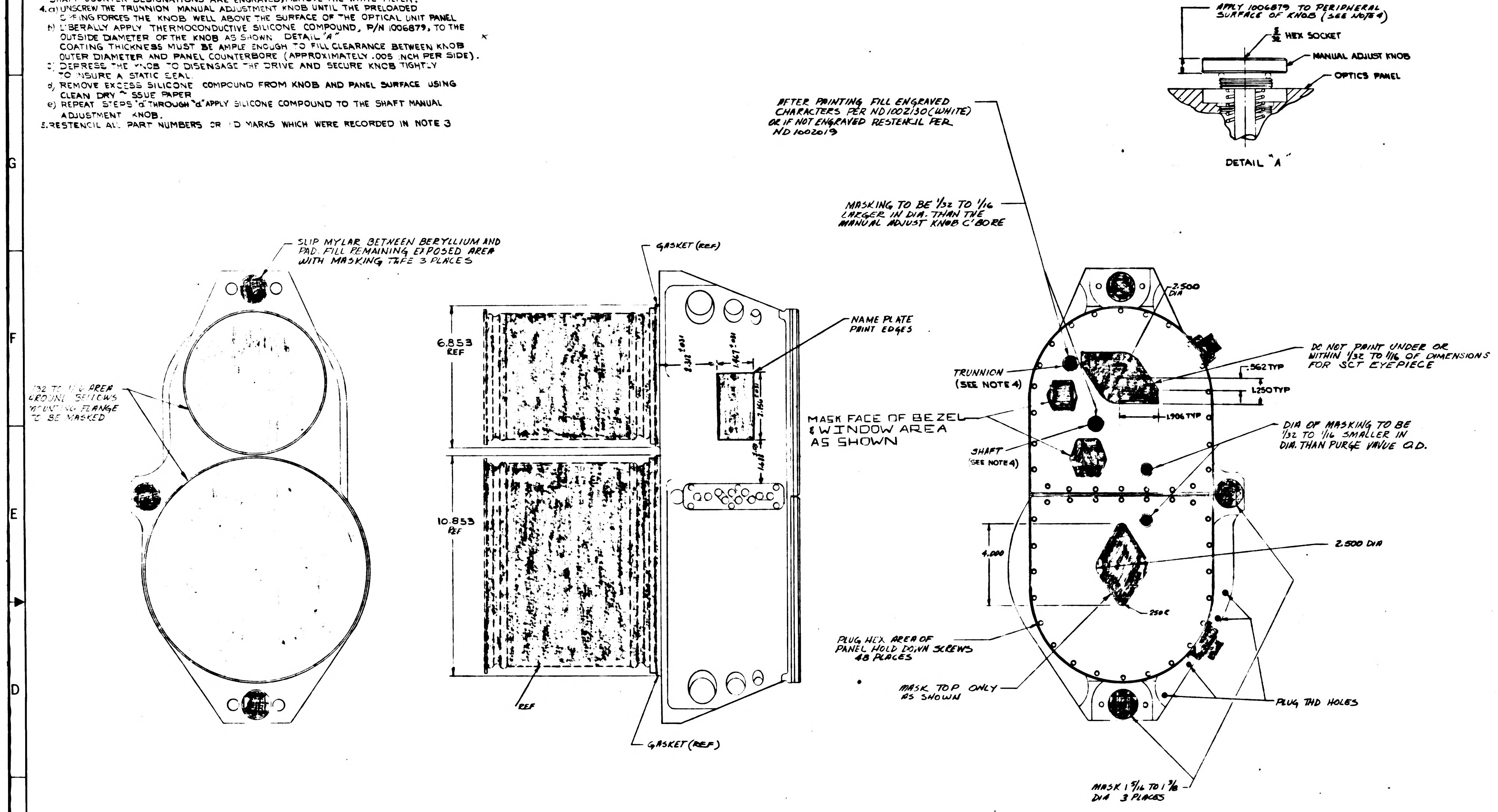
NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

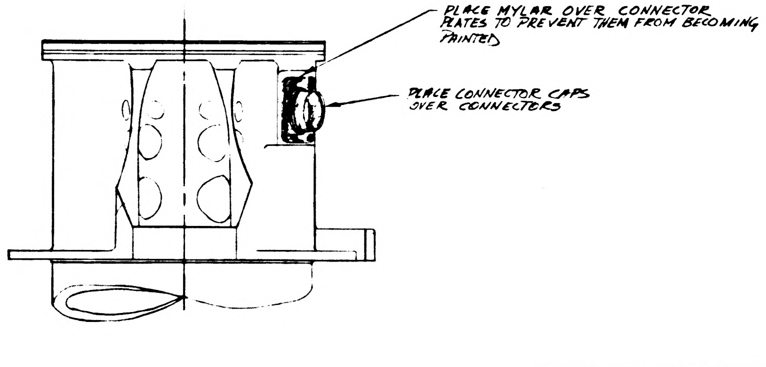
2011000 AC

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	6-1/[illegible]	[illegible]
U		REVISED PER TDRR 29152	6-14-[illegible]	[illegible]
V		REVISED PER TDRR 29300	6-28	[illegible]
W		REVISED PER TDRR 29558	7-2[illegible]	[illegible]
Y		REVISED PER TDRR 29560	7-25-[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-19-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
2.312 ±.031
1.467 ±.011
2.156 ±.011
1.608 ±.010
NAME PLATE PAINT EDGES
GASKET (REF)
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
TRUNNION (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES

DETAIL "A"


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AHB DATE 4-4-[illegible]
CHECKED
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 5-1966

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

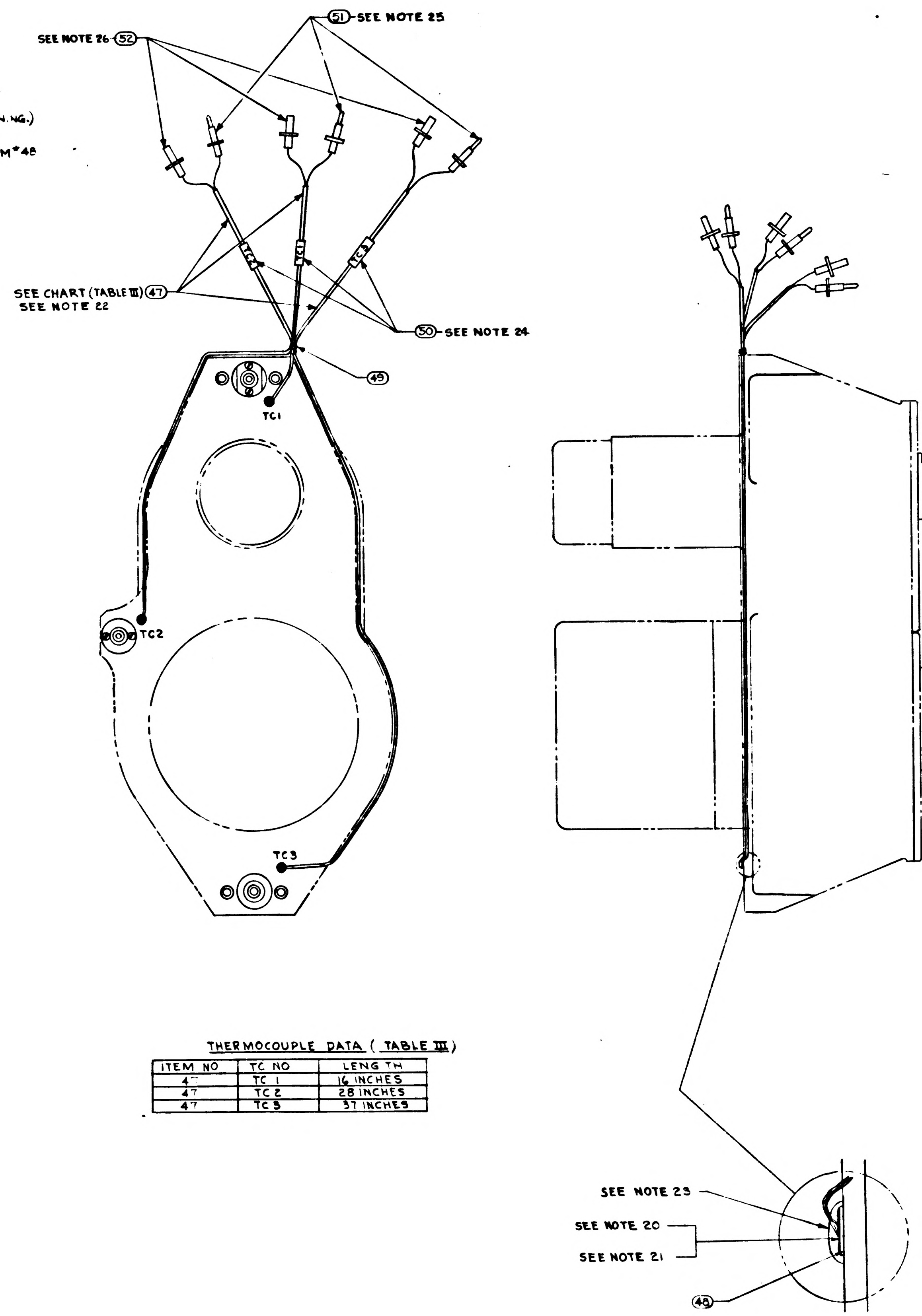
TITLE
OPTICAL UNIT

CODE IDENT NO 30230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 3 OF

AC 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-8-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-5-66	
AB		REVISED PER TDRR 31108	9-15-66	
AC		REVISED PER TDRR 31646	10-20-66	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
  A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
  B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
  C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
  MARK TC1, TC2, TC3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
  CRIMP ITEM NO. 5 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. [illegible] (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.
28. TORQUE 48 NAS1352C04LLB SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.



THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.L. Rhoades DATE 5-18-66
CHECKED R. Jahn 5-
APPROVAL
APPROVAL
A. C. M
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

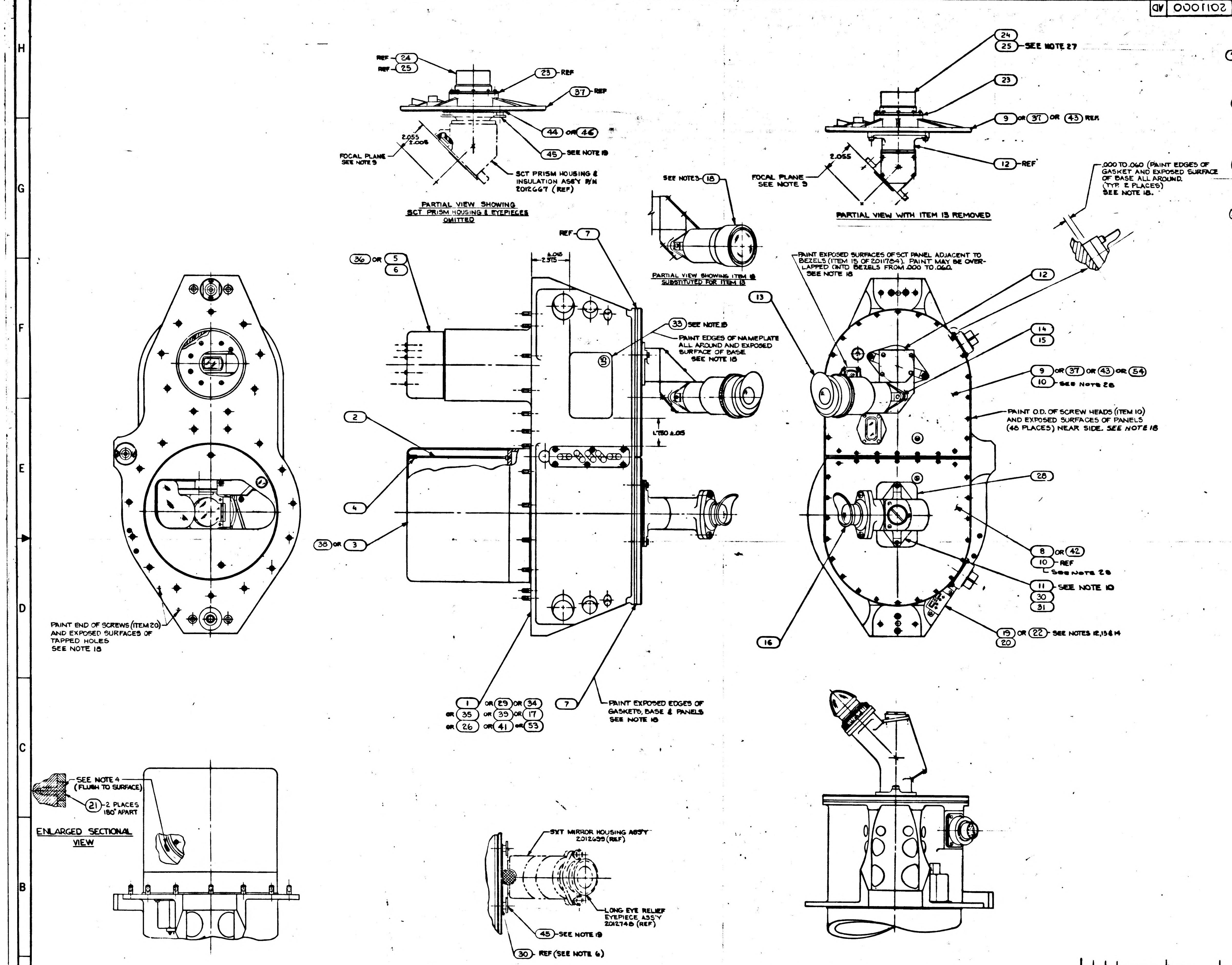
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 4 OF 4

2011000

2011000 AD

SYM	ZONE	REVISIONS 12219 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17350	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	4/5/66	
R		REVISED PER TDRR 28088	4/14/66	
S		REVISED PER TDRR 29043	5-19-6	[illegible]
T		REVISED PER TDRR 29144	6-1-6	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	6-28-66	
W		REVISED PER TDRR 29558	7-1-66	
Y		REVISED PER TDRR 29560	7-	
Z		REVISED PER TDRR 30742	8-13-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 32813	1-27-67	[illegible]


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055
2.006
FOCAL PLANE SEE NOTE 5
SCT PRISM HOUSING & INSULATION ASSY P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 5
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
2.015
2.515
36 OR 5
6
33 SEE NOTE 18
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.03
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011764). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASSY 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASSY 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON FRACTIONS + — − DECIMALS + — − ANGLES + — − DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 88386910000
APPLICATION		MATERIAL —	DRAWN F.S.L. DATE 7-22-64 CHECKED 8-1964 APPROVAL 8/7/64 APPROVAL E. Thorp 9/1/64
		CONTRACT	NASA APPROVAL MIT APPROVAL 1964

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000

SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 1 OF 4

0001102

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   - a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   - b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.

B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO ⅓ OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/18/66	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	3/11/66	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	6-1-66	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 3288	[illegible]	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*

SEE CHART TABLE III, SH. 4

061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PR(81" TOT)			
0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																		32									
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910030		SHIM, FOCUSING AIR (SXT)			
																		27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011782	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7358691 $\frac{0601}{0606}$		SPACER			
1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 $\frac{0400}{0406}$		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		#	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P6L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910360		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Haywood 9/20/65
APPROVAL
APPROVAL E. Thomas 10/65
NOT REQUIRED PER LETTER NASA PP/65-812
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

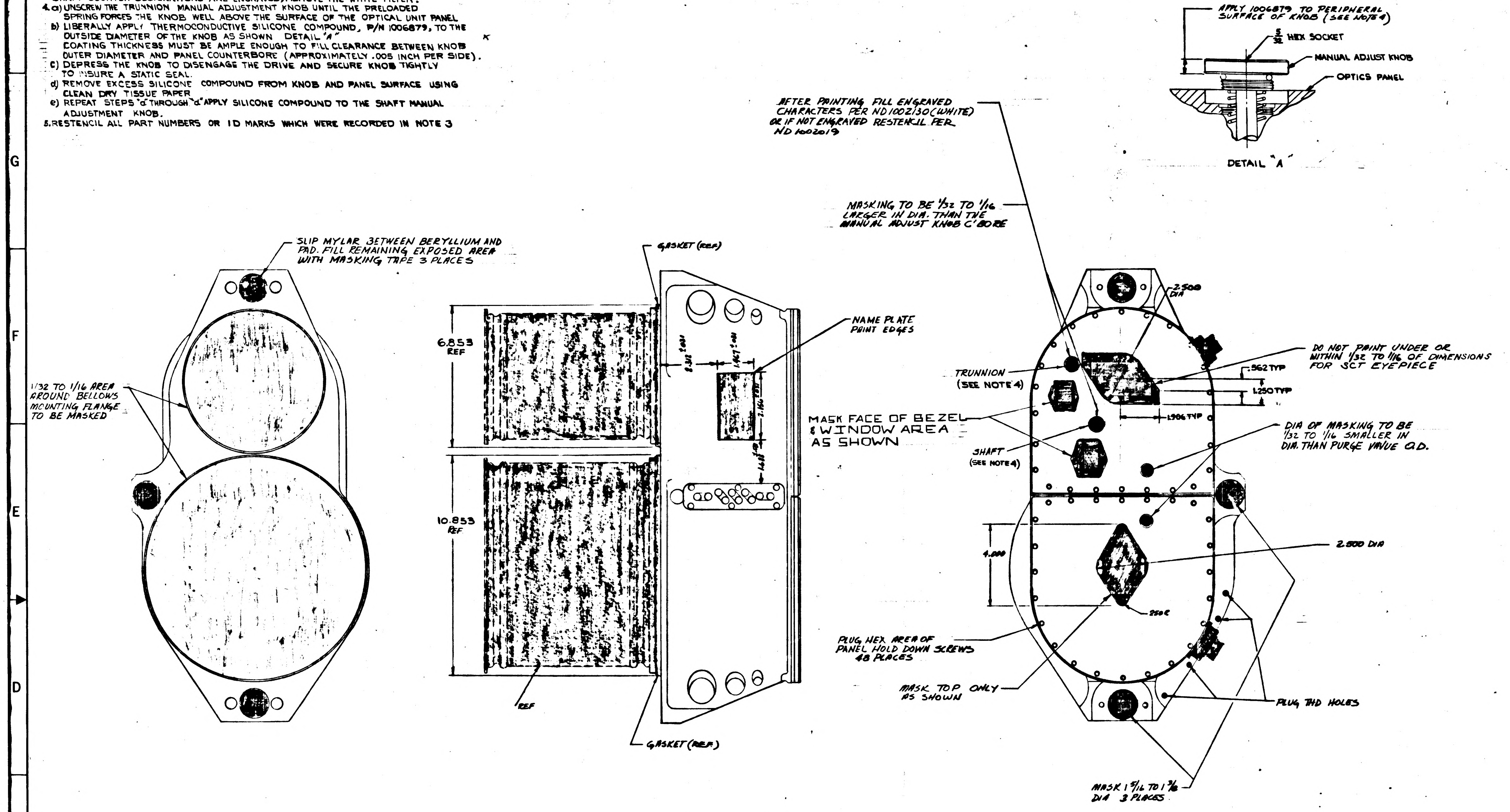
TITLE
OPTICAL UNIT

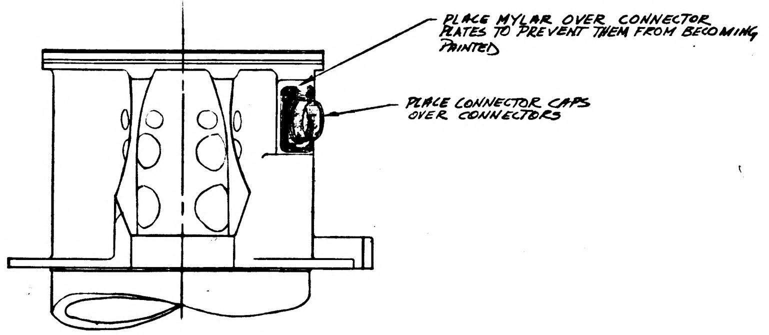
CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE NONE | WEIGHT CALC ACTUAL | SHEET 2 OF

NOTES:
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR ID MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR ID MARKS WHICH WERE RECORDED IN NOTE 3

2011000 AD

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	6-1-66	[illegible]
U		REVISED PER TDRR 29152	6-17-66	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	7-25-66	[illegible]
Z		REVISED PER TDRR 30742	8-12-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	11-20-66	[illegible]
AD		REVISED PER TDRR 32818	1-27-67	[illegible]


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
GASKET (REF)
NAME PLATE PAINT EDGES
2.312 ±.031
1.467 ±.031
2.166 ±.031
1.608 ±.031
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN AMB DATE 4-15-66
CHECKED
APPROVAL N. Brunelle 4-19-66
APPROVAL [illegible] 5/11/66
NASA APPROVAL [illegible] 5/1/66
MIT APPROVAL WG Marsh 5-1966

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

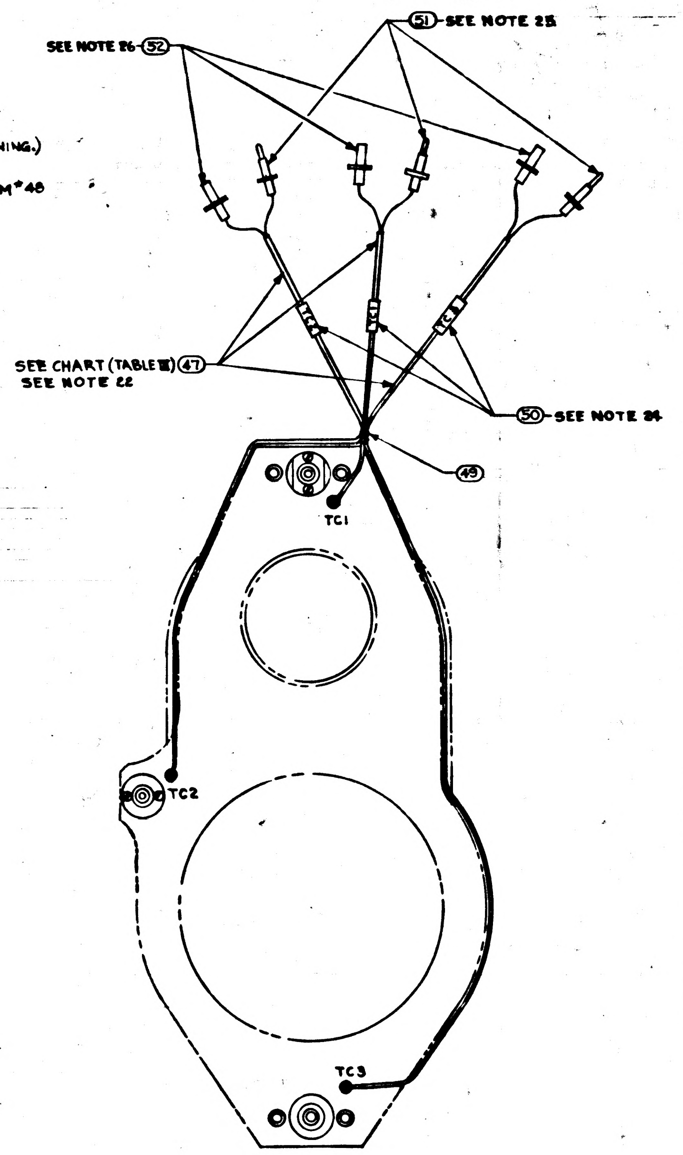
TITLE
OPTICAL UNIT

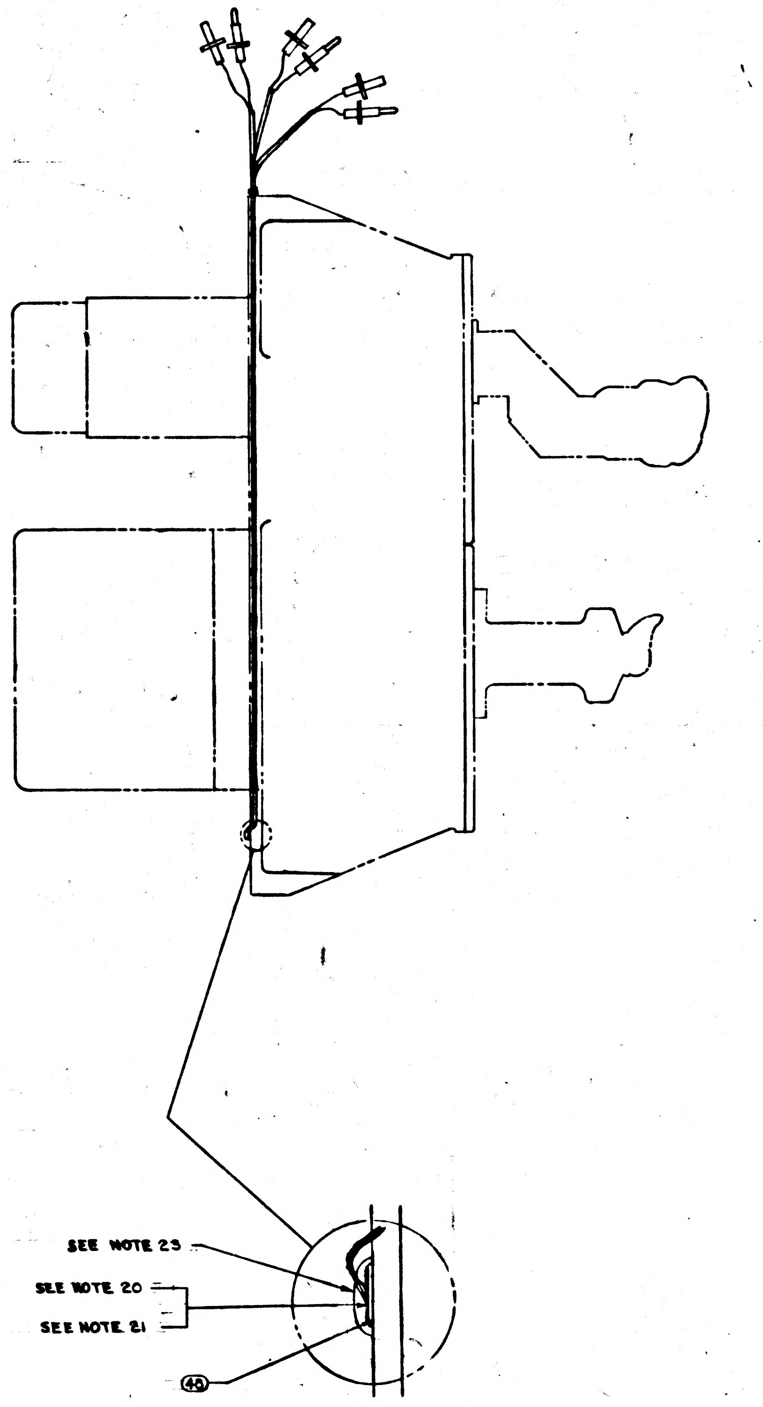
CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT | CALC ACTUAL | SHEET 3 OF 4

2011000 AD

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-8-66	
Ⓜ Z		REVISED PER TDRR 30742	8-18-66	
Ⓜ AA		REVISED PER TDRR 31106	9-5-66	
Ⓜ AB		REVISED PER TDRR 31106	9-16-66	
Ⓜ AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32818	1-27-67	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC1, TC2, TC3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.L. Rhodes DATE 5-18-66
CHECKED R. Jackson 5-19-66
APPROVAL
APPROVAL 6-9-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL W G Thurlow

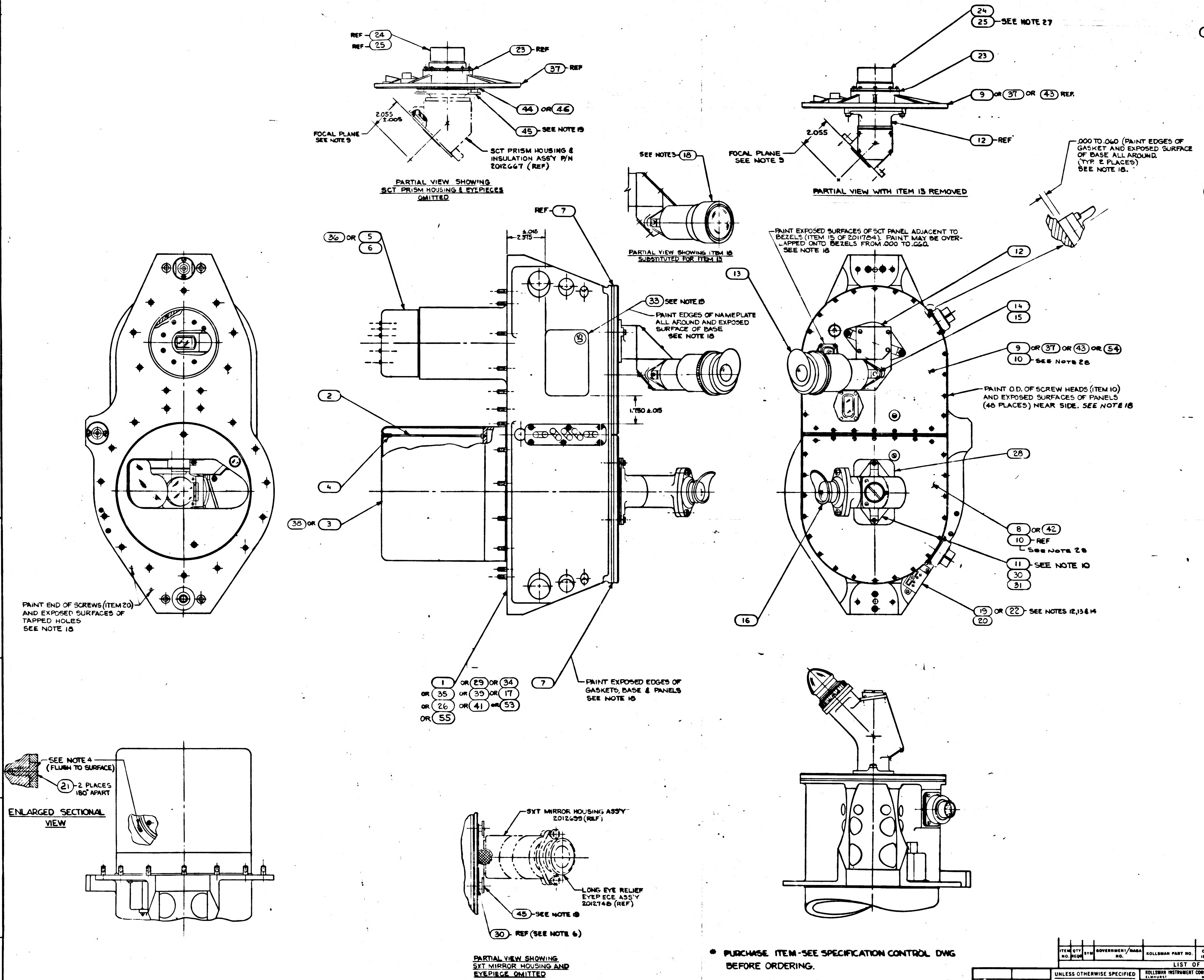
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011000 AE

SYM	ZONE	REVISIONS 12217 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390	18 Mar 65	wk
B		REVISED PER TDRR NO. 19197	5/2/65	[illegible]
C		REVISED PER TDRR NO. 19851	6/7/65	wk
D		REVISED PER TDRR NO. 20186	6/[illegible]/65	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	wk
H		REVISED PER TDRR 23067	[illegible]	wk
J		REVISED PER TDRR 23362	11/[illegible]/65	
K		REVISED PER TDRR 25241	1/18/66	
L		REVISED PER TDRR 25766	2/8/66	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	4/5/66	
R		REVISED PER TDRR 28088	4/24/66	
S		REVISED PER TDRR 29043	5-19-6	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	5/14/66	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-2[illegible]	[illegible]
Y		REVISED PER TDRR 29560	7-[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 328.8	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
2.055
FOCAL PLANE SEE NOTE 9
12 REF
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.05
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 18
30 REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schultz DATE 7-22-64
CHECKED C. [illegible] 8-1964
APPROVAL [illegible] 9/[illegible]/64
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 1964

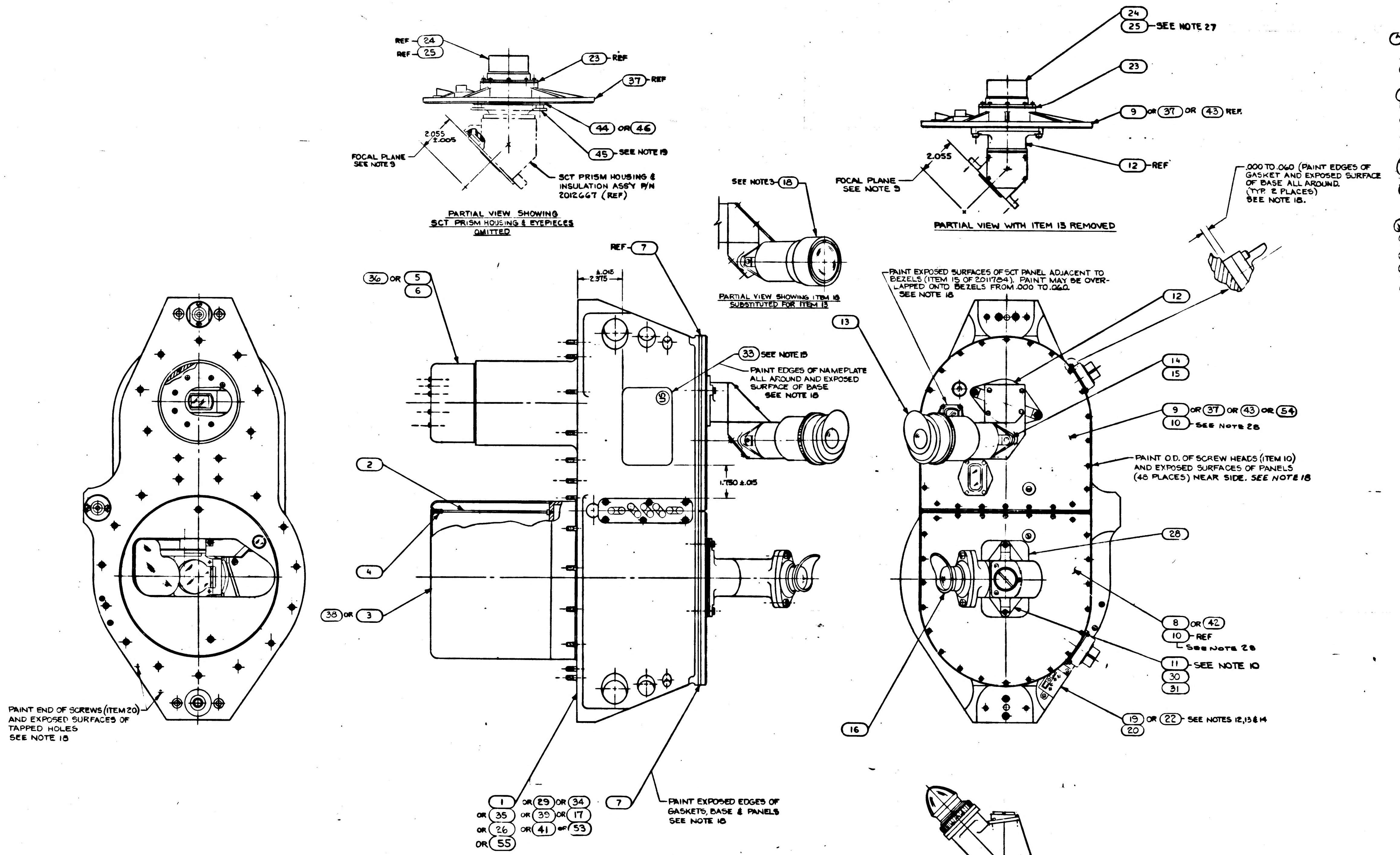
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

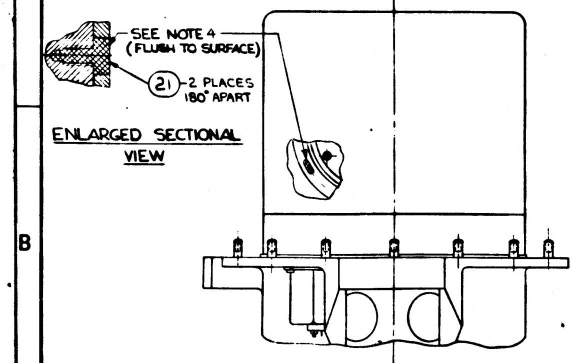
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET
OF

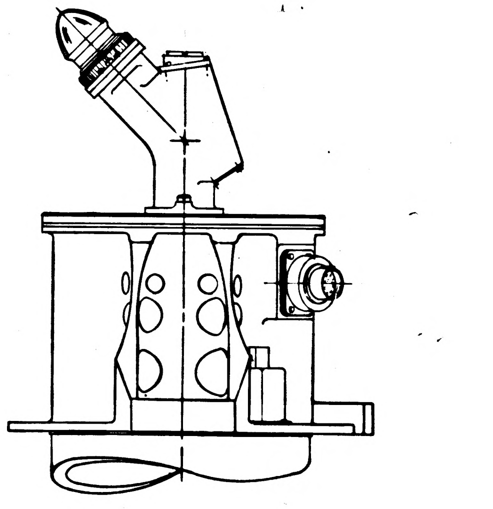
2011000 AE

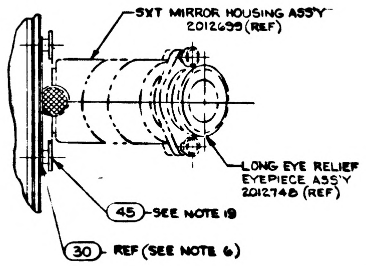
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	18 Mar 65	[illegible]
B		REVISED PER TDRR NO. 19197	5/26/65	[illegible]
C		REVISED PER TDRR NO. 19851	6/4/65	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/1/66	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	4/24/66	[illegible]
S		REVISED PER TDRR 29043	5-17-6	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 32818	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
2.055
FOCAL PLANE SEE NOTE 9
12 REF
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.015
2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16


SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART

ENLARGED SECTIONAL VIEW




SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-28-64
CHECKED [illegible] 8-4-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF

2011000 AE

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASS'Y, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/18/66	WK
L		REVISED PER TDRR 25766	2/4/66	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	3/1/66	WK
P		REVISED PER TDRR 27722	4/5/66	W
R		REVISED PER TDRR 28088	4/12/66	W
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	6-1-66	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31109	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 32818	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*

SEE CHART TABLE III, SH.4 (item 47)

LIST OF PARTS AND MATERIALS

061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-1-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																		32									
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157008		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																		27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7938691 0631/0651		SPACER			
1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 0400/0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R4L	— # —		SCREW, SELF-LOCKING PAN HD. FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Haymond 9/20-65
APPROVAL
APPROVAL E. Thomas 10/6/65
NOT REQUIRED PER LETTER NASA PP7-65-812
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 30230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 4

MASTER

AE 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.

B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22229 SHEET 2 REDRAWN	9/24	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25341	1/18/66	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	3/1/66	WK
P		REVISED PER TDRR 27722	[illegible]	W
R		REVISED PER TDRR 28088	[illegible]	W
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31169	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 3288	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]

TABLE I (SCHEMATIC REF)

DWG.SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*

SEE CHART TABLE III, SH.4

LIST OF PARTS AND MATERIALS

061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASS'Y STAGE II			
AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																		32									
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																		27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7958691 0601 thru 0606		SPACER			
1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 thru 0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R4L	— # —		SCREW, SELF-LOCKING PAN HD. FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57586910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Haymond 9/20/65
APPROVAL
APPROVAL E. Therrys 10/6/65

NOT REQUIRED PER LETTER
NASA APPROVAL NASA PP7-65-812
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 30230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT
CALC
ACTUAL
SHEET 2 OF 4

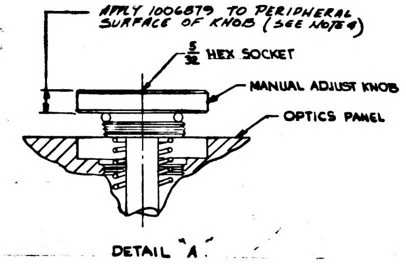
MASTER

2011000 AE

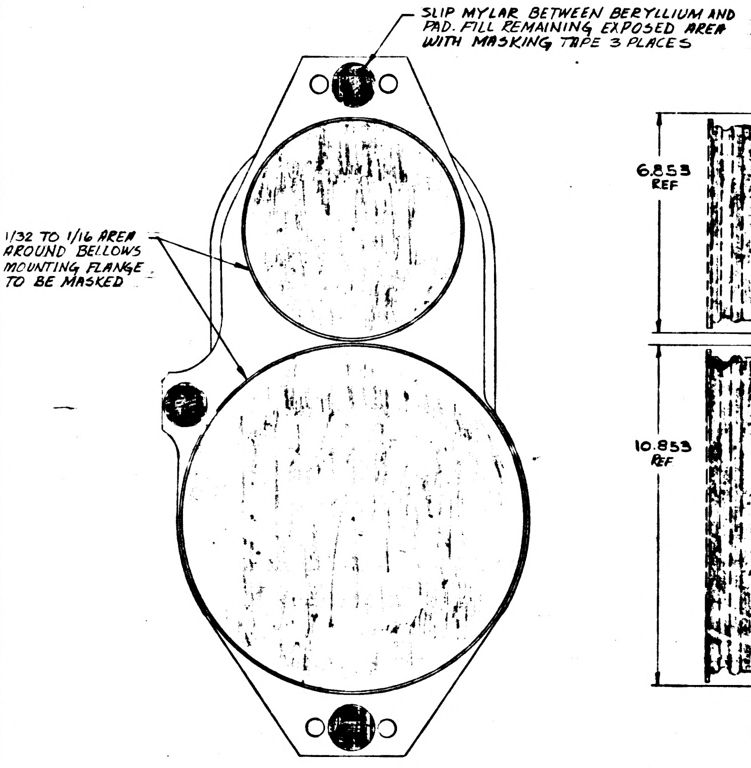
NOTES:

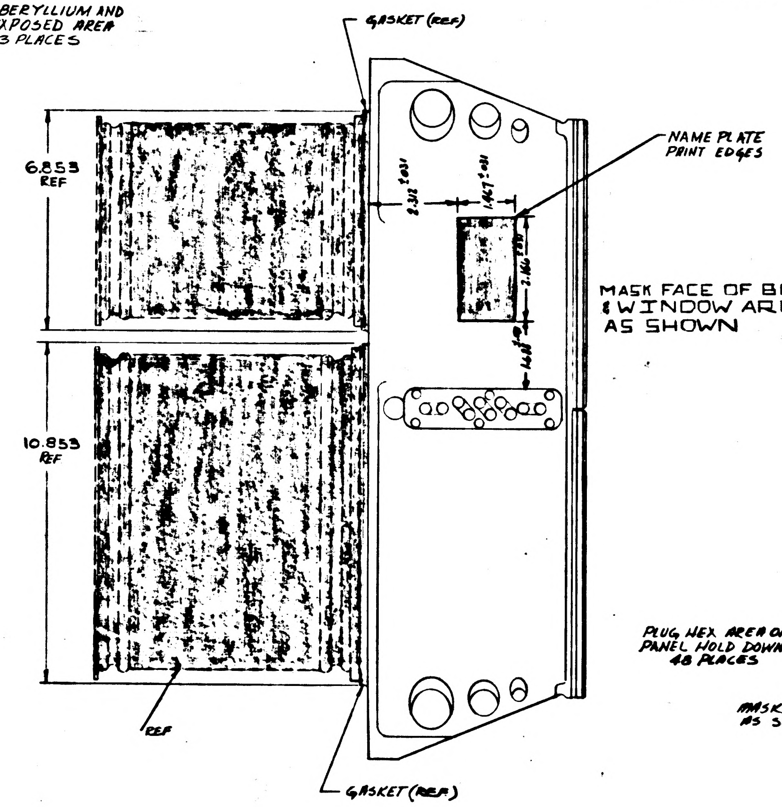
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

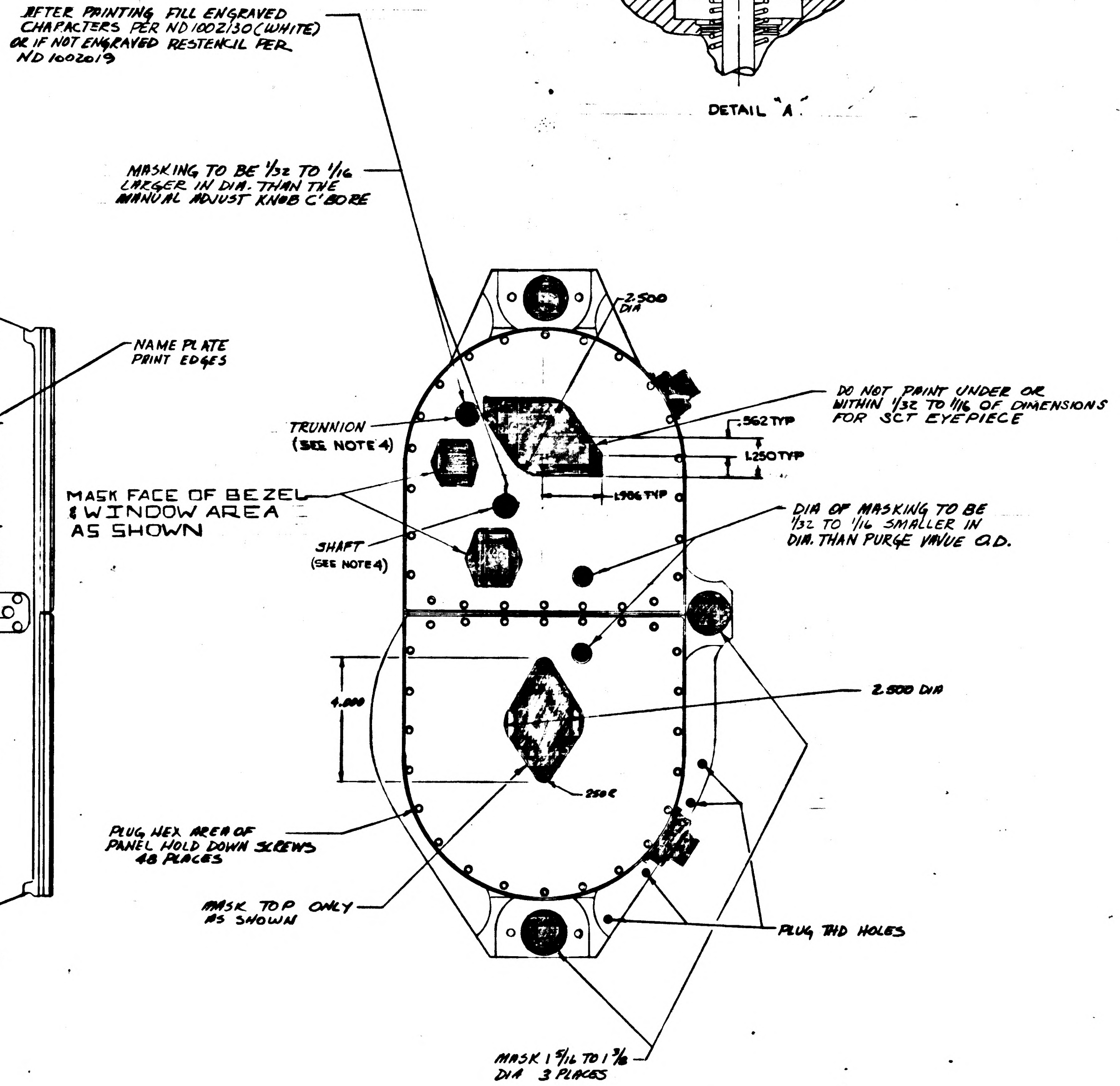
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	6-1-66	[illegible]
U		REVISED PER TDRR 29152	6-14-66	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	7-12-66	[illegible]
Y		REVISED PER TDRR 29560	7-25-66	[illegible]
Z		REVISED PER TDRR 30742	8-19-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 32818	[illegible]	[illegible]
AE		REVISED PER TDRR 32833	[illegible]	[illegible]

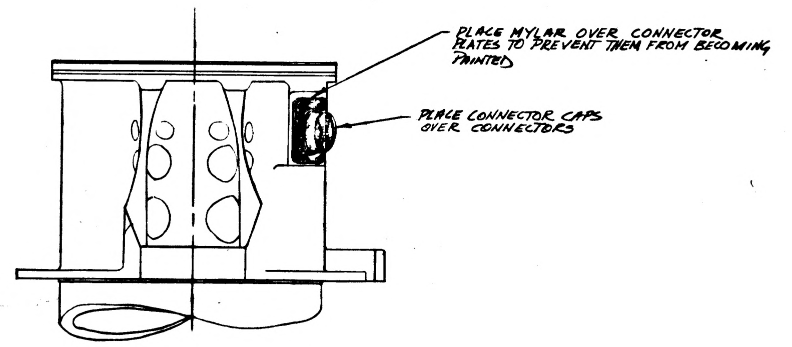

APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


GASKET (REF)
6.853 REF
10.853 REF
2.312 ±.031
1.467 ±.031
2.166 ±.031
NAME PLATE PRINT EDGES
REF
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND 1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-18-66
CHECKED
APPROVAL N. Brunetto 4-18-66
APPROVAL [illegible] 5/18/66
NASA APPROVAL [illegible] 5/18/66
MIT APPROVAL [illegible] 5-1966

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 4

2011000 AE

NOTES:
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
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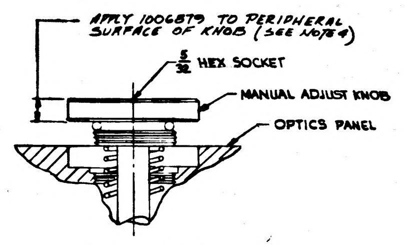
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
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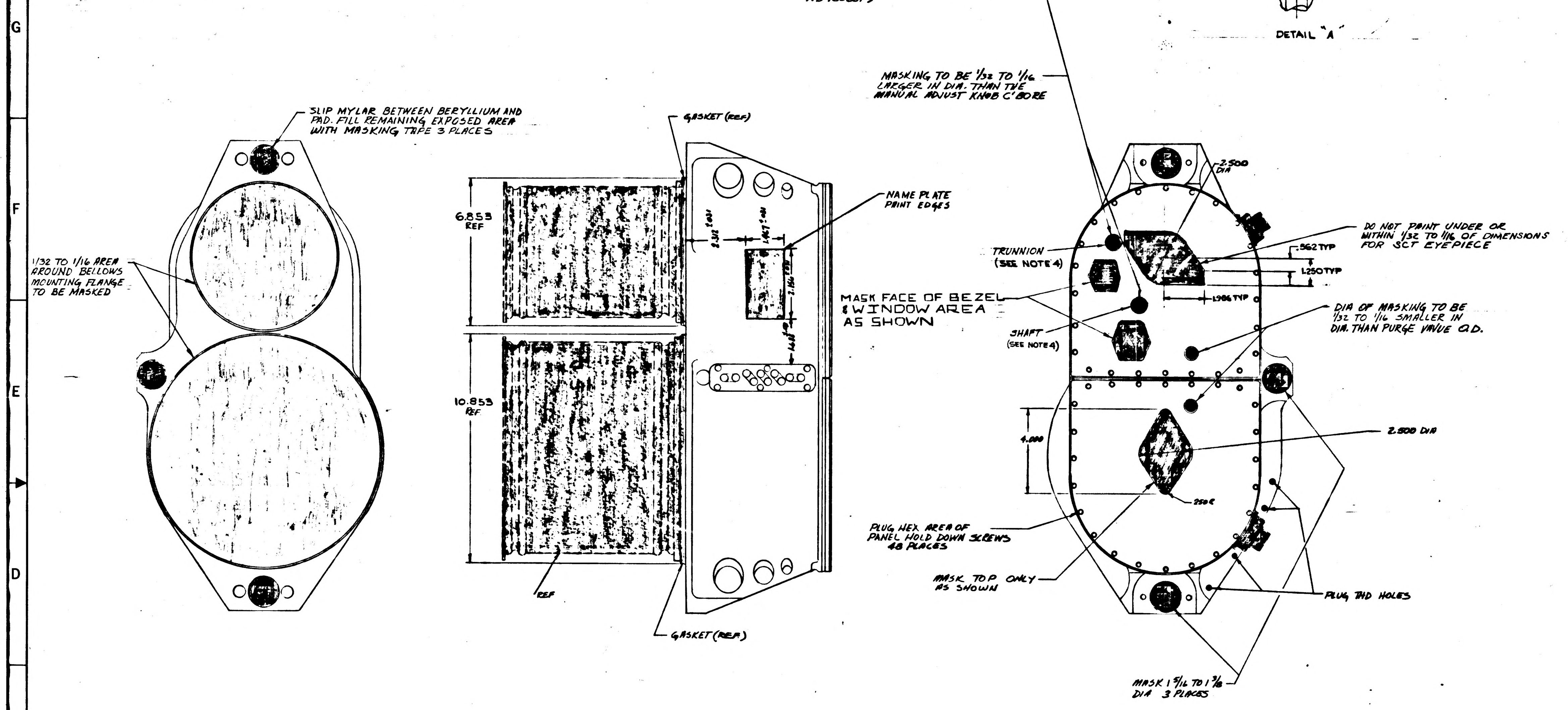
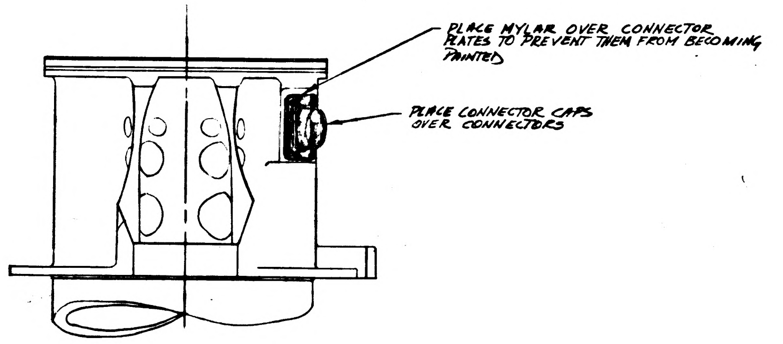
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
2.312 ±.01
1.467 ±.01
2.156 ±.01
1.618 ±.01
REF
GASKET (REF)
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
.562 TYP
1.250 TYP
1.986 TYP
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	6-1-66	
U		REVISED PER TDRR 29152	6-14-66	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	7-12-66	
Y		REVISED PER TDRR 29560	7-26-66	
Z		REVISED PER TDRR 30742	8-12-66	
AA		REVISED PER TDRR 31106	9-15-66	
AB		REVISED PER TDRR 31108	[illegible]	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 32018	[illegible]	
AE		REVISED PER TDRR 32833	[illegible]	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL 4-19-66
APPROVAL 5/1/66
NASA APPROVAL 5/1/66
MIT APPROVAL 5-1966

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 3 OF 4

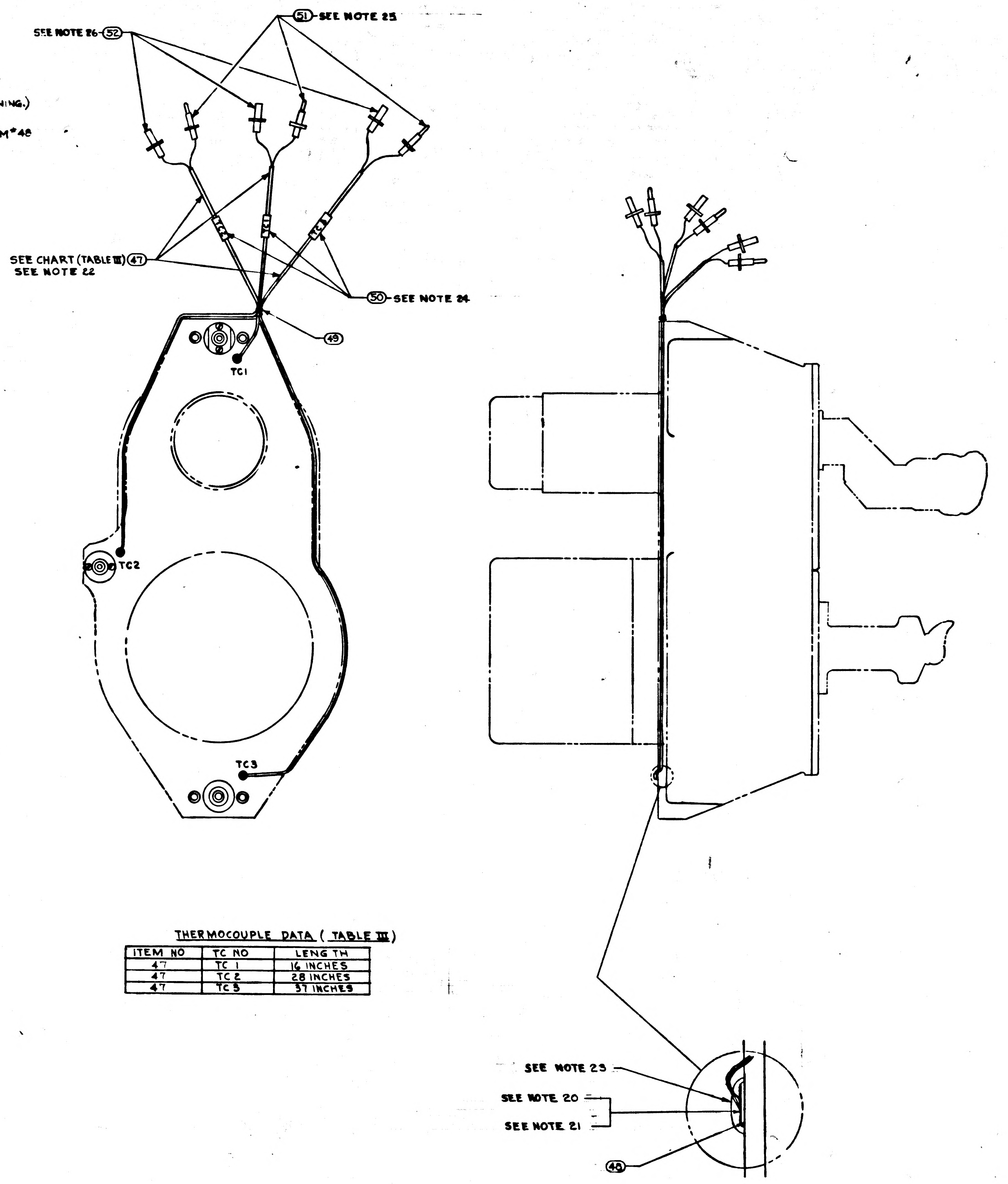
MASTER

2011000 AE

2011000 AE

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-2-66	Vinson
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-5-66	
AB		REVISED PER TDRR 31108	9-14-66	
AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.



THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al. Rhodes DATE 5-18-66
CHECKED R Jadum 5-19-66
APPROVAL
APPROVAL E. Thorp 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL W G Newton 6-21

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

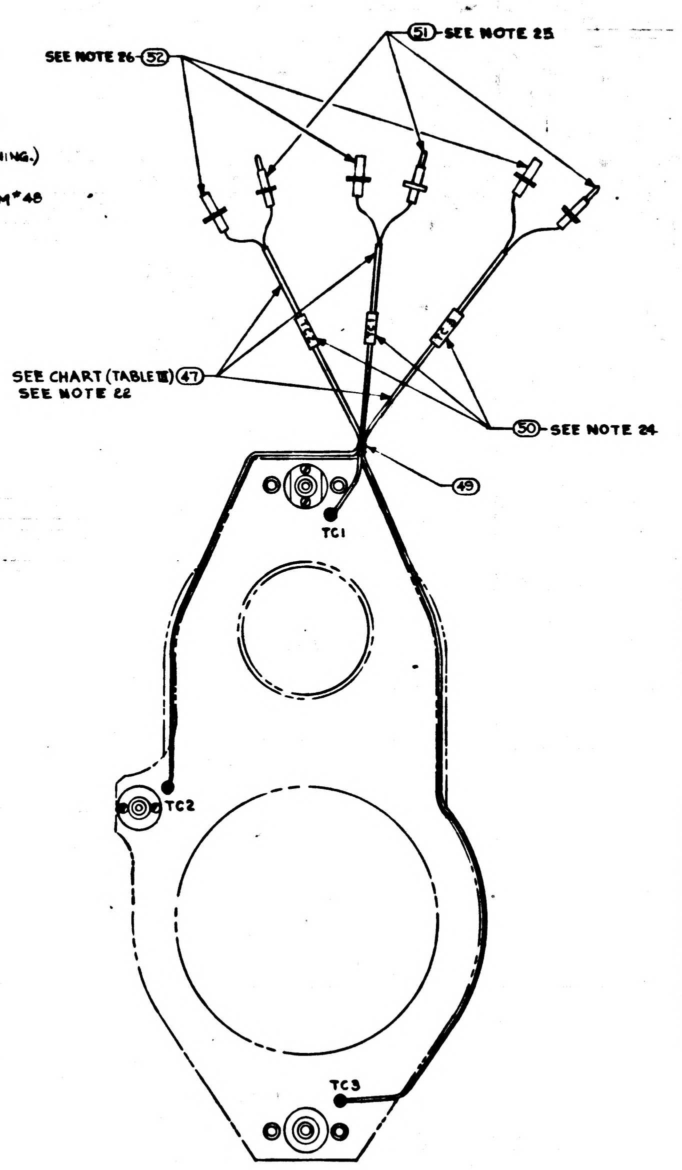
TITLE
OPTICAL UNIT

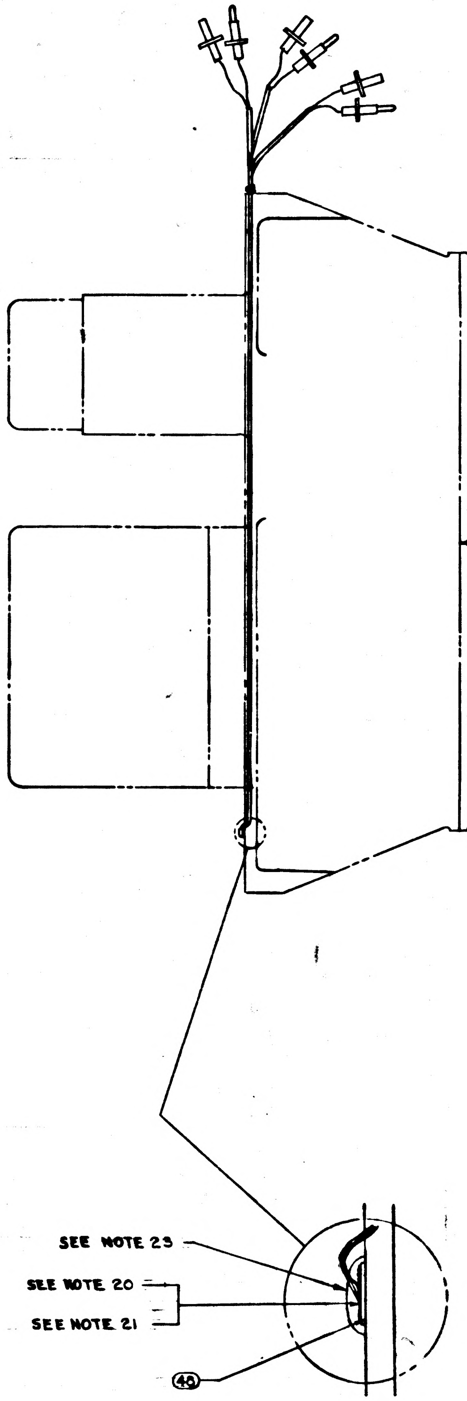
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011000 AE

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
  A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
  B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
  C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC1, TC2, TC3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.
28. TORQUE 48 NAS1352C04LLB SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-?-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-5-66	
AB		REVISED PER TDRR 31108	9-16-66	
AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN AL. Rhodes DATE 5-18-66
CHECKED R. Jaden 5-19-66
APPROVAL
APPROVAL E. Dhong 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL W G Hurley 6-28

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

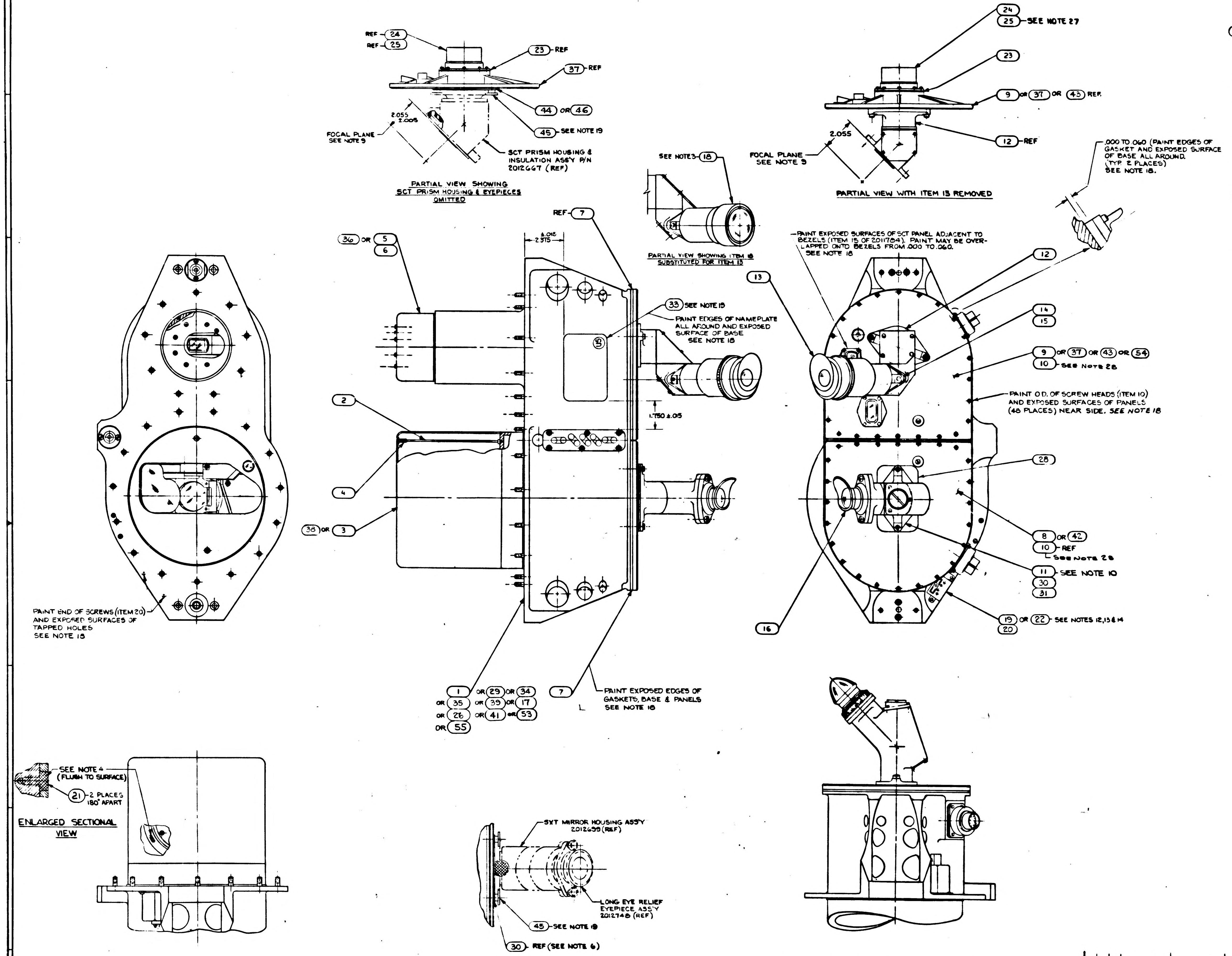
CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000 AE

10 9

2011000 AF

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	
B		REVISED PER TDRR NO. 19197	[illegible]	
C		REVISED PER TDRR NO. 19851	[illegible]	
D		REVISED PER TDRR NO. 20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25769	[illegible]	
N		REVISED PER TDRR 2[illegible]441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29[illegible]		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152		
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR 29558		
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-8-66	
AA		REVISED PER TDRR 31106	9-[illegible]	
AB		REVISED PER TDRR 31108	[illegible]	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 328[illegible]	1-27-6[illegible]	
AE		REVISED PER TDRR 32833	1-27-6[illegible]	
AF		REVISED PER TDRR 340[illegible]7	6/23/[illegible]	



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055
2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
2.016
2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.05
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED 8-10-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF 1

10 9 8 7 6 5 4 3 2 1

AF 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. -2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.0 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
7. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE 'A' OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22.23 SHEET 2 REDRAWN	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 32818	[illegible]-27-67	[illegible]
AE		REVISED PER TDRR 32833	[illegible]-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*
036	NA	NA	NA	*	NA
037	NA	NA	NA	*	NA

SEE CHART TABLE III, SH.4

037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PR (81" TOT)			
1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																				32									
0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																				27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7958691 [illegible]		SPACER			
1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011987-$\frac{1}{7}$T	5638391 0400 0486		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD., SELF-LOCKING			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		#	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P4L	— # —		SCREW, SELF-LOCKING PAN HD FULL TH'D 250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Haywood 9/20/65
APPROVAL
APPROVAL
NOT REQUIRED PER LETTER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 4

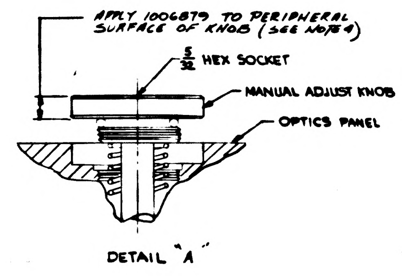
MASTER

2011000 AF

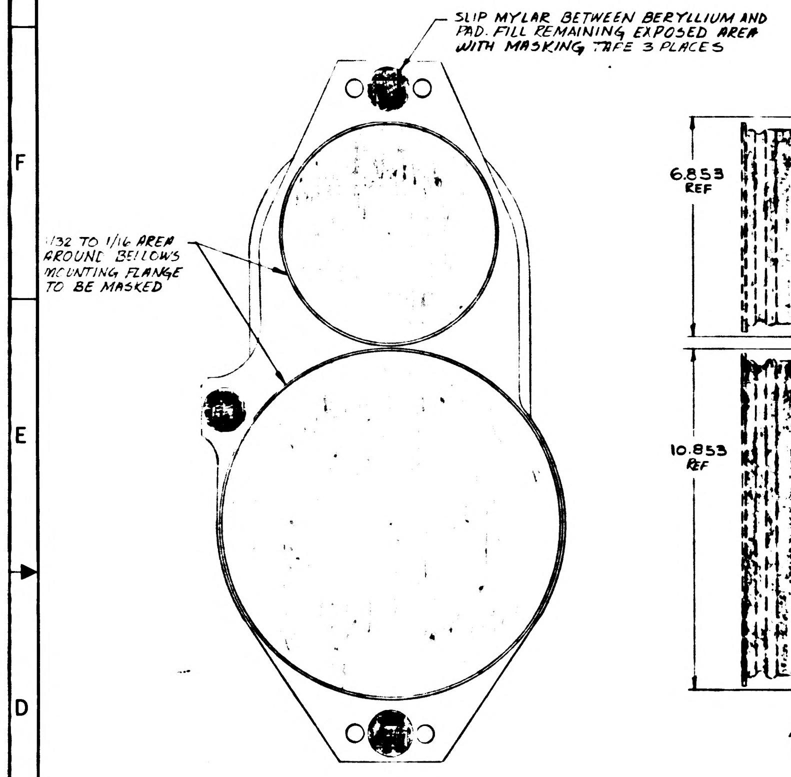
NOTES:

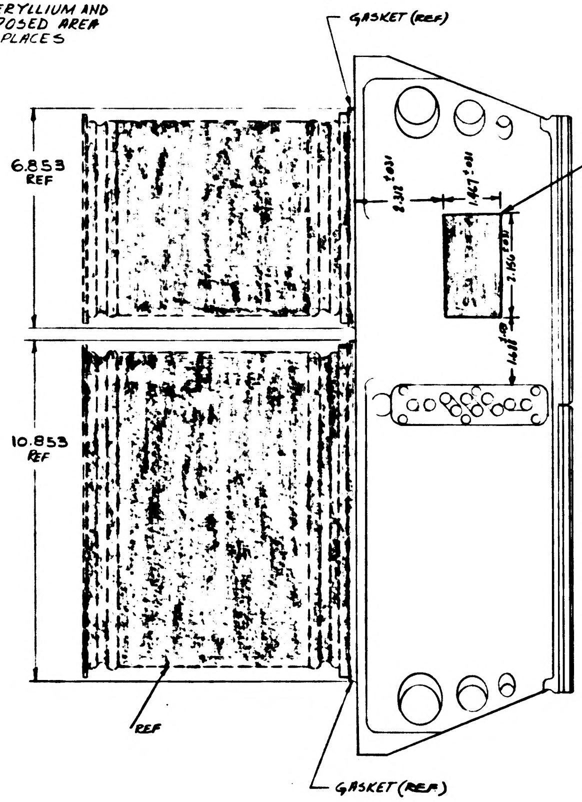
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

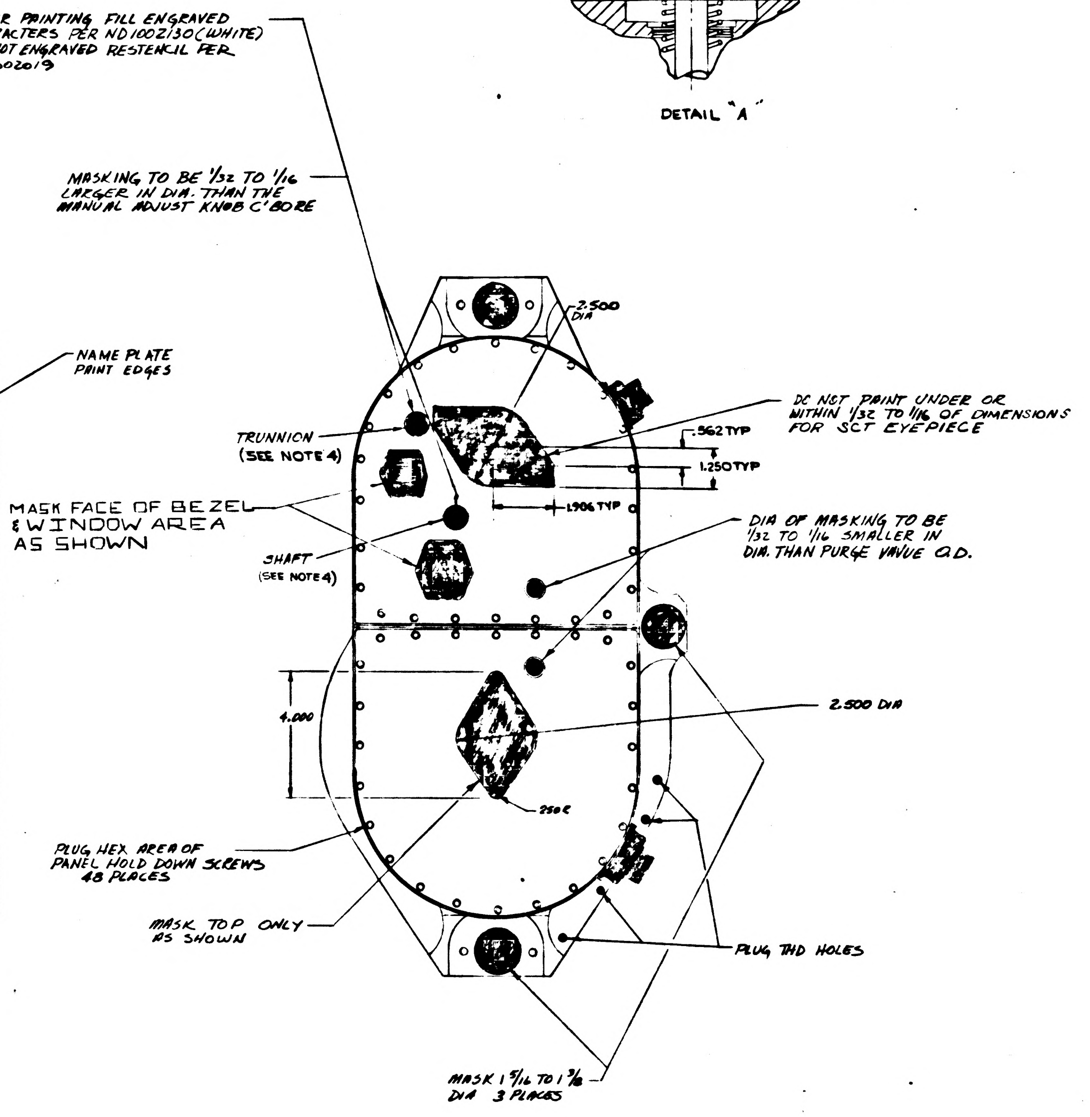
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 32818	[illegible]	[illegible]
AE		REVISED PER TDRR 32833	[illegible]	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]

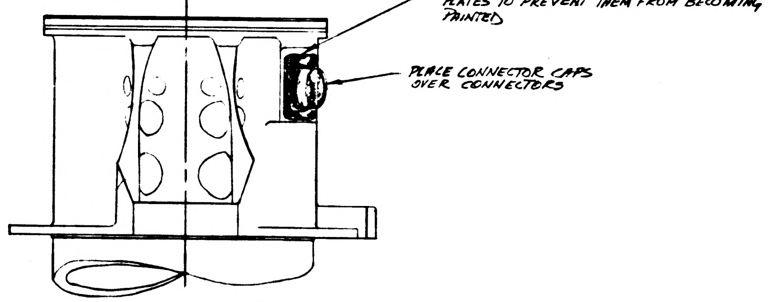

APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


GASKET (REF)
6.853 REF
10.853 REF
2.312 ±.031
1.467 ±.011
2.156 ±.011
1.608 ±.010
NAME PLATE PAINT EDGES
REF
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL [illegible] 4-8-66
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 5/1966

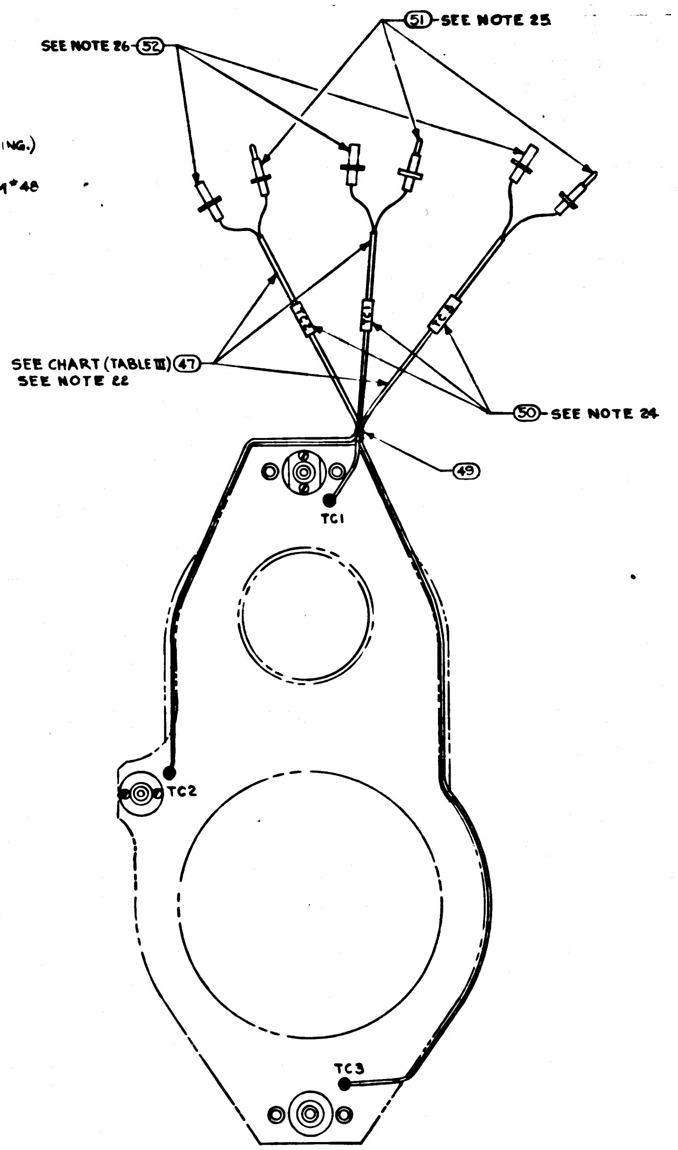
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT
CODE IDENT NO. 30230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 4

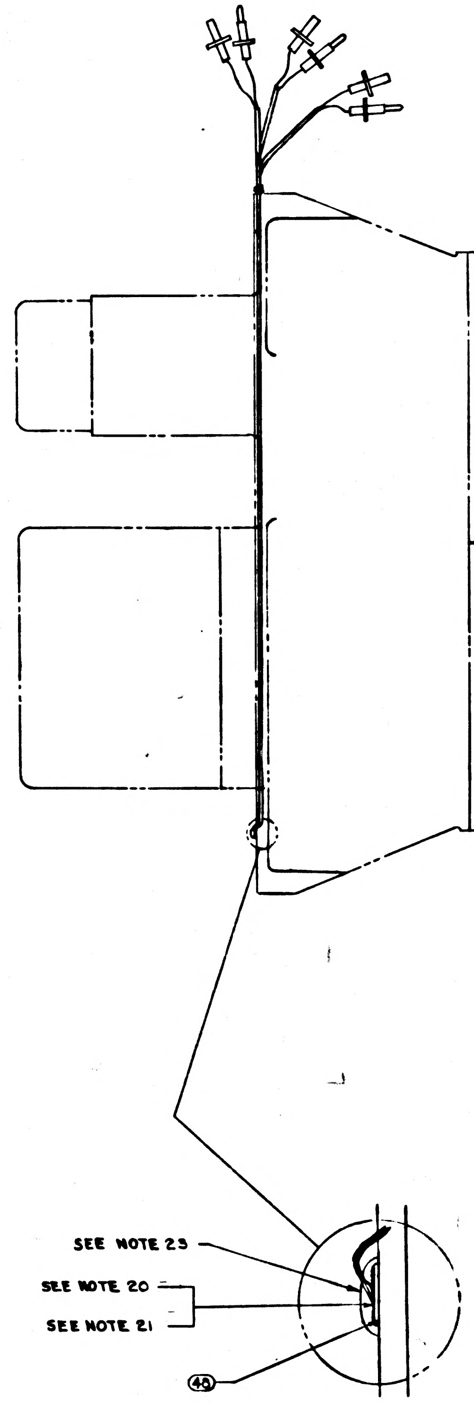
2011000 AF

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-2-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-5-66	
AB		REVISED PER TDRR 31108	9-16-66	
AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32812	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	

0. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
   - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
   - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
   - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)

21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC1, TC2, TC3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

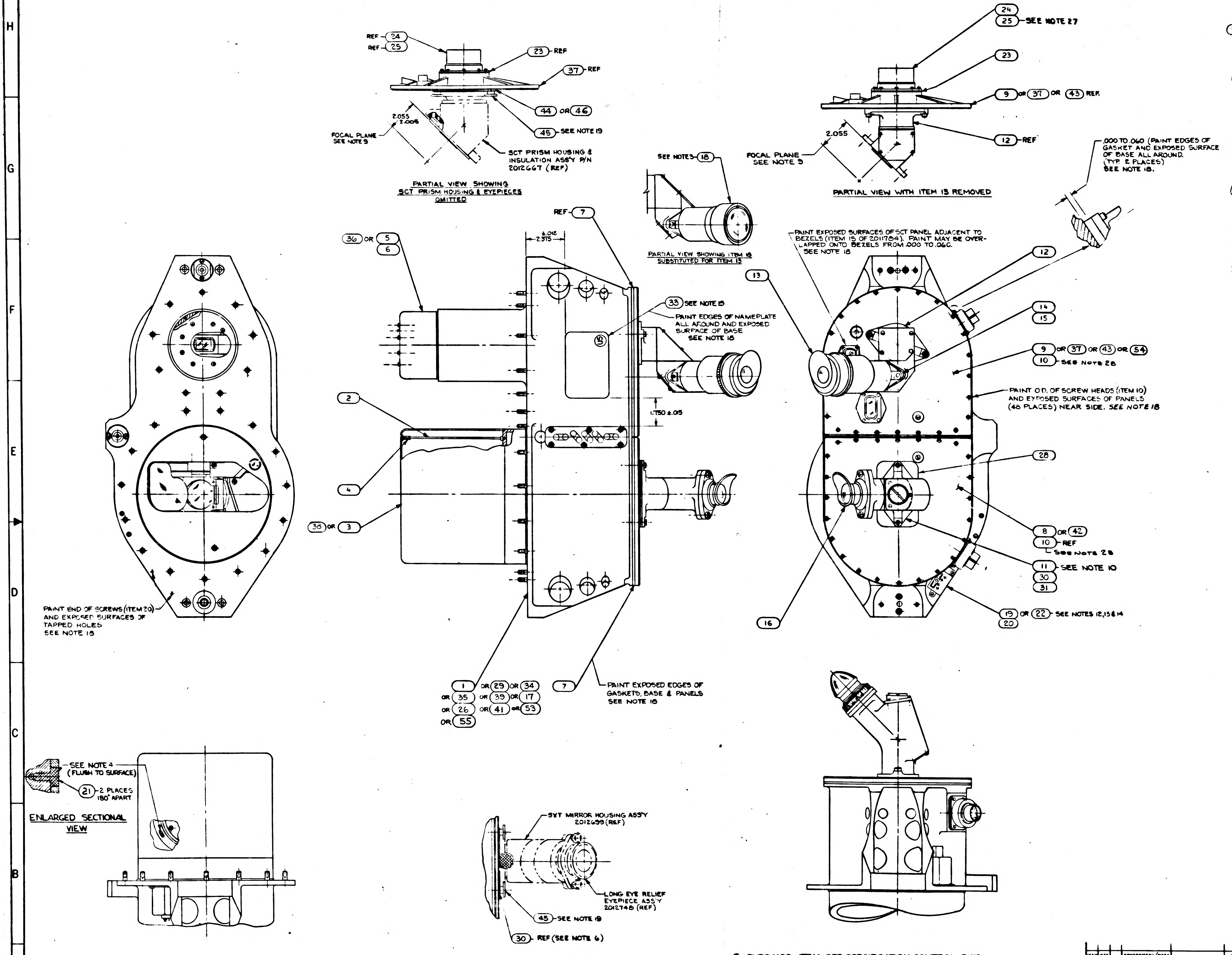
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al. Rhodes DATE 5-18-66
CHECKED R Jadern 5-19-66
APPROVAL
APPROVAL 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE OPTICAL UNIT
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011000 AF

2011000 AG

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17790	[illegible]	WK
B		REVISED PER TDRR NO. 19197	[illegible]	WK
C		REVISED PER TDRR NO. 19851	[illegible]	WK
D		REVISED PER TDRR NO. 20186	[illegible]	WK
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25769	[illegible]	[illegible]
N		REVISED PER TDRR 26441	[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29343	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	9-15-66	[illegible]
AB		REVISED PER TDRR 31108	9-15-66	[illegible]
AC		REVISED PER TDRR 31646	10-20-66	[illegible]
AD		REVISED PER TDRR 32818	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]
AG		REVISED PER TDRR 34083	6/30/67	[illegible]


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
SEE NOTE 3 18
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
2.055
FOCAL PLANE SEE NOTE 9
12 REF
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

PARTIAL VIEW WITH ITEM 13 REMOVED

ENLARGED SECTIONAL VIEW

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88356910000
DRAWN DATE 7-22-64
CHECKED 8-10-64
APPROVAL
APPROVAL 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET OF

2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22623 SHEET 2 REDRAWN	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-15-66	
AB		REVISED PER TDRR 31108	[illegible]	
AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32088	[illegible]	
AE		REVISED PER TDRR 32833	[illegible]-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*
036	NA	NA	NA	*	NA
037	NA	NA	NA	*	NA
062	NA	NA	NA	NA	*

SEE CHART TABLE III SHEET 4 (ITEMS 60, 59, 58)

SEE CHART TABLE III, SH. 4 (ITEM 47)

QTY REQD																					LIST OF PARTS AND MATERIALS									
062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			2010746-012			THERMOCOUPLE, CONTACT			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE, CONTACT			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE, CONTACT			
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																					32									
0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																					27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7958691 0601/0606		SPACER			
1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 0400/0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD., SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P8L	— # —		SCREW, SELF-LOCKING PAN HD FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A. C. WILLIAMS DATE [illegible]-17-65
CHECKED F. Haymond 9/20/65
APPROVAL
APPROVAL E. Thorys 10/6/65
NOT REQUIRED PER LETTER
NASA APPROVAL [illegible]312
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

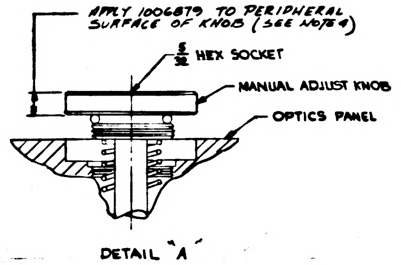
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET OF

AG 2011000

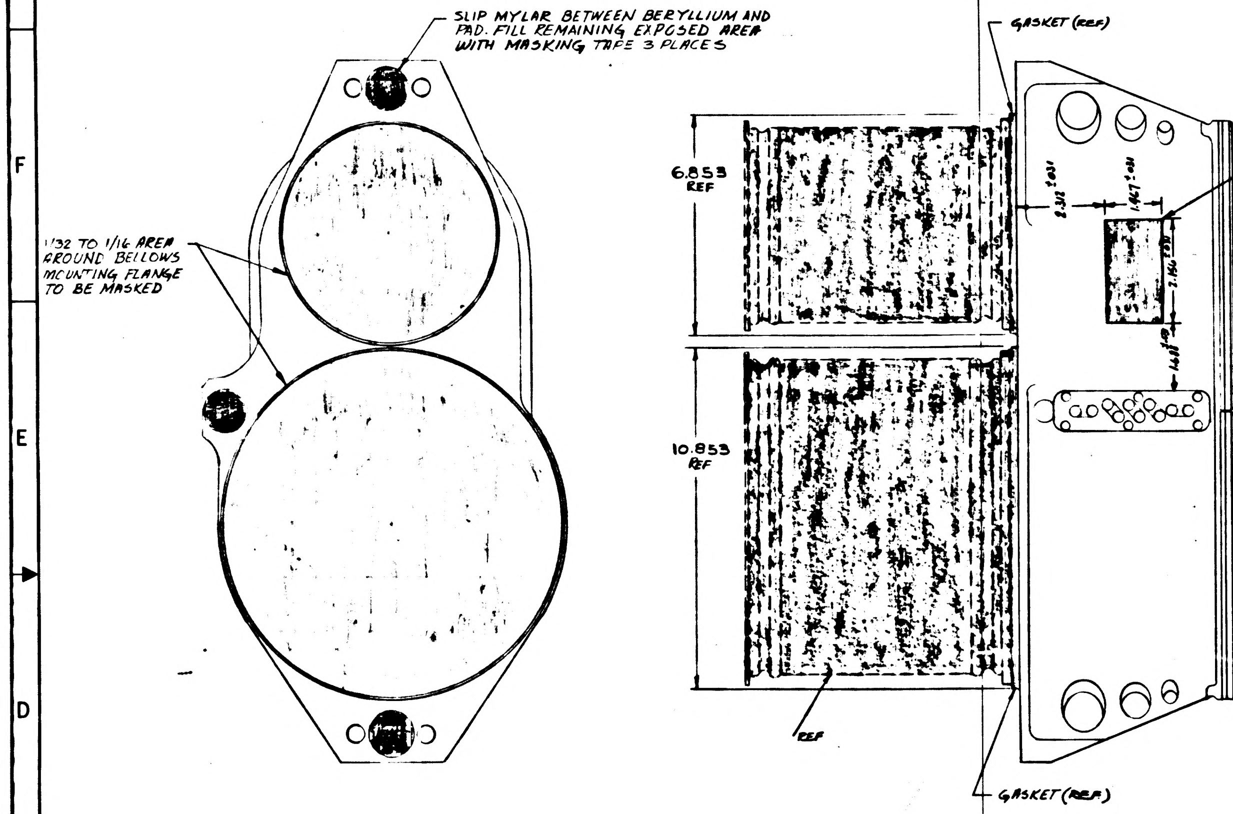
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	6-14-66	
V		REVISED PER TDRR 29300	6-28	
W		REVISED PER TDRR 29558	7-12-66	
Y		REVISED PER TDRR 29560	7-25	
Z		REVISED PER TDRR 30742	8-12-66	
AA		REVISED PER TDRR 31106	9-15-66	
AB		REVISED PER TDRR 31108	9-15-66	
AC		REVISED PER TDRR 31646	11-20-66	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	2-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
[illegible]		REVISED PER TDRR 34083	6/30/67	

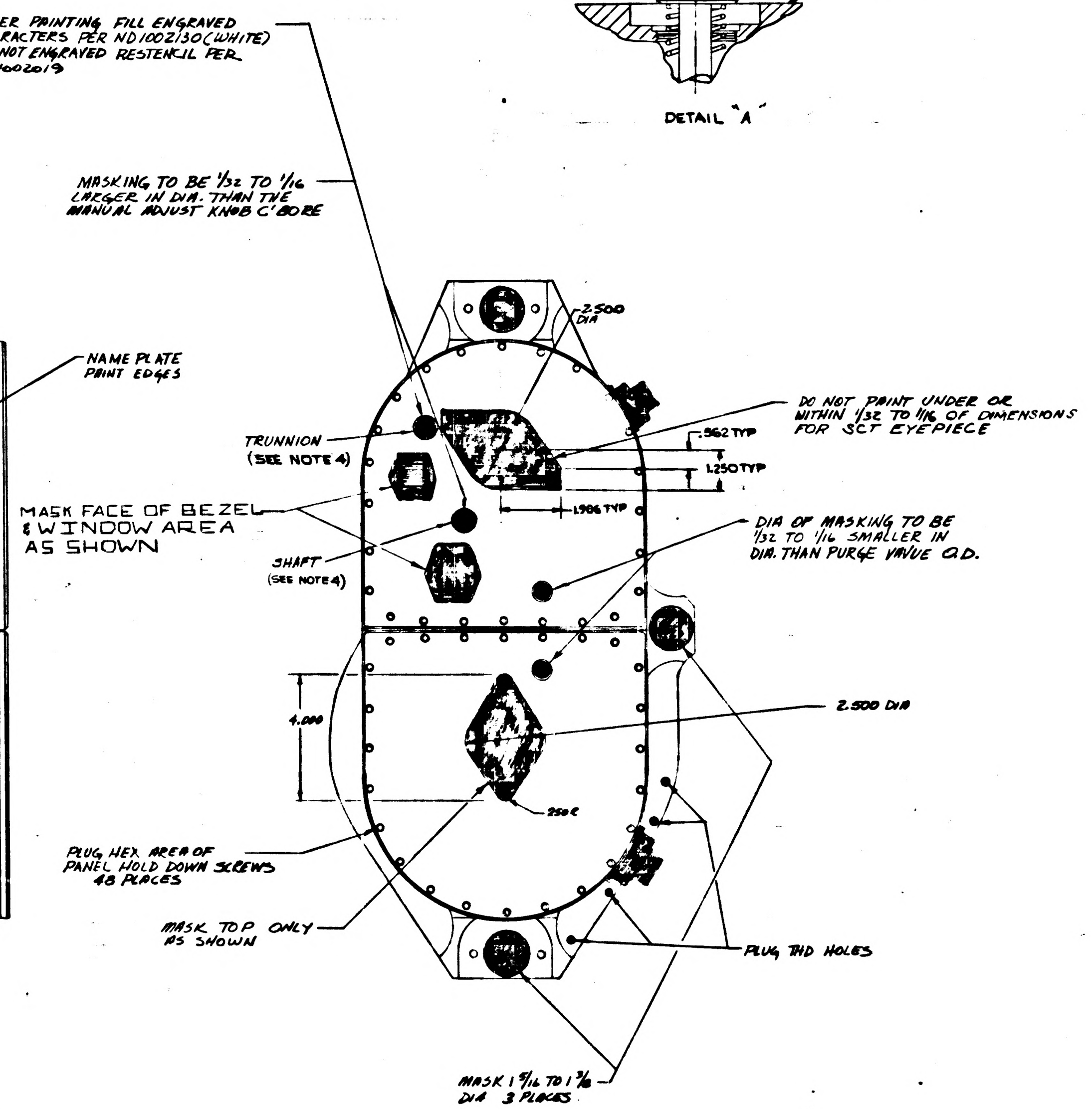
NOTES:

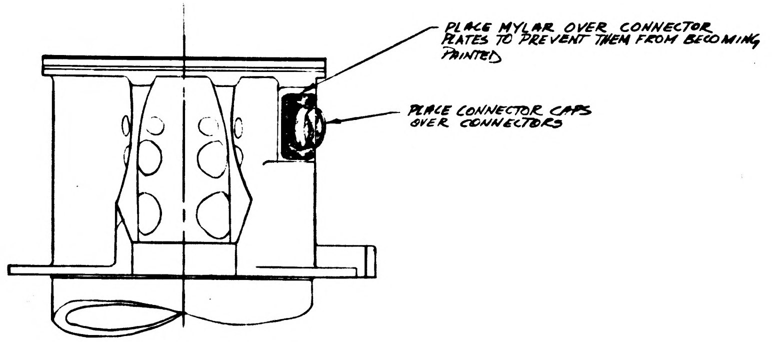
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.608 ±.031
NAME PLATE PAINT EDGES
REF
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/16 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY
USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-15-66
CHECKED
APPROVAL 4-15-66
APPROVAL 5/10/66
NASA APPROVAL 5/10/66
MIT APPROVAL 5-1966

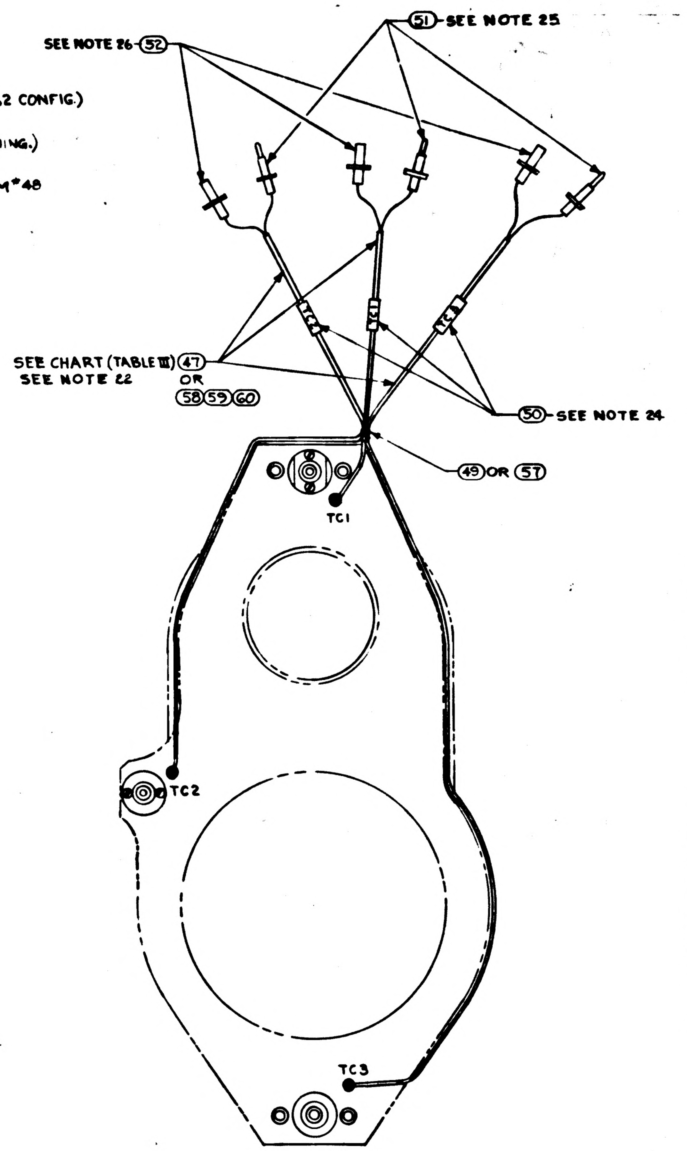
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

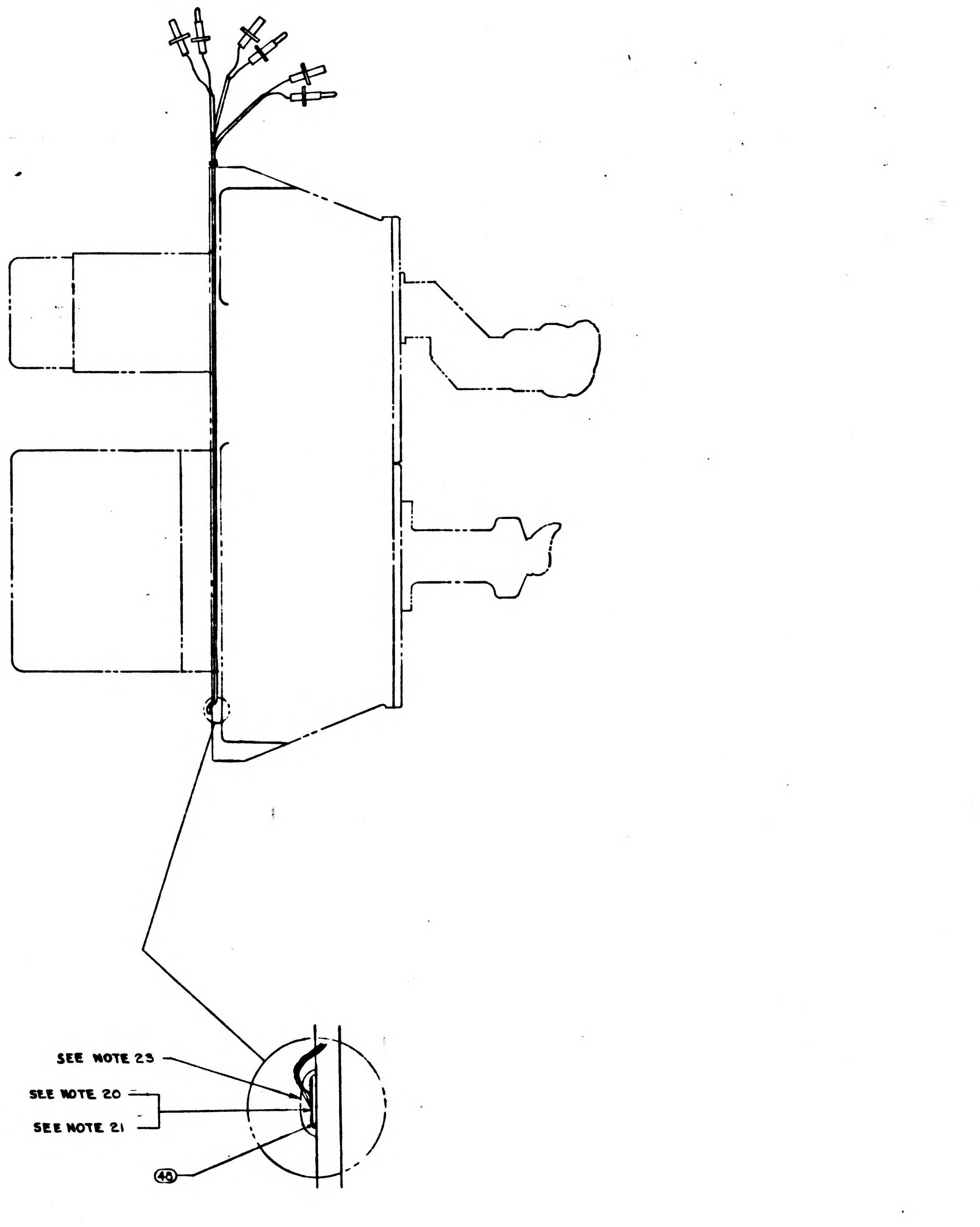
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-8-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-3-66	
AB		REVISED PER TDRR 31108	9-16-66	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/26/67	

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG.) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
    - C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.
28. TORQUE 4# NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.L. Rhodes DATE 5-18-66
CHECKED R. Jadua 5-19-66
APPROVAL
APPROVAL E. Dimza 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

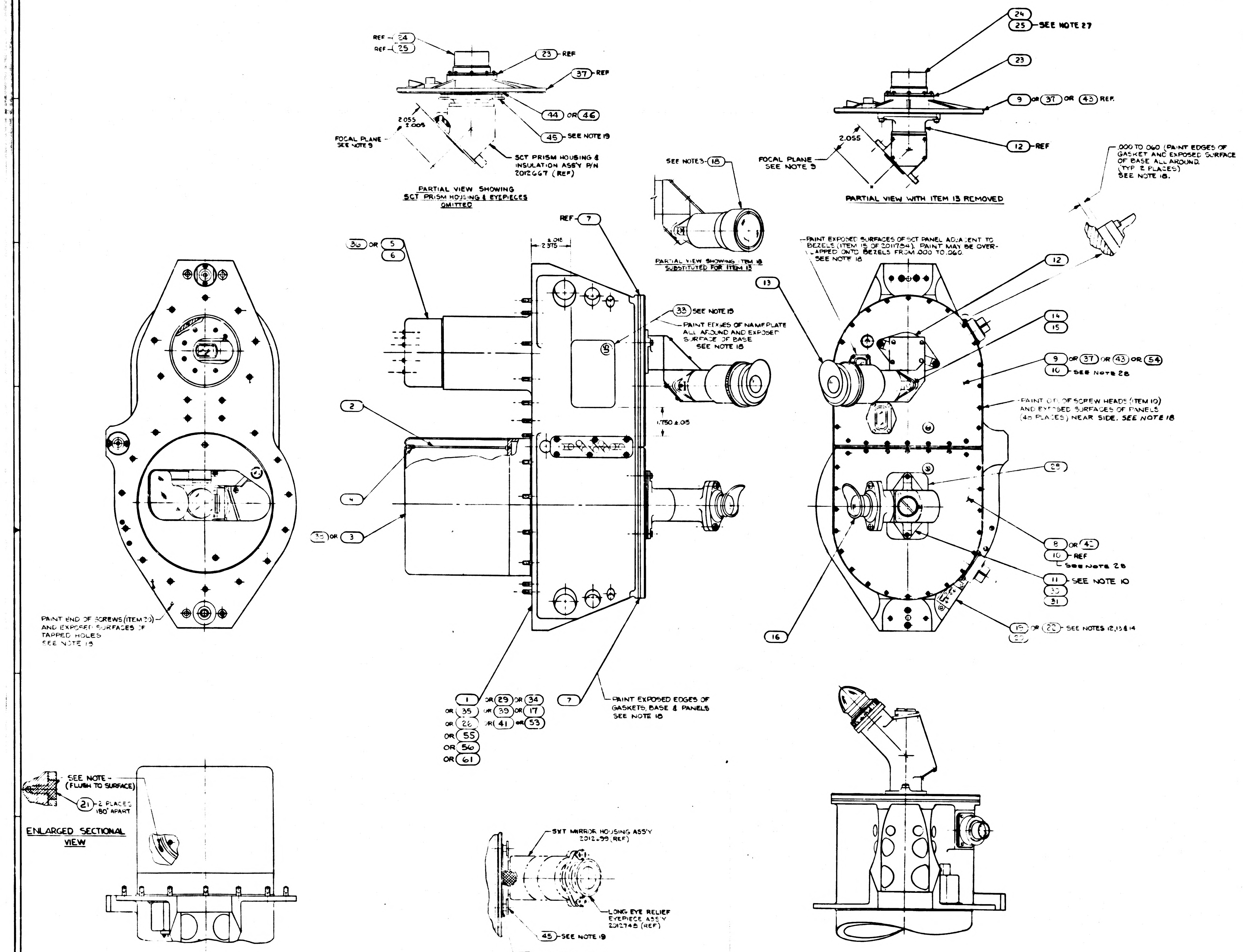
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011000 AH

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17790	[illegible]	wK
B		REVISED PER TDRR NO 19197	[illegible]	wK
C		REVISED PER TDRR NO 19851	[illegible]	wK
D		REVISED PER TDRR NO 20186	[illegible]	wK
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25769	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152		
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR 29558		
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	[illegible]	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR [illegible]	[illegible]	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 328[illegible]	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 340[illegible]7	6/23	
AG		REVISED PER TDRR 34083	[illegible]	
AH		REVISED PER TDRR 34132	7/3	


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTE 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
FOCAL PLANE SEE NOTE 9
2.055
12 REF
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
35 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (45 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
SEE NOTE 28
11 SEE NOTE 10
32
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 15
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55
OR 56
OR 61
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE - (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012199 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± — ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88[illegible]6910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible] 8-[illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 90230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF

AH 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.0 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING [illegible] ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 5 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   b. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. *(USING ITEM 21)*
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. [illegible] SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR [illegible]	[illegible]	[illegible]
J		REVISED PER TDRR [illegible]362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 2576[illegible]	[illegible]	[illegible]
M		REVISED PER TDRR 2576[illegible]	[illegible]	[illegible]
N		REVISED PER TDRR [illegible]	[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR [illegible]	[illegible]	[illegible]
U		REVISED PER TDRR [illegible]	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR [illegible]9558	[illegible]	[illegible]
Y		REVISED PER TDRR [illegible]9560		
Z		REVISED PER TDRR 30742	8-18-6[illegible]	[illegible]
AA		REVISED PER TDRR 31[illegible]	[illegible]	[illegible]
AB		REVISED PER TDRR 31[illegible]	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 32[illegible]8	[illegible]-27-67	[illegible]
AE		REVISED PER TDRR 32833	[illegible]-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/27/67	
AG		REVISED PER TDRR 34083	6/30 67	[illegible]
AH		REVISED PER TDRR 34[illegible]58	7/18/67	[illegible]

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*
036	NA	NA	NA	*	NA
037	NA	NA	NA	*	NA
062	NA	NA	NA	NA	*

SEE CHART TABLE III SHEET 4 (items 58, 59, 60)

SEE CHART TABLE III, SH 4 (item 47)

LIST OF PARTS AND MATERIALS

071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61			2012736-041			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			2010746-012			THERMOCOUPLE, CONTACT			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE, CONTACT			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE, CONTACT			
0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			010490-112			SLEEVE, INSULATION			
0	0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE THERMOCOUPLE, TWIST PRF (81" TOT			
0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASSY SCT			
1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASSY SXT			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1		1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																						32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																						27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-[illegible]T	7958691 [illegible]		SPACER			
1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386011360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910610		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1129C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011987-[illegible]T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910550		PANEL ASSEMBLY SCT			
1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1[illegible]C04R4L	"		SCREW, SELF-LOCKING PAN HD FULL TH [illegible]			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	853[illegible]911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	[illegible]386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	[illegible]		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	[illegible]86910040		ROD THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	[illegible]		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

NEXT ASSY	USED ON

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN [illegible]

DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

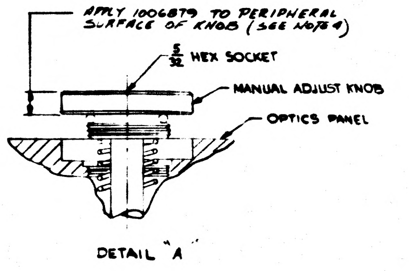
CODE IDENT NO [illegible] SIZE E NASA NUMBER 2011[illegible]0
SCALE [illegible] WEIGHT CALC ACTUAL SHEET [illegible] OF [illegible]

NOTES:
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

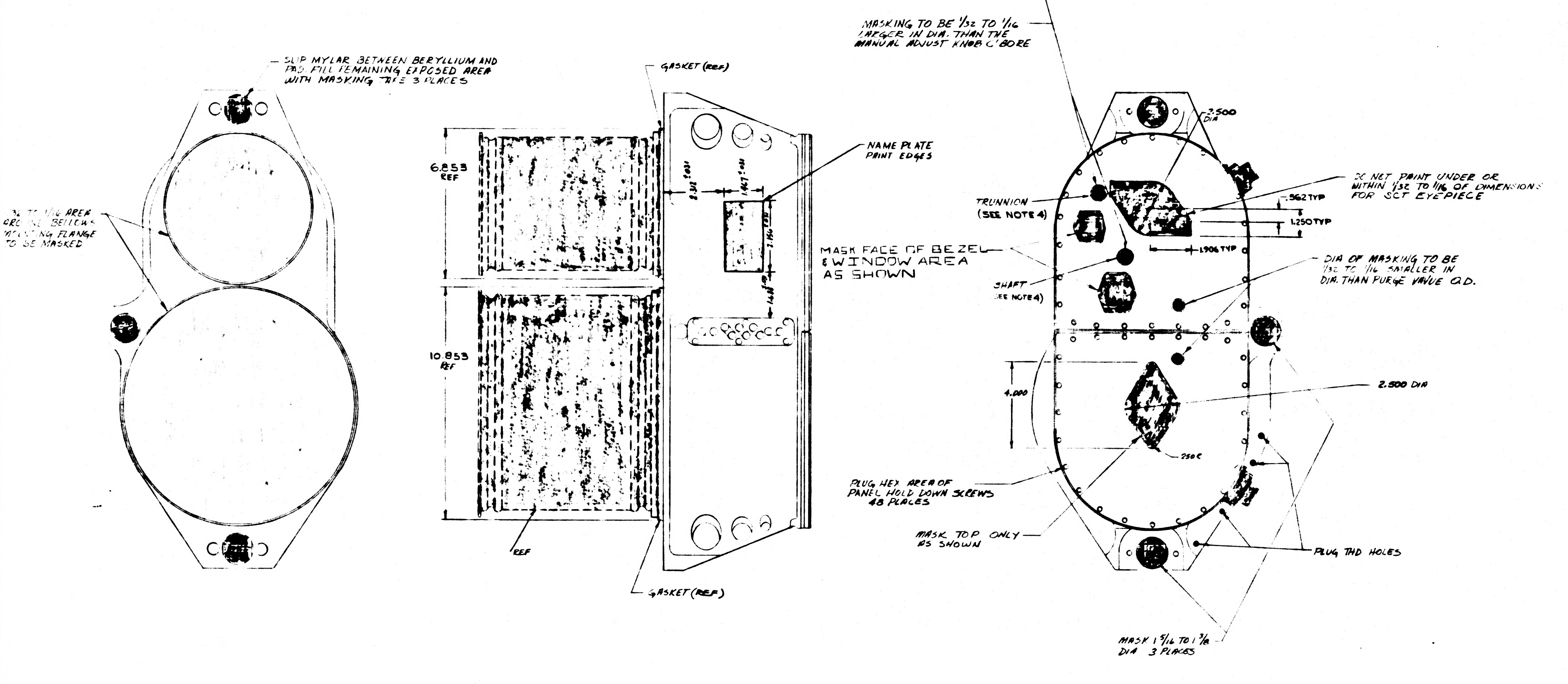
2011000 AF

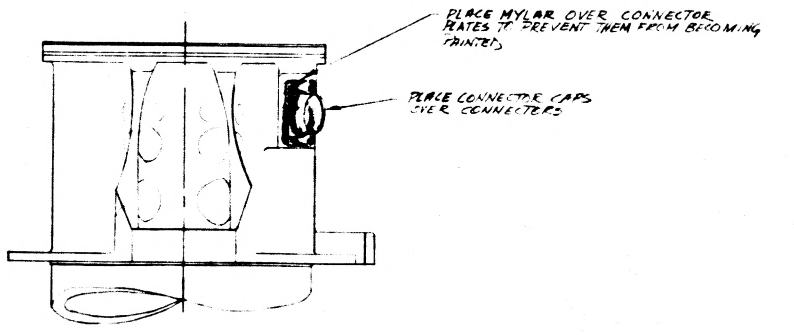
REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560	[illegible]	
Z		REVISED PER TDRR 30742	[illegible]	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR 31108	[illegible]	
AC		REVISED PER TDRR 3646	[illegible]	
AD		REVISED PER TDRR 32018	[illegible]	
AE		REVISED PER TDRR 32833	[illegible]	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	[illegible]	
AH		REVISED PER TDRR 34138	[illegible]	


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
GASKET (REF)
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE [illegible]
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF [illegible]

2011000 AH

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
Y		THIS SHEET ADDED PER TDRR 29560	6-D-..	
Z		REVISEDPER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	8-5-66	
AB		REVISED PER TDRR 31108	9-16-66	
AC		REVISED PER TDRR 31646	10 2-66	
AD		REVISED PER TDRR 32418	1-27-67	
AE		REVISED PER TDRR 32833	1-27-6	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	
AH		REVISED PER TDRR 34138	7/13/67	

20 ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:

- A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
- B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
- C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)

21 PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM # 48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".

22 AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.

23 AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.

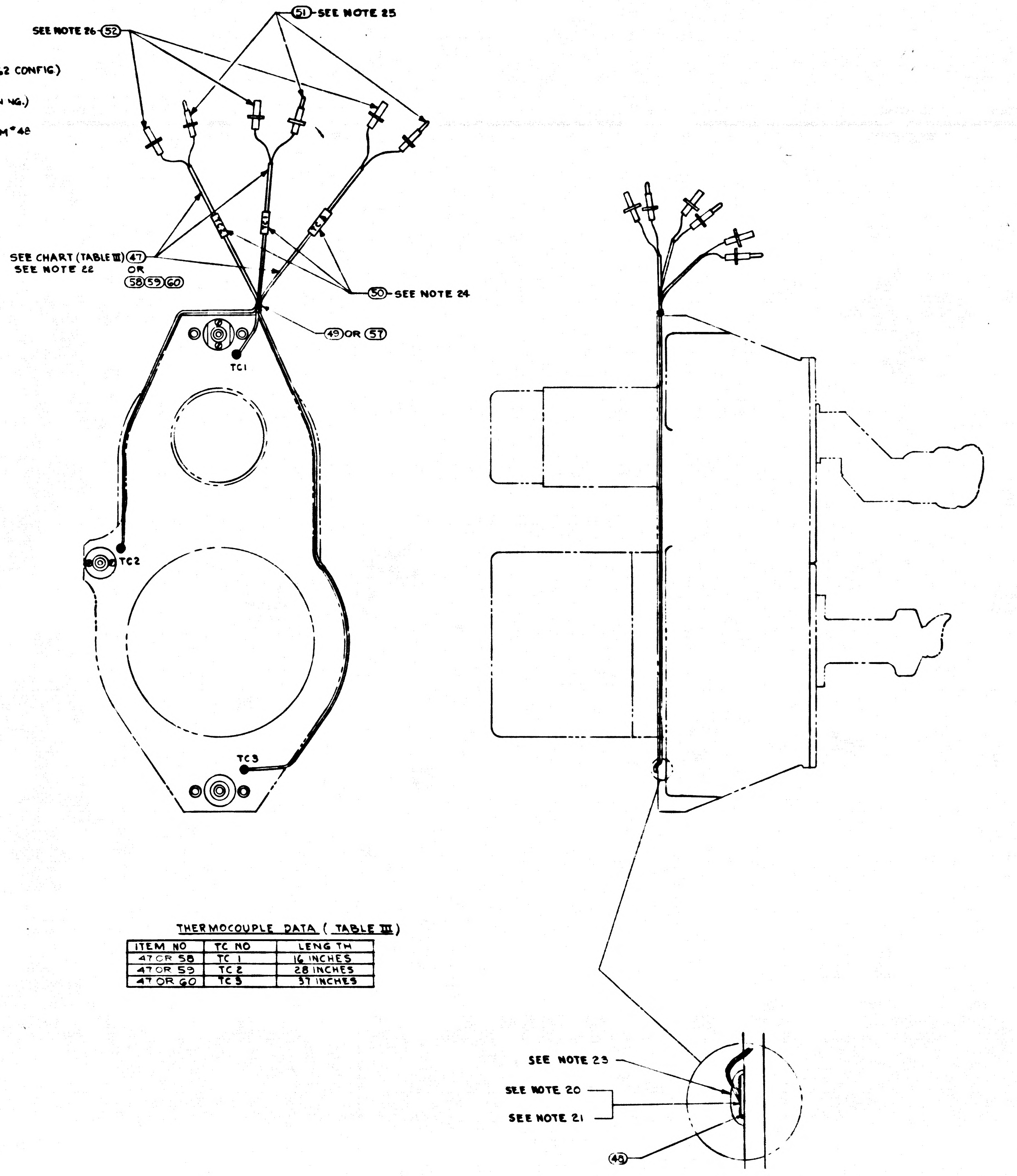
24 MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).

25 CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206

26 CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206

27 VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.

28 TORQUE 48 NAS1352C04LL8 SCREWS (ITEM No. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.



THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 883869-0000
DRAWN AL RHOADS DATE 5-18-64
CHECKED 5-19-
APPROVAL
APPROVAL 6-9-64
NASA APPROVAL A. C. [illegible]
MIT APPROVAL

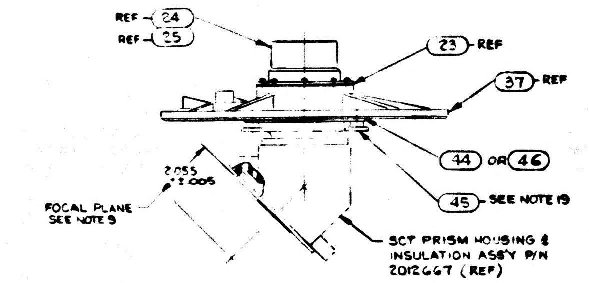
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

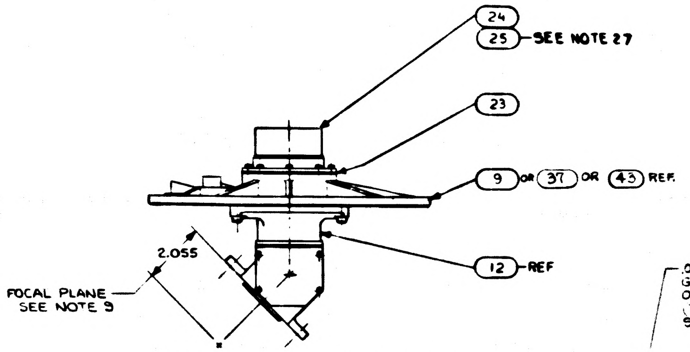
CODE IDENT NO 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000 A

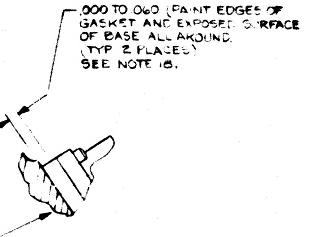
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 1779		
B		REVISED PER TDRR NO 19197		
C		REVISED PER TDRR NO 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25766		
M		REVISED PER TDRR 25764		
N		REVISED PER TDRR 26441		
P		REVISED PER TDRR 27722		
R		REVISED PER TDRR 28088		
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152		
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR 29558		
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742		
AA		REVISED PER TDRR 31106		
AB		REVISED PER TDRR 31108		
AC		REVISED PER TDRR 31646		
AD		REVISED PER TDRR 328[illegible]		
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 340[illegible]	6/23	
AG		REVISED PER TDRR 340[illegible]		
AH		REVISED PER TDRR 34[illegible]	7/9/67	
AJ		REVISED PER TDRR 34382		

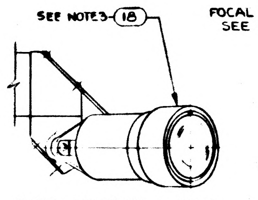

REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

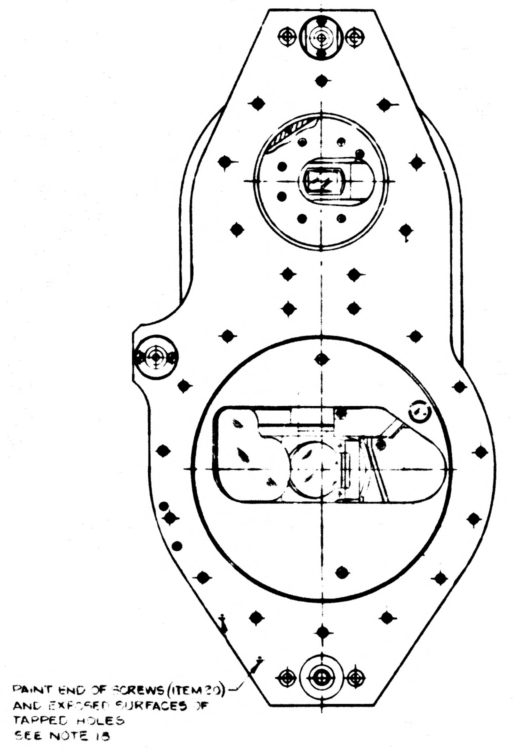

24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9

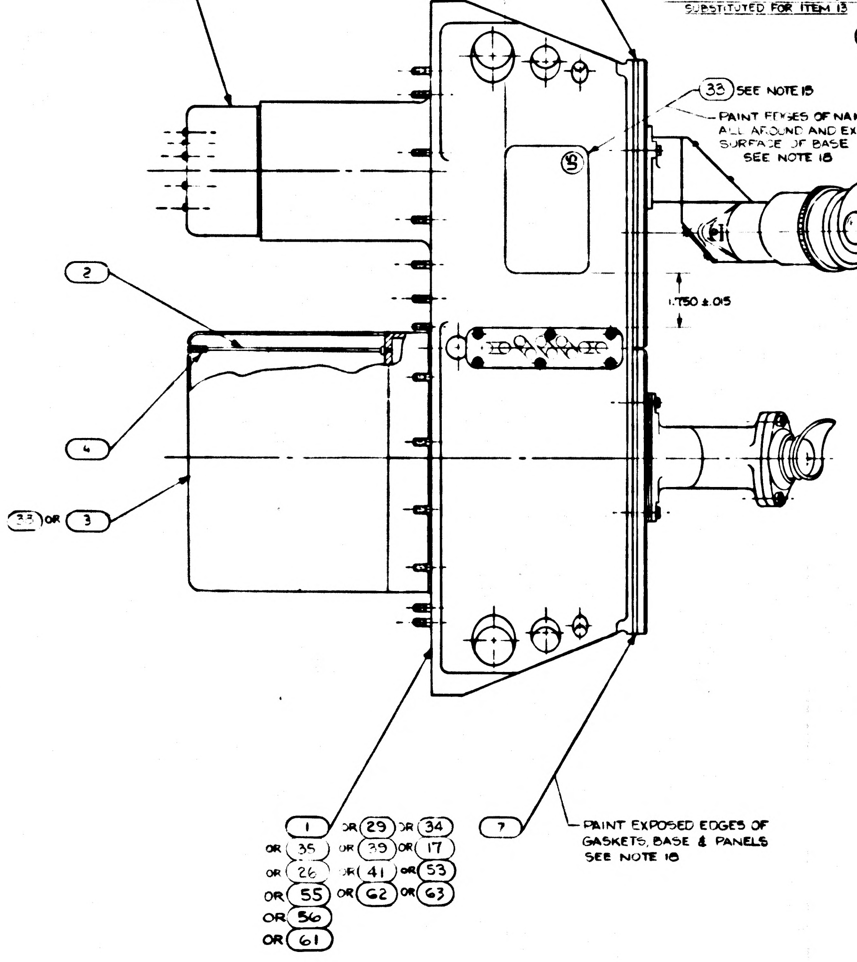
PARTIAL VIEW WITH ITEM 13 REMOVED

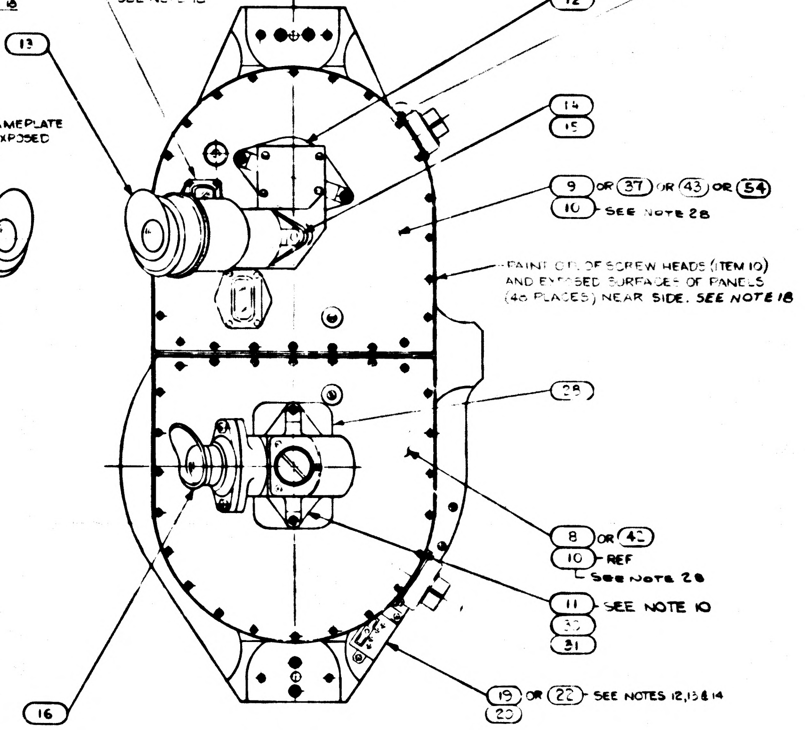

.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.

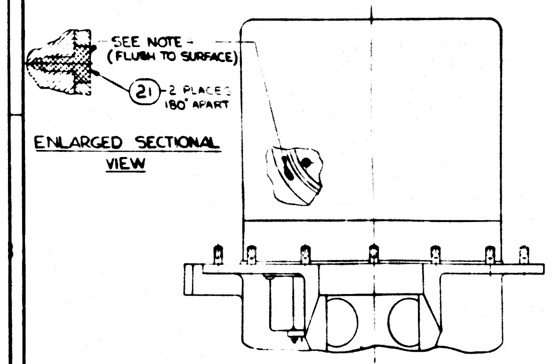

SEE NOTE 3 18

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

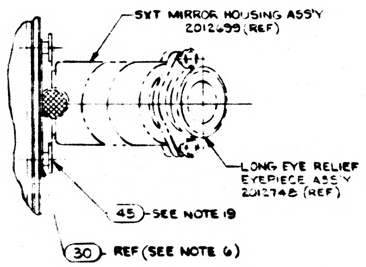

PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18


REF 7
±.015
2.375
36 OR 5
6
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
33 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55 OR 62 OR 63
OR 56
OR 61
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18

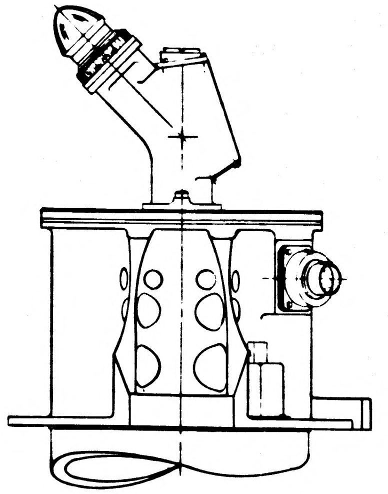

PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (46 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16


SEE NOTE (FLUSH TO SURFACE)
21 2 PLACES 180° APART

ENLARGED SECTIONAL VIEW


SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88[illegible]910000
DRAWN DATE 7-22-64
CHECKED 8-4-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 20[illegible]00
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT [illegible] ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   A. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. -1.00 ± .225 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
   AFTER MACHINING [illegible] PLATE ITEM 30 PER MIL-STD-171, TABLE V.
7. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
8. A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF PLUGS (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

AV [illegible]

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22229 SHEET 2 REDRAWN	[illegible]	[illegible]
H		REVISED PER TDRR 23047	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31066	[illegible]	[illegible]
AB		REVISED PER TDRR 31069	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 32818	[illegible]	[illegible]
AE		REVISED PER TDRR 32833	[illegible]	[illegible]
AF		REVISED PER TDRR 34017	6/2/67	
AG		REVISED PER TDRR 34083	6/30/67	[illegible]
AH		REVISED PER TDRR 34358	7/18/67	[illegible]
AJ		REVISED PER TDRR 34362	8/15/67	

SEE CHART TABLE III SHEET 4 (items 60, 59, 58)

SEE CHART TABLE III, SH 4 (item 47)

042	038	071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
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0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
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0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	[illegible]	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-005			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	[illegible]	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	0	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																								32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																								27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012770-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-[illegible]T	7558691[illegible]		SPACER			
1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386011360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18		SEE NOTE 3.	2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-[illegible]T	5638391[illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD, SELF LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P8L	—		SCREW SELF-LOCKING PAN HD FULL THD [illegible]			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911930		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57586910960		NUT, SLOTTED FLAT HEX HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50[illegible]86910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*
038	*	NA	NA	*
042	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA
051	NA	NA	NA	NA	*
061	NA	NA	NA	NA	*
036	NA	NA	NA	*	NA
037	NA	NA	NA	*	NA
062	NA	NA	NA	NA	*
038	NA	NA	NA	*	NA
042	NA	NA	NA	NA	*

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 2[illegible]
DRAWN [illegible] DATE [illegible]
CHECKED [illegible]
APPROVAL
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

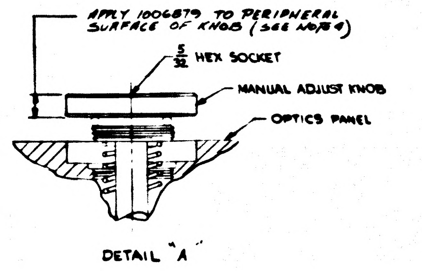
TITLE
OPTICAL UNIT

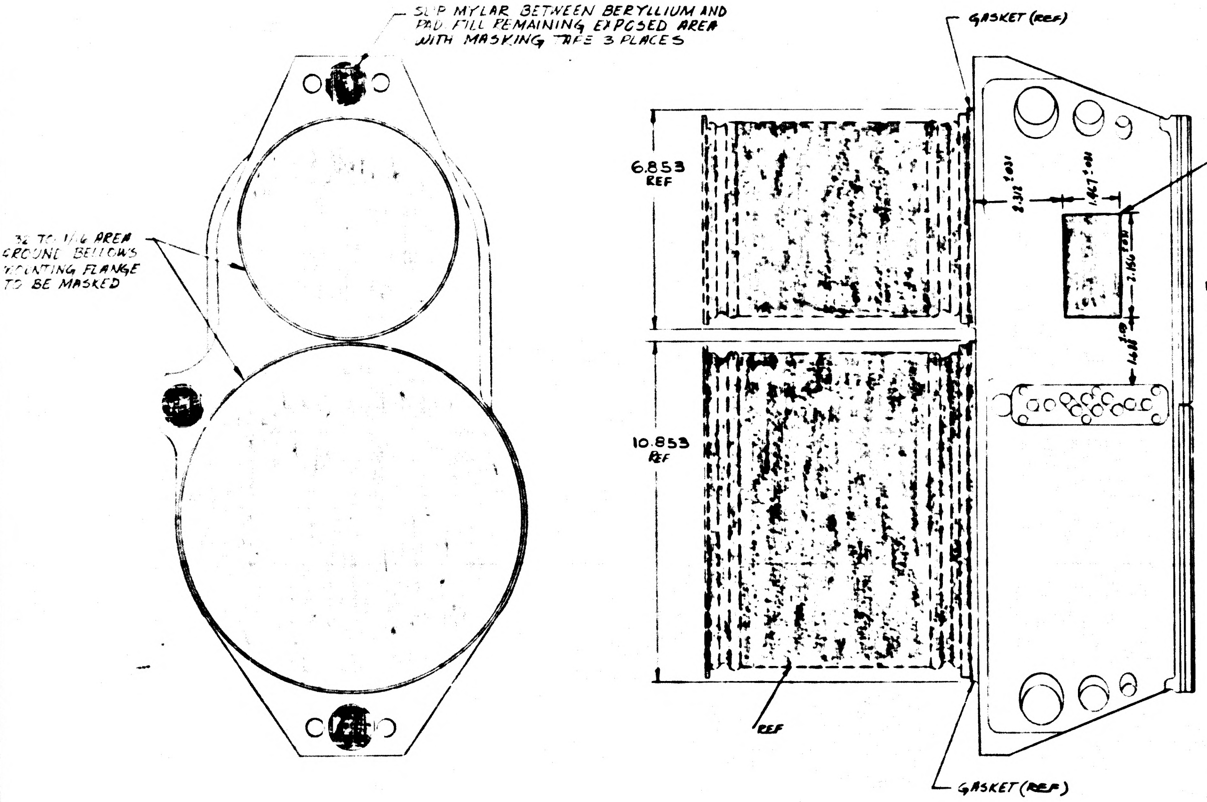
CODE IDENT NO [illegible]
SIZE E
NASA NUMBER 2011000
SCALE [illegible]
WEIGHT CALC ACTUAL
SHEET [illegible] OF [illegible]

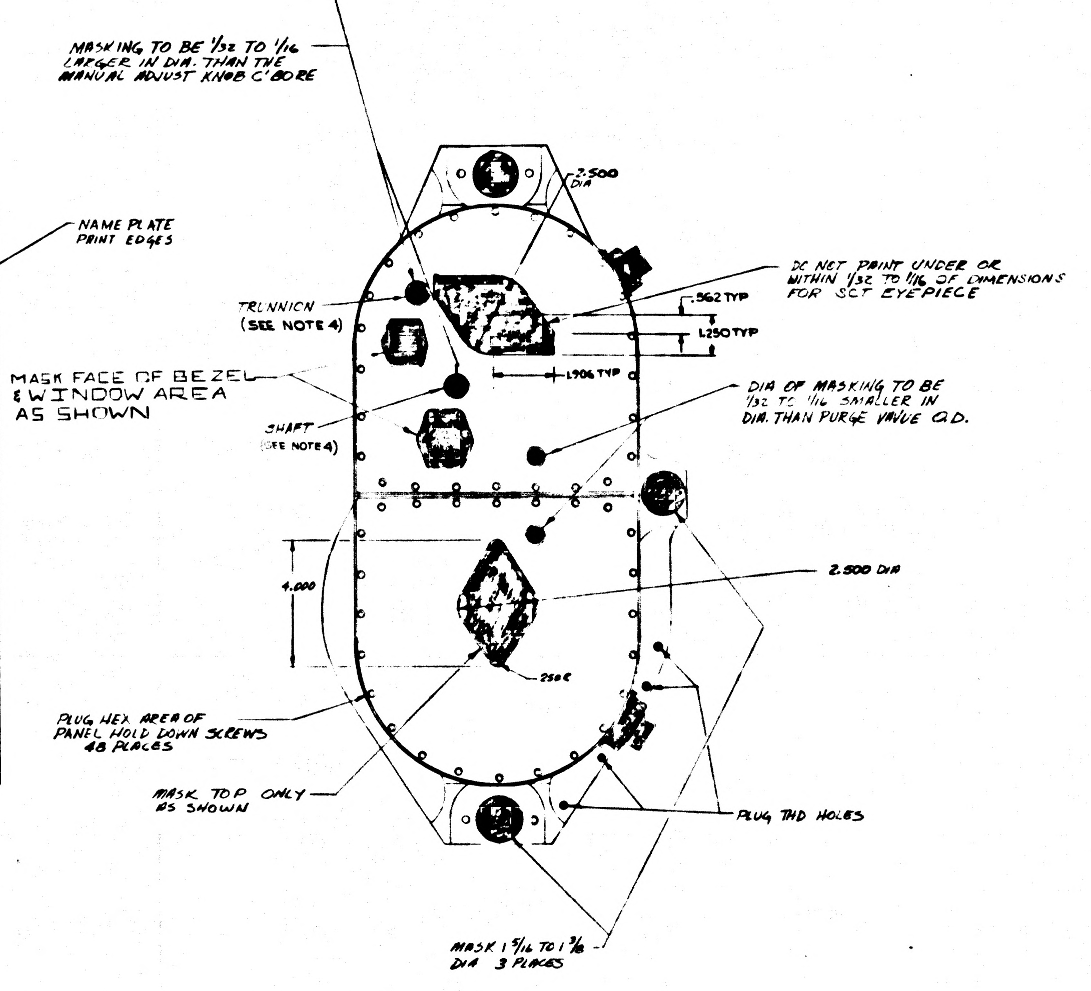
2011000 AJ

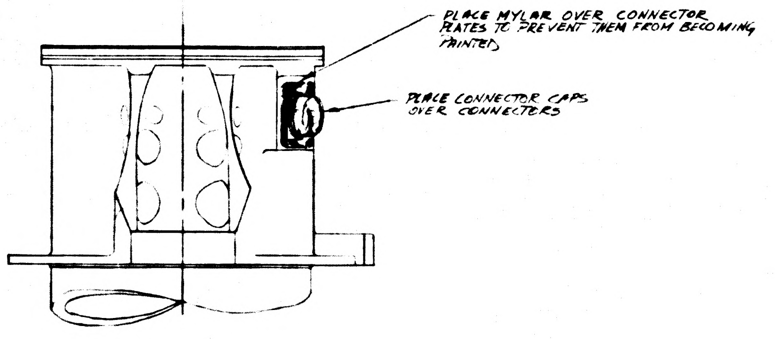
NOTES:
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29C43		
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560	[illegible]	
Z		REVISED PER TDRR 30742	[illegible]	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR 31108	[illegible]	
AC		REVISED PER TDRR 3140	[illegible]	
AD		REVISED PER TDRR 32018	1-27-67	
AE		REVISED PER TDRR 32833	2-7-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6-30-67	
AH		REVISED PER TDRR 34138	[illegible]	
AJ		REVISED PER TDRR 34382	[illegible]	


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
2.312 ±.031
1.467 ±.011
2.156 ±.011
1.688 ±.011
NAME PLATE PAINT EDGES
REF
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
TRUNNION (SEE NOTE 4)
1.906 TYP
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± | DECIMALS ± | ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

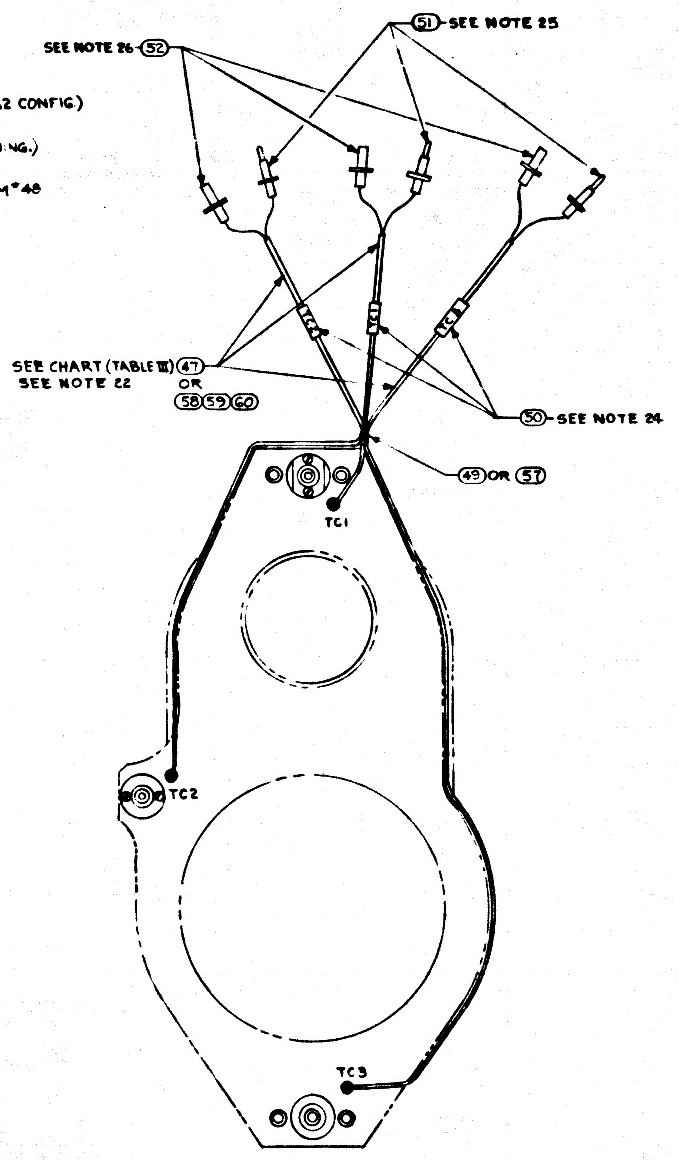
TITLE
OPTICAL UNIT

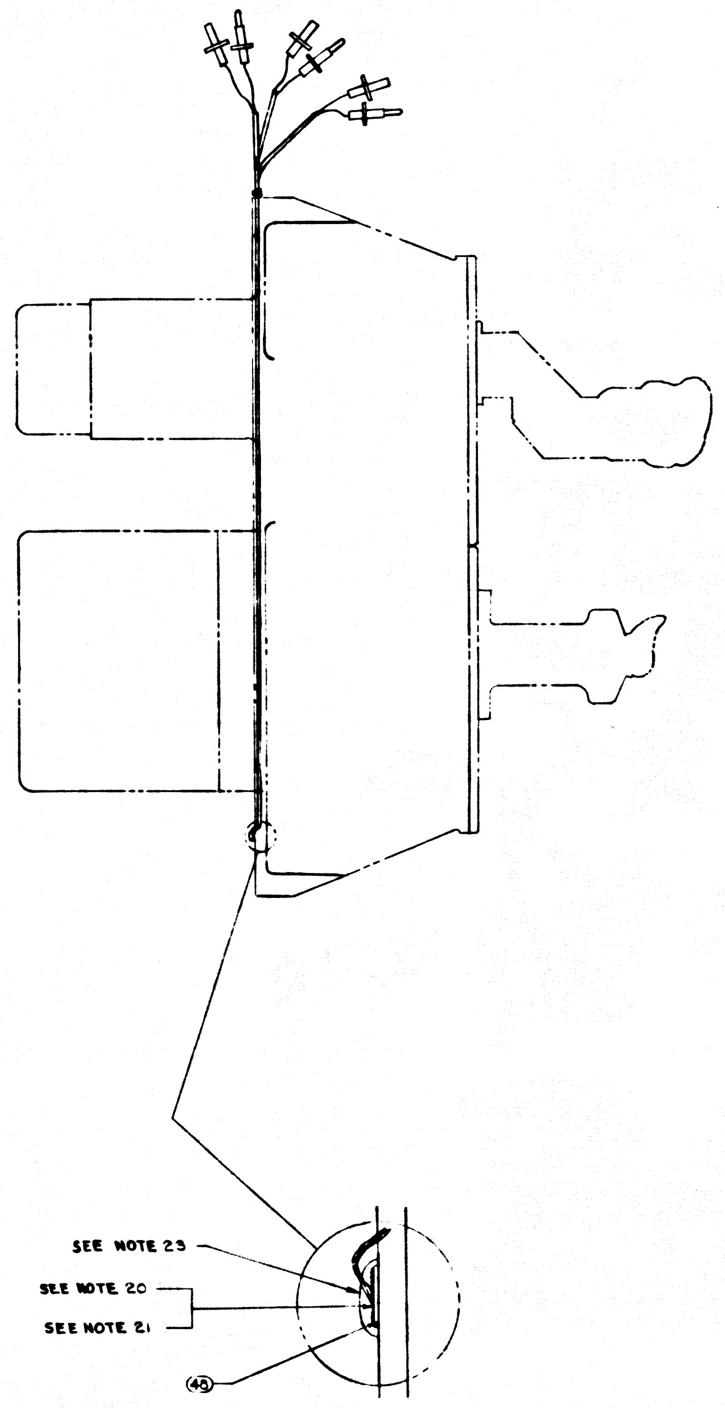
CODE IDENT NO 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 3 OF

2011000 AJ

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	[illegible]	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR 31108	9-[illegible]-66	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32873	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34[illegible]83	6/30/67	
AH		REVISED PER TDRR 34[illegible]38	7/19/67	
AJ		REVISED PER TDRR 34382	8-8-67	

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
    - C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

	--
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.L. R[illegible]ASS DATE 5-18-66
CHECKED R[illegible] 5-19-66
APPROVAL
APPROVAL E. Carey 6-9-66
A.C. METZLER
NASA APPROVAL
MIT APPROVAL W.G. Tinkley [illegible]

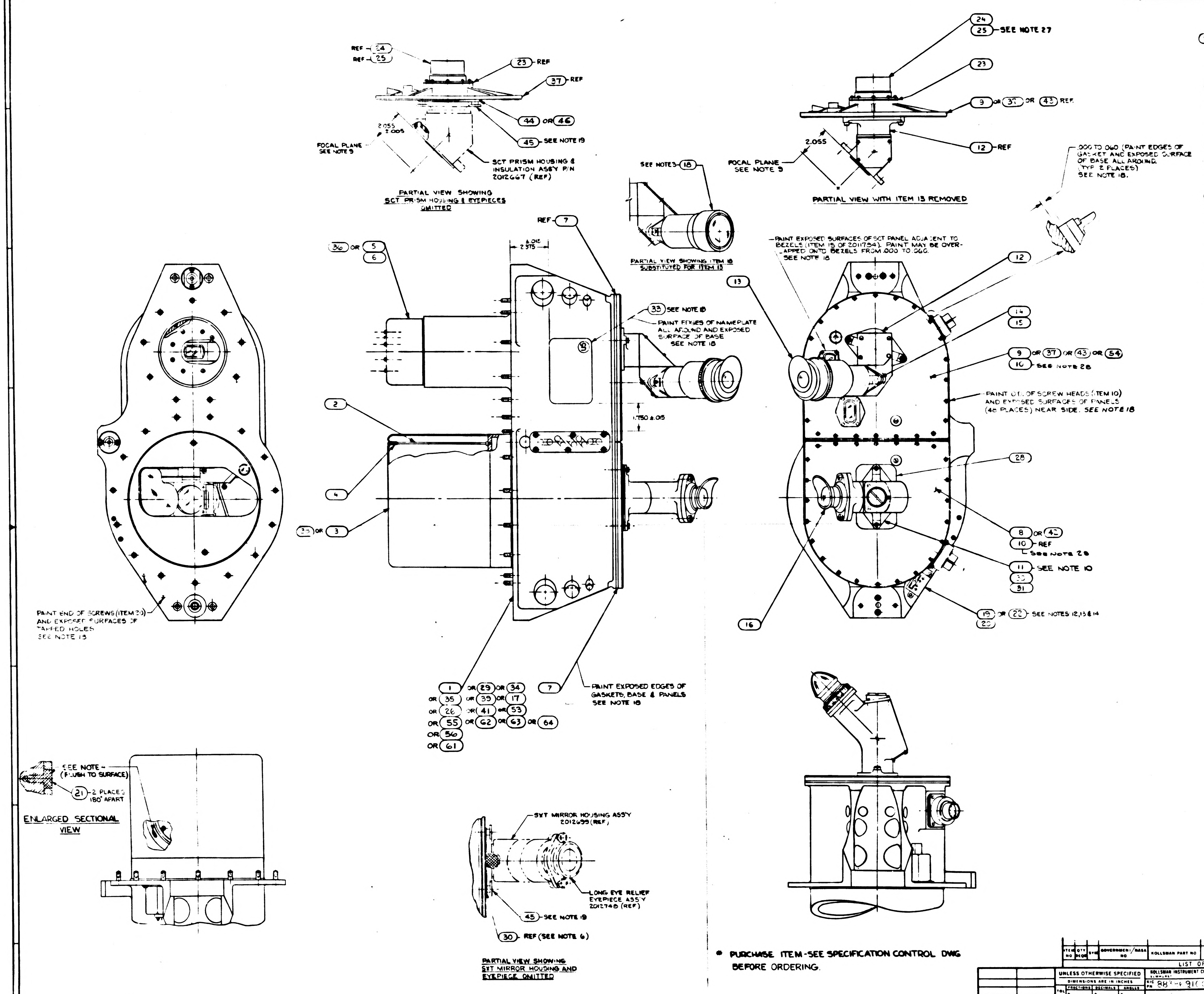
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 30230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000 AK

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17?5?		
B		REVISED PER TDRR NO 19197		
C		REVISED PER TDRR NO 19851		
D		REVISED PER TDRR NO 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 257[illegible]		
M		REVISED PER TDRR 25764		
N		REVISED PER TDRR 26441		
P		REVISED PER TDRR 27722		
R		REVISED PER TDRR 29086		
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152		
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR 29558		
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-8-6	
AA		REVISED PER TDRR 31106		
AB		REVISED PER TDRR 31108		
AC		REVISED PER TDRR 31646		
AD		REVISED PER TDRR 328[illegible]	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 340[illegible]	6/23	
AG		REVISED PER TDRR 340[illegible]		
AH		REVISED PER TDRR 34[illegible]8	7/3/67	
AJ		REVISED PER TDRR 3439[illegible]	5/15 67	
AK		REVISED PER TDRR 3479[illegible]		


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
2.055
FOCAL PLANE SEE NOTE 9
12 REF
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. TYP 2 PLACES) SEE NOTE 18.
SEE NOTES 18
REF 7
36 OR 5
6
.015
2.375
33 SEE NOTE 18
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ± .015
2
4
32 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011754). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55 OR 62 OR 63 OR 64
OR 56
OR 61
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

PARTIAL VIEW WITH ITEM 13 REMOVED

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

ENLARGED SECTIONAL VIEW

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASS'Y	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88[illegible]910[illegible]0
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible]
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF

AK 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   A. [illegible] -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE (ITEM 16), MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. [illegible] ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE PART NO 2012748 WITH PART NO 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
   AFTER MACHINING [illegible] ITEM 30 PER [illegible], TABLE V.
7. ITEM 6 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
8. A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± .015 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF [illegible] (ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE A OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.
    REFER TO SHEET 4 FOR NOTES 20 THRU 28
29. FOR 2011000-039 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002281. (PANELS ONLY 2011711-000 AND 2011784-011)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. [illegible] SHEET 2 REDRAWN	[illegible]	[illegible]
H		REVISED PER TDRR [illegible]	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR [illegible]	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29150	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31000	[illegible]	[illegible]
AB		REVISED PER TDRR 31100	[illegible]	[illegible]
AC		REVISED PER TDRR 31640	[illegible]	[illegible]
AD		REVISED PER TDRR 3288	[illegible]	[illegible]
AE		REVISED PER TDRR 32833	-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/27/67	
AG		REVISED PER TDRR 34083	[illegible]	[illegible]
AH		REVISED PER TDRR 34158	7/18/67	[illegible]
AJ		REVISED PER TDRR 34382	8/15/67	
AK		REVISED PER TDRR 34755	9 1967	

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*
038	*	NA	NA	*
042	*	NA	NA	*
039	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208
000	*	NA	NA	NA	NA	NA
011	*	NA	NA	NA	NA	NA
021	NA	*	NA	NA	NA	NA
031	NA	NA	NA	*	NA	NA
001	*	NA	NA	NA	NA	NA
030	NA	NA	*	NA	NA	NA
032	NA	NA	NA	*	NA	NA
022	NA	*	NA	NA	NA	NA
041	NA	NA	NA	NA	*	NA
002	*	NA	NA	NA	NA	NA
012	*	NA	NA	NA	NA	NA
023	NA	*	NA	NA	NA	NA
024	NA	*	NA	NA	NA	NA
033	NA	NA	NA	*	NA	NA
034	NA	NA	NA	*	NA	NA
035	NA	NA	NA	*	NA	NA
051	NA	NA	NA	NA	*	NA
061	NA	NA	NA	NA	*	NA
036	NA	NA	NA	*	NA	NA
037	NA	NA	NA	*	NA	NA
062	NA	NA	NA	NA	*	NA
038	NA	NA	NA	*	NA	NA
042	NA	NA	NA	NA	*	NA
039	NA	NA	NA	NA	NA	*

SEE CHART TABLE III SHEET 4 (items 60, 59, 58)

SEE CHART TABLE III, SH 4 (item 47)

SEE NOTES 17,18,&19 (item 40)

039	042	038	071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64			2012736-[illegible]			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63			2012736-012			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		62			2012736-002			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61			2012736-041			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			2010746-012			THERMOCOUPLE CONTACT			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE CONTACT			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE CONTACT			
0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	0	0	0	0	1	1	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	0	0	0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	0	0	AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE THERMOCOUPLE, TWIST PR (81" TOT)			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASSY SCT			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASSY SXT			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1		1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																									32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																									27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012780-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/4T	7958691 [illegible]		SPACER			
1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386011360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AP	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012780-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011987-1/2T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW CAP, SOC HD, SELF LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910550		PANEL ASSEMBLY, SCT			
1	0	1	1	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74422015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P6L	— # —		SCREW SELF-LOCKING PAN HD FULL THD .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	[illegible]86910960		NUT, SLOTTED FLAT CSK HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	[illegible]86910010		COVER SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	85386910040		ROD THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011590-000	85386910090		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN [illegible]
DRAWN [illegible] DATE
CHECKED Fitzpatrick
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL
CONTRACT

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230 | SIZE E | NASA NUMBER 2011000
SCALE | WEIGHT | CALC ACTUAL | SHEET OF

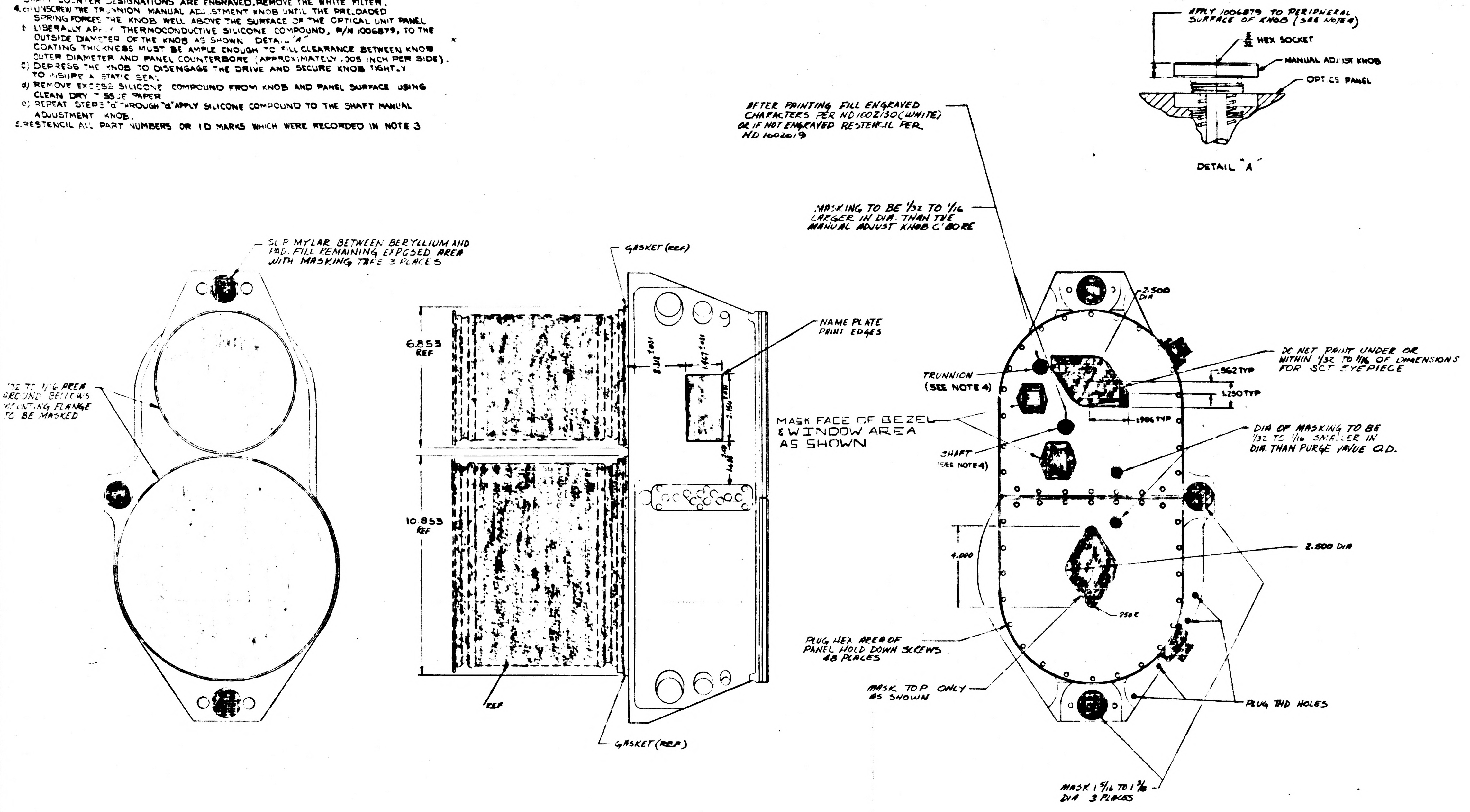
2011000 AK

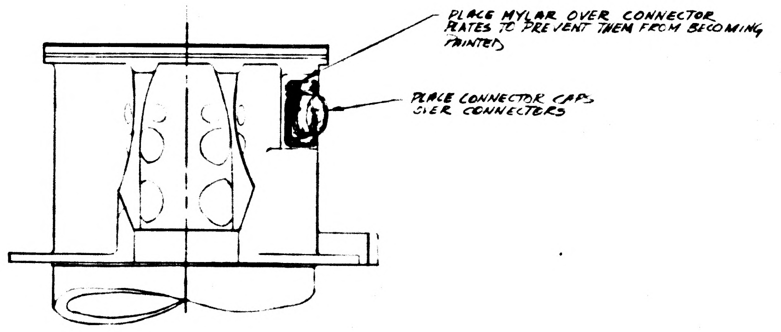
NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		RELEASED PER TDRR 29043		
		REVISED PER TDRR 29144	[illegible]	
		EVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560	[illegible]	
Z		EVISED PER TDRR [illegible]	[illegible]	
AA		EVISED PER TDRR 31106	[illegible]	
AB		EVISED PER TDRR 31108	9-15-66	
AC		EVISED PER TDRR [illegible]646	9-20-66	
AD		EVISED PER TDRR [illegible]	1-27-67	
AE		EVISED PER TDRR 32833	1-27-67	
AF		EVISED PER TDRR 34017	6/23/67	
AG		EVISED PER TDRR 34083	6/30/67	
AH		EVISED PER TDRR 34138	7/13/67	
AJ		EVISED PER TDRR 34382	8/8/67	
AK		EVISED PER TDRR 34795	9-29-67	


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
8.312 ±.031
1.467 ±.031
2.156 ±.031
1.608 ±.031
NAME PLATE PRINT EDGES
GASKET (REF)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
RIC
PN
DRAWN AMB DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

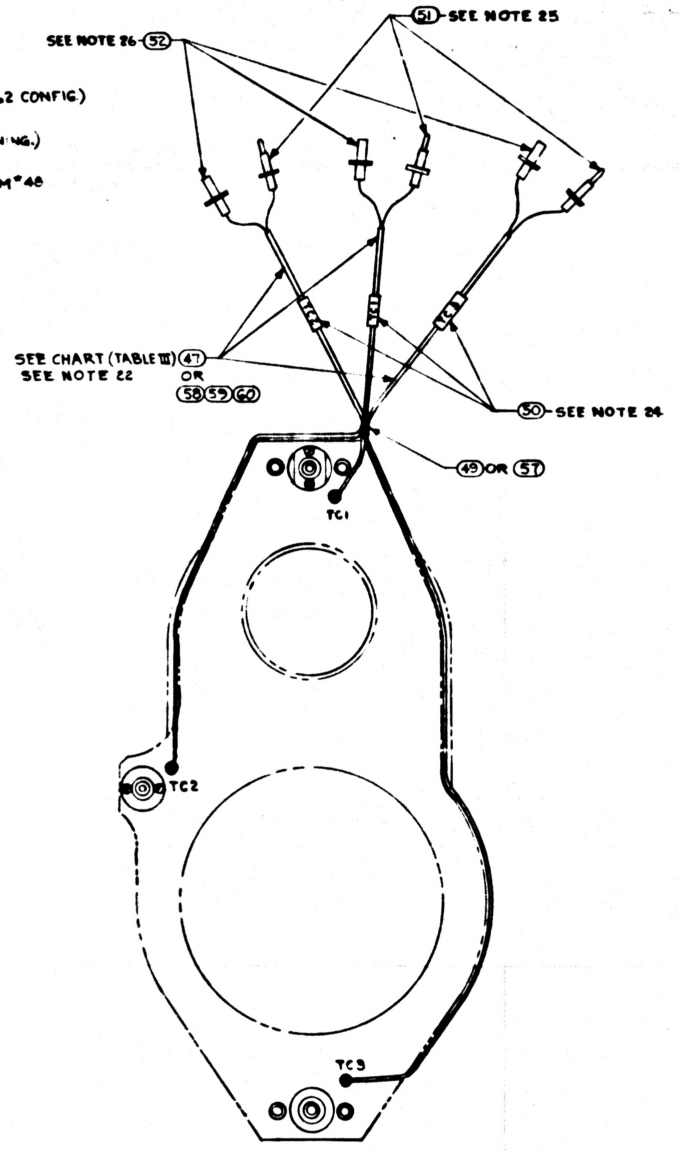
TITLE
OPTICAL UNIT

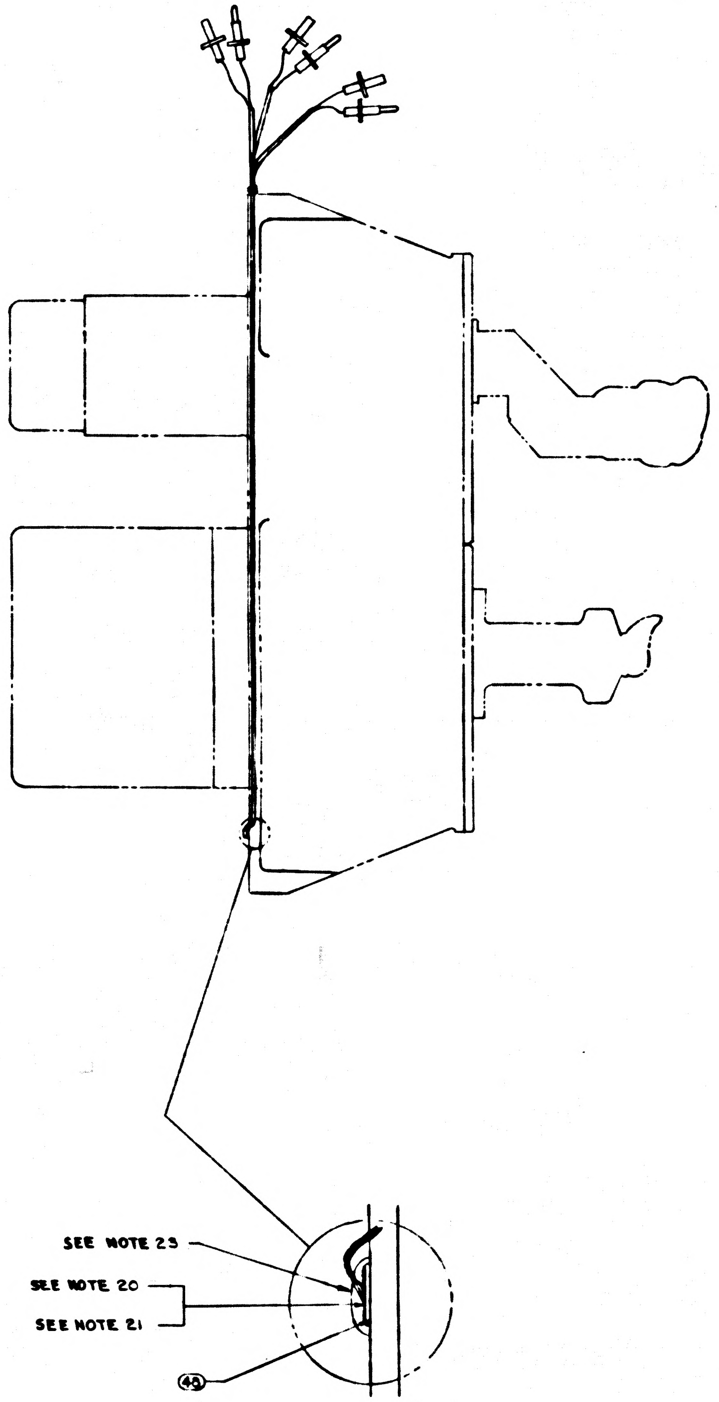
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF

2011000 AK

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 23560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 311_8	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 324__	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-6_	[illegible]
AF		REVISED PER TDRR 34017	6/2_	
AG		REVISED PER TDRR 34083	[illegible]	[illegible]
AH		REVISED PER TDRR [illegible]	7/13/67	[illegible]
AJ		REVISED PER TDRR 3438_	8/8/67	[illegible]
AK		REVISED PER TDRR 34758	[illegible]	

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
    - C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

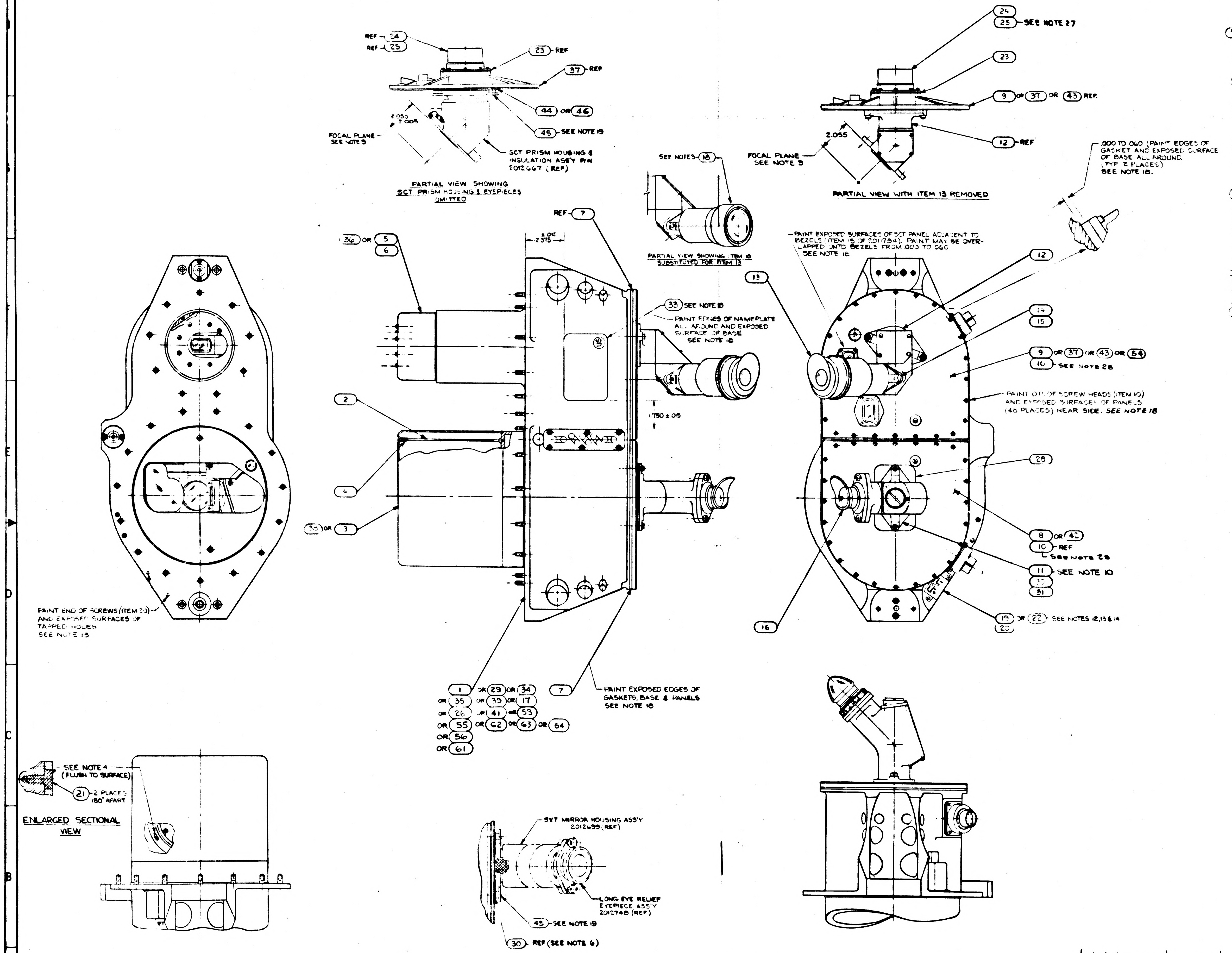
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 8838691000
DRAWN AL Rhoades DATE 5-18-66
CHECKED R. Jordan 5-19-66
APPROVAL
APPROVAL E. Cherny 6-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80_30 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000 AL


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
2.055
FOCAL PLANE SEE NOTE 9
12 REF
SEE NOTE 3 18
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 18
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34 OR 35 OR 39 OR 17 OR 26 OR 41 OR 53 OR 55 OR 62 OR 63 OR 64 OR 56 OR 61
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 15
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43 OR 54
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (46 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

PARTIAL VIEW WITH ITEM 13 REMOVED

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

ENLARGED SECTIONAL VIEW

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17729	[illegible]	[illegible]
B		REVISED PER TDRR NO 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO 20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28086	[illegible]	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29303	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 328	[illegible]	[illegible]
AE		REVISED PER TDRR 32833	1-27-[illegible]	[illegible]
AF		REVISED PER TDRR 340	[illegible]	
AG		REVISED PER TDRR 34033	[illegible]	[illegible]
AH		REVISED PER TDRR 34 38	[illegible]	[illegible]
AJ		REVISED PER TDRR 34352	2/18/67	[illegible]
AK		REVISED PER TDRR 3475	[illegible]	[illegible]
AL		REVISED PER TDRR 3475	[illegible]	

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 8826910000
DRAWN DATE 7-22-64
CHECKED 8-1964
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE OPTICAL UNIT
CODE IDENT NO 80240
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF

2011000 AL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 [illegible] SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.

WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORE SIDE) TO OBTAIN A FOCUS RANGE OF:
A. +2 TO [illegible] DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
B. -1.0 ± .25 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
AFTER MACHINING PASSIVATE ITEM 30 PER [illegible], TABLE V.

8. ITEM [illegible] SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNOBSTRUCTED OPERATION OF THE RESOLVER MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL [illegible] AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR [illegible]ING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. [illegible] USED ON IT[illegible] AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 [illegible] OF LAST T[illegible] PER ND10[illegible]

11. REMOVE CO[illegible] FROM ITEM [illegible] OR 22
A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 8 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
B. TRIM ELECTRICAL ZERO OF SXT 1x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.

13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.

14. POT CLEARANCE CAVITY OF TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.

15. NAMEPLATE ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)

16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. SEE TABLE II.

17. FOR 2011000-0[illegible] CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291.
FOR 2011000-0[illegible] CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.

18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.

19. [illegible]RATION P[illegible] ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

29. FOR 2011000-039 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002281 (PANELS ONLY 2011711-000 AND 2011784-011)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22[illegible] SHEET 2 REDRAWN		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23[illegible]62		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25736		
M		REVISED PER TDRR 25764		
N		REVISED PER TDRR 26441		
P		REVISED PER TDRR 27722		
R		REVISED PER TDRR 28088		
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 2915[illegible]		
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR [illegible]9558		
Y		REVISED PER TDRR [illegible]9560		
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31[illegible]		
AB		REVISED PER TDRR 31[illegible]		
AC		REVISED PER TDRR 31[illegible]		
AD		REVISED PER TDRR 32918		
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/2[illegible]/67	
AG		REVISED PER TDRR 3[illegible]083		
AH		REVISED PER TDRR 34[illegible]98	7/15/67	
AJ		REVISED PER TDRR 34362	8/15/67	
AK		REVISED PER TDRR 34755	9-29-67	
AL		REVISED PER TDRR 34758	2-7-6[illegible]	

SEE CHART TABLE III SHEET 4 (items 58–60)

SEE CHART TABLE III, SH 4 (item 47)

SEE NOTES 17,18,&19 (item 40)

LIST OF PARTS AND MATERIALS

QTY REQD

039	042	038	071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	0[illegible]	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64			2012736-[illegible]			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63			2012736-012			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		62			2012736-002			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61			2012736-041			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			2010746-012			THERMOCOUPLE CONTACT			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE CONTACT			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE CONTACT			
0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-031			PANEL ASSY (SCT)			
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			010490-112			SLEEVE, INSULATION			
0	0	0	0	0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	0	0	AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE THERMOCOUPLE, TWIST PRF(81" TO			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASSY SCT			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASSY SXT			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1		1	1	1	1	0	1	1	1	1		1	1	1	0	0	38			2012615			COVER, SEXTANT HEAD			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0		1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																									32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012[illegible]3	4538[illegible]910090		SHIM, FOCUSING AIR (SXT)			
																									27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04 6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-[illegible]T	7958691 [illegible]		SPACER			
1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386011360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18		SEE NOTE 3.	2011788	8538691[illegible]40		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P[illegible]L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011987-[illegible]T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD, SELF LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910550		PANEL ASSEMBLY SCT			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P6L	—		SCREW, SELF-LOCKING PAN HD FULL THD .25[illegible]			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	[illegible]386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	[illegible]386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	[illegible]386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	[illegible]		OPTICAL UNIT SUBASSY STAGE II			

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*
038	*	NA	NA	*
042	*	NA	NA	*
039	*	NA	NA	*

DWG.SUFFIX	2012390	2012391	2012732	2012741
071	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
000	*	NA	NA	NA	NA	NA	NA
011	*	NA	NA	NA	NA	NA	NA
021	NA	*	NA	NA	NA	NA	NA
031	NA	NA	NA	*	NA	NA	NA
001	*	NA	NA	NA	NA	NA	NA
030	NA	NA	*	NA	NA	NA	NA
032	NA	NA	NA	*	NA	NA	NA
022	NA	*	NA	NA	NA	NA	NA
041	NA	NA	NA	NA	*	NA	NA
002	*	NA	NA	NA	NA	NA	NA
012	*	NA	NA	NA	NA	NA	NA
023	NA	*	NA	NA	NA	NA	NA
024	NA	*	NA	NA	NA	NA	NA
033	NA	NA	NA	*	NA	NA	NA
034	NA	NA	NA	*	NA	NA	NA
035	NA	NA	NA	*	NA	NA	NA
051	NA	NA	NA	NA	*	NA	NA
061	NA	NA	NA	NA	*	NA	NA
036	NA	NA	NA	*	NA	NA	NA
037	NA	NA	NA	*	NA	NA	NA
062	NA	NA	NA	NA	NA	NA	*
038	NA	NA	NA	*	NA	NA	NA
042	NA	NA	NA	NA	*	NA	NA
039	NA	NA	NA	NA	NA	*	NA

DWG.SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
071	NA	NA	NA	NA	*	NA	NA

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN [illegible]
DRAWN A. WILLIAMS DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

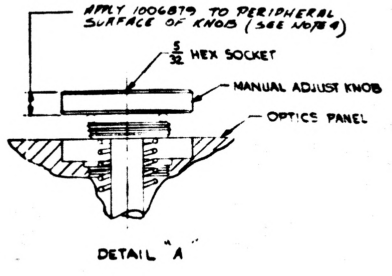
CODE IDENT NO [illegible]
SIZE E
NASA NUMBER 2011000
SCALE
WEIGHT CALC ACTUAL
SHEET

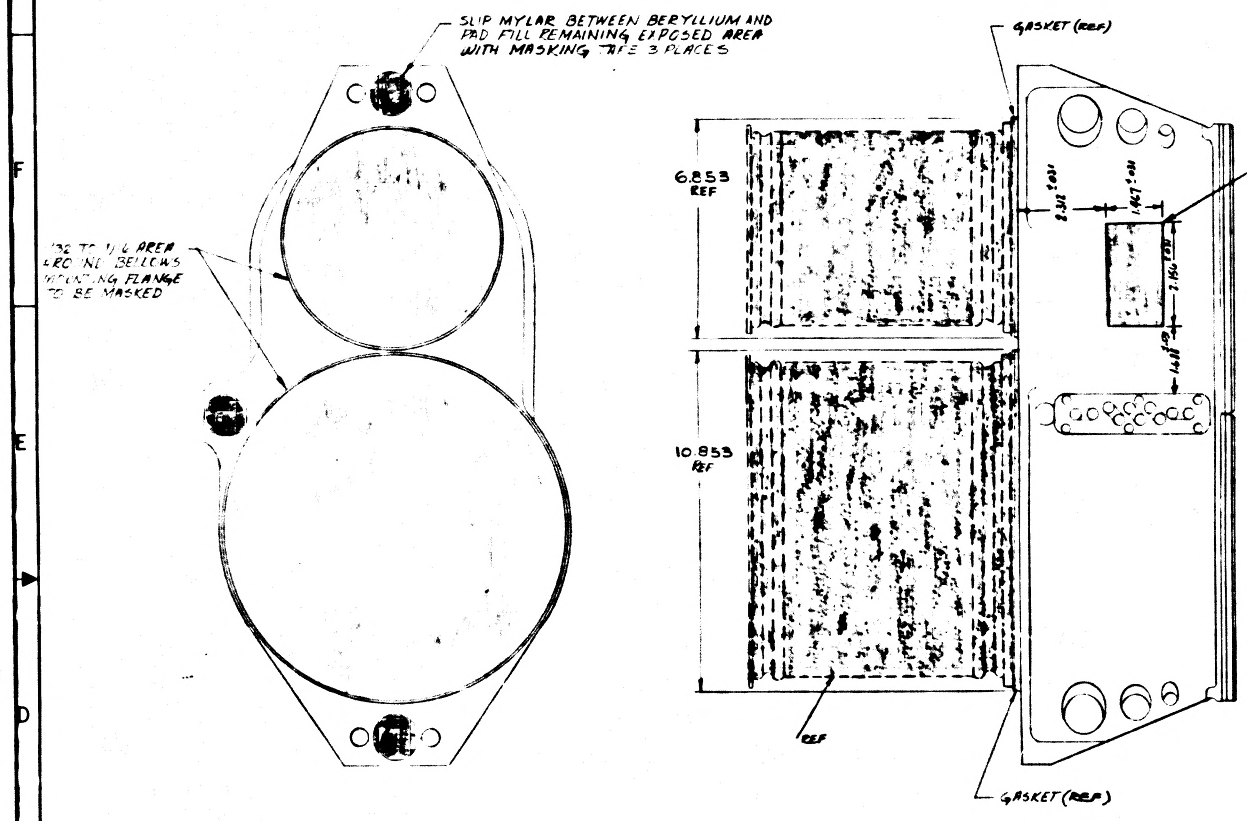
NOTES:

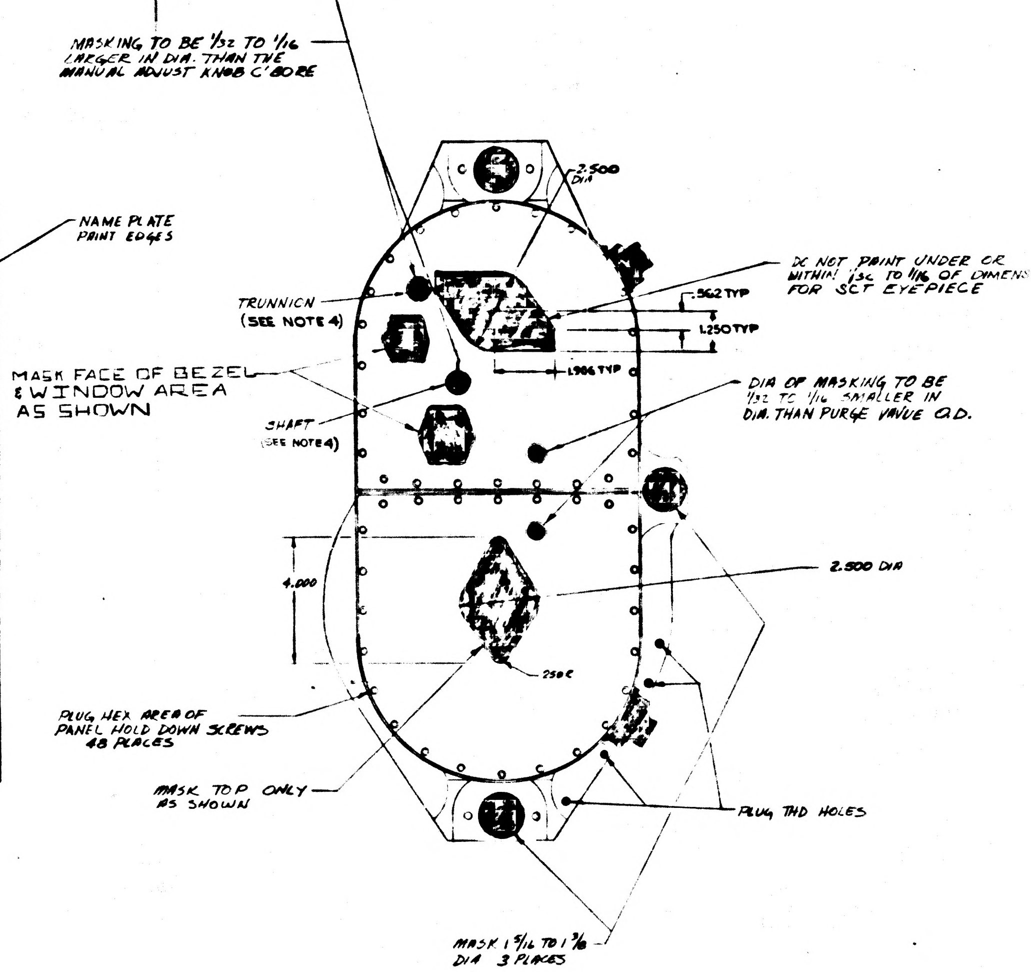
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

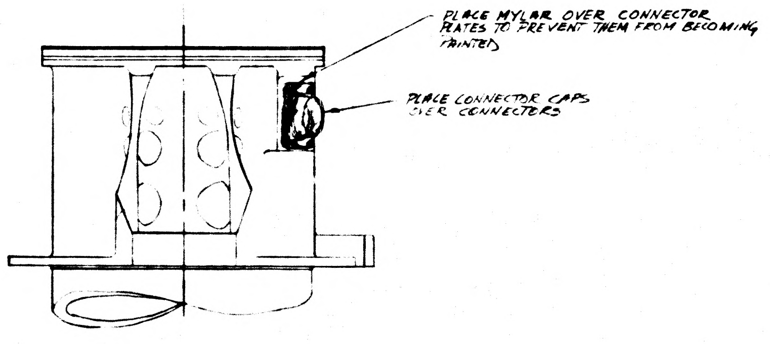
2011000 AL

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29643		
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30142	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 3146	[illegible]	[illegible]
AD		REVISED PER TDRR 32018	1-2 -67	[illegible]
AE		REVISED PER TDRR 32833	-67	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]
AG		REVISED PER TDRR 34083	6 30 67	[illegible]
AH		REVISED PER TDRR 34138	7/ 5/67	[illegible]
AJ		REVISED PER TDRR 34382	8/ 6/67	[illegible]
AK		REVISED PER TDRR 34795	9-29-67	[illegible]
AL		REVISED PER TDRR 34758	12-7-67	[illegible]


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.688 ±.031
NAME PLATE PAINT EDGES
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE [illegible]
CHECKED
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE
WEIGHT CALC ACTUAL
SHEET 5 OF

2011000 AL

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-[illegible]	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR 31108	9-16-66	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 32[illegible]	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 3408[illegible]	6/23/67	
AH		REVISED PER TDRR 34[illegible]	7/3/67	
AJ		REVISED PER TDRR 3438[illegible]	[illegible]	
AK		REVISED PER TDRR 34765	[illegible]	
AL		REVISED PER TDRR 34758	12-7-67	

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
  A. REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
  B. TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
  C. FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)

21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".

22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.

23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.

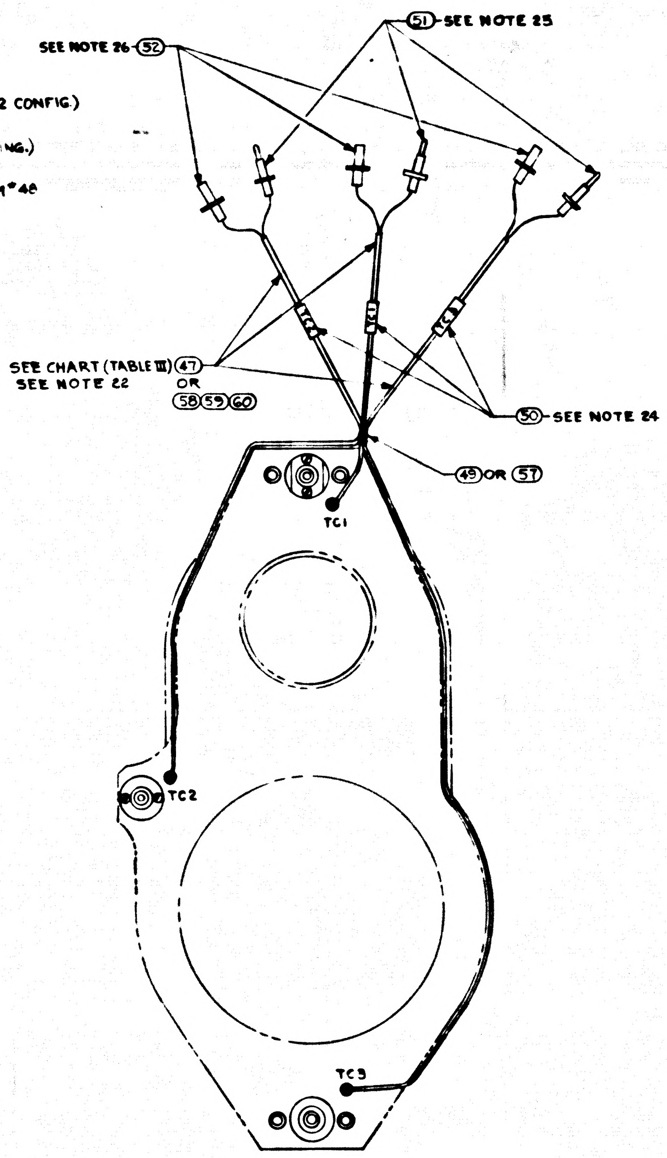
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).

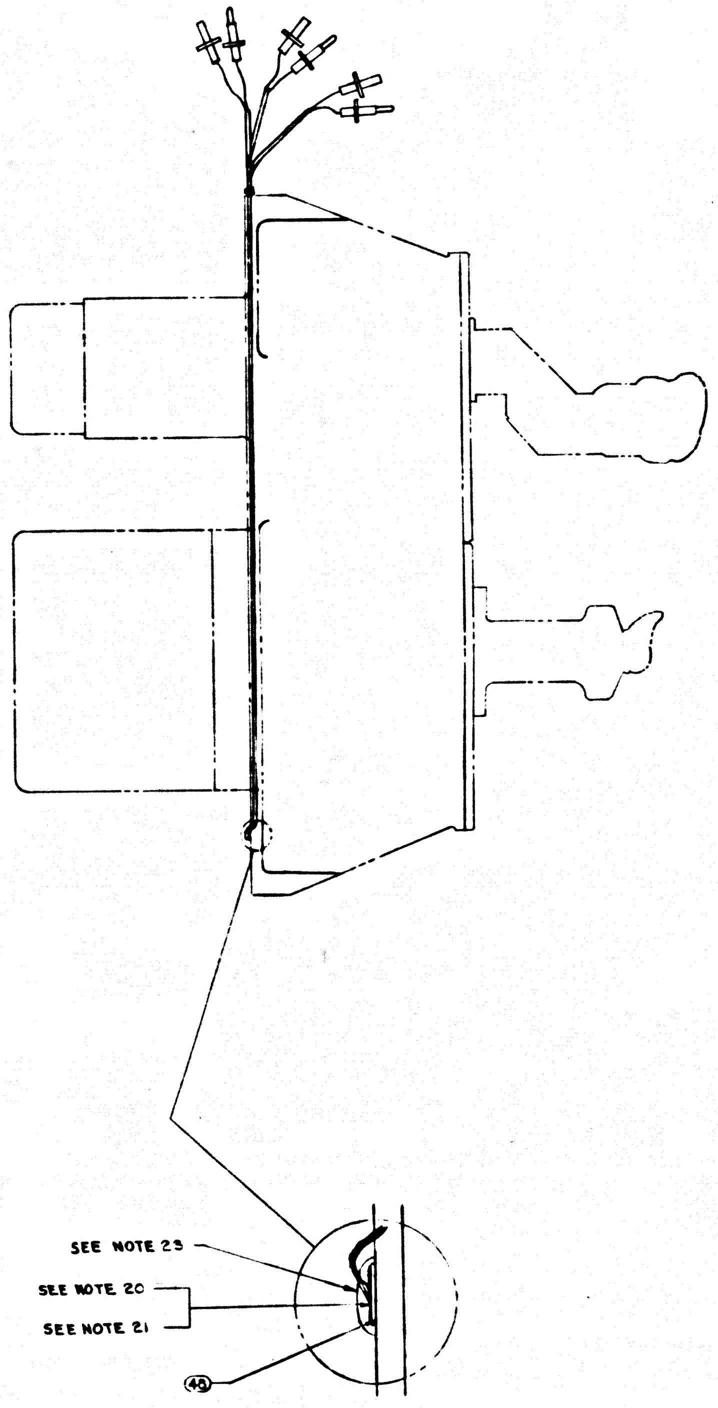
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION), AS SHOWN PER ND 1002206

26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206

27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.

28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN AL Rhodes DATE 5-18-66
CHECKED R. Jadum 5-19-66
APPROVAL
APPROVAL E. Chang 5-9-66
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

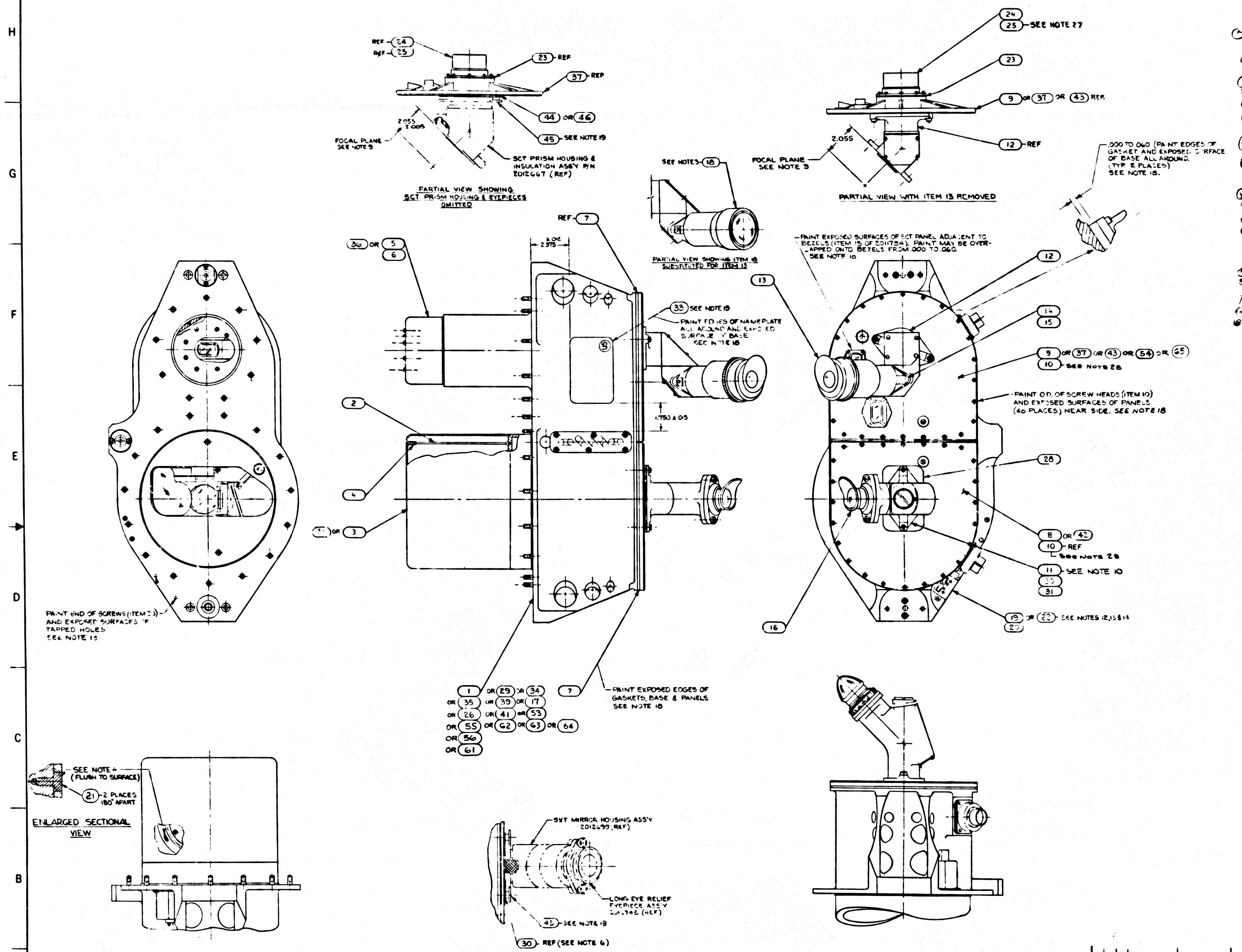
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

2011000 AM

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO [illegible]	[illegible]	WK
B		REVISED PER TDRR NO 19197	[illegible]	WK
C		REVISED PER TDRR NO 19451	[illegible]	WK
D		REVISED PER TDRR NO 20196	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	WK
F		REVISED PER TDRR 22640	[illegible]	WK
G		REVISED PER TDRR 226[illegible]	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28095	[illegible]	WK
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	NCM
V		REVISED PER TDRR 293[illegible]	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31646	[illegible]	[illegible]
AD		REVISED PER TDRR 32818	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]
AG		REVISED PER TDRR 34083	6/30/67	[illegible]
AH		REVISED PER TDRR 34138	7/[illegible]/67	[illegible]
AJ		REVISED PER TDRR 34382	8/18/67	[illegible]
AK		REVISED PER TDRR 34755	9/[illegible]/67	[illegible]
AL		REVISED PER TDRR 3475[illegible]	12-7-67	[illegible]
AM		REVISED PER TDRR [illegible]	[illegible]	[illegible]



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055
2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
FARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF 7
±.015
2.375
36 OR 5
6
33 SEE NOTE 19
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 10
13
12
14
15
9 OR 37 OR 43 OR 54 OR 65
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (40 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 30) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 13
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55 OR 62 OR 63 OR 64
OR 56
OR 61
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2011748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASS'Y	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88356910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219 METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORE SIDE) TO OBTAIN A FOCUS RANGE OF:
   - a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   - b. -1.00 ± .025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING [illegible] ITEM 30 [illegible], TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ± .005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES

B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ± .005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 28

29. FOR 2011000-039 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291. (PANELS ONLY 2011711-000 AND 2011784-011)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22629 SHEET 2 REDRAWN	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29330	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-6[illegible]	
AA		REVISED PER TDRR 31106	[illegible]	
AB		REVISED PER TDRR 31100	[illegible]	
AC		REVISED PER TDRR 31646	[illegible]	
AD		REVISED PER TDRR 32818	[illegible]	
AE		REVISED PER TDRR 32833	[illegible]-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	
AH		REVISED PER TDRR 34198	7/13/67	
AJ		REVISED PER TDRR 34382	8/18/67	
AK		REVISED PER TDRR 34755	9-29-67	
AL		REVISED PER TDRR 34758	12-7-67	
AM		REVISED PER [illegible]	[illegible]	

SEE CHART TABLE III SHEET 4

SEE CHART TABLE III, SH 4

SEE NOTES 17,18,&19

039	042	038	071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65			2011784-04			PANEL ASSEMBLY			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64			2012736-00			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63			2012736-012			OPTICAL UNIT SUBASSY STAGE II			
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0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE CONTACT			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE CONTACT			
0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
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0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
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0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	0	0	0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	0	0	AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE THERMOCOUPLE, TWIST PR (81" TOT)			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	0	1	0	0	0	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	[illegible]		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																									32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157008		SCREW, CAP, HEX SOC HD			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																									27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691[illegible]		SPACER			
1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		●	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		●	1011625-28	74455151028		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/2T	5638391[illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	45	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		●	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R8L	— " —		SCREW, SELF-LOCKING PAN HD FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57586910560		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910[illegible]90		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

LIST OF PARTS AND MATERIALS

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*
038	*	NA	NA	*
042	*	NA	NA	*
039	*	NA	NA	*

DWG SUFFIX	2012390	2012391	2012732	2012741
071	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
000	*	NA	NA	NA	NA	NA	NA
011	*	NA	NA	NA	NA	NA	NA
021	NA	*	NA	NA	NA	NA	NA
031	NA	NA	NA	*	NA	NA	NA
001	*	NA	NA	NA	NA	NA	NA
030	NA	NA	*	NA	NA	NA	NA
032	NA	NA	NA	*	NA	NA	NA
022	NA	*	NA	NA	NA	NA	NA
041	NA	NA	NA	NA	*	NA	NA
002	*	NA	NA	NA	NA	NA	NA
012	*	NA	NA	NA	NA	NA	NA
023	NA	*	NA	NA	NA	NA	NA
024	NA	*	NA	NA	NA	NA	NA
033	NA	NA	NA	*	NA	NA	NA
034	NA	NA	NA	*	NA	NA	NA
035	NA	NA	NA	*	NA	NA	NA
051	NA	NA	NA	NA	*	NA	NA
061	NA	NA	NA	NA	*	NA	NA
036	NA	NA	NA	*	NA	NA	NA
037	NA	NA	NA	*	NA	NA	NA
062	NA	NA	NA	NA	NA	NA	*
038	NA	NA	NA	*	NA	NA	NA
042	NA	NA	NA	NA	*	NA	NA
039	NA	NA	NA	NA	NA	*	NA

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
071	NA	NA	NA	NA	*	NA	NA

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED [illegible] 9/[illegible]/65
APPROVAL
APPROVAL [illegible]
NOT REQUIRED PER LETTER NASA [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

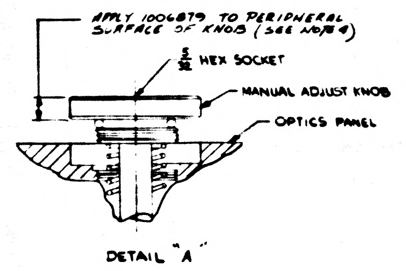
CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET [illegible] OF 4

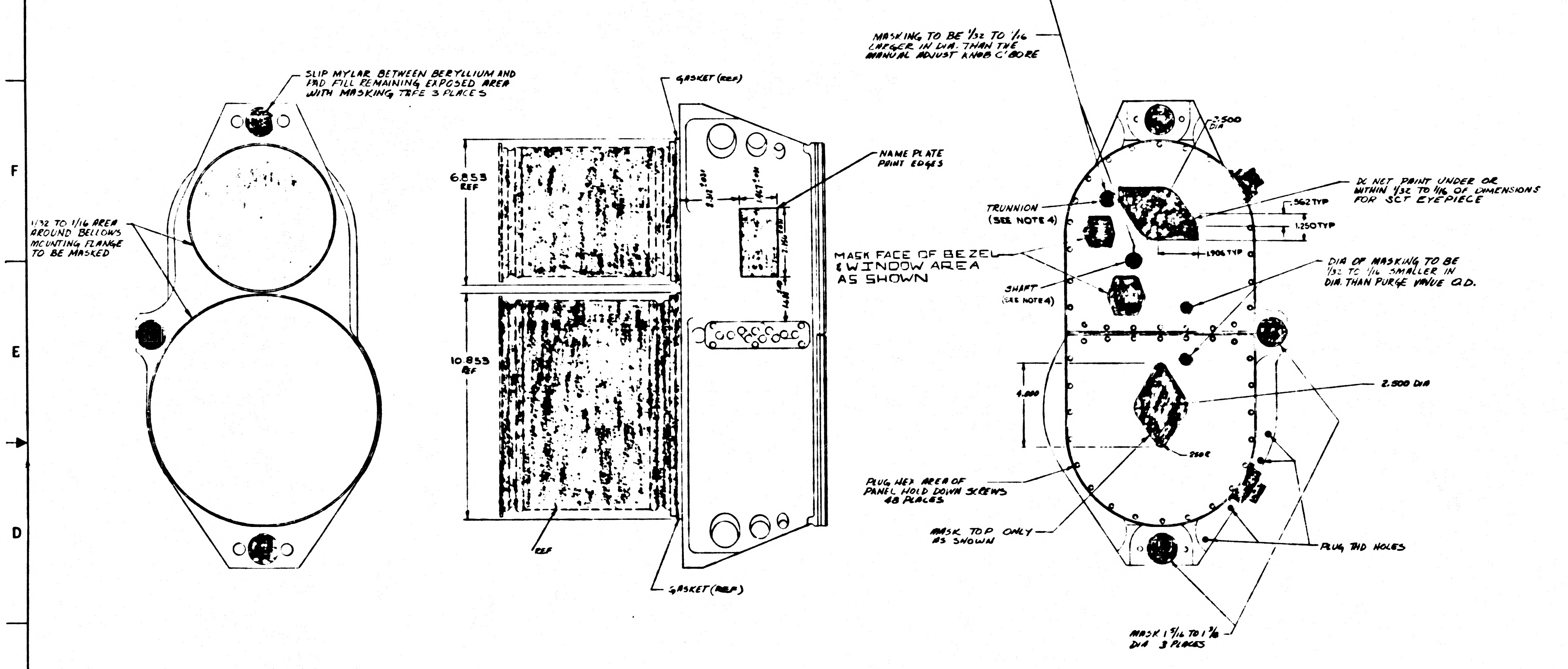
E-100

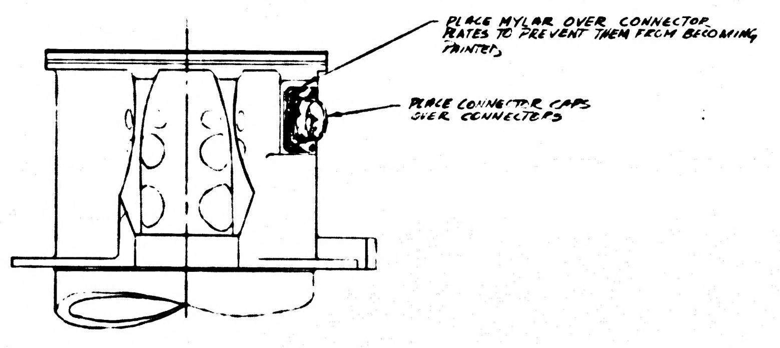
2011000 AM

NOTES:
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR ID MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR ID MARKS WHICH WERE RECORDED IN NOTE 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR [illegible]44	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR [illegible]	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR [illegible]646	[illegible]	[illegible]
AD		REVISED PER TDRR 32018	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	1-27-67	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]
AG		REVISED PER TDRR 34083	6-30-67	[illegible]
AH		REVISED PER TDRR 34138	7/19/67	[illegible]
AJ		REVISED PER TDRR 34382	8/18/67	[illegible]
AK		REVISED PER TDRR 34795	9-24-67	[illegible]
AL		REVISED PER TDRR 34758	12-7-67	[illegible]
AM		REVISED PER [illegible]	[illegible]	[illegible]


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
GASKET (REF)
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± | DECIMALS ± | ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
DRAWN AMB DATE [illegible]
CHECKED
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT
CODE IDENT NO 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 3 OF 4

2011000 AM

2011000 AM

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
   - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
   - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
   - C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG) (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)

21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".

22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.

23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.

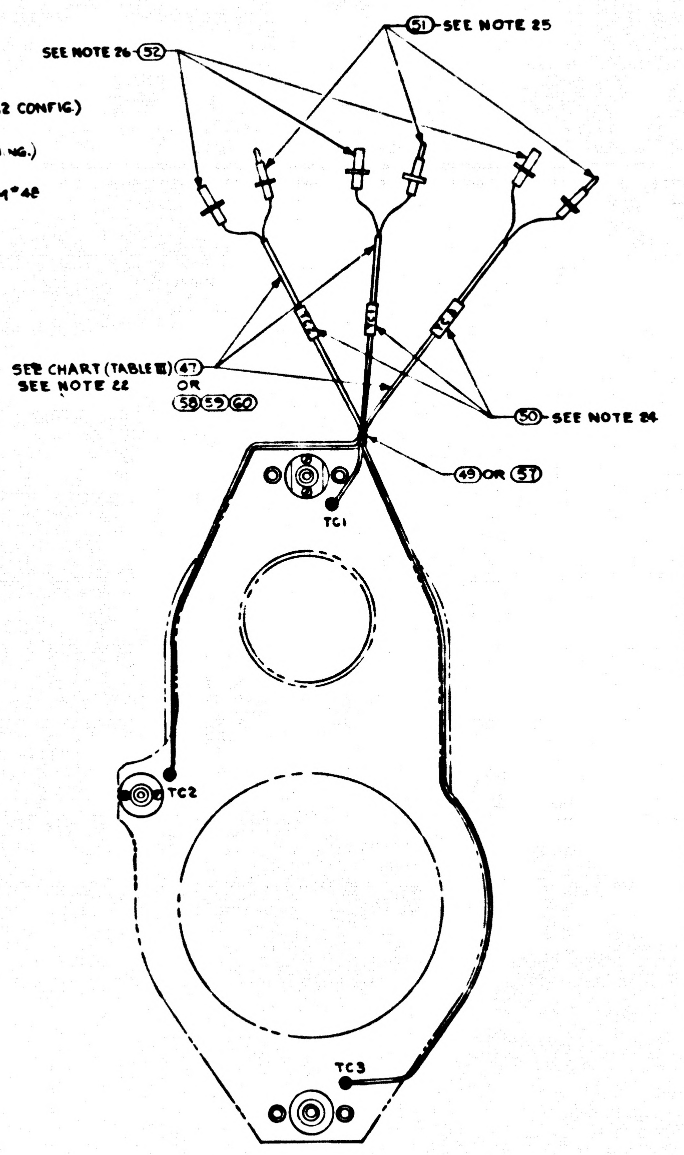
24. MARK TC 1, TC 2, TC 3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).

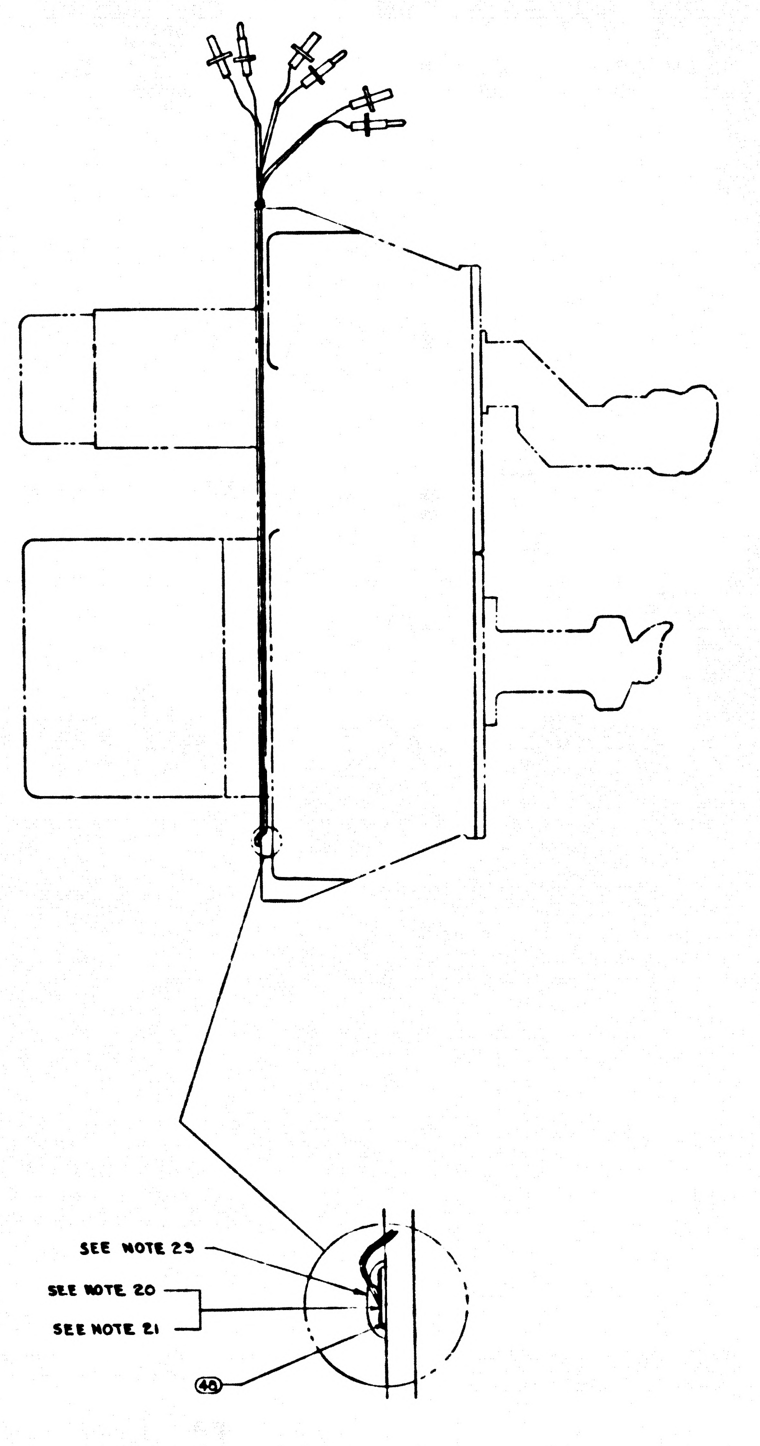
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206

26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206

27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.

28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III,

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-D-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	3-5-66	
AB		REVISED PER TDRR 31108		
AC		REVISED PER TDRR 31646		
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	
AH		REVISED PER TDRR 34138	7/13/67	
AJ		REVISED PER TDRR 34382	8/18/67	
AK		REVISED PER TDRR 34788	9-29-67	
AL		REVISED PER TDRR 34758	12-7-67	
AM		REVISED PER TDRR		

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN AL Rhodes DATE 5-18-66
CHECKED R Jackson 5-19-66
APPROVAL
APPROVAL E. Dhong 6-9-66
A. C. METZLER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

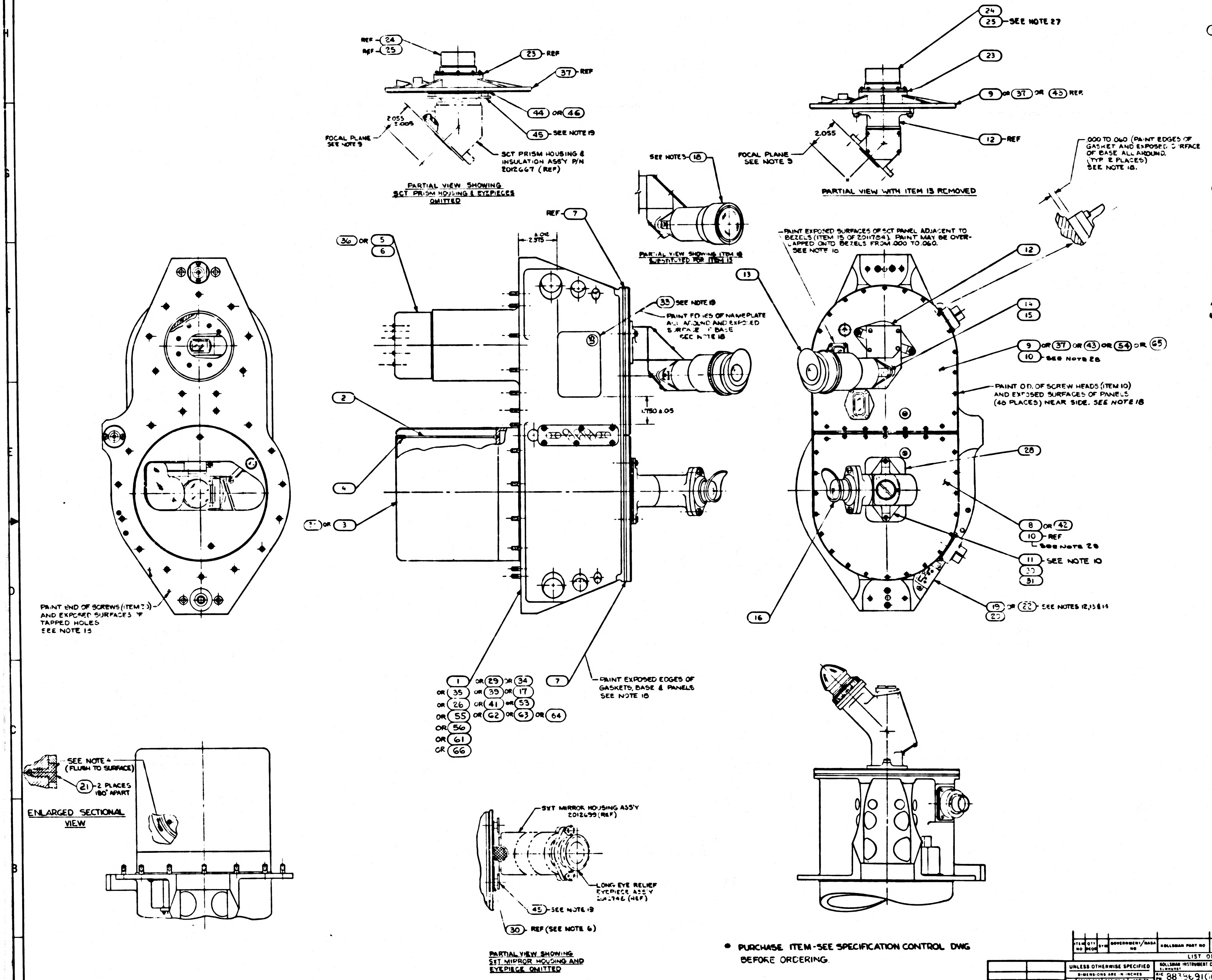
TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011000 AM

2011000 AN

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO		
B		REVISED PER TDRR NO 13197		
C		REVISED PER TDRR NO 19951		
D		REVISED PER TDRR NO 20196		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 2263		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25766		
M		REVISED PER TDRR 25764		
N		REVISED PER TDRR 26441		
P		REVISED PER TDRR 27722		
R		REVISED PER TDRR 29085		
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144		
U		REVISED PER TDRR 29152		MGM
V		REVISED PER TDRR 29300		
W		REVISED PER TDRR 29558		
Y		REVISED PER TDRR 29960		
Z		REVISED PER TDRR 30742	8-19-66	
AA		REVISED PER TDRR 31106		
AB		REVISED PER TDRR 31108	9-15-66	
AC		REVISED PER TDRR 31646		
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	
AH		REVISED PER TDRR 34138	7/3/67	
AJ		REVISED PER TDRR 34382	8/18/67	
AK		REVISED PER TDRR 34755	9/19/67	
AL		REVISED PER TDRR 34758	12-7-67	
AM		REVISED PER TDRR 35		
AN		REVISED PER TDRR 36451		


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
2.375
36 OR 5
6
33 SEE NOTE 18
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ± .05
2
4
3 OR 3
PAINT END OF SCREWS (ITEM 23) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 15
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41 OR 53
OR 55 OR 62 OR 63 OR 64
OR 56
OR 61
OR 66
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 10
13
12
14
15
9 OR 37 OR 43 OR 54 OR 65
10 SEE NOTE 28
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (46 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF SEE NOTE 28
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012746 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ± .025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012689 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

   AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 3 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ± .005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ± .005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
   A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
   B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291, EXCEPT PARA 3.2.4.2 (THICKNESS REQUIREMENTS AS INDICATED) IS NOT APPLICABLE. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES.
19. VIBRATION PROOF ITEM 45, USING GRADE A OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

    REFER TO SHEET 4 FOR NOTES 20 THRU 28

29. FOR 2011000-039 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG AND PAINT IN ACCORDANCE WITH ND1002291. (PANELS ONLY 2011711-000 AND 2011784-011)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
AA		REVISED PER TDRR 31106	9-15-66	
AB		REVISED PER TDRR 31108	9-15-66	
AC		REVISED PER TDRR 31646	10-20-66	
AD		REVISED PER TDRR 32818	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6-23-67	
AG		REVISED PER TDRR 34083	6-30-67	
AH		REVISED PER TDRR 34138	7-13-67	
AJ		REVISED PER TDRR 34382	8-10-67	
AK		REVISED PER TDRR 34755	9-26-67	
AL		REVISED PER TDRR 34758	12-7-67	
AM		REVISED PER TDRR 35999	4-16-68	
AN		REVISED PER TDRR 36451	6-25-68	

NA 2011000

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO.22.2[illegible] SHEET 2 REDRAWN	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29063	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-18-66	

SEE CHART TABLE III SHEET 4 (items 58–60)

SEE CHART TABLE III, SH 4 (item 47)

SEE NOTES 17, 18 & 19 (item 40)

LIST OF PARTS AND MATERIALS

081	039	042	038	071	062	037	036	061	051	035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66			2012736-051			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65			2011784-06			PANEL ASSEMBLY SCT			
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64			2012736-00			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63			2012736-012			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		62			2012736-002			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61			2012736-041			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60			2010746-012			THERMOCOUPLE CONTACT			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59			2010746-011			THERMOCOUPLE CONTACT			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58			2010746-010			THERMOCOUPLE CONTACT			
0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57			1008936-003			TAPE LACING			
0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	56			2012736-001			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55			2012736-031			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54			2011784-051			PANEL ASSY (SCT)			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53			2012736-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
0	0	0	0	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
0	0	0	0	0	0	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
0	0	0	0	0	AR	0	0	0	0	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS TYPE MFT-2.5			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PR (81" TOT)			
0	1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	AR	AR	AR	AR	0	AR	AR	AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	0	1	0	0	0	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																										32									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																										27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691 [illegible]		SPACER			
1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		•	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		•	1011625-28	74455151028		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC HD, SELF-LOCKING			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		•	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P8L	—		SCREW, SELF-LOCKING PAN HD FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57356910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQD

TABLE I (SCHEMATIC REF)

DWG SUFFIX	2012390	2012391	2012732	2012741
000	•	•	NA	NA
011	•	•	NA	NA
021	•	•	NA	NA
031	•	NA	NA	•
001	•	•	NA	NA
030	•	NA	•	NA
032	•	NA	NA	•
022	•	•	NA	NA
041	•	NA	NA	•
002	•	•	NA	NA
012	•	•	NA	NA
023	•	•	NA	NA
024	•	•	NA	NA
033	•	NA	NA	•
034	•	NA	NA	•
035	•	NA	NA	•
051	*	NA	NA	*
061	*	NA	NA	*
036	*	NA	NA	*
037	*	NA	NA	*
062	*	NA	NA	*
038	*	NA	NA	*
042	*	NA	NA	*
039	*	NA	NA	*

DWG SUFFIX	2012390	2012391	2012732	2012741
071	*	NA	NA	*
081	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
000	•	NA	NA	NA	NA	NA	NA
011	•	NA	NA	NA	NA	NA	NA
021	NA	•	NA	NA	NA	NA	NA
031	NA	NA	NA	•	NA	NA	NA
001	•	NA	NA	NA	NA	NA	NA
030	NA	NA	•	NA	NA	NA	NA
032	NA	NA	NA	•	NA	NA	NA
022	NA	•	NA	NA	NA	NA	NA
041	NA	NA	NA	NA	•	NA	NA
002	•	NA	NA	NA	NA	NA	NA
012	•	NA	NA	NA	NA	NA	NA
023	NA	•	NA	NA	NA	NA	NA
024	NA	•	NA	NA	NA	NA	NA
033	NA	NA	NA	•	NA	NA	NA
034	NA	NA	NA	•	NA	NA	NA
035	NA	NA	NA	•	NA	NA	NA
051	NA	NA	NA	NA	•	NA	NA
061	NA	NA	NA	NA	*	NA	NA
036	NA	NA	NA	*	NA	NA	NA
037	NA	NA	NA	*	NA	NA	NA
062	NA	NA	NA	NA	NA	NA	*
038	NA	NA	NA	*	NA	NA	NA
042	NA	NA	NA	NA	*	NA	NA
039	NA	NA	NA	NA	NA	*	NA

DWG SUFFIX	2011000	2016203	2016205	2016206	2016207	2016208	2016209
071	NA	NA	NA	NA	*	NA	NA
081	NA	NA	NA	NA	*	NA	NA

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A C WILLIAMS DATE 9-17-65
CHECKED
APPROVAL
APPROVAL
NOT REQUIRED PER LETTER NASA PP7-65-312
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230 | SIZE E | NASA NUMBER 2011000
SCALE NONE | WEIGHT CALC ACTUAL | SHEET [illegible] OF 4

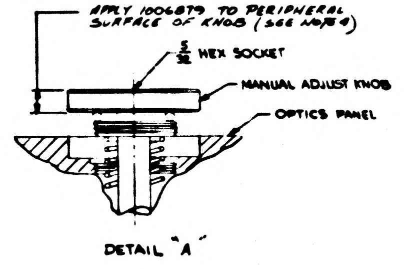
2011000 AN

NOTES:

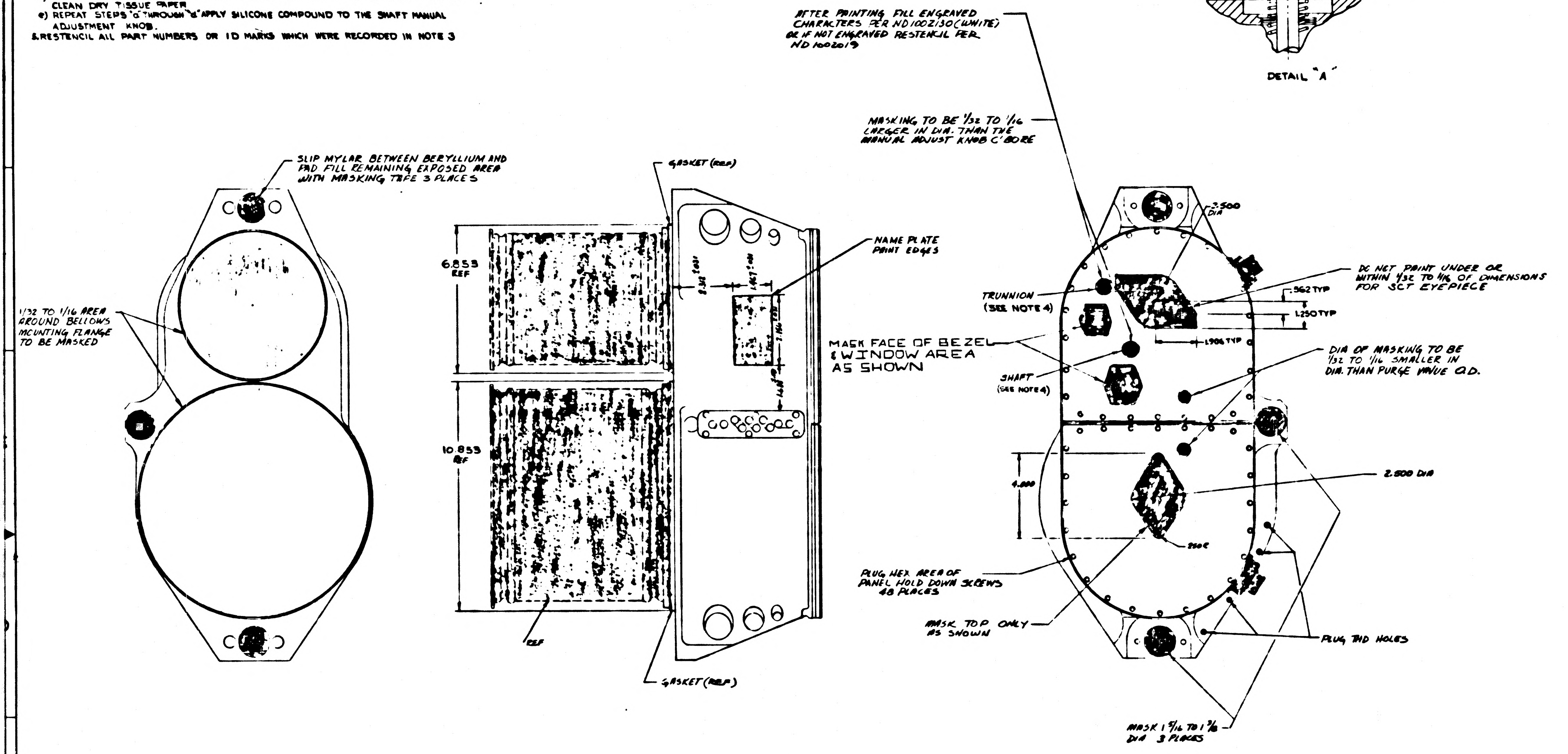
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR ID MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR ID MARKS WHICH WERE RECORDED IN NOTE 3

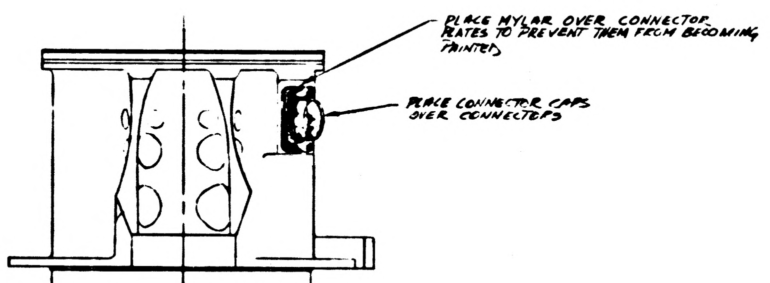
REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	
Z		REVISED PER TDRR 30742	[illegible]	[illegible]
AA		REVISED PER TDRR 31106	[illegible]	[illegible]
AB		REVISED PER TDRR 31108	[illegible]	[illegible]
AC		REVISED PER TDRR 31446	[illegible]	[illegible]
AD		REVISED PER TDRR 32018	1-27-67	[illegible]
AE		REVISED PER TDRR 32833	2767	[illegible]
AF		REVISED PER TDRR 34017	6/23/67	[illegible]
AG		REVISED PER TDRR 34083	6-30-67	[illegible]
AH		REVISED PER TDRR 34138	7/19/67	[illegible]
AJ		REVISED PER TDRR 34382	8/16/67	[illegible]
AK		REVISED PER TDRR 34795	9-24-67	[illegible]
AL		REVISED PER TDRR 34758	12-7-67	[illegible]
AM		REVISED PER TDRR 35[illegible]	[illegible]	[illegible]
AN		REVISED PER TDRR 3645	[illegible]	[illegible]


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
6.853 REF
10.853 REF
REF
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
GASKET (REF)
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
R/C
PN
DRAWN AMB DATE [illegible]
CHECKED
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
KIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

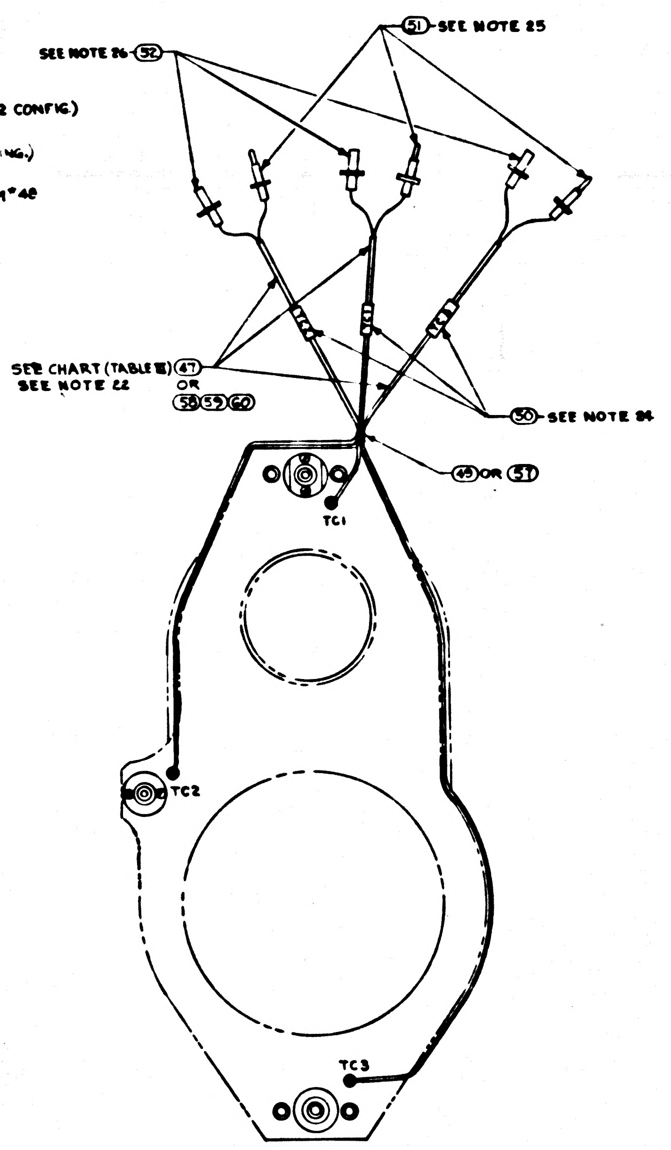
TITLE
OPTICAL UNIT

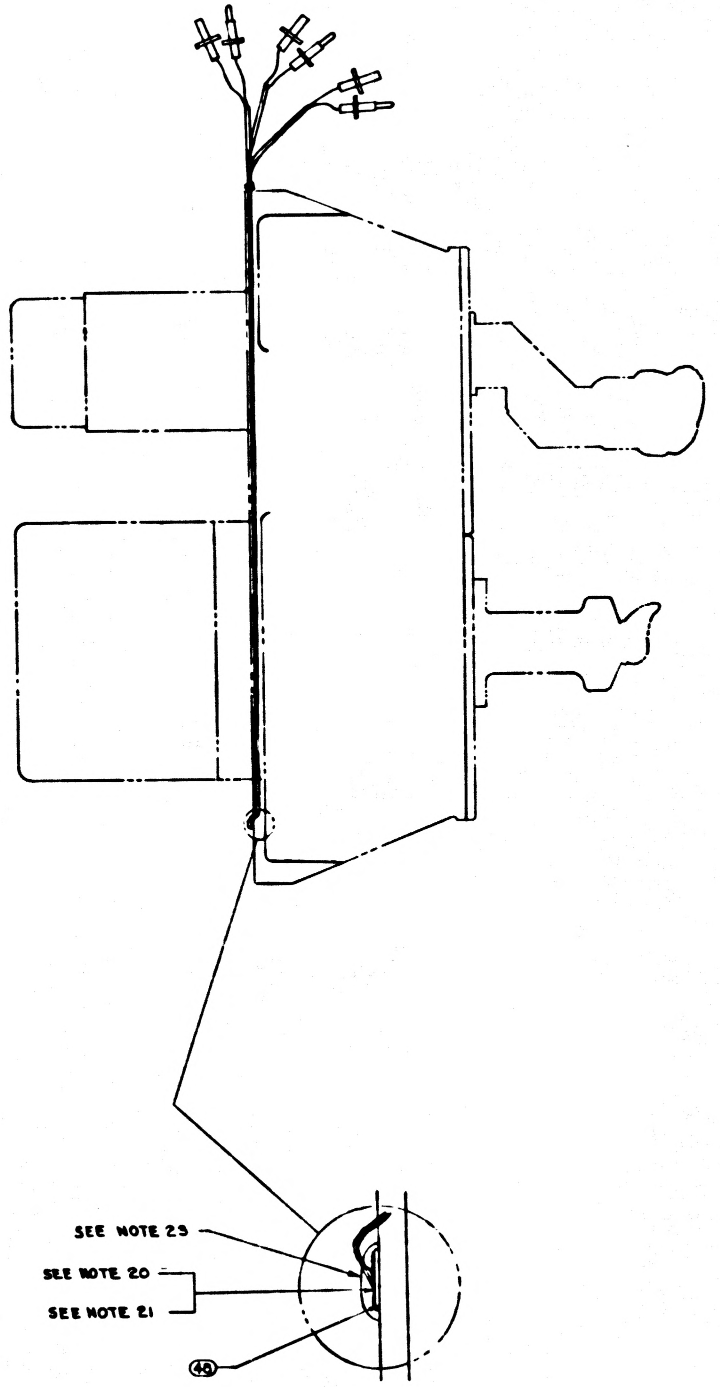
CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 4

NA	0001102

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-8-66	
Z		REVISED PER TDRR 30742	8-18-66	
AA		REVISED PER TDRR 31106	9-6-66	
AB		REVISED PER TDRR 31108	9-1-66	
AC		REVISED PER TDRR 30646	[illegible]	
AD		REVISED PER TDRR 32819	1-27-67	
AE		REVISED PER TDRR 32833	1-27-67	
AF		REVISED PER TDRR 34017	6/23/67	
AG		REVISED PER TDRR 34083	6/30/67	
AH		REVISED PER TDRR 34126	7/7/67	
AJ		REVISED PER TDRR 34382	8/16/67	
AK		REVISED PER TDRR 34788	9-29-67	
AL		REVISED PER TDRR 34758	12-7-67	
AM		REVISED PER TDRR 35[illegible]	[illegible]	
AN		REVISED PER TDRR 3645[illegible]	[illegible]	

20. ASSEMBLE THERMOCOUPLES (ITEM 47 FOR -035 CONFIG.) & (ITEMS 58, 59 & 60 FOR (-062) CONFIG.) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES FOR (-035 CONFIG.) & REMOVE 3/8 INCH OF INSULATION FROM THE UNJOINED ENDS OF WIRE FOR (-062 CONFIG.)
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER FOR (-035 CONFIG.)
    - C- FLATTEN & FUSE THE TWISTED ENDS OF WIRE FOR (-035 CONFIG.)(DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 OR 58, 59 & 60 COVER UNINSULATED SURFACES OF ITEM NO. 47 OR 58, 59 & 60 AND ADJOINING AREA WITH CEMENT PER ND1002004 TYPE I.
24. MARK TC1, TC2, TC3 AS SHOWN PER ND1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND1002211.
28. TORQUE 48 NAS1352C04LL8 SCREWS (ITEM NO. 10) TO 10 IN-LBS FOR METAL TO METAL CONTACT BETWEEN BOTH THE SXT AND SCT PANEL ASSYS, GASKET AND OPTICAL SUB ASSY, STAGE II.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47 OR 58	TC 1	16 INCHES
47 OR 59	TC 2	28 INCHES
47 OR 60	TC 3	37 INCHES

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	HOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

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DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

HOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
HIC PN 88386910000
DRAWN Al Rhodes DATE 5-18-66
CHECKED R. Jackson 5-19-66
APPROVAL
APPROVAL F. Obrey 6-9-66
A.C. METZLER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT | CALC ACTUAL | SHEET 4 OF 4

REVISIONS

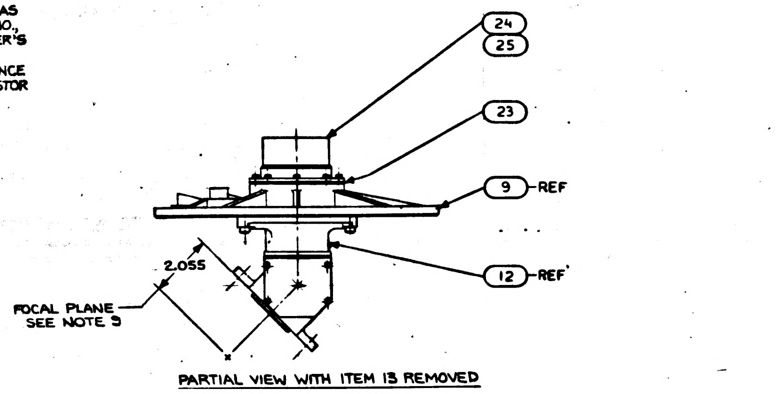
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.1T390		

12217

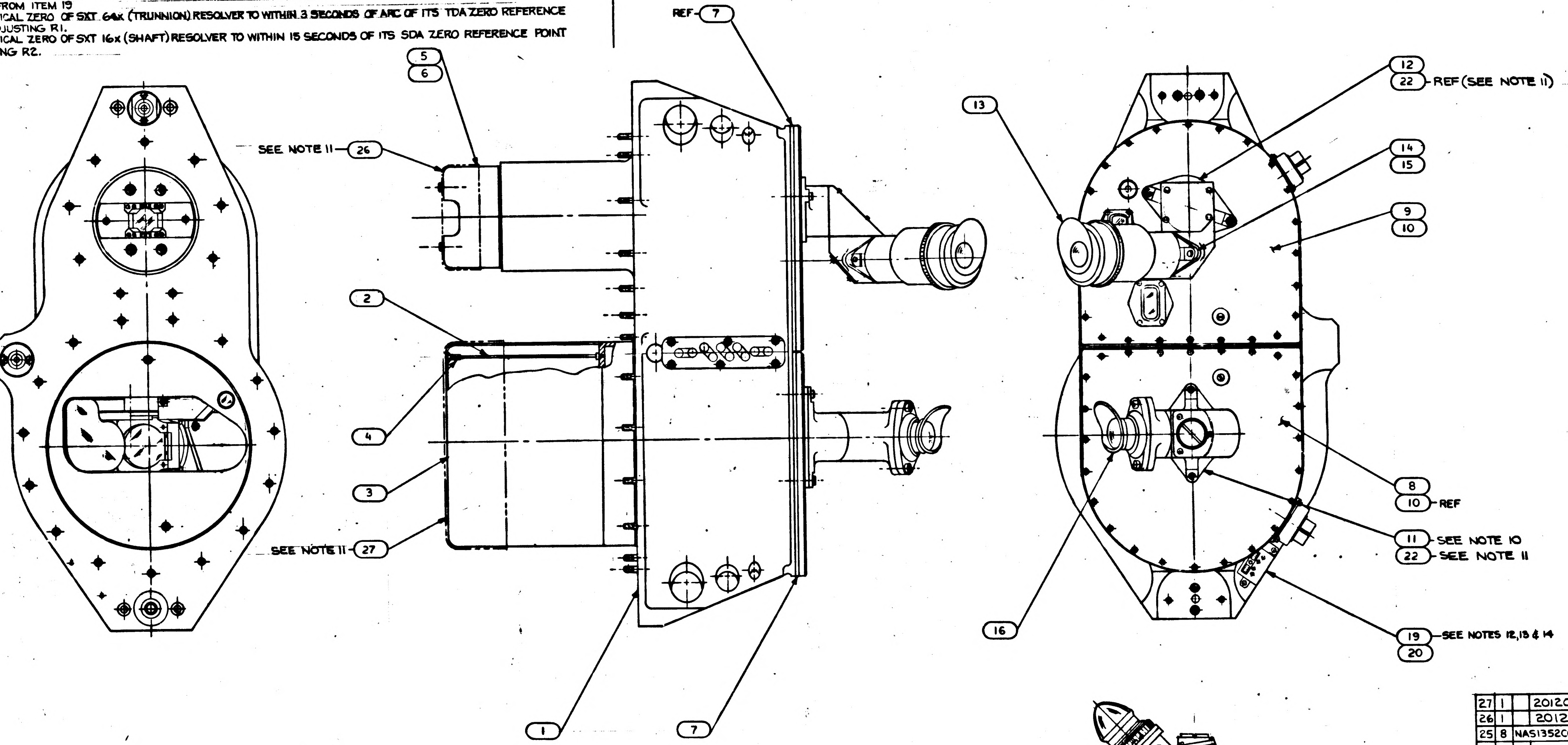
2011000 A

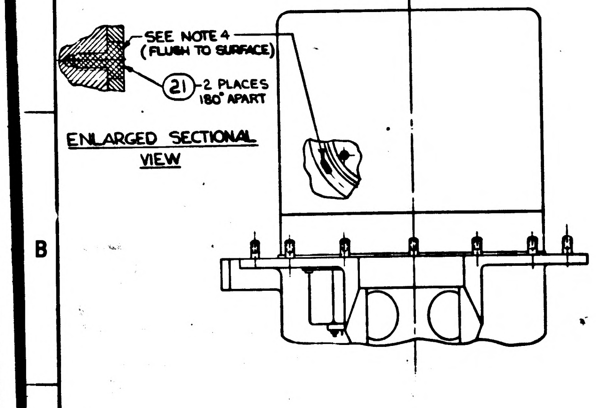
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ±0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS 1, 7 & 8.
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING OF SPACER 2011665 WHICH IS ITEM 4 ON DWG 2011786 & SECURING THE LENS HOLDER ASSY 2011794 OF THE SAME ASSY TIGHT AGAINST THIS SPACER. VIBRATION PROOF PART NO. 2011794 USING TWO (2) DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE "H".
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 15 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND10C2240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.

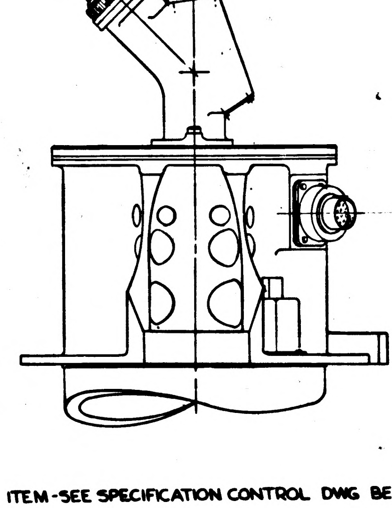


PARTIAL VIEW WITH ITEM 13 REMOVED





ENLARGED SECTIONAL VIEW



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
27	1		2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
26	1		2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
25	8		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
24	1		2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
23	AR		2011955-$^{1}_{6}$T	7938691$^{0601}_{[illegible]}$		SPACER			
22	2		2012101	85386910940		PLATE, DUST COVER, ASSY OF			
21	AR	*	1011541	74471435001		ADHESIVE, EPOXY			
20	2	*	1011625-28	74455151028	—	SCREW, CAP HEX SOC HD SELF-LOCKING			
19	1		2011346	85386910810		RESOLVER TRIMMING MODULE ASSY			
18	1		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
17	1		2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
16	1		2011932	85386910830		SXT EYEPIECE ASSEMBLY			
15	2		NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
14	AR		2011887-$^{1}_{7}$T	5638691$^{0400}_{0406}$		SHIM, SPACER (SCT TURRET)			
13	1		2011960	85386910560		SCT EYEPIECE ASSEMBLY			
12	1		2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
11	1		2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
10	48		NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
9	1		2011784	85386910650	—	PANEL ASSEMBLY, SCT			
8	1		2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
7	2	*	10117454	74426015004		GASKET			
6	4		NAS 1190C04P4L	—		SCREW, SELF-LKG PAN HEAD FULL TH'D 250°			
5	1		2012138	85386911040		COUNTERWEIGHT & COVER ASSEMBLY			
4	2		2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
3	1		2011604	50386910010		COVER, SEXTANT HEAD			
2	2		2011603	53386910040		ROD, THREADED			
1	1		2011890	85386910690	--	OPTICAL UNIT SUBASSY STAGE II			

LIST OF PARTS AND MATERIALS

SEE NOTE 3 (items 17 and 18)

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
—	—

APPLICATION

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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN DATE 7-28-64
CHECKED 8-[illegible]-64
APPROVAL
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

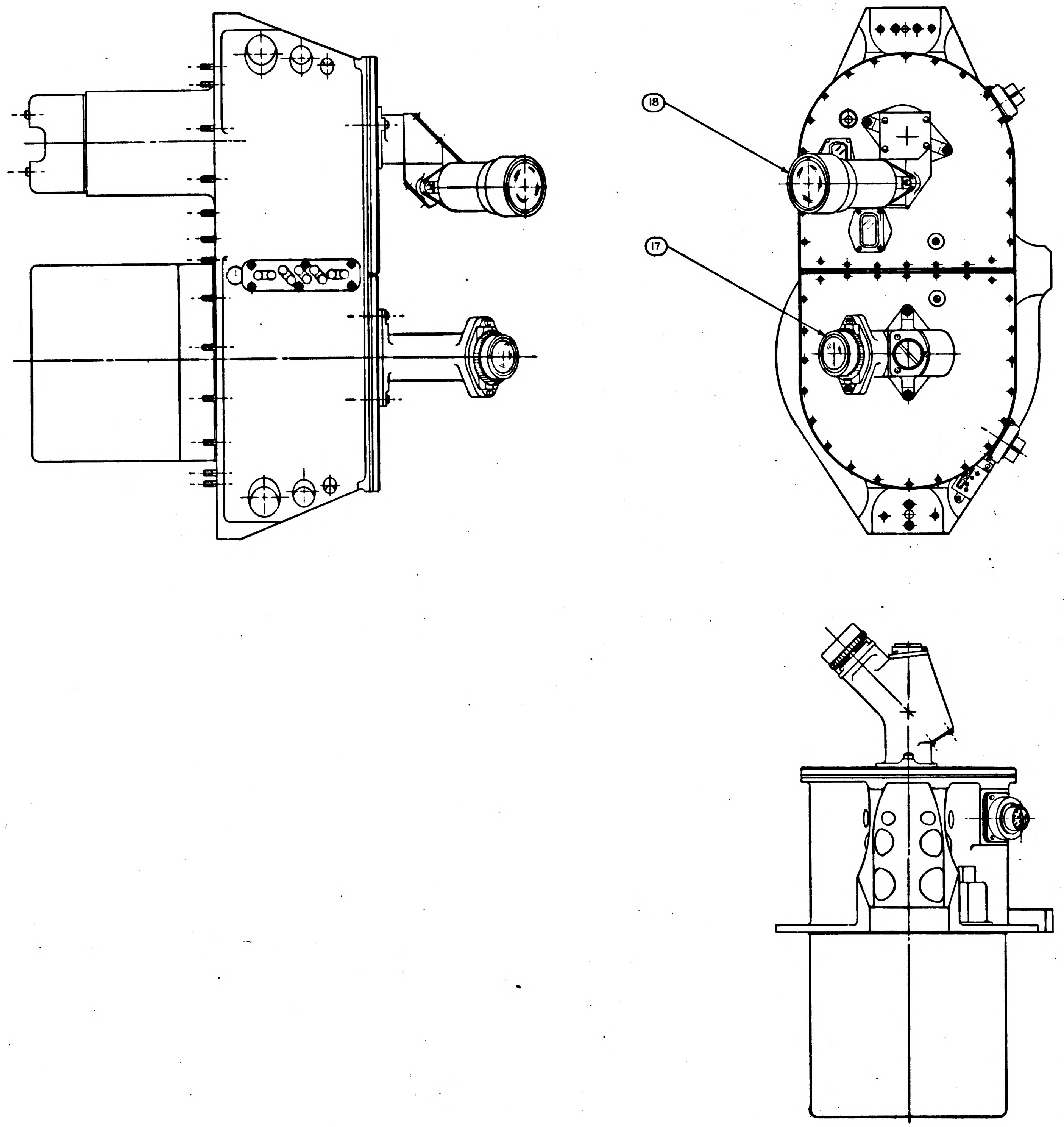
CODE IDENT NO.
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

2011000 A

A 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390		

NOTES:
SEE SHEET 1 OF 2



FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 88386910000
APPLICATION		MATERIAL — CONTRACT	DRAWN F. Schaller DATE 7-22-64 CHECKED C. Langstaff 8-25-64 APPROVAL 8/27/64 APPROVAL E. Morano 9/1/64 NASA APPROVAL MIT APPROVAL Aug 64

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TITLE
OPTICAL UNIT

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011000

SCALE 1/2 WEIGHT CALC ACTUAL SHEET 2 OF 2

APOLLO G&N Specification
PS 2011000 Rev. A
Original Issue Date: 5-6-65
Release Authority: TDRR 19005
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

OPTICAL UNIT ASSEMBLY

DRAWING NO. 2011000

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
7/8/65	A	20669	Spec. Completely Revised	W. K.	J. B.

This specification consists of page 1 to 33 inclusive.

APPROVALS	NASA/MSC	A Saltzman [illegible] 5-6-65 [illegible] W Kupfer 6 May 65 MIT/IL	KIC

1. SCOPE

This specification establishes the detail requirements for complete identification and acceptance of the Optical Unit, Assembly Part No. 2011000.

1.1 Product Configuration and Baseline Acceptances

1.1.1 The product configuration baseline shall be established by FACI for the Optical Unit Assembly, Serial No. . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No. unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein.

2.1 Effective Issues.

2.1.1 Military Standards and Specifications shall be the issue in effect on the date of contract.

SPECIFICATIONS

APOLLO G&N

ND 1002214	General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.
ND 1002023	Serialization, General Specification for
PS 2010606	Procurement Specification Product Configuration and Acceptance Test Requirements for the Precision Test Fixture.

STANDARDS

Military

MIL-STD-209	Clean Room and Work Station Requirements, Controlled, Environment
MIL-STD-150A	Photographic Lenses

DRAWINGS

APOLLO G&N

1019720	Optics-Navigation Base Shipping Container
2011000	Optical Unit Assembly

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the contracting officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this document and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of conflict as soon as it is determined.

a. The contract

b. This Specification

c. Documents listed in this section

3 REQUIREMENTS

The Primary Performance Requirements described in Section 3.1 are derived from the Apollo mission analysis. These requirements will be demonstrated by the ability of the Assembly to meet the Functional Performance Requirements.

Functional Performance Requirements described in Section 3.2 are derived in order to demonstrate the ability of the Assembly to perform the Primary Performance Requirements.

3.1 Primary Performance Requirements. The Assembly shall meet the environmental tests specified for nominal Apollo missions and have the following accuracies. These are not Functional Performance Requirements, but are the bases from which the Functional Performance Requirements will be derived.

3.1.1 SXT LLOS to SLOS Measurement Accuracy. At the center of the field of view, the Sextant (SXT) shall be capable of measuring the Trunnion Drive Axis (TDA) angle between the star line of sight (SLOS) and landmark line of sight (LLOS) to within 10 seconds of arc.

3.1.2 SXT SLOS Positioning Accuracy. The SXT SLOS shall be perpendicular to the mounting plane to within 40 seconds of arc at zero trunnion angle.

3.1.3 SCT LOS Positioning Accuracy. The Scanning Telescope (SCT) line of sight (LOS) shall be perpendicular to the mounting plane to within six minutes of arc at zero trunnion angle.

3.1.4 Tracker Tracking Accuracy. The Star Tracker, with supporting electronics, shall be capable of developing error signals for a star between +1.0 and +2.0 S-4 magnitude, in its field of view, to within a 10 arc second (rms) repeatability and providing a star presence signal to the computer when the star is in the field of view.

3.1.5 Tracker Pointing Accuracy. The tracker LOS shall be known to within 10 arc sec. relative to the SLOS of the SXT.

3.1.6 Photometer Sensing Accuracy. The photometer shall be capable of accurately sensing the horizon intensity over a range of 9.5 to 2.4×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600Å..

Å

3.1.7 Photometer Pointing Accuracy. The photometer line of sight shall be known to within 10 arc seconds in the trunnion direction relative to the LLOS.

3.2 Functional Performance Requirements. The Assembly shall perform as specified herein under the following conditions to verify its ability to perform the Primary Performance Requirements.

Drive Motor Fixed Excitation	28VAC±5%	800 cps ±1% <-90
Resolver Excitation	28VAC±1%	800 cps ±1%
Tachometer Excitation	28VAC±1%	800 cps ±1%
Tracker - Photometer	28VDC±2%	

3.2.1 SDA Orientation. The Shaft Drive Axis (SDA) shall be perpendicular with respect to the mounting plane between the Assembly and the Navigation Base within 10 seconds of arc for the SXT and to 40 sec. of arc for the SCT.

3.2.2 Orientation of the TDA Measuring Plane to the Shaft Axis. The sum of the errors resulting from the lack of perpendicularity between Trunnion Drive Axis (TDA) and SDA and the lack of perpendicularity of the SLOS and the TDA shall not exceed 20 arc seconds for the SXT and 2 arc minutes for the SCT.

3.2.3 Orientation of SLOS to TDA. The error resulting from the lack of perpendicularity between the TDA and SLOS for the SXT as when the SLOS is internally autocollimated shall not exceed 10 arc seconds.

3.2.4 Parallelism of Optical Axis to SDA Axis. (Reticle Eccentricity). The parallelism of the optical axis to SDA axis shall be within 10 seconds of arc for the SXT and 50 seconds of arc for the SCT.

3.2.5 Resolver Alignment. The SXT SDA and TDA resolvers and the SCT SDA TDA resolvers and counters shall be within the LOS tolerances specified in Table 1 when aligned to the specified references.

TABLE I

RESOLVER ALIGNMENT

FUNCTION	COMPONENT	REFERENCE	TOLERANCE (LOS)
SEXTANT TRUNNION (SXT TDA)	64X RSVR (Prior to Trimming)	SXT SLOS Angle (2 times TDA Angle)	± 2 min Zero Error
	2X RSVR		± 6 min Zero Error
	1X RSVR		± 6 min Zero Error
	Trimmed 64X RSVR		± 3 sec Zero Error 24 sec Max error spread
SEXTANT SHAFT	16 X RSVR	SXT SDA ANGLE	± 1 min Zero Error
	1X (SHAFT)		± 3 min Zero Error
	1X (GEARBOX)		± 2 min Zero Error
	1/2X RSVR		± 8 min Zero Error
	Trimmed 16X RSVR		± 10 sec Zero Error 44 sec Max error spread
TELESCOPE TRUNNION (SCT TDA)	1X RSVR	SCT LOS ELEVATION ANGLE (2 times TDA ANGLE)	± 2 min Zero Error * 8 min Max ea. point
	Trunnion TPAC		2 min Max each point
TELESCOPE SHAFT (SCT SDA)	1X RSVR	SCT SDA ANGLE	4 Min Max ea. point ** ± 1 min Zero Error
	Shaft TPAC		2 Min Max ea. point

* The tolerances represent the differences between the SCT LOS Elevation angle (2 times the TDA angle) and the Trimmed SXT 64X Trunnion Resolver.

** These tolerances represent the differences between the SCT SDA angle and the Trimmed SXT 16X Shaft Resolver.

TPAC = Telescope Panel Angle Counter

3.2.6 Resolving Power. The resolving power for all lines of sight of the SXT and SCT shall be determined with the eyepiece adjusted for optimum focus at the center of the respective fields using black and white targets as defined by MIL-STD-150A, Photographic Lenses.

The resolving power will be tested using either high contrast or low contrast targets depending upon whether the test equipment configuration includes high or low contrast target. The resolving power for high or low contrast targets shall be as follows or better:

	Resolving Power in arc seconds					
Approximate Position in Field	SXT				SCT	
	LLOS		SLOS		LOS	
Target Contrast	Low	High	Low	High	Low	High
Center	14.4	10.3	9.1	7.2	146	64.6
1/3 Field Radius	*	*	14.4	11.5	230	91.5
2/3 Field Radius	*	*	28.7	23.0	328	184

*If the SXT SLOS resolution at the three field positions and the SXT LLOS resolution at field center are within the tolerance specified, it shall be assumed that the SXT LLOS resolution, at the field radii specified, is also within tolerance.

3.2.7 Air/Vacuum Focusing. The focus of each standard eyepiece upon the reticle plane shall be within the tolerances specified in the following chart for standard eyepieces. If the assembly configuration includes long eye-relief eyepieces then their focus shall be within the tolerances specified in the following chart for LER eyepieces.

Eyepiece	Air Reticle	Vacuum Reticle
SXT Standard	Adjustable between -2 and +2 Diopters	Adjustable between -2 and +2 Diopters
SXT LER	+1 ± .25 Diopters	-1 ± .25 Diopters
SCT Standard	-1 ± .25 Diopters	----------------
SCT LER	-1 ± .25 Diopters	----------------

3.2.8 Luminous Transmittance. The luminous transmittance of the SXT SLOS to CIE illuminant "C" (6500°K) shall not be less than 25%.

The luminous transmittance of the SXT LLOS to CIE illuminant "C" shall not be less than 4%.

The luminous transmittance of the scanning telescope to CIE "C" shall not be less than 30%.

If the assembly configuration includes an eyepiece polaroid filter then the following shall be a requirement. The ratio of the luminous transmittance of the SXT, SLOS and SXT LLOS shall be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

3.2.9 Freedom of Motion. The SDA and TDA of the SCT shall move freely when rotated manually.

3.2.10 Static Friction. Breakaway friction shall be less than .04 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases. Except that at 0° and 180° the breakaway friction shall be less than .052 inch-ounces on the SCT.

3.2.11 Dynamic Friction Level. Dynamic friction shall be less than .03 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases.

3.2.12 Reticle Lighting. The SXT and SCT reticle lamps shall draw a current that is within 10% of measurements made while the lamp illumination was observable. In addition the respective reticles shall appear illuminated when viewed via the eyepiece.

3.2.13 Dark Noise. With no light incident on the photomultiplier tube and an AGC voltage of 2.0 volts applied to the OUA, the preamplifier wide band output shall not be greater than 1.0 volts rms.

3.2.14 Reference Voltage. The tuning fork reference voltage shall be greater than 6.0 volts peak-to-peak.

3.2.15 Tracker Frequency. The frequency of the "X" tuning fork shall be 455 cps ± 1 cps and the frequency of the "Y" tuning fork shall be 356 cps ± 1 cps as measured at the reference point.

3.2.16 Error Signal Gradient. With a +2.0 magnitude star and +2.0 volts AGC, measure the ac voltage at the preamplifier output with the simulated star at the following coordinates.

a. Every 20 seconds for 1 minute on either side of null.

b. Every 1 minute for 6 minutes on either side of null.

c. Every 3 minutes until the edge of the 15 minute field of view on either side of the null.

These coordinates should be first taken along the trunnion (X) axis and then along the cross trunnion (Y) axis.

The error signal gradient shall be greater than 114 volts/radian over a 4 minute field of view centered at null.

With a star of +1.0 magnitude, set the AGC to 2.6 volts and repeat the ± 1, 2, 3, 4 and 5 minute points along each axis. The error signal gradient shall be less than 170 volts/radian over a 4 minute field of view centered at null.

3.2.17 Star Presence Output. The star presence output shall be less than 5.0 volts when an AGC input of 0 volts is applied to the OUA.

The star presence output shall be greater than 14.0 volts when an AGC input of 2.0 volts is applied to the OUA.

3.2.18 **SXT Star LOS to Tracker LOS Alignment and Accuracy.** The SXT star line of sight and the star tracker line of sight shall be parallel to within 20 arc seconds in the trunnion axis and 3 arc minutes in the cross trunnion axis.

The error angle between the SXT star line of sight and the star tracker line of sight shall be known to within 10 arc seconds.

3.2.19 **Horizon Photometer Output.** The preamplifier output shall be 125-250 millivolts for the maximum horizon intensity which is 9.5×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600Å.

Å

The preamplifier output at 1/2 the maximum horizon intensity level shall be 1/2 the output at the maximum level ± 5%.

The preamplifier output at 1/4 the maximum horizon intensity level shall be 1/2 the output at the 1/2 maximum level ± 5%.

3.2.20 Photometer Frequency. The frequency measured at the preamplifier output shall be 550 ± 1 cps.

3.2.21 SXT LLOS to Photometer LOS Alignment and Accuracy. The sextant landmark line of sight and photometer line of sight shall be parallel to within 3 arc minutes. The error between the two lines of sights shall be known to within 10 arc seconds.

3.3 Product Performance and Repeatability. The Assembly shall meet the Functional Requirements of Section 3.2 and furthermore shall withstand specified environmental stresses without degradation of performance characteristics. This performance characteristic repeatability shall be demonstrated by subjecting the OUA to the following test procedures.

> NOTE: The following sequence of test procedures is mandatory except that (a) the sequence of Vibration and Thermal Vacuum tests may be interchanged, and (b) the sequence of the Pressure Leak Rate and the Functional Performance tests may be interchanged.

1. Baseline Performance Tests
2. Environmental Tests
    a) Mechanical Integrity
    b) Thermal Vacuum
3. Final Visual and Mechanical Inspection
4. Pressure Leak Rate Test
5. Functional Performance Tests

3.3.1 Baseline Performance Tests. These tests, as a minimum, shall demonstrate the following Functional Performance Requirements from Section 3.2.

3.2.1	SDA Orientation
3.2.2	Orientation of the TDA Measuring Plane to the Shaft Axis
3.2.4	Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)
3.2.18	SXT Star LOS to Tracker LOS Alignment and Accuracy
3.2.21	SXT LLOS to Photometer LOS Alignment and Accuracy

3.3.2 Environmental Tests.

3.3.2.1 Vibration Procedure. The Assembly shall be vibrated according to these requirements.

Random vibration with the indicated characteristics shall be applied along each of three mutually perpendicular axes for a period of one minute per axis.

Linear increase from $.0054g^2$/cps at 20 cps to $.02g^2$/cps at 70 cps and constant to 1000 cps; then linear decrease to $0.004g^2$/cps at 2000 cps with a -3db limit.

3.3.2.2 Thermal-Vacuum Test. The Assembly shall be subjected to simulated flight conditions in a Space Simulator chamber.

The command module conditions shall include the following:

Pressure - 5 psi of air or greater

Temperature - greater than 0°F
less than 160°F

The space side conditions shall include the following two conditions:

(1) Simultaneous cold wall and vacuum.
(2) Simultaneous cold wall, vacuum and sun. Cold wall, vacuum and sun are defined as follows:

Cold Wall (temperature of wall) - $320^{\circ}F \begin{smallmatrix} +10^{\circ}F \\ -0^{\circ}F \end{smallmatrix}$

Vacuum: less than 1 x 10^{-6} torr
Sun: A collimated radiation source simulating one sun in spectrum and intensity.

CAUTION

The Star Tracker and Photometer objective lenses shall be shielded from the direct rays of the Sun Source.

The SCT and SXT shall be successfully driven in the shaft and trunnion axes once during each hour of the simulation to insure proper general functioning. The focus of the SXT upon the vacuum reticle shall also be verified.

3.3.3 Final Visual and Mechanical Inspection. The Assembly shall be inspected to ensure that it conforms to the highest quality standards of general workmanship, optical cleanliness and mechanical and operational integrity.

3.3.4 Pressure Leak Rate. With the optical head in vacuum, a differential pressure of 5 psi across the optic base shall not cause a leakage rate in excess of 9.99 x 10^{-5} st'd cc/sec of air.

3.3.5 Functional Performance and Repeatability. The Assembly will then be tested to show compliance to the Functional Performance Requirements of Section 3.2 by the procedures described in Section 4.2 of this Procurement Specification.

In order to demonstrate that there has been no measureable change in characteristics of the Assembly between Baseline Testing and Final Test, the data from these tests shall be compared. The maximum allowable differences between the two sets of data for corresponding tests shall be as follows:

TABLE II

Test	Performance Requirements	Maximum allowable difference between Baseline and Final Test
SDA Orientation (3.2.1)		
SXT SDA	10 arc sec.	6 arc sec.
SCT SDA	40 arc sec.	10 arc sec.
Orientation TDA Meas. Plane to SDA (3.2.2)		
SXT	20 arc sec.	6 arc sec.
SCT (not applicable		
Parrallelism of Optical Axis to SDA Axis (Reticle Eccentricity (3.2.4)		
SXT reticle	10 arc sec.	4 arc sec.
SCT reticle	50 arc sec.	25 arc sec.
SXT SLOS to Tracker LOS Alignment and Accuracy (3.2.18) Error Angle	20 arc sec. (trunnion) 3 arc min. (cross trunnion)	10 arc sec. 10 arc sec.
SXT LLOS to Photometer LOS Alignment and Accuracy (3.2.21) Error Angle	3 arc min.	10 arc sec.

NOTE: The allowable difference between baseline and final test does not represent changes in the Assembly characteristics, but rather allowable errors in measurement accuracy and stability.

3.4 Product Configuration

3.4.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2011000 and all drawings and engineering data referenced thereon.

3.4.2 Nameplate and Serialization. Each Assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023. This number shall be affixed to the optical base.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein. The failure of the end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When non-conformance units are corrected by the contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the non-conformance or, when so directed by the cognizant inspector, a complete reexamination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: $25^{\circ} \pm 10^{\circ}C$
(b) Relative Humidity: 90% maximum
(c) Barometric Pressure: 28 to 32 inches Hg

4.2 Tests. The following chart shall be used to correlate between the Functional Performance Requirements specified in Section 3 and the tests specified in Section 4.

Paragraph Title	Section 3	Section 4
SDA Orientation	3.2.1	4.2.1.1 4.2.1.2
Orientation of the TDA Measuring Plane to the Shaft Axis	3.2.2	4.2.1.3
Orientation of SLOS to TDA	3.2.3	4.2.1.3.2
Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)	3.2.4	4.2.1.1 4.2.1.2
Resolver Alignment	3.2.5(Table 1)	4.2.1.4 4.2.1.5 4.2.1.6 4.2.1.7 4.2.1.8 4.2.1.9
Resolving Power	3.2.6	4.2.1.10
Air/Vacuum Focusing	3.2.7	4.2.1.11
Luminous Transmittance	3.2.8	4.2.1.12
Freedom of Motion	3.2.9	4.2.1.13
Static Friction	3.2.10	4.2.1.14 4.2.1.15
Dynamic Friction Level	3.2.11	4.2.1.14 4.2.1.15
Reticle Lighting	3.2.12	4.2.1.16
Dark Noise	3.2.13	4.2.1.17
Reference Voltage	3.2.14	4.2.1.18
Tracker Frequency	3.2.15	4.2.1.19
Error Signal Gradient	3.2.16	4.2.1.20
Star Presence Output	3.2.17	4.2.1.21
SXT Star LOS to Tracker LOS Alignment and Accuracy	3.2.18	4.2.1.22
Horizon Photometer Output	3.2.19	4.2.1.23
Photometer Frequency	3.2.20	4.2.1.24
SXT LLOS to Photometer LOS Alignment and Accuracy	3.2.21	4.2.1.25
Baseline Performance	3.3.1	4.2.1.26
Environmental Tests	3.3.2	4.2.1.27
Final Visual Mechanical Inspection	3.3.3	4.2.1.28
Pressure Leak Rate	3.3.4	4.2.1.29
Functional Performance & Repeatability	3.3.5	4.2.1.30

4.2.1 Test Sequence. Except as noted in Section 3.3 the sequence of Functional testing as presented herein is optional and may be performed in any order which will permit most economical use of manpower and equipment.

4.2.1.1 SXT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity). The SXT reticle shall be observed through a certified reference LOS afforded by the Precision Test Fixture's SXT Vertical Autocollimator via the LLOS as shown schematically in Figure 1. A series of angular displacement measurements of the reticle through the complete excursion of SDA shall be taken with the autocollimator filar micrometers. The results shall be charted and analysed to yield the reticle's eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall not exceed 10 seconds of arc and SDA perpendicularity shall be within 10 seconds of arc.

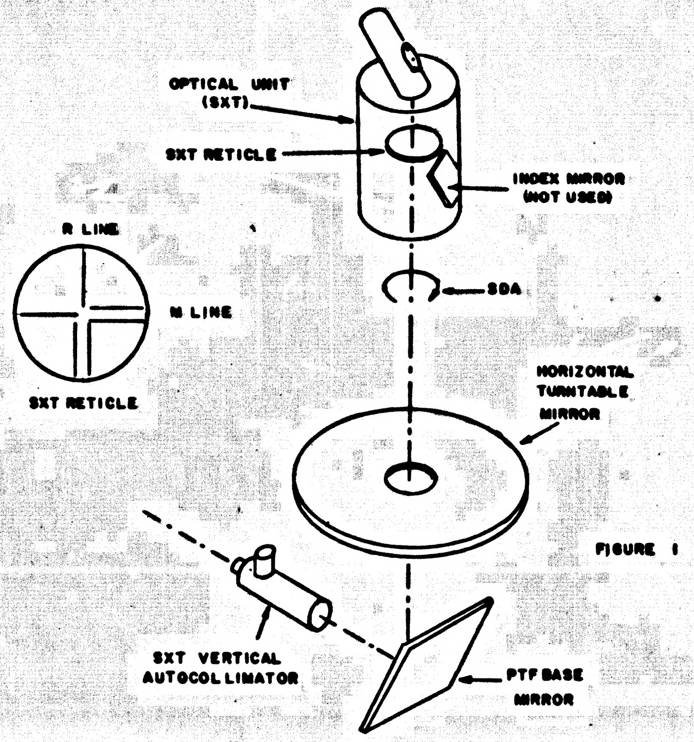

OPTICAL UNIT (SXT)
SXT RETICLE
INDEX MIRROR (NOT USED)
R LINE
M LINE
SXT RETICLE
SDA
HORIZONTAL TURNTABLE MIRROR
SXT VERTICAL AUTOCOLLIMATOR
PTF BASE MIRROR

FIGURE 1

4.2.1.2 SCT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity) and SDA Orientation. The SCT reticle and PTF's SCT Vertical Collimator reticle shall be observed through the SCT eyepiece as shown schematically in Figure 2. A series of angular displacement measurements between the SCT reticle's "R" line (reference Figure 3) and the Collimator reticle's parallel component, at the cardinal angles of SDA rotation shall be made with reference to the reticle line thickness. The results shall be charted and analyzed to yield the SCT reticle eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall be within 50 seconds of arc and the SDA shall be perpendicular to the ball plane mount to within 40 seconds of arc.

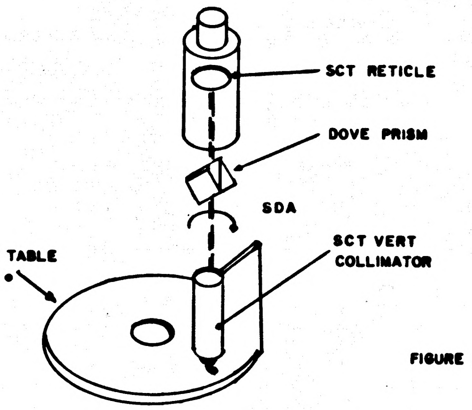

SCT RETICLE
DOVE PRISM
SDA
SCT VERT COLLIMATOR
ROTARY TABLE AT 247°

FIGURE 2

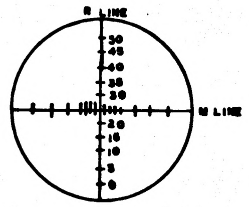

R LINE
50
45
40
35
30
20
15
10
5
0
M LINE

FIGURE 3

4.2.1.3 Orientation of the TDA Measuring Plane to the Shaft Axis.

4.2.1.3.1 SXT. The SXT reticle and its autocollimated SLOS reflection shall be observed through the SXT eyepiece as shown schematically in Figure 4. A series of angular displacement measurements between the reticle "R" line and its reflection, through the complete excursion of SDA, shall be made with reference to the reticle line pattern. The results shall be charted and analysed to yield the parallelism error between the SLOS and LLOS and the eccentricity of the reflected SLOS reticle image to the SDA, both of which are related to the lack of perpendicularity between the TDA and SDA. The sum of the errors resulting from the lack of perpendicularity between the TDA and SDA and the lack of perpendicularity of the SLOS and TDA shall not exceed 20 arc seconds.

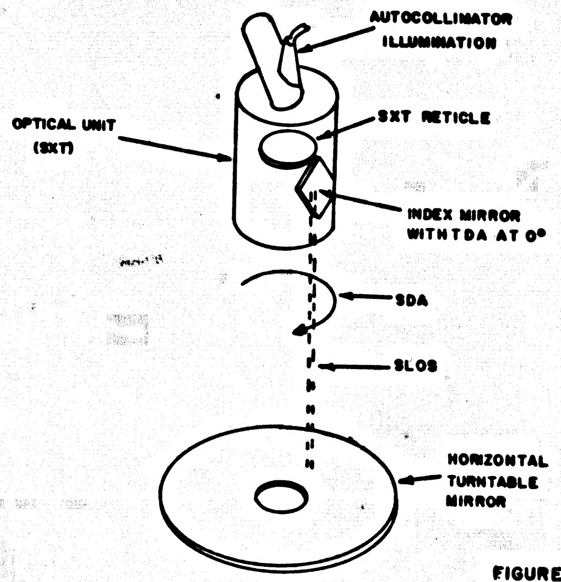

AUTOCOLLIMATOR ILLUMINATION
OPTICAL UNIT (SXT)
SXT RETICLE
INDEX MIRROR WITH TDA AT 0°
SDA
SLOS
HORIZONTAL TURNTABLE MIRROR

FIGURE 4

4.2.1.3.2 Orientation of SLOS to TDA. With the SXT TDA set to internally autocollimate the SLOS, the electrical angle corresponding to the coincidence of the "M" line and the reflection of the "M" line shall be recorded as the Self Collimation Angle. The position of the "R" line reflection shall be within 10 seconds of the "R" line at this position.

4.2.1.3.3 SCT. The SCT azimuth and elevation collimator shall be observed via the SCT eyepiece through an SCT TDA excursion as indicated in Figure 5. The lateral (normal to trunnion axis) displacement of the SCT reticle "R" line, between the ends of its excursion shall be estimated utilizing the collimator reticle pattern as a reference. The variation of "R" line thus measured, which results from a lack of perpendicularity between LOS and TDA and a lack of perpendicularity between TDA and SDA, shall not exceed 2 arc minutes.

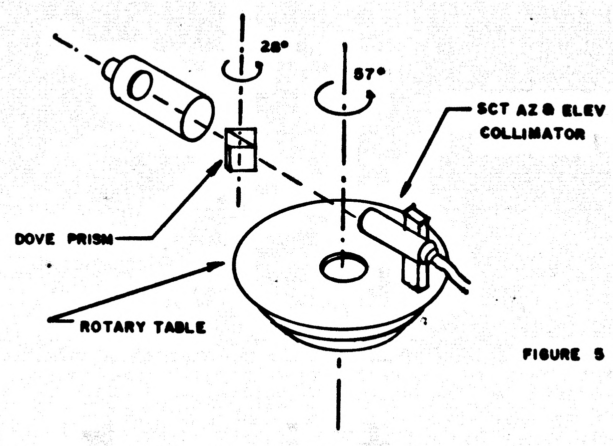


FIGURE 5

4.2.1.4 SXT TDA Accuracy

4.2.1.4.1 SXT TDA Zero Error. The SXT TDA Zero Error shall be measured by observing the SXT reticle simultaneously through the SLOS and LLOS by means of an autocollimator when the SXT TDA is set at electrical zero. The relative displacement between the two views of the reticle is the Zero Error and shall not exceed ± 3 sec.

4.2.1.4.2 SXT TDA Peak to Peak Error. The SXT TDA peak to peak error shall be based on the analysis of a series of positional measurements made with the optical unit as its index mirror is rotated about its vertically oriented trunnion axis, while the unit is in a horizontal position. The SXT shall be autocollimated via SLOS off a reference fixtures elevation mirror as shown in Figure 6. At each index mirror position, the SXT TDA 64X Resolver readout, converted to SXT Trunnion LOS angle, shall be compared to a reference rotary table position when coincidence between the SXT reticle and its reflection is achieved. The peak to peak error or maximum spread between the largest and smallest (algebraic) error measured shall be limited to 24 seconds.

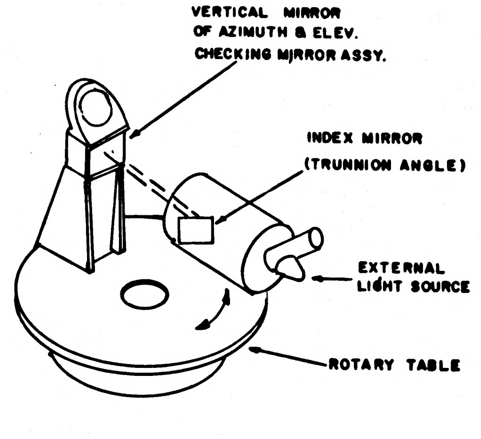


FIGURE 6

4.2.1.5 SXT SDA Accuracy. The SXT SDA accuracy shall be based on the statistical analysis of a series of positional measurements made with the SXT as it is rotated about its vertically positioned Shaft Axis. The SXT shall be autocollimated via the SLOS off the PTF 57° Azimuth Mirror as shown in Figure 7. At each position the SXT SDA 16X Resolver readout, converted to SXT Shaft Angle shall be compared to the PTF rotary table position when coincidence between the SXT reticle and its reflection is achieved. The maximum error at zero reference shall not exceed 10 arc seconds. The peak to peak error at any point shall not exceed 45 arc seconds[illegible], the standard deviation shall not exceed 10 arc seconds, and the maximum error at any point shall not exceed 30 arc seconds.

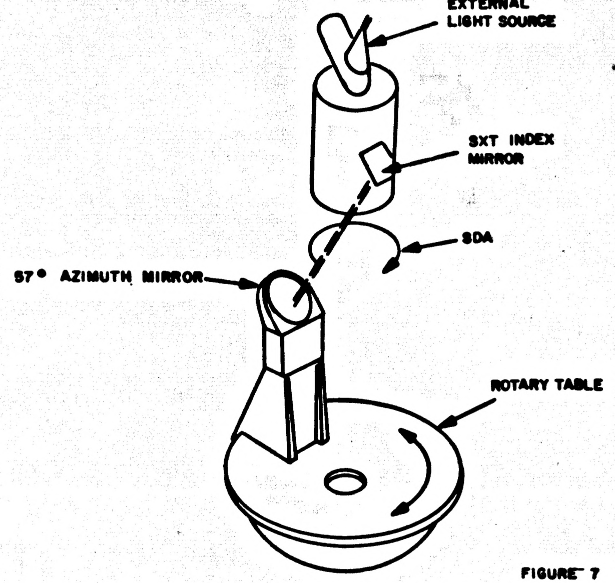


FIGURE 7

4.2.1.6 SCT TDA Electrical Accuracy. The SCT TDA electrical positional accuracy shall be based on the statistical analysis of a series of measurements made with the OUA mounted on the PTF. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) TDA's angular position via the 64X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 0° in azimuth and aligning the SCT's reticle "M" line to the PTF's azimuth and elevation collimator as shown in Figure 8 by positioning the SXT TDA. The maximum error at zero reference shall not exceed 2 minutes. The maximum allowable error at each point shall be 8 minutes.

4.2.1.7 SCT TDA Mechanical Accuracy. The SCT TDA mechanical positional accuracy shall be measured simultaneously and by a similar statistical technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to the angle readout the SCT TDA counter. The OUA shall be positioned at the SCT LOS to 0° in azimuth and then the SCT's reticle "M" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 8. The maximum allowable error at each point shall be 2 minutes.

4.2.1.8 SCT SDA Electrical Accuracy. The SCT SDA electrical accuracy shall be based on the statistical analysis of a series of measurements made with the OUA mounted on the PTF. The PTF rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) SDA's angular position via the 16X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 57° in elevation and then aligning the SCT's reticle "R" line to the PTF's azimuth and elevation collimator as shown in Figure 9 by positioning the SXT SDA. The maximum error at zero reference shall not exceed 1 minute.

The maximum allowable error at each point shall be 4 minutes.

4.2.1.9 . SCT SDA Mechanical Accuracy. The SCT SDA mechanical positional accuracy shall be measured simultaneously and by a similar statistical technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to the angle read off the SCT SDA counter. The OUA shall be positioned at the SCT LOS to 57° in elevation and then the SCT's reticle "R" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 9. The maximum allowable error at each point shall be 2 minutes.

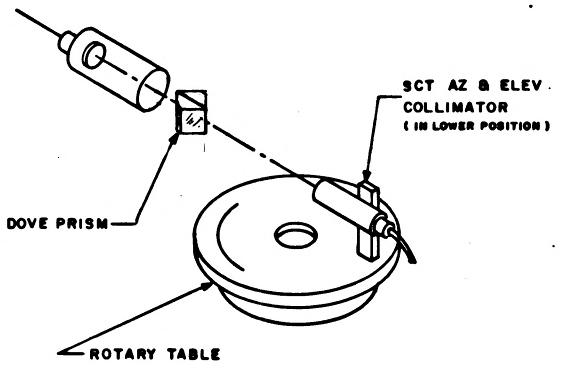


FIGURE 8

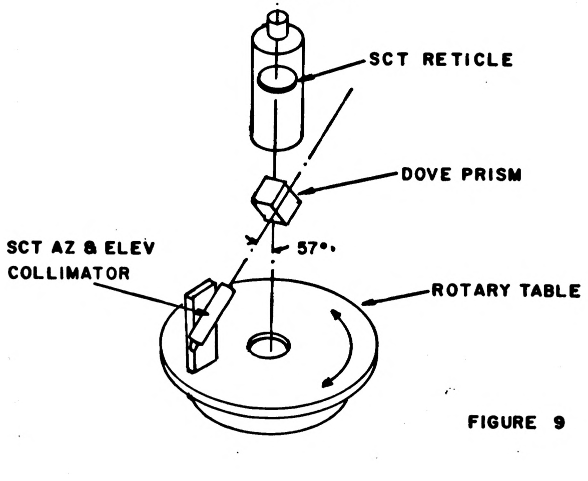


FIGURE 9

4.2.1.10 Resolving Power: The SXT LLOS shall be positioned such that the reticle "R" line and "M" line approximately bisects the negative black and white resolution target and the SXT eyepiece adjusted for optimum focus. The LLOS resolution for patterns which are parallel to the reticle "M" lines and patterns which are parallel to the reticle "R" lines when converted to arc seconds shall be 14.4 arc seconds or better, or 10.3 arc sec or better depending on whether the test equipment used has a low or high contrast target respectively.

The fore mentioned tests shall be repeated while positioning the SXT SLOS to bisect the resolution target. The SLOS resolution at the center of the field shall be 9.1 arc sec or better or 7.2 arc seconds or better, depending on whether the test equipment used has a low or high contrast target respectively. In addition, with a low contrast target the resolution at 1/3 field radius shall be 14.4 arc seconds or better and at 2/3 field radius shall be 28.7 arc seconds or better, while the corresponding values shall be 11.5 arc seconds for 1/3 field radius and 23.0 arc seconds for 2/3 field radius if a high contrast target is being used in the test equipment.

The SCT LOS shall be positioned such that the reticle "R" line and "M" line bisect the resolution target and the SCT eyepiece shall be adjusted for optimum focus. The LOS resolution at the center of the field shall be 146 arc seconds or better if the test equipment has a low contrast target and 64.6 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 15 or 35 gradicule bisects the resolution target. The LOS resolution, at approximately 1/3 field radius, shall be 230 arc seconds or better if the test equipment has a low contrast target and 91.5 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 5 or 45 gradicule bisects the resolution target. The LOS resolution, at approximately 2/3 field radius, shall be 328 arc seconds or better if the test equipment has a low contrast target and 184 arc seconds or better if it has a high contrast target.

4.2.1.11 Air/Vacuum Focusing. The focus adjustment of each eyepiece shall be measured by means of a dioptmeter. Each eyepiece shall be mounted in place with sufficient entrance light to illuminate the air and vacuum reticle to which the focus is set. The adjustable SXT Standard eyepiece shall have a focusing range of -2 to +2 diopters. All other eyepieces are fixed and shall be set at a -1 ± .25 diopter focus.

4.2.1.12 Luminous Transmittance. The luminous transmittance at the assembly lines of sight shall be tested using a CIE illuminant "C" as a light source and a light transmittance meter to monitor the light intensity. The light intensity at the source (I_o) shall be measured prior to testing the assembly.

The assembly shall be positioned such that the light emitted from the source enters the eyepiece and appears centralized in the optics when viewed via the objective lens. The light intensity at the objective lens (I_R) shall then be measured with the transmittance meter. The luminous transmittance shall be determined as follows:

Intensity Ratio ($I_R : I_o$) X 100 = % Transmittance. The luminous transmittance of the SXT LLOS to CIE illuminate "C" shall not be less than 4%.

The luminous transmittance of the SCT to CIE illuminate "C" shall not be less than 30%.

The luminous transmittance of the SXT SLOS shall be tested as specified above while monitoring the light intensity at the SXT Indexing Mirror. The luminous transmittance of the SXT SLOS to CIE illuminate "C" shall not be less than 25%.

If the assembly configuration includes an eyepiece polaroid filter then the following test shall be performed:

The ratio of the luminous transmittance of the SXT SLOS and SXT LLOS shall be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

4.2.1.13 Freedom of Motion. Unscrew and pop out the SCT Shaft Manual Input Adapter and rotate control. SCT Shaft shall move freely. Unscrew and pop out the SCT Trunnion Manual Input Adapter and rotate control. SCT Trunnion shall move freely.

4.2.1.14 SXT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC, 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SXT Shaft or trunnion starts to rotate. The input voltage shall not exceed 5.3 VAC. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage, for an increasing angular rotation of the shaft (SDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the shaft. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a positive direction and in a negative direction for decreasing angular rotation of the trunnion.

4.2.1.15 SCT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SCT shaft or trunnion starts to rotate. The input voltage shall not exceed 6.6 VAC when the shaft or trunnion is at the shade flip position, or 5.3 VAC at all other positions. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage for an increasing angular rotation of the shaft (SDA), shall cause the meter to deflect in a positive direction and the generator output for a decreasing angular rotation of the shaft shall cause the meter to deflect in a negative direction. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the trunnion.

4.2.1.16 Reticle Lighting. Reticle lamp operation shall be determined by means of their current drain and visual check. The current shall be measured by means of a milliammeter when 5.0 VAC is applied across each bank of 4 parallel lamps that illuminate the SXT and SCT reticles. The current drain shall be within 10% of the current measurements previously made while the lamp illumination could be observed and a visual check will be performed to show that the reticle appears illuminated when viewed via the eyepieces.

4.2.1.17 Dark Noise. With input power applied to the OUA, a 2 volt AGC signal applied to the Tracker High Voltage Power Supply, and the SCT head covered with a opaque black cloth; the tracker preamplifier output shall not exceed 1.0 volts rms when measured with a wide band meter.

4.2.1.18 Reference Voltage. The tuning fork reference voltages measured at the outputs of the X and Y Drive Amplifiers shall be greater than 6 volts peak-to-peak as measured with an oscilloscope.

4.2.1.19 Tracker Frequency. The fundamental component of the signal frequencies measured at the Tracker preamplifier output shall be 455 cps ± 1 cps and 356 ± 1 cps respectively as measured with a wave analyzer and frequency counter.

4.2.1.20 Error Signal Gradient. With a + 2.0 volt AGC signal applied to the OUA, a + 2.0 magnitude, simulated 6 second star shall be positioned, in the tracker field of view, to obtain a minimum output of both fundamental components of the tracker preamplifier output when utilizing a wave analyzer and an A.C. Voltmeter.

The star shall then be off set from null, to each position specified in Table III, along the Shaft axis coordinate and then along the Trunnion axis coordinate. The fundamental components of the tracker preamplifier output shall be as specified in Table III for each corresponding star displacement from null with a wave analyzer and an A.C. Voltmeter.

The error signal gradient shall then be tested wiht a +2.6 volt AGC signal applied to the OUA and utilizing a +1.0 magnitude, simulated 6 second star. The star shall be positioned to obtain a minimum output of both fundamental components of the tracker preamplifier output. The star shall then be displaced 1, 2, 3, 4, and 5 minutes from null along both shaft and trunnion coordinates. The fundamental components of the preamplifier output shall be as specified in Table III for each corresponding star displacement.

TABLE III

Star Displacement From Null	OUTPUT (mv rms)			
	+2.0 Mag. Star +2.0 Volts AGC		+1.0 Star Mag. +2.6 Volts AGC	
	356 cps Min	455 cps Min	356 cps Max	455 cps Max
20"	5.9	5.9	21.3	21.3
40"	16.8	16.8	37.6	37.6
1'	32.8	32.8	49.0	49.0
2'	73.0	73.0	109.7	109.7
3'	122.5	122.5	183.5	183.5
4'	131.2	131.2	194.0	194.0
5'	145.0	145.0	217.0	217.0
6'	155.8	155.8	233.4	233.4
9'	132.5	132.5	198.0	198.0
12'	91.4	91.4	136.9	136.9
15'	0	0	50.0	50.0

4.2.1.21 Star Presence. With a 0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply Star presence output shall be less than 5.0 volts as measured with a D.C. Voltmeter.

With a +2.0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply star presence output shall be greater than 14.0 volts as measured with a D.C. Voltmeter.

4.2.1.22 Tracker LOS to SXT Star LOS. With a simulated 0 magnitude star positioned in the tracker field of view and a +3.4 volt AGC signal applied to the assembly; the star shall be translated in both trunnion and cross-trunnion directions to obtain a minimum output of both fundamental components of the tracker preamplifier output and the star position established. The star, viewed along the SXT LOS, shall then be positioned to the center of the SXT reticle and the star position shall be established again. The difference between the two star positions shall not exceed 20 arc seconds in the trunnion direction and 3 arc minutes in the cross-trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the Tracker LOS.

4.2.1.23 Horizon Photometer Output. A simulated horizon having a 30 minute minimum diameter and initial intensity equivalent to 9.5×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600 Å shall be positioned on the photometer optical axis. The fundamental component of the photometer preamplifier output shall be between 125 and 250 millivolts. These tests shall be made using a wave analyzer and an A.C. Voltmeter.

The simulated horizon intensity shall then be decreased, from its initial value, to one-half its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at initial value horizon intensity, ± 5%.

The simulated horizon intensity shall then be decreased, from one-half its initial value, to one-fourth its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at one-half initial value horizon intensity, ± 5%.

4.2.1.24 Photometer Fork Frequency. The fundamental component of the signal frequency measured at the photometer preamplifier output shall be 550 cps ± 1 cps using a wave analyzer and a frequency counter.

4.2.1.25 Photometer LOS to SXT LLOS. A simulated star shall be positioned in the photometer field of view. The fundamental component of the photometer preamplifier output shall be monitored as the star is translated in the trunnion direction and the preamplifier output graphically plotted versus the position of the star. The center of the aperture in the trunnion direction, shall be determined by analysing this plot.

Similarly, the star shall then be positioned to the "known" center determined above, and the fundamental component of the preamplifier output monitored as the star is translated in the cross-trunnion direction. The preamplifier output, graphically plotted versus the position of the star, determines the center of the aperture, as above.

The star shall be positioned to the center of the aperture in both trunnion and cross-trunnion directions. The position of the star shall be measured. The star, viewed via the SXT LLOS, shall then be positioned on the SXT reticle center and the star position measured. The difference between the two star positions shall not exceed 3 arc minutes. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the photometer LOS.

4.2.1.26 Baseline Performance. See applicable portions of Section 4.

4.2.1.27 Environmental Tests. Not applicable.

4.2.1.28 Final Visual Mechanical Inspection. Not applicable.

4.2.1.29 Pressure Leak Rate. The Leak Detector shall be calibrated prior to testing. The external side of the OUA shall be evacuated and backfilled with a 10% Helium mixture of 5 psi. The leak rate shall be determined using the following formula. The leak rate shall not exceed 9.99×10^{-5} st'd cc/sec.

$$\begin{bmatrix}\text{Unit Leak Rate}\\ \text{St'd cc/sec-He}\end{bmatrix} = \frac{\begin{bmatrix}\text{Leak Detector}\\ \text{Reading}\end{bmatrix} \begin{bmatrix}\text{Calibration St'd}\\ \text{Leak Rate}\end{bmatrix} \left(\frac{\text{St'd cc He}}{\text{Sec}}\right)}{\begin{bmatrix}\text{Calibrated Leak}\\ \text{Detector reading}\end{bmatrix} \begin{bmatrix}\text{\% He in Mixture}\end{bmatrix}}$$

4.2.1.30 Functional Performance and Repeatability. Same as section 3.3.5.

4.2.2 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Apollo G&N Drawing 2011000. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulants, defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General. Preparation for delivery shall be in accordance with Specification ND 1002214, General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.

The assembly shall be installed in or removed from its shipping container (P/N 1019720) only under Class II or better clean room conditions in accordance with MIL-STD-209, Clean Room and Work Station Requirements Controlled, Environment.

6. NOTES.

6.1 The Precision Test Fixture (PTF) used to test the Optical Unit Assembly (OUA) shall be certified according to PS 2010606. Certification of the PTF is required before and after each final test. The certification shall be completed not more than 50 hours before or after the tests are performed. If the PTF does not recalibrate after a final test, the affected tests shall be rerun.

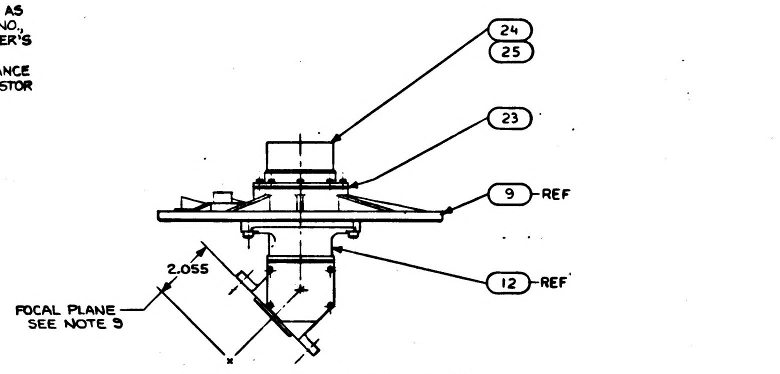
Notice: When APOLLO G&N drawings, specifications, or other data are used for any purpose other than in connection with a definitely related APOLLO G&N procurement operation, the National Aeronautics and Space Administration thereby incurs no responsibility nor any obligation whatsoever; and the fact that APOLLO G&N may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

B 2011000

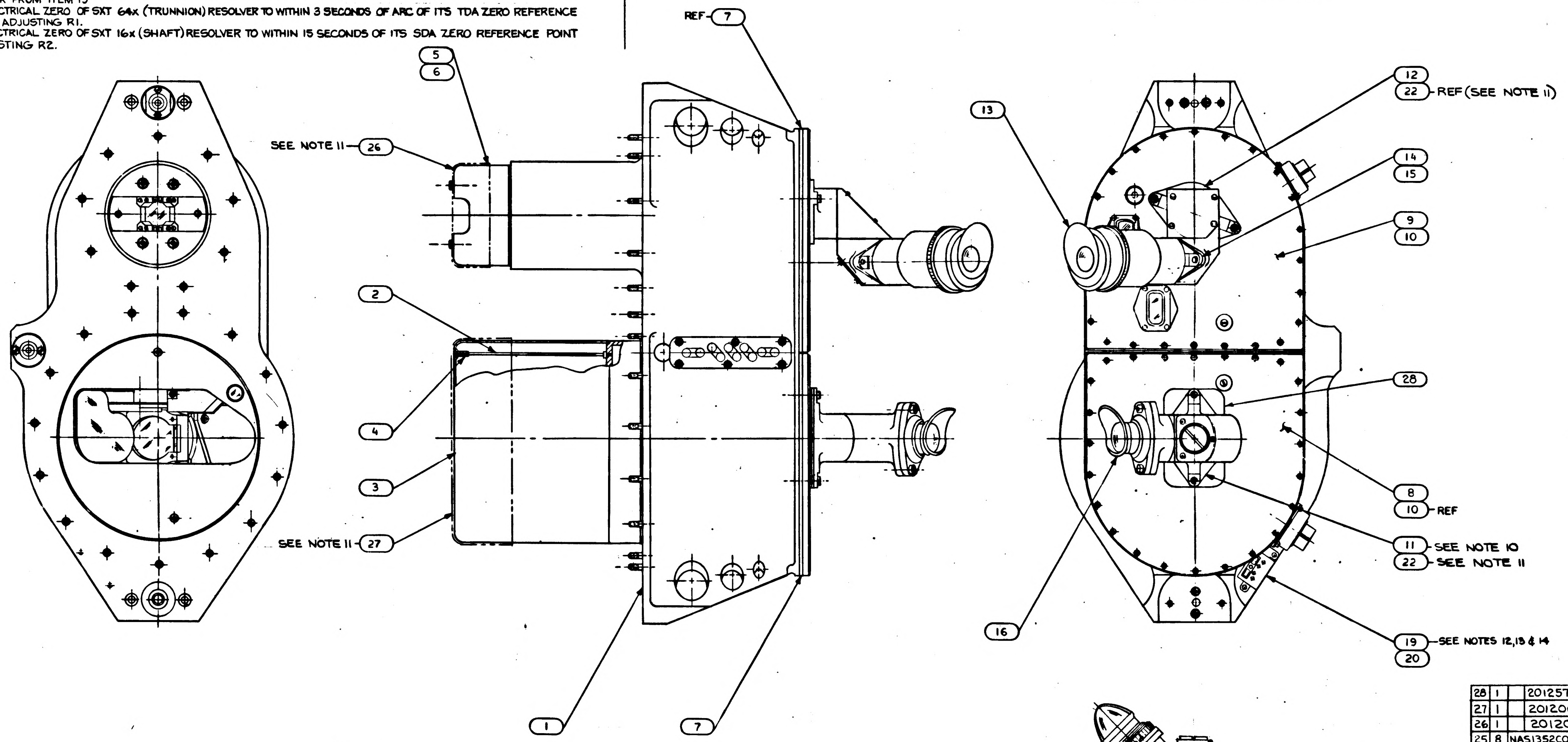
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390		
B		REVISED PER TDRR NO. 19197		

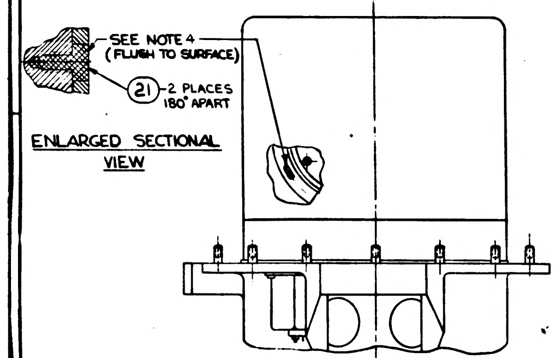
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ± 0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS 1, 7 & 8.
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING OF SPACER 2011665 WHICH IS ITEM 4 ON DWG 2011786 & SECURING THE LENS HOLDER ASSY, 2011794 OF THE SAME ASSY TIGHT AGAINST THIS SPACER. VIBRATION PROOF PART NO. 2011794 USING TWO (2) DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE "H".
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 15 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.

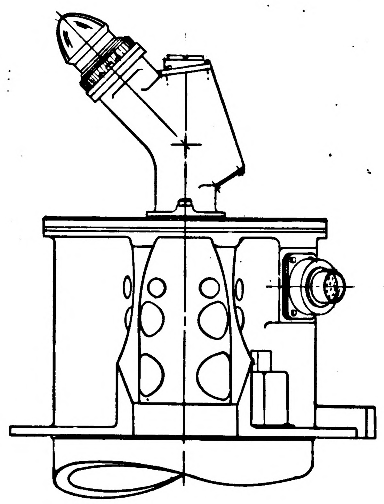


PARTIAL VIEW WITH ITEM 13 REMOVED





ENLARGED SECTIONAL VIEW



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
28	1		2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
27	1		2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
26	1		2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
25	8		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC.HD, SELF-LOCKING			
24	1		2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
23	AR		2011955-$^{1T}_{6}$	7938691$^{0601}_{THRU\ 0606}$		SPACER			
22	2		2012101	85386910940		PLATE, DUST COVER, ASSY OF			
21	AR	*	1011541	74471435001		ADHESIVE, EPOXY			
20	2	*	1011625-28	74455151028		SCREW, CAP HEX SOC HD SELF-LOCKING			
19	1		2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
18	1		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
17	1		2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
16	1		2011932	85386910830		SXT EYEPIECE ASSEMBLY			
15	2		NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
14	AR		2011887-$^{1T}_{7}$	5638691$^{0400}_{0406}$		SHIM, SPACER (SCT TURRET)			
13	1		2011960	85386910560		SCT EYEPIECE ASSEMBLY			
12	1		2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
11	1		2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
10	48		NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
9	1		2011784	85386910650		PANEL ASSEMBLY, SCT			
8	1		2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
7	2	*	1011745-4	74426015004		GASKET			
6	4		NAS 1190C04PAL	—		SCREW, SELF-LKG PAN HEAD FULL THD 2.50"			
5	1		2012138	85386911040		COUNTERWEIGHT & COVER ASSEMBLY			
4	2		2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
3	1		2011604	50386910010		COVER, SEXTANT HEAD			
2	2		2011603	53386910040		ROD, THREADED			
1	1		2011890	85386910690		OPTICAL UNIT SUBASSY STAGE II			

SEE NOTE 3 – 18
SEE NOTE 3 – 17

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED C. Langstaff 8-20-64
APPROVAL
APPROVAL E. Wong 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

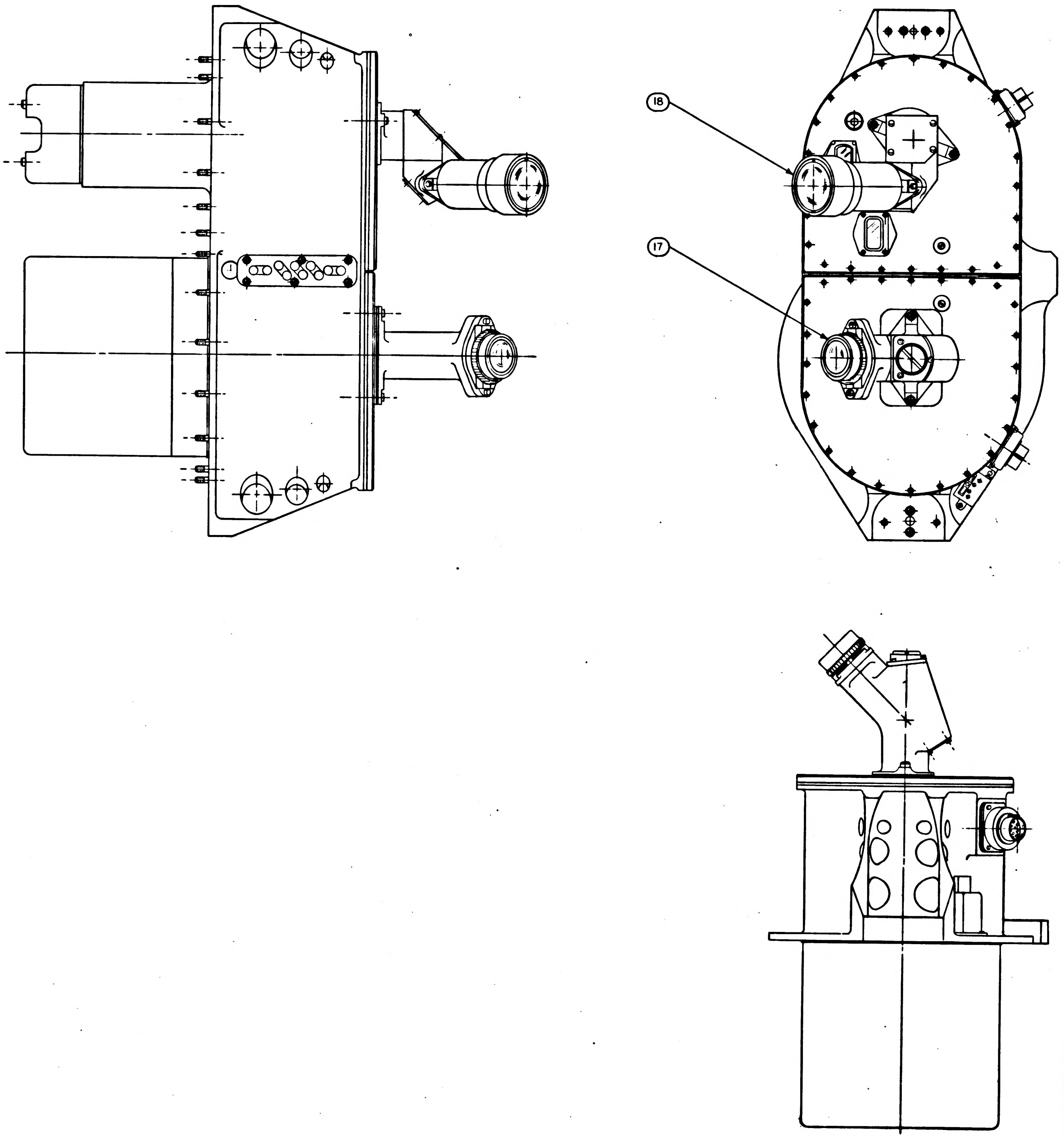
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT | CALC ACTUAL | SHEET 1 OF 2

NOTES:
SEE SHEET 1 OF 2

2011000 B

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17350		
B		REVISED PER TDRR NO.19197		



FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —, DECIMALS ± —, ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F Schiller DATE 7-22-64
CHECKED C Langstaff 8-25-64
APPROVAL 8/27/64
APPROVAL 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 2 OF 2

APOLLO G&N Specification
PS 2011000 Rev. B
Original Issue Date: 5-6-65
Release Authority: TDRR 19005
Class A **Release**

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

OPTICAL UNIT ASSEMBLY

DRAWING NO. 2011000

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
7/8/65	A	20669	Spec. Completely Revised	W.K.	J.B.
7/28/65	B	21293	Page 32	W.K.	T.M.

This specification consists of page 1 to 33 inclusive.

APPROVALS	F.S.M 5-[illegible]-65	A.C. 5/6 N.K. 5/6	A.K. 5-6	P.B 5-6	[illegible]	
	NASA/MSC	**MIT/IL**			**KIC**	

4.2.1.25 Photometer LOS to SXT LLOS. A simulated star shall be positioned in the photometer field of view. The fundamental component of the photometer preamplifier output shall be monitored as the star is translated in the trunnion direction and the preamplifier output graphically plotted versus the position of the star. The center of the aperture in the trunnion direction, shall be determined by analyzing this plot.

Similarly, the star shall then be positioned to the "known" center determined above, and the fundamental component of the preamplifier output monitored as the star is translated in the cross-trunnion direction. The preamplifier output, graphically plotted versus the position of the star, determines the center of the aperture, as above.

The star shall be positioned to the center of the aperture in both trunnion and cross-trunnion directions. The position of the star shall be measured. The star, viewed via the SXT LLOS, shall then be positioned on the SXT reticle center and the star position measured. The difference between the two star positions shall not exceed 3 arc minutes. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the photometer LOS.

4.2.1.26 Baseline Performance. See applicable portions of Section 4.

4.2.1.27 Environmental Tests. Not applicable.

4.2.1.28 Final Visual Mechanical Inspection. Not applicable.

4.2.1.29 Pressure Leak Rate. The Leak Detector shall be calibrated prior to testing. The external side of the OUA shall be evacuated and backfilled with a 10% Helium mixture of 5 psi. The leak rate shall be determined using the following formula. The leak rate shall not exceed 9.99×10^{-5} st'd cc/sec.

$$\left[\begin{matrix}\text{Unit Leak Rate}\\ \text{St'd cc/sec-He}\end{matrix}\right] = \frac{\left[\begin{matrix}\text{Leak Detector}\\ \text{Reading}\end{matrix}\right] \left[\begin{matrix}\text{Calibration St'd}\\ \text{Leak Rate}\end{matrix} \left(\frac{\text{St'd cc He}}{\text{Sec}}\right)\right]}{\left[\begin{matrix}\text{Calibrated Leak}\\ \text{Detector reading}\end{matrix}\right] \left[\frac{\text{\% He in Mixture}}{100}\right]}$$

4.2.1.30 Functional Performance and Repeatability. Same as section 3.3.5.

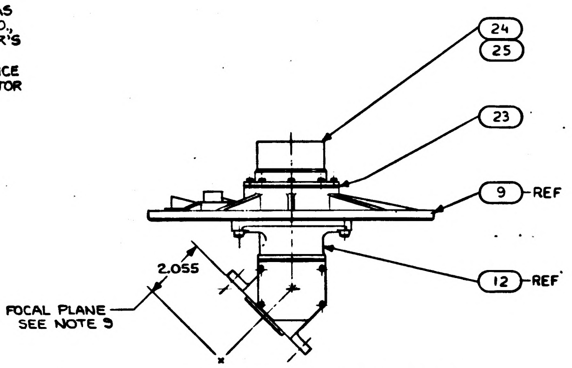
2011000 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390	[illegible]	wk
B		REVISED PER TDRR NO. 19197	[illegible]	wk
C		REVISED PER TDRR NO. 19851	[illegible]	wk

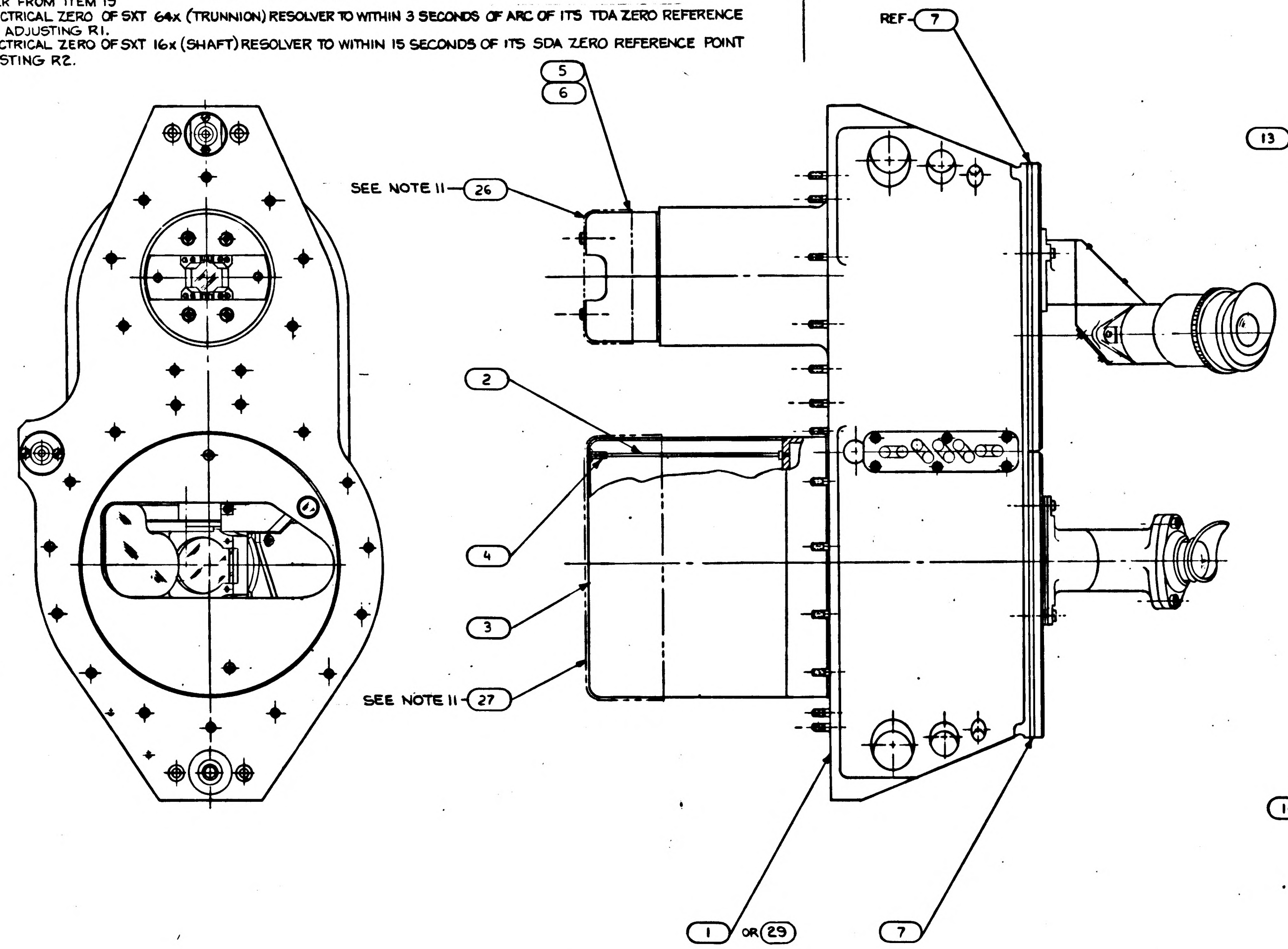
REVISIONS 12217

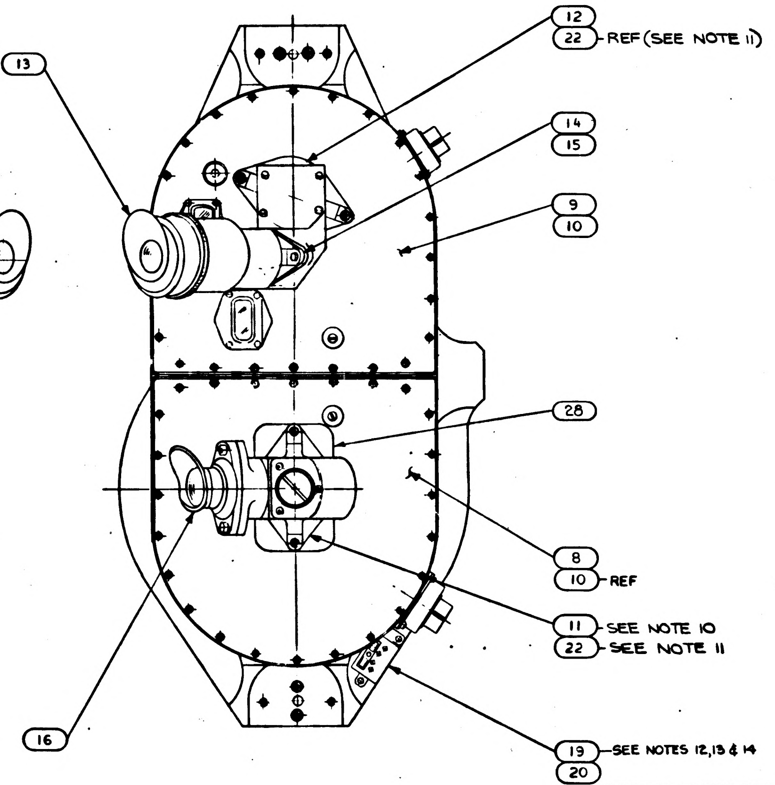
NOTES:

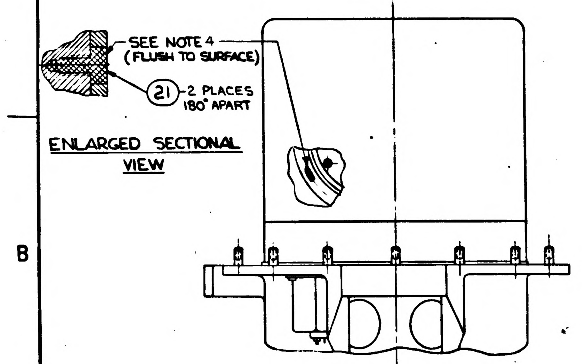
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ± 0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1, 7 & 8) OR (29, 7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING OF SPACER 2011665 WHICH IS ITEM 4 ON DWG 2011786 & SECURING THE LENS HOLDER ASSY, 2011794 OF THE SAME ASSY TIGHT AGAINST THIS SPACER. VIBRATION PROOF PART NO. 2011794 USING TWO (2) DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE "H".
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 15 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.



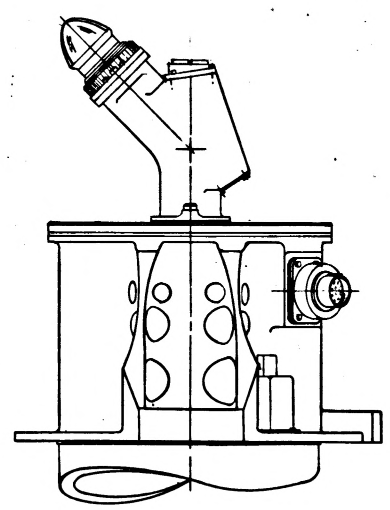
PARTIAL VIEW WITH ITEM 13 REMOVED







ENLARGED SECTIONAL VIEW



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

	QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	1	0	29			2011890-011			OPTICAL UNIT SUBASSY STAGE II			
	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
	1	1	27			2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
	1	1	26			2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
	AR	AR	23			2011955-1/6 T	7938691 0601/0606		SPACER			
	2	2	22			2012101	85386910940		PLATE, DUST COVER, ASSY OF			
	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
	2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD SELF-LOCKING			
	1	1	19			2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
SEE NOTE 3	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
SEE NOTE 3	1	1	17			2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
	2	2	15			NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
	AR	AR	14			2011887-1/7 T	5638691 0400/0406		SHIM, SPACER (SCT TURRET)			
	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
	2	2	7		*	1011745-4	74426015004		GASKET			
	4	4	6			NAS 1190C04P4L	—		SCREW, SELF-LKG PAN HEAD FULL TH'D 250°			
	1	1	5			2012138	85386911040		COUNTERWEIGHT & COVER ASSEMBLY			
	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
	2	2	2			2011603	53386910040		ROD, THREADED			
	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

LIST OF PARTS AND MATERIALS

NEXT ASSY — USED ON —
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulte DATE 7-22-64
CHECKED C. [illegible] 8-[illegible]64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

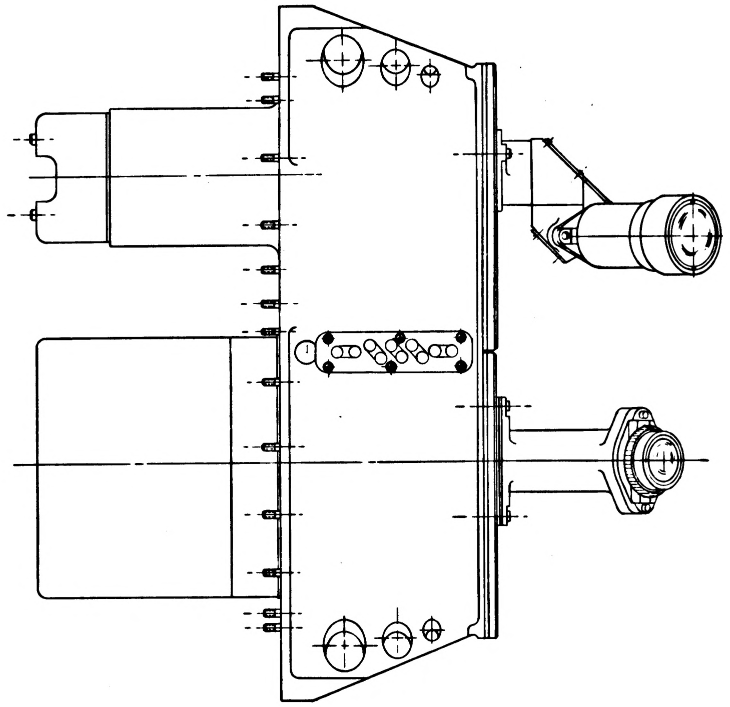
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

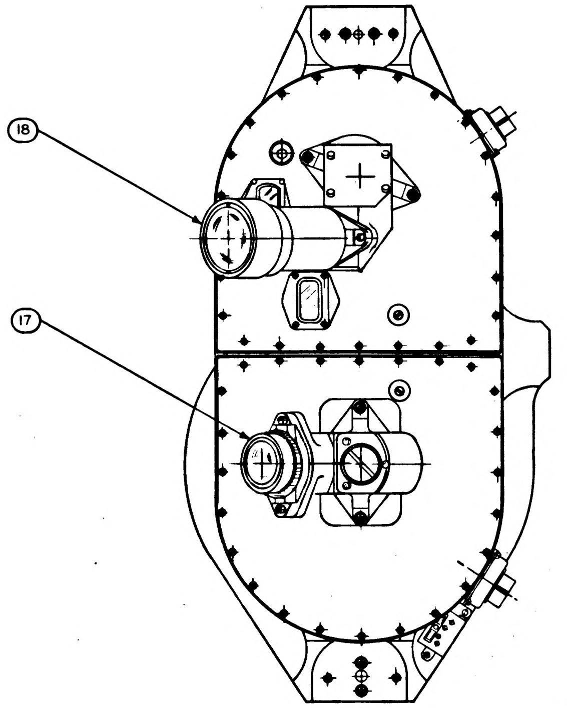
2011000 C

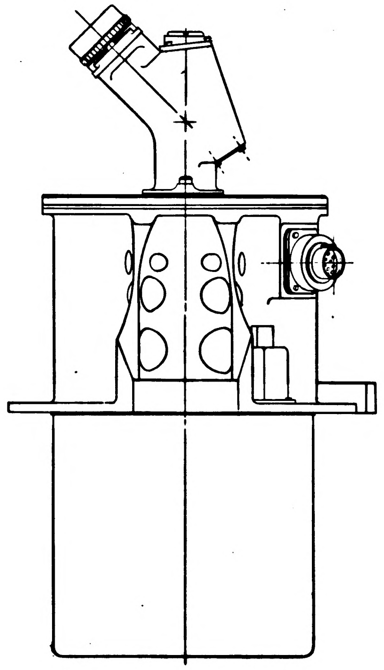
NOTES:
SEE SHEET 1 OF 2

2011000 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO.19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]







FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schuller DATE 7-22-64
CHECKED C. Tangstaff 8-25-64
APPROVAL E. Cardmun 8/27/64
APPROVAL E. Thorup 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 C

APOLLO G&N Specification
PS 2011000 Rev. C
Original Issue Date: 5-6-65
Release Authority: TDRR 19005
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

OPTICAL UNIT ASSEMBLY

DRAWING NO. 2011000

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
7/8/65	A	20669	Spec. Completely Revised	W.K.	J.B.
7/28/65	B	21293	Page 32	W.K.	T.M.
8/9/65	C	21390	7, 8, 11, 12, 14, 22, 23, 24, 27, 29, 31, 32	W. K.	T.M.

This specification consists of page 1 to 33 inclusive.

APPROVALS	F.S.M 5-12-65	H.S 5/6 W.K 5/6	A.K 5-6	P.B 5-6	S.M.	
	NASA/MSC	**MIT/IL**			**KIC**	

3.2.6 Resolving Power. The resolving power for all lines of sight of the SXT and SCT shall be determined with the eyepiece adjusted for optimum focus at the center of the respective fields using black and white targets as defined by MIL-STD-150A, Photographic Lenses.

The resolving power will be tested using either high contrast or low contrast targets depending upon whether the test equipment configuration includes high or low contrast target. The resolving power for high or low contrast targets shall be as follows or better:

	Resolving Power in arc seconds					
Approximate Position in Field	SXT				SCT	
	LLOS		SLOS		LOS	
Target Contrast	Low	High	Low	High	Low	High
Center	14.4	10.3	9.1	7.2	146	64.6
1/3 Field Radius	*	*	14.4	11.5	230	91.5
2/3 Field Radius	*	*	28.7	23.0	328	184

*If the SXT SLOS resolution at the three field positions and the SXT LLOS resolution at field center are within the tolerance specified, it shall be assumed that the SXT LLOS resolution, at the field radii specified, is also within tolerance.

3.2.7 Air/Vacuum Focusing. The focus of each standard eyepiece upon the reticle plane shall be within the tolerances specified in the following chart for standard eyepieces. If the assembly configuration includes long eye-relief eyepieces then their focus shall be within the tolerances specified in the following chart for LER eyepieces.

Eyepiece	Air Reticle	Vacuum Reticle
SXT Standard	Adjustable between -2 and +2 Diopters	Adjustable between -2 and +2 Diopters
SXT LER	-1 ± .25 Diopters	-1 ± .25 Diopters
SCT Standard	-1 ± .25 Diopters	----------------
SCT LER	-1 ± .25 Diopters	------------------

3.2.8 Luminous Transmittance. The luminous transmittance of the SXT SLOS to CIE illuminant "C" (6500°K) shall not be less than 25%.

The luminous transmittance of the SXT LLOS to CIE illuminant "C" shall not be less than 4%.

The luminous transmittance of the scanning telescope to CIE "C" shall not be less than 30%.

If the assembly configuration includes an eyepiece polaroid filter then the following shall be a requirement. The ratio of the luminous transmittance of the SXT SLOS to SXT LLOS shall not be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

3.2.9 Freedom of Motion. The SDA and TDA of the SCT shall move freely when rotated manually.

3.2.10 Static Friction. Breakaway friction shall be less than .04 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases. Except that at 0° and 180° the breakaway friction shall be less than .052 inch-ounces on the SCT.

3.2.11 Dynamic Friction Level. Dynamic friction shall be less than .03 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases.

3.2.12 Reticle Lighting. The SXT and SCT reticle lamps shall draw a current that is within 10% of measurements made while the lamp illumination was observable. In addition the respective reticles shall appear illuminated when viewed via the eyepiece.

3.2.13 Dark Noise. With no light incident on the photomultiplier tube and an AGC voltage of 2.0 volts applied to the OUA, the preamplifier wide band output shall not be greater than 1.0 volts rms.

3.2.20 Photometer Frequency. The frequency measured at the preamplifier output shall be 550 ± 1 cps.

3.2.21 SXT LLOS to Photometer LOS Alignment and Accuracy. The SXT Landmark Line of Sight and Photometer Line of Sight shall be parallel to within 3 arc minutes in the trunnion axis and within 3 arc minutes in the cross trunnion axis. The error between the two lines of sights shall be known to within 10 arc seconds.

3.3 Product Performance and Repeatability. The Assembly shall meet the Functional Requirements of Section 3.2 and furthermore shall withstand specified environmental stresses without degradation of performance characteristics. This performance characteristic repeatability shall be demonstrated by subjecting the OUA to the following test procedures.

NOTE: The following sequence of test procedures is mandatory except that (a) the sequence of Vibration and Thermal Vacuum tests may be interchanged, and (b) the sequence of the Pressure Leak Rate and the Functional Performance tests may be interchanged.

1. Baseline Performance Tests
2. Environmental Tests
   a) Mechanical Integrity
   b) Thermal Vacuum
3. Final Visual and Mechanical Inspection
4. Pressure Leak Rate Test
5. Functional Performance Tests

3.3.1 Baseline Performance Tests. These tests, as a minimum, shall demonstrate the following Functional Performance Requirements from Section 3.2.

3.2.1	SDA Orientation
3.2.2	Orientation of the TDA Measuring Plane to the Shaft Axis
3.2.4	Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)
3.2.18	SXT Star LOS to Tracker LOS Alignment and Accuracy
3.2.21	SXT LLOS to Photometer LOS Alignment and Accuracy

3.3.2 Environmental Tests.

3.3.2.1 Mechanical Integrity. The Assembly shall be vibrated according to these requirements.

Random vibration with the indicated characteristics shall be applied along each of three mutually perpendicular axes for a period of one minute per axis.

Linear increase from $.0054g^2$/cps at 20 cps to $.02g^2$/cps at 70 cps and constant to 1000 cps; then linear decrease to $0.004g^2$/cps at 2000 cps with a -3db limit.

3.3.2.2 Thermal-Vacuum Test. The Assembly shall be subjected to simulated flight conditions in a Space Simulator chamber.

The command module conditions shall include the following:

Pressure -5 psi of air or greater

Temperature - greater than 0°F
less than 160°F

The space side conditions shall include the following two conditions:

(1) Simultaneous cold wall and vacuum.
(2) Simultaneous cold wall, vacuum and sun. Cold wall, vacuum and sun are defined as follows:

Cold Wall (temperature of wall) $- 320^{\circ}F \; {}^{+ 10^{\circ}F}_{- 0^{\circ}F}$

TABLE II

Test	Performance Requirements	Maximum allowable difference between Baseline and Final Test
SDA Orientation (3.2.1)		
SXT SDA	10 arc sec.	6 arc sec.
SCT SDA	40 arc sec.	10 arc sec.
Orientation TDA Meas. Plane to SDA (3.2.2)		
SXT	20 arc sec.	6 arc sec.
SCT (not applicable)		
Parrallelism of Optical Axis to SDA Axis (Reticle Eccentricity (3.2.4)		
SXT reticle	10 arc sec.	4 arc sec.
SCT reticle	50 arc sec.	25 arc sec.
SXT SLOS to Tracker LOS Alignment and Accuracy (3.2.18) Error Angle	20 arc sec. (trunnion)	10 arc sec.
	3 arc min. (cross trunnion)	10 arc sec.
SXT LLOS to Photometer LOS Alignment and Accuracy (3.2.21) Error Angle	3 arc min (trunnion)	10 arc sec.
	3 arc min (cross trunnion)	10 arc sec.

NOTE: The allowable difference between baseline and final test does not represent changes in the Assembly characteristics, but rather allowable errors in measurement accuracy and stability.

4.2.1.5 SXT SDA Accuracy. The SXT SDA accuracy shall be based on the analysis of a series of positional measurements made with the SXT as it is rotated about its vertically positioned Shaft Axis. The SXT shall be autocollimated via the SLOS off the PTF 57° Azimuth Mirror as shown in Figure 7. At each position the SXT SDA 16X Resolver readout, converted to SXT Shaft Angle shall be compared to the PTF rotary table position when coincidence between the SXT reticle and its reflection is achieved. The maximum error at zero reference shall not exceed 10 arc seconds. The peak to peak error at any point shall not exceed 44 arc seconds.

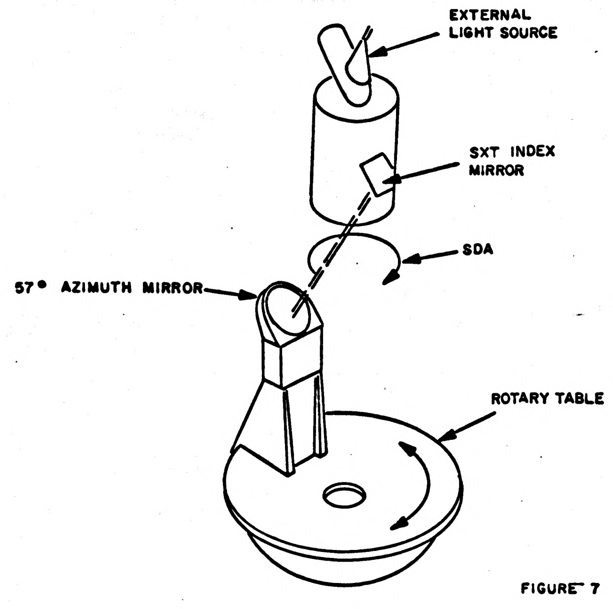

EXTERNAL LIGHT SOURCE
SXT INDEX MIRROR
SDA
57° AZIMUTH MIRROR
ROTARY TABLE

FIGURE 7

4.2.1.6 SCT TDA Electrical Accuracy. The SCT TDA electrical positional accuracy shall be based on the analysis of a series of measurements made with the OUA mounted on the PTF. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) TDA's angular position via the 64X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 0° in azimuth and aligning the SCT's reticle "M" line to the PTF's azimuth and elevation collimator as shown in Figure 8 by positioning the SXT TDA. The maximum error at zero reference shall not exceed 2 minutes. The maximum allowable error at each point shall be 8 minutes.

4.2.1.7 SCT TDA Mechanical Accuracy. The SCT TDA mechanical positional accuracy shall be measured simultaneously and by a similar technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to the angle readout the SCT TDA counter. The OUA shall be positioned at the SCT LOS to 0° in azimuth and then the SCT's reticle "M" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 8. The maximum allowable error at each point shall be 2 minutes.

4.2.1.8 SCT SDA Electrical Accuracy. The SCT SDA electrical accuracy shall be based on the analysis of a series of measurements made with the OUA mounted on the PTF. The PTF rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) SDA's angular position via the 16X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 57° in elevation and then aligning the SCT's reticle "R" line to the PTF's azimuth and elevation collimator as shown in Figure 9 by positioning the SXT SDA. The maximum error at zero reference shall not exceed 1 minute.

The maximum allowable error at each point shall be 4 minutes.

4.2.1.9 SCT SDA Mechanical Accuracy. The SCT SDA mechanical positional accuracy shall be measured simultaneously and by a similar technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to the angle read off the SCT SDA counter. The OUA shall be positioned at the SCT LOS to 57° in elevation and then the SCT's reticle "R" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 9. The maximum allowable error at each point shall be 2 minutes.

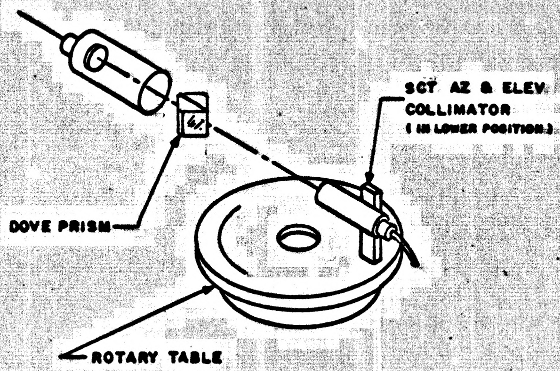


FIGURE 8

4.2.1.12 Luminous Transmittance. The luminous transmittance at the assembly lines of sight shall be tested using a CIE illuminant "C" as a light source and a light transmittance meter to monitor the light intensity. The light intensity at the source (Io) shall be measured prior to testing the assembly.

The assembly shall be positioned such that the light emitted from the source enters the eyepiece and appears centralized in the optics when viewed via the objective lens. The light intensity at the objective lens (I_R) shall then be measured with the transmittance meter. The luminous transmittance shall be determined as follows:

Intensity Ratio ($I_R : I_o$) X 100 = % Transmittance. The luminous transmittance of the SXT LLOS to CIE illuminate "C" shall not be less than 4%.

The luminous transmittance of the SCT to CIE illuminate "C" shall not be less than 30%.

The luminous transmittance of the SXT SLOS shall be tested as specified above while monitoring the light intensity at the SXT Indexing Mirror. The luminous transmittance of the SXT SLOS to CIE illuminate "C" shall not be less than 25%.

If the assembly configuration includes an eyepiece polaroid filter then the following test shall be performed:

The ratio of the luminous transmittance of the SXT SLOS and SXT LLOS shall not be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

With the use of a phase sensitive voltmeter, the generator output voltage for an increasing angular rotation of the shaft (SDA), shall cause the meter to deflect in a positive direction and the generator output for a decreasing angular rotation of the shaft shall cause the meter to deflect in a negative direction. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the trunnion.

4.2.1.16 Reticle Lighting. Reticle lamp operation shall be determined by means of their current drain and visual check. The current shall be measured by means of a milliammeter when 5.0 VAC is applied across each bank of 4 parallel lamps that illuminate the SXT and SCT reticles. The current drain shall be within 10% of the current measurements previously made while the lamp illumination could be observed and a visual check will be performed to show that the reticle appears illuminated when viewed via the eyepieces.

4.2.1.17 Dark Noise. With input power applied to the OUA, a 2 volt AGC signal applied to the Tracker High Voltage Power Supply, and the SCT head covered with a opaque black cloth; the tracker preamplifier output shall not exceed 1.0 volts rms when measured with a wide band meter.

4.2.1.18 Reference Voltage. The tuning fork reference voltages measured at the outputs of the X and Y Drive Amplifiers shall be greater than 6 volts peak-to-peak as measured with an oscilloscope.

4.2.1.19 Tracker Frequency. The signal frequencies measured at the Tracker fork reference outputs shall be 455 ± 1 cps and 356 ± 1 cps as measured with a frequency counter.

4.2.1.20 Error Signal Gradient. With a + 2.0 volt AGC signal applied to the OUA, a + 2.0 magnitude, simulated 6 second star shall be positioned, in the tracker field of view, to obtain a minimum output of both fundamental components of the tracker preamplifier output when utilizing a wave analyzer and an A.C. Voltmeter.

4.2.1.21 Star Presence. With a 0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply Star presence output shall be less than 5.0 volts as measured with a D.C. Voltmeter.

With a + 2.0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply star presence output shall be greater than 14.0 volts as measured with a D.C. Voltmeter.

4.2.1.22 Tracker LOS to SXT Star LOS. With a simulated -4 magnitude star positioned in the tracker field of view and a + 4.8 volt AGC signal applied to the assembly; the star shall be translated in both trunnion and cross-trunnion directions to obtain a minimum output of both fundamental components of the tracker preamplifier output and the approximate star position established. The exact star position shall then be established by graphical extrapolation of X and Y error signal gradients. The star, viewed along the SXT LOS, shall then be positioned to the center of the SXT reticle and the star position shall be established again. The difference between the two star positions shall not exceed 20 arc seconds in the trunnion direction and 3 arc minutes in the cross-trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the Tracker LOS.

4.2.1.23 Horizon Photometer Output. A simulated horizon having a 30 minute minimum diameter and initial intensity equivalent to 9.5×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600 Å shall be positioned on the photometer optical axis. The fundamental component of the photometer preamplifier output shall be between 125 and 250 millivolts. These tests shall be made using a wave analyzer and an A.C. Voltmeter.

The simulated horizon intensity shall then be decreased, from its initial value, to one-half its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at initial value horizon intensity, ± 5%.

The simulated horizon intensity shall then be decreased, from one-half its initial value, to one-fourth its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at one-half initial value horizon intensity, ± 5%.

4.2.1.24 Photometer Fork Frequency. The fundamental component of the signal frequency measured at the photometer preamplifier output shall be 550 cps ± 1 cps using a wave analyzer and a frequency counter.

4.2.1.25 Photometer LOS to SXT LLOS. A simulated star shall be positioned in the photometer field of view. The fundamental component of the photometer preamplifier output shall be monitored as the star is translated in the trunnion direction and the preamplifier output graphically plotted versus the position of the star. The center of the aperture in the trunnion direction, shall be determined by analyzing this plot.

Similarly, the star shall then be positioned to the "known" center determined above, and the fundamental component of the preamplifier output monitored as the star is translated in the cross-trunnion direction. The preamplifier output, graphically plotted versus the position of the star, determines the center of the aperture, as above.

The star shall be positioned to the center of the aperture in both trunnion and cross-trunnion directions. The position of the star shall be measured. The star, viewed via the SXT LLOS, shall then be positioned on the SXT reticle center and the star position measured. The difference between the two star positions shall not exceed 3 arc minutes in the trunnion direction and 3 arc minutes in the cross trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the photometer LOS.

4.2.1.26 Baseline Performance. See applicable portions of Section 4.

4.2.1.27 Environmental Tests. Not applicable.

4.2.1.28 Final Visual Mechanical Inspection. Not applicable.

4.2.1.29 Pressure Leak Rate. The Leak Detector shall be calibrated prior to testing. The external side of the OUA shall be evacuated and backfilled with a 10% Helium mixture of 5 psi. The leak rate shall be determined using the following formula. The leak rate shall not exceed 9.99×10^{-5} st'd cc/sec.

$$\begin{bmatrix}\text{Unit Leak Rate}\\ \text{St'd cc/sec-He}\end{bmatrix} = \frac{\begin{bmatrix}\text{Leak Detector}\\ \text{Reading}\end{bmatrix} \begin{bmatrix}\text{Calibration St'd}\\ \text{Leak Rate}\end{bmatrix.\left(\frac{\text{St'd cc He}}{\text{Sec}}\right)\Bigg]}{\begin{bmatrix}\text{Calibrated Leak}\\ \text{Detector reading}\end{bmatrix} \left[\frac{\text{\% He in Mixture}}{100}\right]}$$

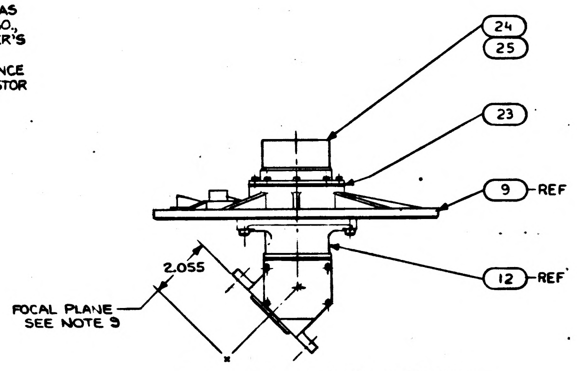
4.2.1.30 Functional Performance and Repeatability. Same as section 3.3.5.

2011000 D

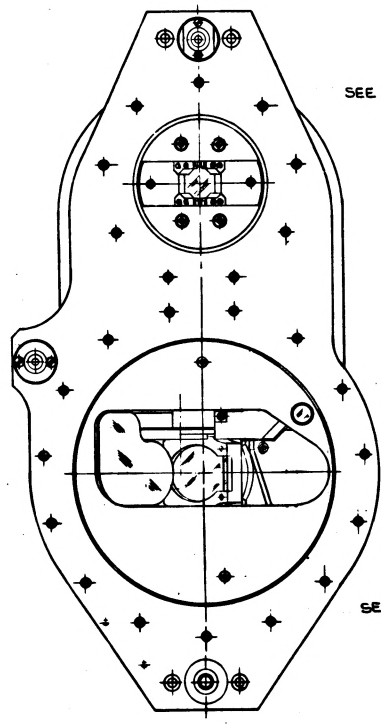
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390		
B		REVISED PER TDRR NO.19197		
C		REVISED PER TDRR NO.19851		
D		REVISED PER TDRR NO.20186		

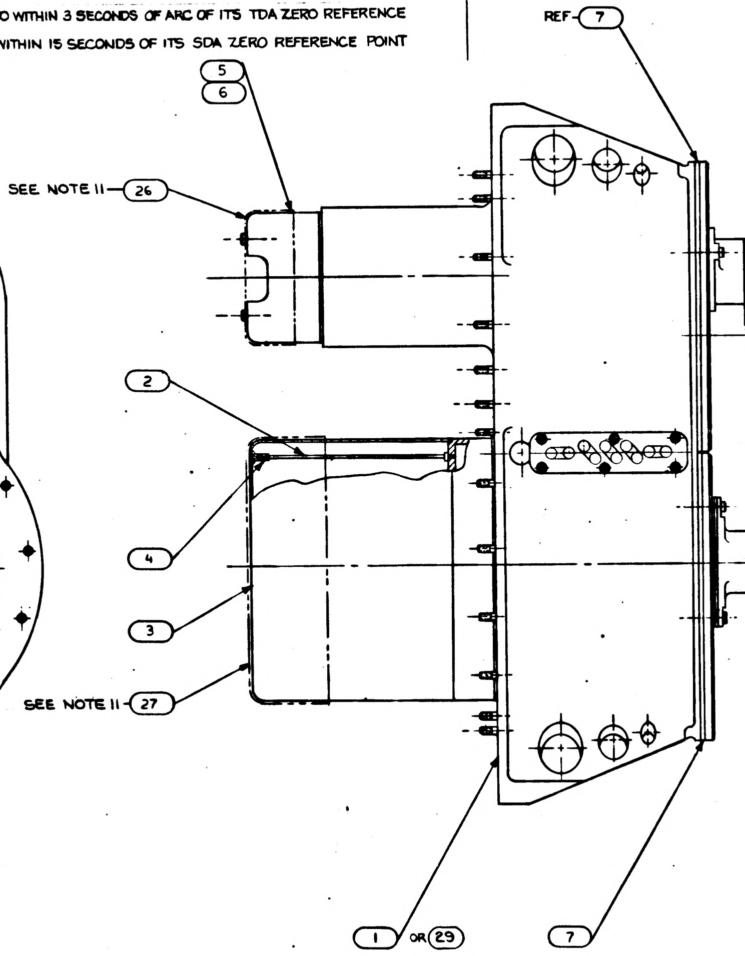
NOTES:

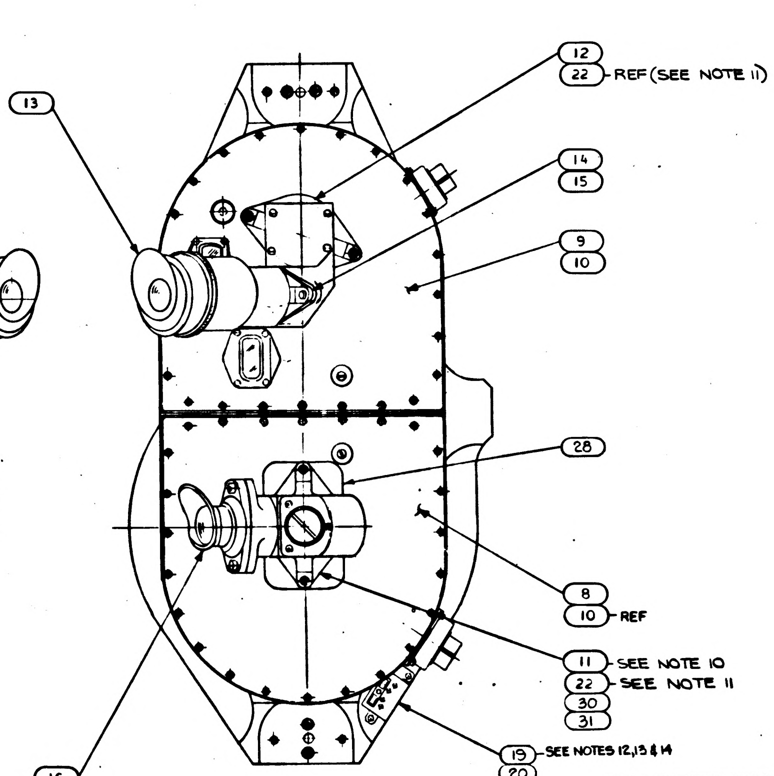
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ±0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1, 7 & 8) OR (29, 7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE.) AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200).
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 15 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.

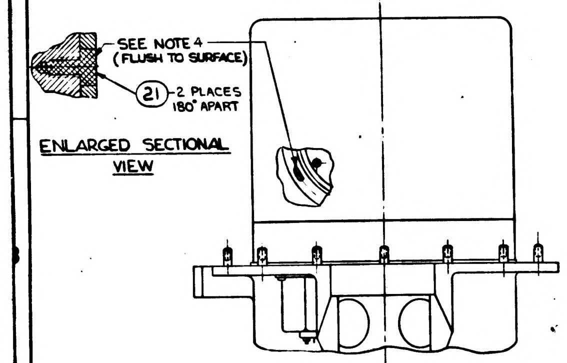


PARTIAL VIEW WITH ITEM 13 REMOVED

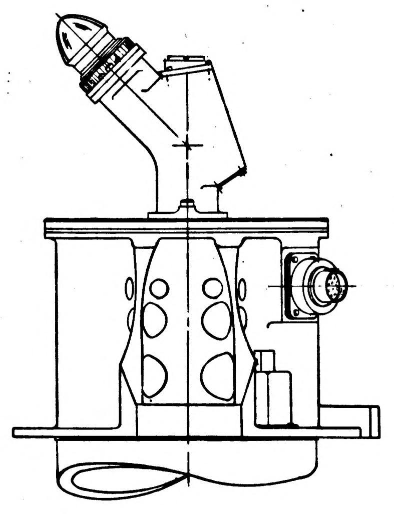








ENLARGED SECTIONAL VIEW



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	30			2012608	45386910120		SHIM, FOCUSING			
1	0	29			2011890-011			OPTICAL UNIT SUBASSY STAGE II			
1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
1	1	27			2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
1	1	26			2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC.HD, SELF-LOCKING			
1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	23			2011955-$^{1}_{6}$T	7938691$^{0601}_{THRU\ 0606}$		SPACER			
2	2	22			2012101	85386910940		PLATE, DUST COVER, ASSY OF			
AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD SELF-LOCKING			
1	1	19			2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
1	1	17			2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	15			NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	14			2011887-$^{1}_{7}$T	5638691$^{0400}_{0406}$		SHIM, SPACER (SCT TURRET)			
1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	7		*	1011745-4	74426015004		GASKET			
4	4	6			NAS 1190C04P4L	—		SCREW, SELF-LKG PAN HEAD FULL TH'D 2.0"			
1	1	5			2012138	85386911040		COUNTERWEIGHT & COVER ASSEMBLY			
2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2			2011603	53386910040		ROD, THREADED			
0	1	1			2011890-000	85386910690	-	OPTICAL UNIT SUBASSY STAGE II			

SEE NOTE 3 — (items 18 and 17)

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schiller DATE 7-22-64
CHECKED C. Langstaff 8-25-64
APPROVAL
APPROVAL E. Thorup 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

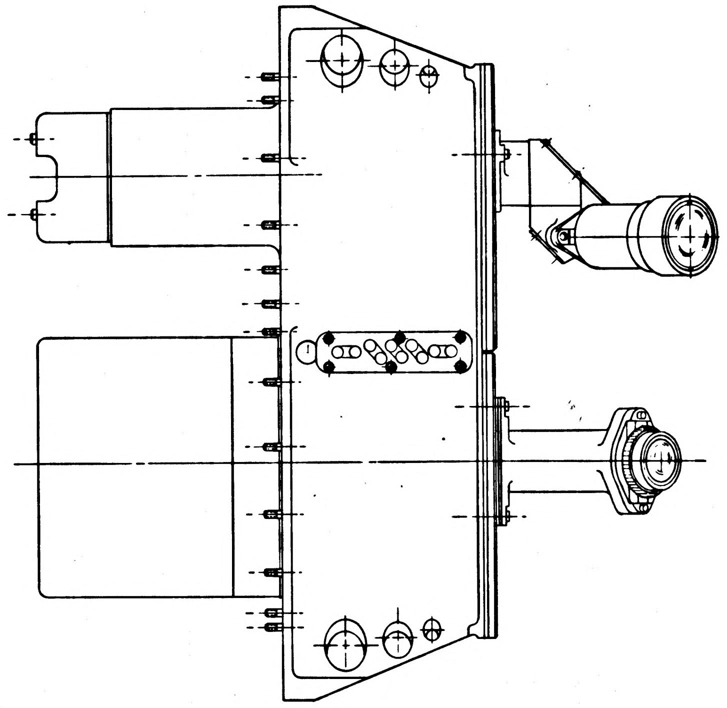
TITLE
OPTICAL UNIT

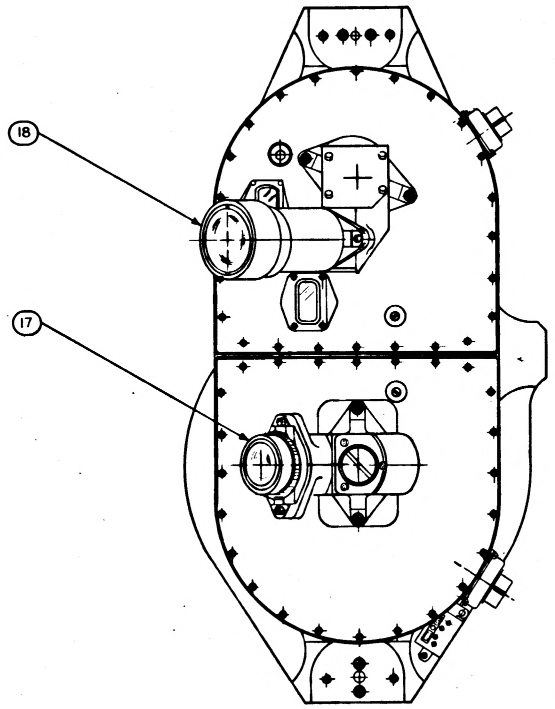
CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 1 OF 2

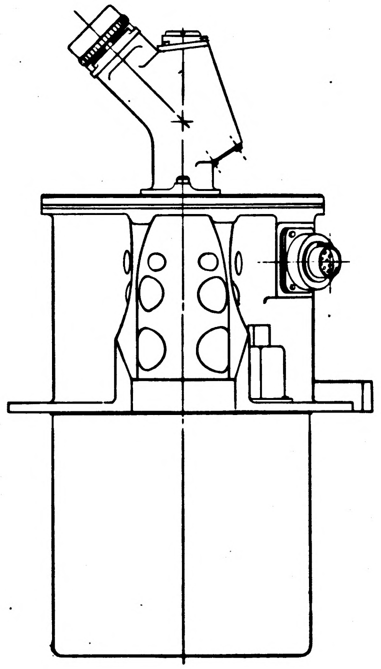
2011000 D

NOTES:
SEE SHEET 1 OF 2

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]







FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED 8-25-64
APPROVAL 8/27/64
APPROVAL E. Thorup 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 2 OF 2

APOLLO G&N Specification
PS 2011000 Rev. D
Original Issue Date: 5-6-65
Release Authority: TDRR 19005
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

OPTICAL UNIT ASSEMBLY

DRAWING NO. 2011000

Record of Revisions

	Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
					MIT	NASA
M	7/8/65	A	20669	Spec. Completely Revised	W.K.	J.B.
M	7/28/65	B	21293	Page 32	W.K.	T.M.
M	8/9/65	C	21390	7,8,11,12,14,22,23,24,27, 29,31,32	W. K.	T.M.
M	10/28/65	D	23541	7,8,26,27	W.K.	T.M.

This specification consists of page 1 to 33 inclusive.

APPROVALS	F.S.M 5-12-65	A.S 5/6 W.K 5/6	A.K 5-6	P.B 5-6	S.M.	
	NASA/MSC	MIT/IL			KIC	

1. SCOPE

This specification establishes the detail requirements for complete identification and acceptance of the Optical Unit, Assembly Part No. 2011000.

1.1 Product Configuration and Baseline Acceptances

1.1.1 The product configuration baseline shall be established by FACI for the Optical Unit Assembly, Serial No. . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No. unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein.

2.1 Effective Issues.

2.1.1 Military Standards and Specifications shall be the issue in effect on the date of contract.

SPECIFICATIONS

APOLLO G&N

ND 1002214	General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.
ND 1002023	Serialization, General Specification for
PS 2010606	Procurement Specification Product Configuration and Acceptance Test Requirements for the Precision Test Fixture.

STANDARDS

Military

MIL-STD-209	Clean Room and Work Station Requirements, Controlled, Environment
MIL-STD-150A	Photographic Lenses

DRAWINGS

APOLLO G&N

1019720	Optics Navigation Base Shipping Container
2011000	Optical Unit Assembly

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the contracting officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this document and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of conflict as soon as it is determined.

a. The contract

b. This Specification

c. Documents listed in this section

3 REQUIREMENTS

The Primary Performance Requirements described in Section 3.1 are derived from the Apollo mission analysis. These requirements will be demonstrated by the ability of the Assembly to meet the Functional Performance Requirements.

Functional Performance Requirements described in Section 3.2 are derived in order to demonstrate the ability of the Assembly to perform the Primary Performance Requirements.

3.1 Primary Performance Requirements. The Assembly shall meet the environmental tests specified for nominal Apollo missions and have the following accuracies. These are not Functional Performance Requirements, but are the bases from which the Functional Performance Requirements will be derived.

3.1.1 SXT LLOS to SLOS Measurement Accuracy. At the center of the field of view, the Sextant (SXT) shall be capable of measuring the Trunnion Drive Axis (TDA) angle between the star line of sight (SLOS) and landmark line of sight (LLOS) to within 10 seconds of arc.

3.1.2 SXT SLOS Positioning Accuracy. The SXT SLOS shall be perpendicular to the mounting plane to within 40 seconds of arc at zero trunnion angle.

3.1.3 SCT LOS Positioning Accuracy. The Scanning Telescope (SCT) line of sight (LOS) shall be perpendicular to the mounting plane to within six minutes of arc at zero trunnion angle.

3.1.4 Tracker Tracking Accuracy. The Star Tracker, with supporting electronics, shall be capable of developing error signals for a star between +1.0 and +2.0 S-4 magnitude, in its field of view, to within a 10 arc second (rms) repeatability and providing a star presence signal to the computer when the star is in the field of view.

3.1.5 Tracker Pointing Accuracy. The tracker LOS shall be known to within 10 arc sec. relative to the SLOS of the SXT.

3.1.6 Photometer Sensing Accuracy. The photometer shall be capable of accurately sensing the horizon intensity over a range of 9.5 to 2.4×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600Å.

3.1.7 Photometer Pointing Accuracy. The photometer line of sight shall be known to within 10 arc seconds in the trunnion direction relative to the LLOS.

3.2 Functional Performance Requirements. The Assembly shall perform as specified herein under the following conditions to verify its ability to perform the Primary Performance Requirements.

Drive Motor Fixed Excitation	28VAC±5%	800 cps ±1% ←90
Resolver Excitation	28VAC±1%	800 cps ±1%
Tachometer Excitation	28VAC±1%	800 cps ±1%
Tracker - Photometer	28VDC±2%	

3.2.1 SDA Orientation. The Shaft Drive Axis (SDA) shall be perpendicular with respect to the mounting plane between the Assembly and the Navigation Base within 10 seconds of arc for the SXT and to 40 sec. of arc for the SCT.

3.2.2 Orientation of the TDA Measuring Plane to the Shaft Axis. The sum of the errors resulting from the lack of perpendicularity between Trunnion Drive Axis (TDA) and SDA and the lack of perpendicularity of the SLOS and the TDA shall not exceed 20 arc seconds for the SXT and 2 arc minutes for the SCT.

3.2.3 Orientation of SLOS to TDA. The error resulting from the lack of perpendicularity between the TDA and SLOS for the SXT as when the SLOS is internally autocollimated shall not exceed 10 arc seconds.

3.2.4 Parallelism of Optical Axis to SDA Axis. (Reticle Eccentricity). The parallelism of the optical axis to SDA axis shall be within 10 seconds of arc for the SXT and 50 seconds of arc for the SCT.

3.2.5 Resolver Alignment. The SXT SDA and TDA resolvers and the SCT SDA TDA resolvers and counters shall be within the LOS tolerances specified in Table 1 when aligned to the specified references.

TABLE I

RESOLVER ALIGNMENT

FUNCTION	COMPONENT	REFERENCE	TOLERANCE (LOS)
SEXTANT TRUNNION (SXT TDA)	64X RSVR (Prior to Trimming)	SXT SLOS Angle (2 times TDA Angle)	± 2 min Zero Error
	2X RSVR		± 6 min Zero Error
	1X RSVR		± 6 min Zero Error
	Trimmed 64X RSVR		± 3 sec Zero Error 24 sec Max error spread
SEXTANT SHAFT	16 X RSVR	SXT SDA ANGLE	± 1 min Zero Error
	1X (SHAFT)		± 3 min Zero Error
	1X (GEARBOX)		± 2 min Zero Error
	1/2X RSVR		± 8 min Zero Error
	Trimmed 16X RSVR		± 10 sec Zero Error 44 sec Max error spread
TELESCOPE TRUNNION (SCT TDA)	1X RSVR	SCT LOS ELEVATION ANGLE (2 times TDA ANGLE)	± 2 min Zero Error * 8 min Max ea. point
	Trunnion TPAC		2 min Max each point
TELESCOPE SHAFT (SCT SDA)	1X RSVR	SCT SDA ANGLE	4 Min Max ea. point ** ± 1 min Zero Error
	Shaft TPAC		2 Min Max ea. point

* The tolerances represent the differences between the SCT LOS Elevation angle (2 times the TDA angle) and the Trimmed SXT 64X Trunnion Resolver.

** These tolerances represent the differences between the SCT SDA angle and the Trimmed SXT 16X Shaft Resolver.

TPAC = Telescope Panel Angle Counter

3.2.6 **Resolving Power.** The resolving power for all lines of sight of the SXT and SCT shall be determined with the eyepiece adjusted for optimum focus at the center of the respective fields using black and white targets as defined by MIL-STD-150A, Photographic Lenses.

The resolving power will be tested using either high contrast or low contrast targets depending upon whether the test equipment configuration includes high or low contrast target. The resolving power for high or low contrast targets shall be as follows or better:

	Resolving Power in arc seconds					
Approximate Position in Field	SXT				SCT	
	LLOS		SLOS		LOS	
Target Contrast	Low	High	Low	High	Low	High
Center	14.4	10.3	9.1	7.2	146	83.
1/3 Field Radius	*	*	14.4	11.5	230	115.0
2/3 Field Radius	*	*	28.7	23.0	328	184

*If the SXT SLOS resolution at the three field positions and the SXT LLOS resolution at field center are within the tolerance specified, it shall be assumed that the SXT LLOS resolution, at the field radii specified, is also within tolerance.

3.2.7 **Air/Vacuum Focusing.** The focus of each standard eyepiece upon the reticle plane shall be within the tolerances specified in the following chart for standard eyepieces. If the assembly configuration includes long eye-relief eyepieces then their focus shall be within the tolerances specified in the following chart for LER eyepieces.

Eyepiece	Air Reticle	Vacuum Reticle
SXT Standard	Adjustable between -2 and +2 Diopters	Adjustable between -2 and +2 Diopters
SXT LER	-1 ± .25 Diopters	-1 ± .25 Diopters
SCT Standard	-1 ± .25 Diopters	----------------
SCT LER	-1 ± .25 Diopters	------------------

3.2.8 Luminous Transmittance. The luminous transmittance of the SXT SLOS to CIE illuminant "C" ($6500^{\circ}K$) shall not be less than 25%.

The luminous transmittance of the SXT LLOS to CIE illuminant "C" shall not be less than 3.2%. 4%

The luminous transmittance of the scanning telescope to CIE "C" shall not be less than 30%.

If the assembly configuration includes an eyepiece polaroid filter then the following shall be a requirement. The ratio of the luminous transmittance of the SXT SLOS to SXT LLOS shall not be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

3.2.9 Freedom of Motion. The SDA and TDA of the SCT shall move freely when rotated manually.

3.2.10 Static Friction. Breakaway friction shall be less than .04 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases. Except that at 0° and 180° the breakaway friction shall be less than .052 inch-ounces on the SCT.

3.2.11 Dynamic Friction Level. Dynamic friction shall be less than .03 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases.

3.2.12 Reticle Lighting. The SXT and SCT reticle lamps shall draw a current that is within 10% of measurements made while the lamp illumination was observable. In addition the respective reticles shall appear illuminated when viewed via the eyepiece.

3.2.13 Dark Noise. With no light incident on the photomultiplier tube and an AGC voltage of 2.0 volts applied to the OUA, the preamplifier wide band output shall not be greater than 1.0 volts rms.

3.2.14 Reference Voltage. The tuning fork reference voltage shall be greater than 6.0 volts peak-to-peak.

3.2.15 Tracker Frequency. The frequency of the "X" tuning fork shall be 455 cps ± 1 cps and the frequency of the "Y" tuning fork shall be 356 cps ± 1 cps as measured at the reference point.

3.2.16 Error Signal Gradient. With a +2.0 magnitude star and +2.0 volts AGC, measure the ac voltage at the preamplifier output with the simulated star at the following coordinates.

a. Every 20 seconds for 1 minute on either side of null.

b. Every 1 minute for 6 minutes on either side of null.

c. Every 3 minutes until the edge of the 15 minute field of view on either side of the null.

These coordinates should be first taken along the trunnion (X) axis and then along the cross trunnion (Y) axis.

The error signal gradient shall be greater than 114 volts/radian over a 4 minute field of view centered at null.

With a star of +1.0 magnitude, set the AGC to 2.6 volts and repeat the ± 1, 2, 3, 4 and 5 minute points along each axis. The error signal gradient shall be less than 170 volts/radian over a 4 minute field of view centered at null.

3.2.17 Star Presence Output. The star presence output shall be less than 5.0 volts when an AGC input of 0 volts is applied to the OUA.

The star presence output shall be greater than 14.0 volts when an AGC input of 2.0 volts is applied to the OUA.

3.2.18 **SXT Star LOS to Tracker LOS Alignment and Accuracy.** The SXT star line of sight and the star tracker line of sight shall be parallel to within 20 arc seconds in the trunnion axis and 3 arc minutes in the cross trunnion axis.

The error angle between the SXT star line of sight and the star tracker line of sight shall be known to within 10 arc seconds.

3.2.19 **Horizon Photometer Output.** The preamplifier output shall be 125-250 millivolts for the maximum horizon intensity which is 9.5×10^{-4} watts/stesadian/cm^2 distributed between 3400 and 3600Å.

Å

The preamplifier output at 1/2 the maximum horizon intensity level shall be 1/2 the output at the maximum level ± 5%.

The preamplifier output at 1/4 the maximum horizon intensity level shall be 1/2 the output at the 1/2 maximum level ± 5%.

3.2.20 **Photometer Frequency.** The frequency measured at the preamplifier output shall be 550 ± 1 cps.

3.2.21 **SXT LLOS to Photometer LOS Alignment and Accuracy.** The SXT Landmark Line of Sight and Photometer Line of Sight shall be parallel to within 3 arc minutes in the trunnion axis and within 3 arc minutes in the cross trunnion axis. The error between the two lines of sights shall be known to within 10 arc seconds.

3.3 **Product Performance and Repeatability.** The Assembly shall meet the Functional Requirements of Section 3.2 and furthermore shall withstand specified environmental stresses without degradation of performance characteristics. This performance characteristic repeatability shall be demonstrated by subjecting the OUA to the following test procedures.

> NOTE: The following sequence of test procedures is mandatory except that (a) the sequence of Vibration and Thermal Vacuum tests may be interchanged, and (b) the sequence of the Pressure Leak Rate and the Functional Performance tests may be interchanged.

1. Baseline Performance Tests
2. Environmental Tests
    a) Mechanical Integrity
    b) Thermal Vacuum
3. Final Visual and Mechanical Inspection
4. Pressure Leak Rate Test
5. Functional Performance Tests

3.3.1 Baseline Performance Tests. These tests, as a minimum, shall demonstrate the following Functional Performance Requirements from Section 3.2.

3.2.1	SDA Orientation
3.2.2	Orientation of the TDA Measuring Plane to the Shaft Axis
3.2.4	Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)
3.2.18	SXT Star LOS to Tracker LOS Alignment and Accuracy
3.2.21	SXT LLOS to Photometer LOS Alignment and Accuracy

3.3.2 Environmental Tests.

3.3.2.1 Mechanical Integrity. The Assembly shall be vibrated according to these requirements.

Random vibration with the indicated characteristics shall be applied along each of three mutually perpendicular axes for a period of one minute per axis.

Linear increase from $.0054g^2$/cps at 20 cps to $.02g^2$/cps at 70 cps and constant to 1000 cps; then linear decrease to $0.004g^2$/cps at 2000 cps with a -3db limit.

3.3.2.2 Thermal-Vacuum Test. The Assembly shall be subjected to simulated flight conditions in a Space Simulator chamber.

The command module conditions shall include the following:

Pressure -5 psi of air or greater

Temperature - greater than 0°F
less than 160°F

The space side conditions shall include the following two conditions:

(1) Simultaneous cold wall and vacuum.
(2) Simultaneous cold wall, vacuum and sun. Cold wall, vacuum and sun are defined as follows:

Cold Wall (temperature of wall) - $320^{\circ}\text{F} \begin{smallmatrix} + 10^{\circ}\text{F} \\ - 0^{\circ}\text{F} \end{smallmatrix}$

Vacuum: less than 1×10^{-6} torr
Sun: A collimated radiation source simulating one sun in spectrum and intensity.

CAUTION

The Star Tracker and Photometer objective lenses shall be shielded from the direct rays of the Sun Source.

The SCT and SXT shall be successfully driven in the shaft and trunnion axes once during each hour of the simulation to insure proper general functioning. The focus of the SXT upon the vacuum reticle shall also be verified.

3.3.3. Final Visual and Mechanical Inspection. The Assembly shall be inspected to ensure that it conforms to the highest quality standards of general workmanship, optical cleanliness and mechanical and operational integrity.

3.3.4 Pressure Leak Rate. With the optical head in vacuum, a differential pressure of 5 psi across the optic base shall not cause a leakage rate in excess of 9.99×10^{-5} st'd cc/sec of air.

3.3.5 Functional Performance and Repeatability. The Assembly will then be tested to show compliance to the Functional Performance Requirements of Section 3.2 by the procedures described in Section 4.2 of this Procurement Specification.

In order to demonstrate that there has been no measureable change in characteristics of the Assembly between Baseline Testing and Final Test, the data from these tests shall be compared. The maximum allowable differences between the two sets of data for corresponding tests shall be as follows:

TABLE II

Test	Performance Requirements	Maximum allowable difference between Baseline and Final Test
SDA Orientation (3.2.1)		
SXT SDA	10 arc sec.	6 arc sec.
SCT SDA	40 arc sec.	10 arc sec.
Orientation TDA Meas. Plane to SDA (3.2.2)		
SXT	20 arc sec.	6 arc sec.
SCT (not applicable)		
Parrallelism of Optical Axis to SDA Axis (Reticle Eccentricity (3.2.4)		
SXT reticle	10 arc sec.	4 arc sec.
SCT reticle	50 arc sec.	25 arc sec.
SXT SLOS to Tracker LOS Alignment and Accuracy (3.2.18) Error Angle	20 arc sec. (trunnion) 3 arc min. (cross trunnion)	10 arc sec. 10 arc sec.
SXT LLOS to Photometer LOS Alignment and Accuracy (3.2.21) Error Angle	3 arc min (trunnion) 3 arc min (cross trunnion)	10 arc sec. 10 arc sec.

NOTE: The allowable difference between baseline and final test does not represent changes in the Assembly characteristics, but rather allowable errors in measurement accuracy and stability.

3.4 Product Configuration

3.4.1 Drawings . The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2011000 and all drawings and engineering data referenced thereon.

3.4.2 Nameplate and Serialization. Each Assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023. This number shall be affixed to the optical base.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein. The failure of the end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When non-conformance units are corrected by the contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the non-conformance or, when so directed by the cognizant inspector, a complete reexamination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature:	25° ± 10°C
(b) Relative Humidity:	90% maximum
(c) Barometric Pressure:	28 to 32 inches Hg

4.2 Tests. The following chart shall be used to correlate between the Functional Performance Requirements specified in Section 3 and the tests specified in Section 4.

Paragraph Title	Section 3	Section 4
SDA Orientation	3.2.1	4.2.1.1 4.2.1.2
Orientation of the TDA Measuring Plane to the Shaft Axis	3.2.2	4.2.1.3
Orientation of SLOS to TDA	3.2.3	4.2.1.3.2
Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)	3.2.4	4.2.1.1 4.2.1.2
Resolver Alignment	3.2.5(Table I)	4.2.1.4 4.2.1.5 4.2.1.6 4.2.1.7 4.2.1.8 4.2.1.9
Resolving Power	3.2.6	4.2.1.10
Air/Vacuum Focusing	3.2.7	4.2.1.11
Luminous Transmittance	3.2.8	4.2.1.12
Freedom of Motion	3.2.9	4.2.1.13
Static Friction	3.2.10	4.2.1.14 4.2.1.15
Dynamic Friction Level	3.2.11	4.2.1.14 4.2.1.15
Reticle Lighting	3.2.12	4.2.1.16
Dark Noise	3.2.13	4.2.1.17
Reference Voltage	3.2.14	4.2.1.18
Tracker Frequency	3.2.15	4.2.1.19
Error Signal Gradient	3.2.16	4.2.1.20
Star Presence Output	3.2.17	4.2.1.21
SXT Star LOS to Tracker LOS Alignment and Accuracy	3.2.18	4.2.1.22
Horizon Photometer Output	3.2.19	4.2.1.23
Photometer Frequency	3.2.20	4.2.1.24
SXT LLOS to Photometer LOS Alignment and Accuracy	3.2.21	4.2.1.25
Baseline Performance	3.3.1	4.2.1.26
Environmental Tests	3.3.2	4.2.1.27
Final Visual Mechanical Inspection	3.3.3	4.2.1.28
Pressure Leak Rate	3.3.4	4.2.1.29
Functional Performance & Repeatability	3.3.5	4.2.1.30

4.2.1 Test Sequence. Except as noted in Section 3.3 the sequence of Functional testing as presented herein is optional and may be performed in any order which will permit most economical use of manpower and equipment.

4.2.1.1 SXT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity). The SXT reticle shall be observed through a certified reference LOS afforded by the Precision Test Fixture's SXT Vertical Autocollimator via the LLOS as shown schematically in Figure 1. A series of angular displacement measurements of the reticle through the complete excursion of SDA shall be taken with the autocollimator filar micrometers. The results shall be charted and analysed to yield the reticle's eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall not exceed 10 seconds of arc and SDA perpendicularity shall be within 10 seconds of arc.

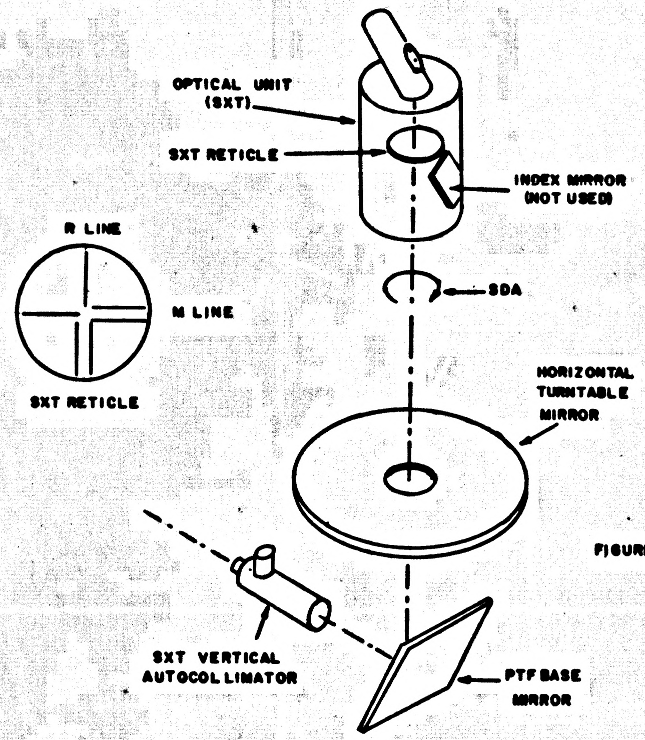

OPTICAL UNIT (SXT)
SXT RETICLE
INDEX MIRROR (NOT USED)
R LINE
M LINE
SXT RETICLE
SDA
HORIZONTAL TURNTABLE MIRROR
SXT VERTICAL AUTOCOLLIMATOR
PTF BASE MIRROR

FIGURE 1

4.2.1.2 **SCT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity) and SDA Orientation.** The SCT reticle and PTF's SCT Vertical Collimator reticle shall be observed through the SCT eyepiece as shown schematically in Figure 2. A series of angular displacement measurements between the SCT reticle's "R" line (reference Figure 3) and the Collimator reticle's parallel component, at the cardinal angles of SDA rotation shall be made with reference to the reticle line thickness. The results shall be charted and analysed to yield the SCT reticle eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall be within 50 seconds of arc and the SDA shall be perpendicular to the ball plane mount to within 40 seconds of arc.

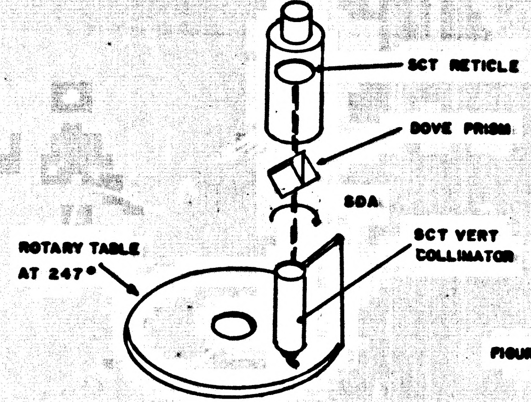

SCT RETICLE
DOVE PRISM
SDA
SCT VERT COLLIMATOR
ROTARY TABLE AT 247°

FIGURE 2

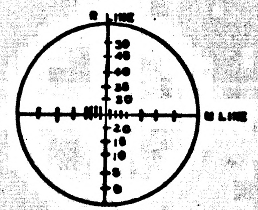

R LINE
50
45
40
35
30
M LINE
20
15
10
5
0

FIGURE 3

4.2.1.3 Orientation of the TDA Measuring Plane to the Shaft Axis.

4.2.1.3.1 SXT. The SXT reticle and its autocollimated SLOS reflection shall be observed through the SXT eyepiece as shown schematically in Figure 4. A series of angular displacement measurements between the reticle "R" line and its reflection, through the complete excursion of SDA, shall be made with reference to the reticle line pattern. The results shall be charted and analyzed to yield the parallelism error between the SLOS and LLOS and the eccentricity of the reflected SLOS reticle image to the SDA, both of which are related to the lack of perpendicularity between the TDA and SDA. The sum of the errors resulting from the lack of perpendicularity between the TDA and SDA and the lack of perpendicularity of the SLOS and TDA shall not exceed 20 arc seconds.

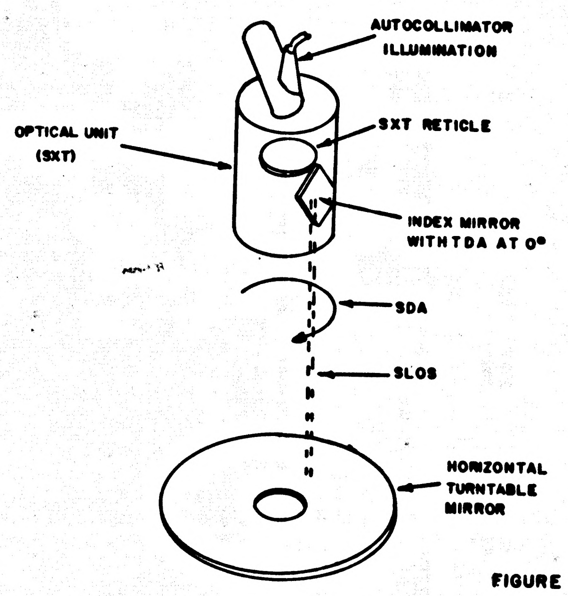

AUTOCOLLIMATOR ILLUMINATION
SXT RETICLE
OPTICAL UNIT (SXT)
INDEX MIRROR WITH TDA AT 0°
SDA
SLOS
HORIZONTAL TURNTABLE MIRROR

FIGURE 4

4.2.1.3.2 Orientation of SLOS to TDA. With the SXT TDA set to internally autocollimate the SLOS, the electrical angle corresponding to the coincidence of the "M" line and the reflection of the "M" line shall be recorded as the Self Collimation Angle. The position of the "R" line reflection shall be within 10 seconds of the "R" line at this position.

4.2.1.3.3 SCT. The SCT azimuth and elevation collimator shall be observed via the SCT eyepiece through an SCT TDA excursion as indicated in Figure 5. The lateral (normal to trunnion axis) displacement of the SCT reticle "R" line, between the ends of its excursion shall be estimated utilizing the collimator reticle pattern as a reference. The variation of "R" line thus measured, which results from a lack of perpendicularity between LOS and TDA and a lack of perpendicularity between TDA and SDA, shall not exceed 2 arc minutes.

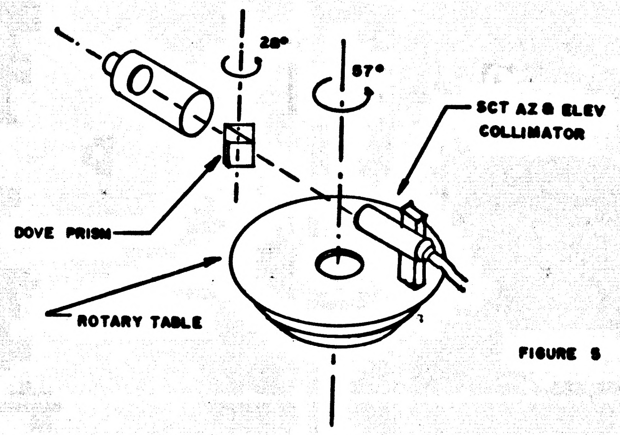


FIGURE 5

4.2.1.4 SXT TDA Accuracy

4.2.1.4.1 SXT TDA Zero Error. The SXT TDA Zero Error shall be measured by observing the SXT reticle simultaneously through the SLOS and LLOS by means of an autocollimator when the SXT TDA is set at electrical zero. The relative displacement between the two views of the reticle is the Zero Error and shall not exceed ± 3 sec.

4.2.1.4.2 SXT TDA Peak to Peak Error. The SXT TDA peak to peak error shall be based on the analysis of a series of positional measurements made with the optical unit as its index mirror is rotated about its vertically oriented trunnion axis, while the unit is in a horizontal position. The SXT shall be autocollimated via SLOS off a reference fixtures elevation mirror as shown in Figure 6. At each index mirror position, the SXT TDA 64X Resolver readout, converted to SXT Trunnion LOS angle, shall be compared to a reference rotary table position when coincidence between the SXT reticle and its reflection is achieved. The peak to peak error or maximum spread between the largest and smallest (algebraic) error measured shall be limited to 24 seconds.

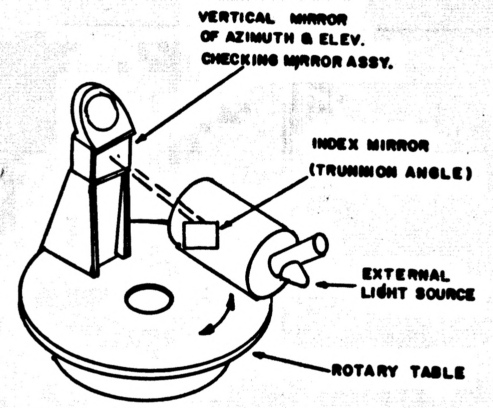


FIGURE 6

]

4.2.1.5 SXT SDA Accuracy. The SXT SDA accuracy shall be based on the analysis of a series of positional measurements made with the SXT as it is rotated about its vertically positioned Shaft Axis. The SXT shall be autocollimated via the SLOS off the PTF 57° Azimuth Mirror as shown in Figure 7. At each position the SXT SDA 16X Resolver readout, converted to SXT Shaft Angle shall be compared to the PTF rotary table position when coincidence between the SXT reticle and its reflection is achieved. The maximum error at zero reference shall not exceed 10 arc seconds. The peak to peak error at any point shall not exceed 44 arc seconds.

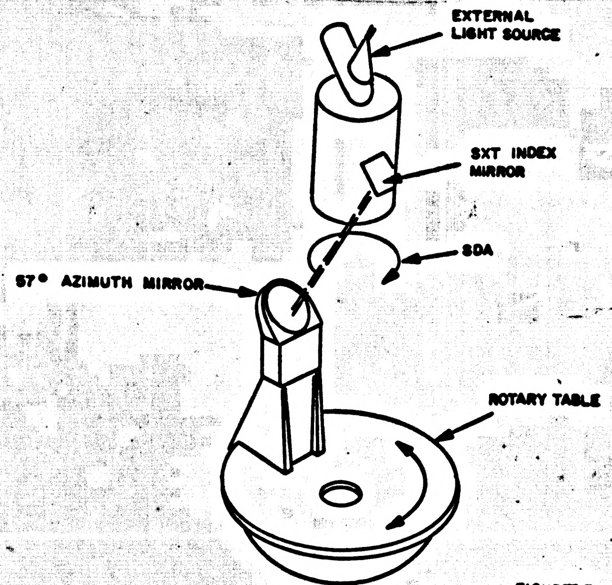

EXTERNAL LIGHT SOURCE
SXT INDEX MIRROR
SDA
57° AZIMUTH MIRROR
ROTARY TABLE

FIGURE 7

4.2.1.6 SCT TDA Electrical Accuracy. The SCT TDA electrical positional accuracy shall be based on the analysis of a series of measurements made with the OUA mounted on the PTF. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) TDA's angular position via the 64X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 0° in azimuth and aligning the SCT's reticle "M" line to the PTF's azimuth and elevation collimator as shown in Figure 8 by positioning the SXT TDA. The maximum error at zero reference shall not exceed 2 minutes. The maximum allowable error at each point shall be 8 minutes.

4.2.1.7 SCT TDA Mechanical Accuracy. The SCT TDA mechanical positional accuracy shall be measured simultaneously and by a similar technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to the angle readout the SCT TDA counter. The OUA shall be positioned at the SCT LOS to 0° in azimuth and then the SCT's reticle "M" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 8. The maximum allowable error at each point shall be 2 minutes.

4.2.1.8 SCT SDA Electrical Accuracy. The SCT SDA electrical accuracy shall be based on the analysis of a series of measurements made with the OUA mounted on the PTF. The PTF rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) SDA's angular position via the 16X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 57° in elevation and then aligning the SCT's reticle "R" line to the PTF's azimuth and elevation collimator as shown in Figure 9 by positioning the SXT SDA. The maximum error at zero reference shall not exceed 1 minute.

The maximum allowable error at each point shall be 4 minutes.

4.2.1.9 SCT SDA Mechanical Accuracy. The SCT SDA mechanical positional accuracy shall be measured simultaneously and by a similar technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to the angle read off the SCT SDA counter. The OUA shall be positioned at the SCT LOS to 57° in elevation and then the SCT's reticle "R" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 9. The maximum allowable error at each point shall be 2 minutes.

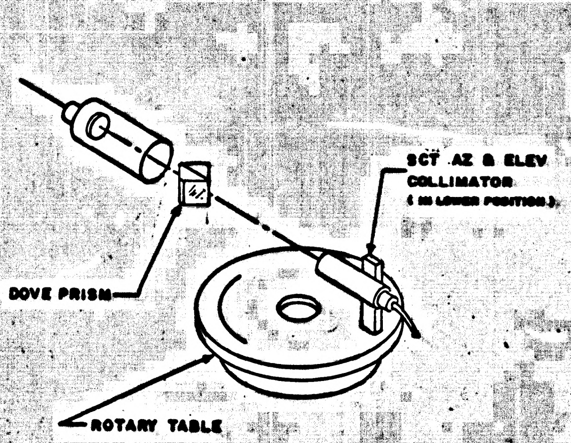


FIGURE 8

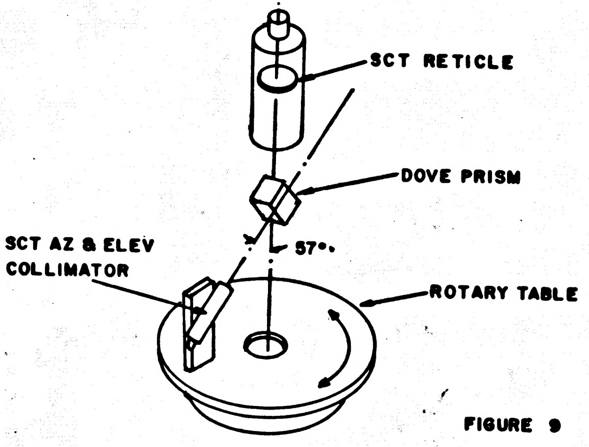


FIGURE 9

4.2.1.10 Resolving Power: The SXT LLOS shall be positioned such that the reticle "R" line and "M" line approximately bisects the negative black and white resolution target and the SXT eyepiece adjusted for optimum focus. The LLOS resolution for patterns which are parallel to the reticle "M" lines and patterns which are parallel to the reticle "R" lines when converted to arc seconds shall be 14.4 arc seconds or better, or 10.3 arc sec or better depending on whether the test equipment used has a low or high contrast target respectively.

The fore mentioned tests shall be repeated while positioning the SXT SLOS to bisect the resolution target. The SLOS resolution at the center of the field shall be 9.1 arc sec or better or 7.2 arc seconds or better, depending on whether the test equipment used has a low or high contrast target respectively. In addition, with a low contrast target the resolution at 1/3 field radius shall be 14.4 arc seconds or better and at 2/3 field radius shall be 28.7 arc seconds or better, while the corresponding values shall be 11.5 arc seconds for 1/3 field radius and 23.0 arc seconds for 2/3 field radius if a high contrast target is being used in the test equipment.

The SCT LOS shall be positioned such that the reticle "R" line and "M" line bisect the resolution target and the SCT eyepiece shall be adjusted for optimum focus. The LOS resolution at the center of the field shall be 146 arc seconds or better if the test equipment has a low contrast target and 83 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 15 or 35 gradicule bisects the resolution target. The LOS resolution, at approximately 1/3 field radius, shall be 230 arc seconds or better if the test equipment has a low contrast target and 115.0 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 5 or 45 gradicule bisects the resolution target. The LOS resolution, at approximately 2/3 field radius, shall be 328 arc seconds or better if the test equipment has a low contrast target and 184 arc seconds or better if it has a high contrast target.

4.2.1.11 Air/Vacuum Focusing. The focus adjustment of each eyepiece shall be measured by means of a dioptmeter. Each eyepiece shall be mounted in place with sufficient entrance light to illuminate the air and vacuum reticle to which the focus is set. The adjustable SXT Standard eyepiece shall have a focusing range of -2 to +2 diopters. All other eyepieces are fixed and shall be set at a -1 ± .25 diopter focus.

4.2.1.12 Luminous Transmittance. The luminous transmittance at the assembly lines of sight shall be tested using a CIE illuminant "C" as a light source and a light transmittance meter to monitor the light intensity. The light intensity at the source (I_o) shall be measured prior to testing the assembly.

The assembly shall be positioned such that the light emitted from the source enters the eyepiece and appears centralized in the optics when viewed via the objective lens. The light intensity at the objective lens (I_R) shall then be measured with the transmittance meter. The luminous transmittance shall be determined as follows:

Intensity Ratio (I_R : I_o) X 100 = % Transmittance. The luminous transmittance of the SXT LLOS to CIE illuminate "C" shall not be less than 3.2%. 3.2%

The luminous transmittance of the SCT to CIE illuminate "C" shall not be less than 30%.

The luminous transmittance of the SXT SLOS shall be tested as specified above while monitoring the light intensity at the SXT Indexing Mirror. The luminous transmittance of the SXT SLOS to CIE illuminate "C" shall not be less than 25%.

If the assembly configuration includes an eyepiece polaroid filter then the following test shall be performed:

The ratio of the luminous transmittance of the SXT SLOS and SXT LLOS shall not be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

4.2.1.13 Freedom of Motion. Unscrew and pop out the SCT Shaft Manual Input Adapter and rotate control. SCT Shaft shall move freely. Unscrew and pop out the SCT Trunnion Manual Input Adapter and rotate control. SCT Trunnion shall move freely.

4.2.1.14 SXT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC, 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SXT Shaft or trunnion starts to rotate. The input voltage shall not exceed 5.3 VAC. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage, for an increasing angular rotation of the shaft (SDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the shaft. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a positive direction and in a negative direction for decreasing angular rotation of the trunnion.

4.2.1.15 SCT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SCT shaft or trunnion starts to rotate. The input voltage shall not exceed 6.6 VAC when the shaft or trunnion is at the shade flip position, or 5.3 VAC at all other positions. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage for an increasing angular rotation of the shaft (SDA), shall cause the meter to deflect in a positive direction and the generator output for a decreasing angular rotation of the shaft shall cause the meter to deflect in a negative direction. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the trunnion.

4.2.1.16 Reticle Lighting. Reticle lamp operation shall be determined by means of their current drain and visual check. The current shall be measured by means of a milliammeter when 5.0 VAC is applied across each bank of 4 parallel lamps that illuminate the SXT and SCT reticles. The current drain shall be within 10% of the current measurements previously made while the lamp illumination could be observed and a visual check will be performed to show that the reticle appears illuminated when viewed via the eyepieces.

4.2.1.17 Dark Noise. With input power applied to the OUA, a 2 volt AGC signal applied to the Tracker High Voltage Power Supply, and the SCT head covered with a opaque black cloth; the tracker preamplifier output shall not exceed 1.0 volts rms when measured with a wide band meter.

4.2.1.18 Reference Voltage. The tuning fork reference voltages measured at the outputs of the X and Y Drive Amplifiers shall be greater than 6 volts peak-to-peak as measured with an oscilloscope.

4.2.1.19 Tracker Frequency. The signal frequencies measured at the Tracker fork reference outputs shall be 455 ± 1 cps and 356 ± 1 cps as measured with a frequency counter.

4.2.1.20 Error Signal Gradient. With a + 2.0 volt AGC signal applied to the OUA, a + 2.0 magnitude, simulated 6 second star shall be positioned, in the tracker field of view, to obtain a minimum output of both fundamental components of the tracker preamplifier output when utilizing a wave analyzer and an A.C. Voltmeter.

The star shall then be off set from null, to each position specified in Table III, along the Shaft axis coordinate and then along the Trunnion axis coordinate. The fundamental components of the tracker pre-amplifier output shall be as specified in Table III for each corresponding star displacement from null with a wave analyzer and an A.C. Voltmeter.

The error signal gradient shall then be tested wiht a +2.6 volt AGC signal applied to the OUA and utilizing a +1.0 magnitude, simulated 6 second star. The star shall be positioned to obtain a minimum output of both fundamental components of the tracker preamplifier output. The star shall then be displaced 1, 2, 3, 4, and 5 minutes from null along both shaft and trunnion coordinates. The fundamental components of the preamplifier output shall be as specified in Table III for each corresponding star displacement.

TABLE III

Star Displacement From Null	OUTPUT (mv rms)			
	+2.0 Mag. Star +2.0 Volts AGC		+1.0 Star Mag. +2.6 Volts AGC	
	356 cps Min.	455 cps Min	356 cps Max	455 cps Max
20"	5.9	5.9	21.3	21.3
40"	16.8	16.8	37.6	37.6
1'	32.8	32.8	49.0	49.0
2'	73.0	73.0	109.7	109.7
3'	122.5	122.5	183.5	183.5
4'	131.2	131.2	194.0	194.0
5'	145.0	145.0	217.0	217.0
6'	155.8	155.8	233.4	233.4
9'	132.5	132.5	198.0	198.0
12'	91.4	91.4	136.9	136.9
15'	0	0	50.0	50.0

4.2.1.21 Star Presence. With a 0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply Star presence output shall be less than 5.0 volts as measured with a D.C. Voltmeter.

With a + 2.0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply star presence output shall be greater than 14.0 volts as measured with a D.C. Voltmeter.

4.2.1.22 Tracker LOS to SXT Star LOS. With a simulated −4 magnitude star positioned in the tracker field of view and a + 4.8 volt AGC signal applied to the assembly; the star shall be translated in both trunnion and cross-trunnion directions to obtain a minimum output of both fundamental components of the tracker preamplifier output and the approximate star position established. The exact star position shall then be established by graphical extrapolation of X and Y error signal gradients. The star, viewed along the SXT LOS, shall then be positioned to the center of the SXT reticle and the star position shall be established again. The difference between the two star positions shall not exceed 20 arc seconds in the trunnion direction and 3 arc minutes in the cross-trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the Tracker LOS.

4.2.1.23 Horizon Photometer Output. A simulated horizon having a 30 minute minimum diameter and initial intensity equivalent to 9.5×10^{-4} watts/steradian/cm^2 distributed between 3400 and 3600 Å shall be positioned on the photometer optical axis. The fundamental component of the photometer preamplifier output shall be between 125 and 250 millivolts. These tests shall be made using a wave analyzer and an A.C. Voltmeter.

The simulated horizon intensity shall then be decreased, from its initial value, to one-half its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at initial value horizon intensity, ± 5%.

The simulated horizon intensity shall then be decreased, from one-half its initial value, to one-fourth its initial value. The fundamental component of the preamplifier output shall be one-half the output obtained at one-half initial value horizon intensity, ± 5%.

4.2.1.24 Photometer Fork Frequency. The fundamental component of the signal frequency measured at the photometer preamplifier output shall be 550 cps ± 1 cps using a wave analyzer and a frequency counter.

4.2.1.25 Photometer LOS to SXT LLOS. A simulated star shall be positioned in the photometer field of view. The fundamental component of the photometer preamplifier output shall be monitored as the star is translated in the trunnion direction and the preamplifier output graphically plotted versus the position of the star. The center of the aperture in the trunnion direction, shall be determined by analyzing this plot.

Similarly, the star shall then be positioned to the "known" center determined above, and the fundamental component of the preamplifier output monitored as the star is translated in the cross-trunnion direction. The preamplifier output, graphically plotted versus the position of the star, determines the center of the aperture, as above.

The star shall be positioned to the center of the aperture in both trunnion and cross-trunnion directions. The position of the star shall be measured. The star, viewed via the SXT LLOS, shall then be positioned on the SXT reticle center and the star position measured. The difference between the two star positions shall not exceed 3 arc minutes in the trunnion direction and 3 arc minutes in the cross trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the photometer LOS.

4.2.1.26 Baseline Performance. See applicable portions of Section 4.

4.2.1.27 Environmental Tests. Not applicable.

4.2.1.28 Final Visual Mechanical Inspection. Not applicable.

4.2.1.29 Pressure Leak Rate. The Leak Detector shall be calibrated prior to testing. The external side of the OUA shall be evacuated and backfilled with a 10% Helium mixture of 5 psi. The leak rate shall be determined using the following formula. The leak rate shall not exceed 9.99×10^{-5} st'd cc/sec.

$$\begin{bmatrix}\text{Unit Leak Rate}\\ \text{St'd cc/sec-He}\end{bmatrix} = \frac{\begin{bmatrix}\text{Leak Detector}\\ \text{Reading}\end{bmatrix}\begin{bmatrix}\text{Calibration St'd}\\ \text{Leak Rate}\end{bmatrix}\left(\frac{\text{St'd cc He}}{\text{Sec}}\right)}{\begin{bmatrix}\text{Calibrated Leak}\\ \text{Detector reading}\end{bmatrix}\left[\frac{\text{\% He in Mixture}}{100}\right]}$$

4.2.1.30 Functional Performance and Repeatability. Same as section 3.3.5.

4.2.2 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Apollo G&N Drawing 2011000. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulants, defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General. Preparation for delivery shall be in accordance with Specification ND 1002214, General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.

The assembly shall be installed in or removed from its shipping container (P/N 1019720) only under Class II or better clean room conditions in accordance with MIL-STD-209, Clean Room and Work Station Requirements Controlled, Environment.

6. NOTES.

6.1 The Precision Test Fixture (PTF) used to test the Optical Unit Assembly (OUA) shall be certified according to PS 2010606. Certification of the PTF is required before and after each final test. The certification shall be completed not more than 50 hours before or after the tests are performed. If the PTF does not recalibrate after a final test, the affected tests shall be rerun.

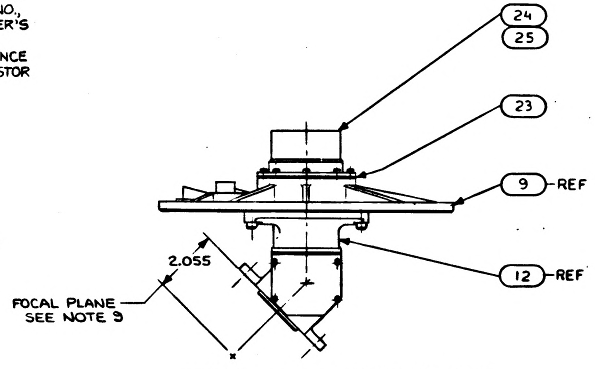
Notice: When APOLLO G&N drawings, specifications, or other data are used for any purpose other than in connection with a definitely related APOLLO G&N procurement operation, the National Aeronautics and Space Administration thereby incurs no responsibility nor any obligation whatsoever; and the fact that APOLLO G&N may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

2011000 E

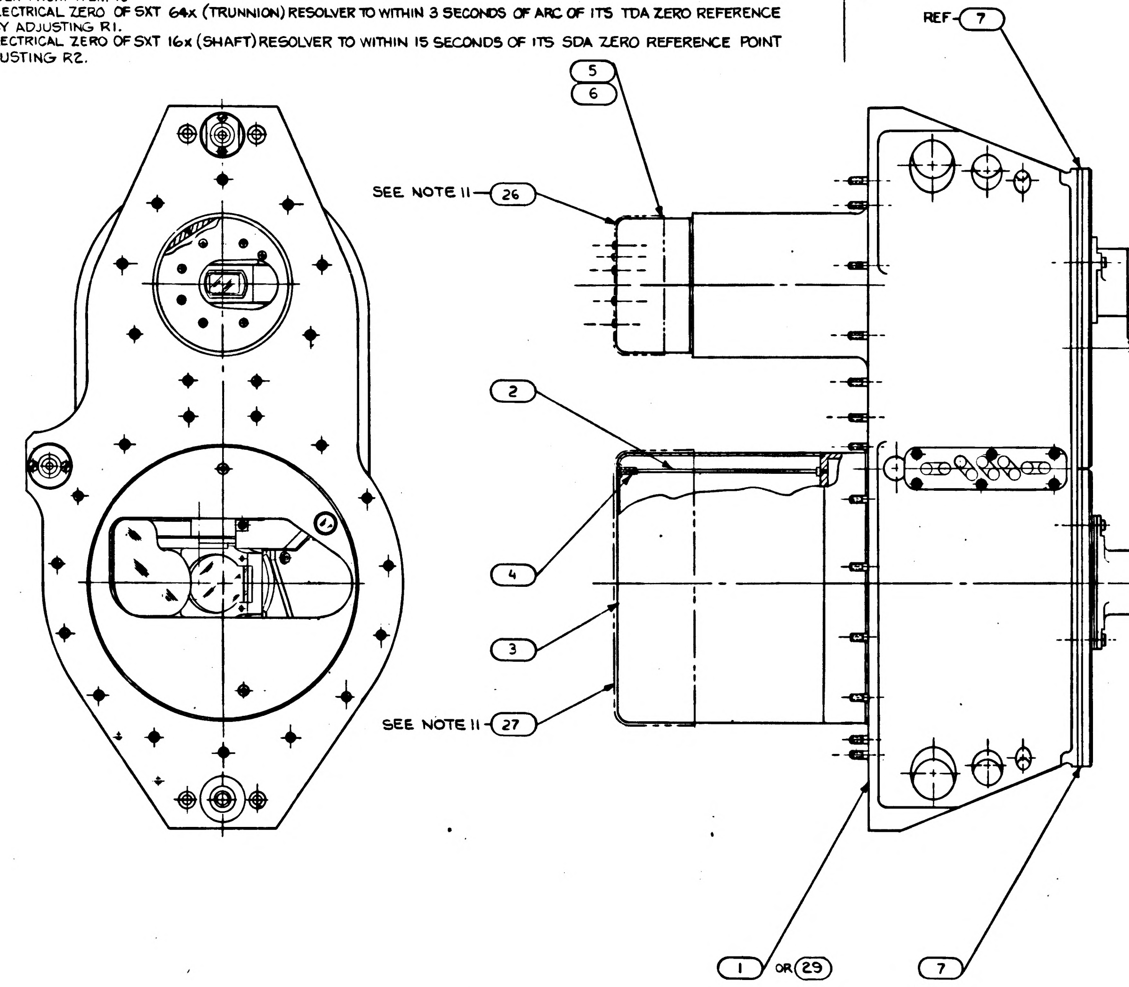
SYM	ZONE	DESCRIPTION	DATE	APPROVED
A		REVISED PER TDRR NO. 17390		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		

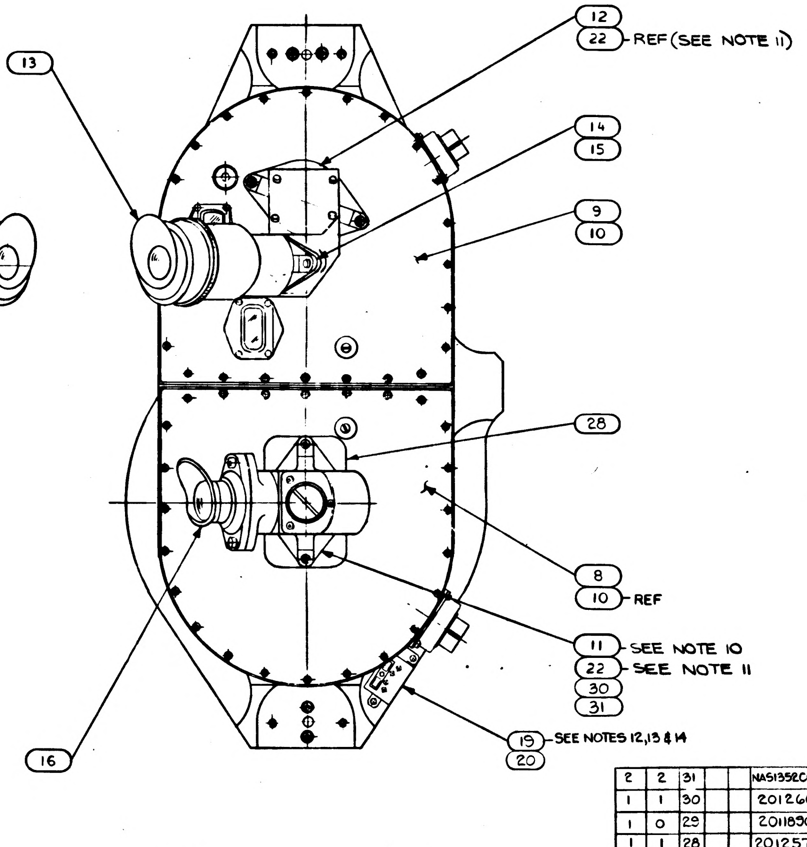
NOTES:

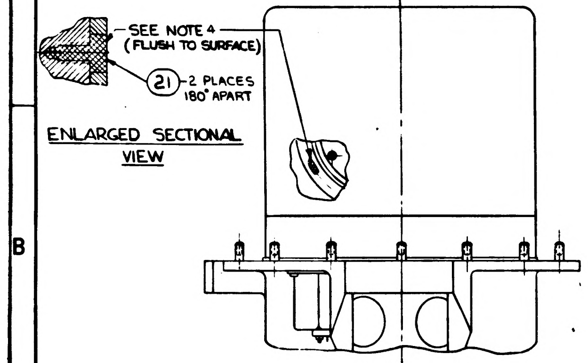
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ± 0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1, 7 & 8) OR (29, 7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE.) AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200).
8. ITEM 3 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 15 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.



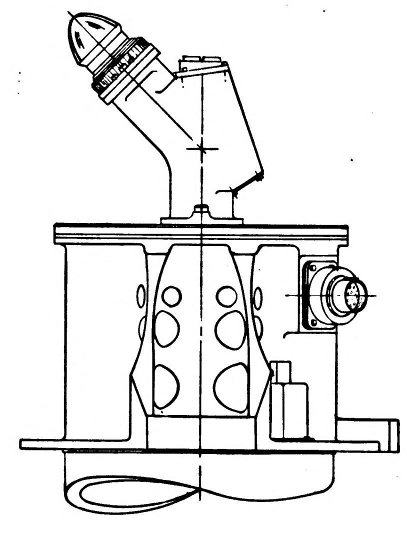
PARTIAL VIEW WITH ITEM 13 REMOVED







ENLARGED SECTIONAL VIEW



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

SEE NOTE 3 — (item 18)
SEE NOTE 3 — (item 17)

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	30			2012608	45386910120		SHIM, FOCUSING			
1	0	29			2011890-011			OPTICAL UNIT SUBASSY STAGE II			
1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
1	1	27			2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
1	1	26			2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	23			2011955-1/6T	7938691 0601 THRU 0606		SPACER			
2	2	22			2012101	85386910940		PLATE, DUST COVER, ASSY OF			
AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	20		*	1011625-28	74455151028		SCREW, CAP HEX SOC HD SELF-LOCKING			
1	1	19			2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
1	1	17			2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	15			NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	14			2011887-1/7T	5638691 0400/0406		SHIM, SPACER (SCT TURRET)			
1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	7		*	1011745-4	74426015004		GASKET			
4	4	6			NAS 1190C04P4L	—		SCREW, SELF-LKG PAN HEAD FULL THD 250°			
1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2			2011603	53386910040		ROD, THREADED			
0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D — LIST OF PARTS AND MATERIALS

NEXT ASSY — USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED C. [illegible] 8-28-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 1 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

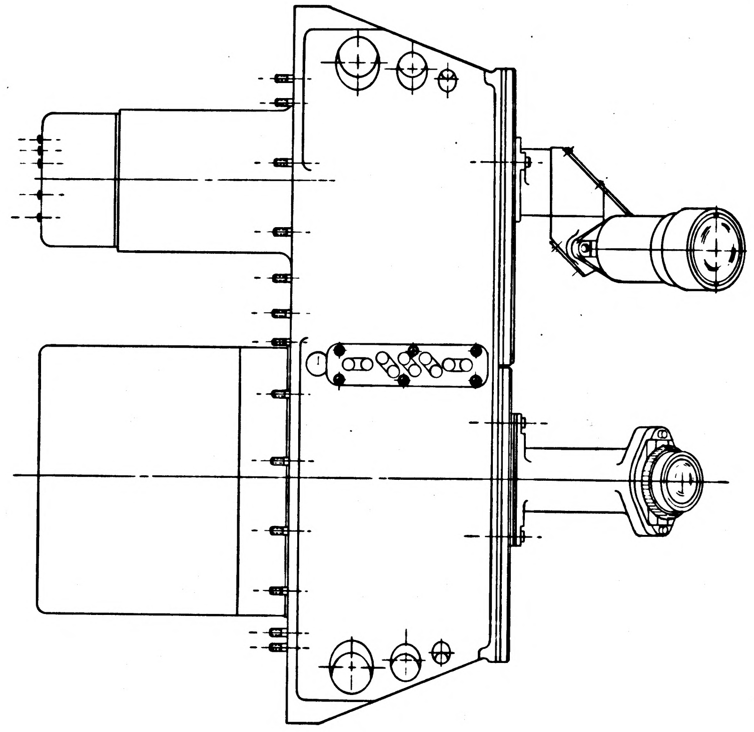
CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 1 OF 2

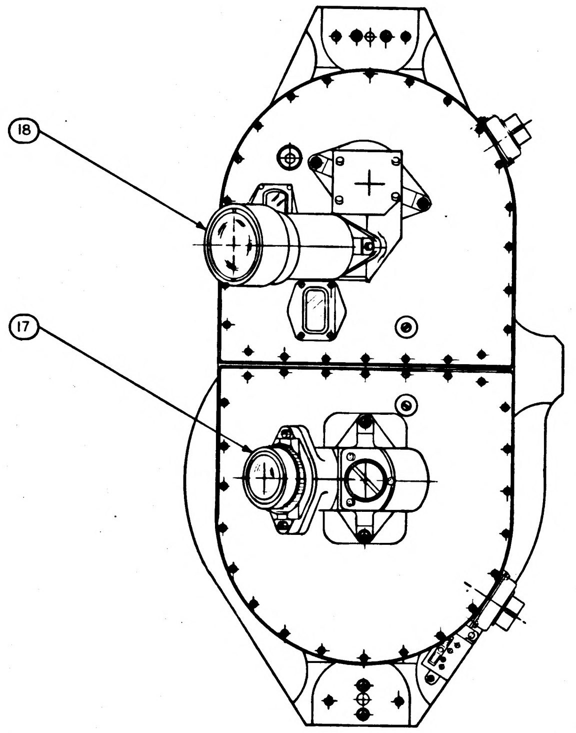
2011000 E

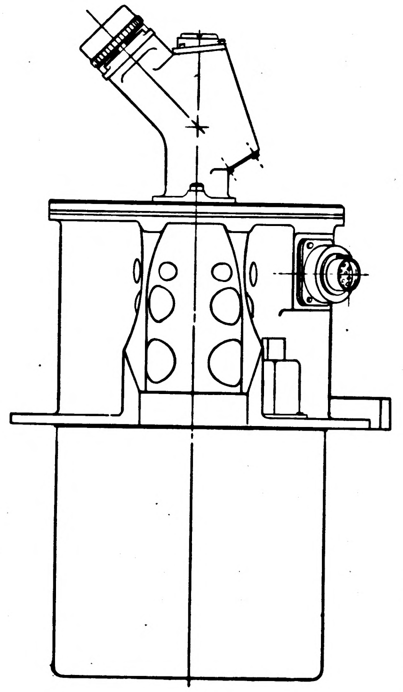
NOTES:
SEE SHEET 1 OF 2

E 2011000

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17390	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]







FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schiller DATE 7-22-64
CHECKED C. Langstaff 8-25-64
APPROVAL [illegible]
APPROVAL E. Thorup 9/1/64
NASA APPROVAL
MIT APPROVAL

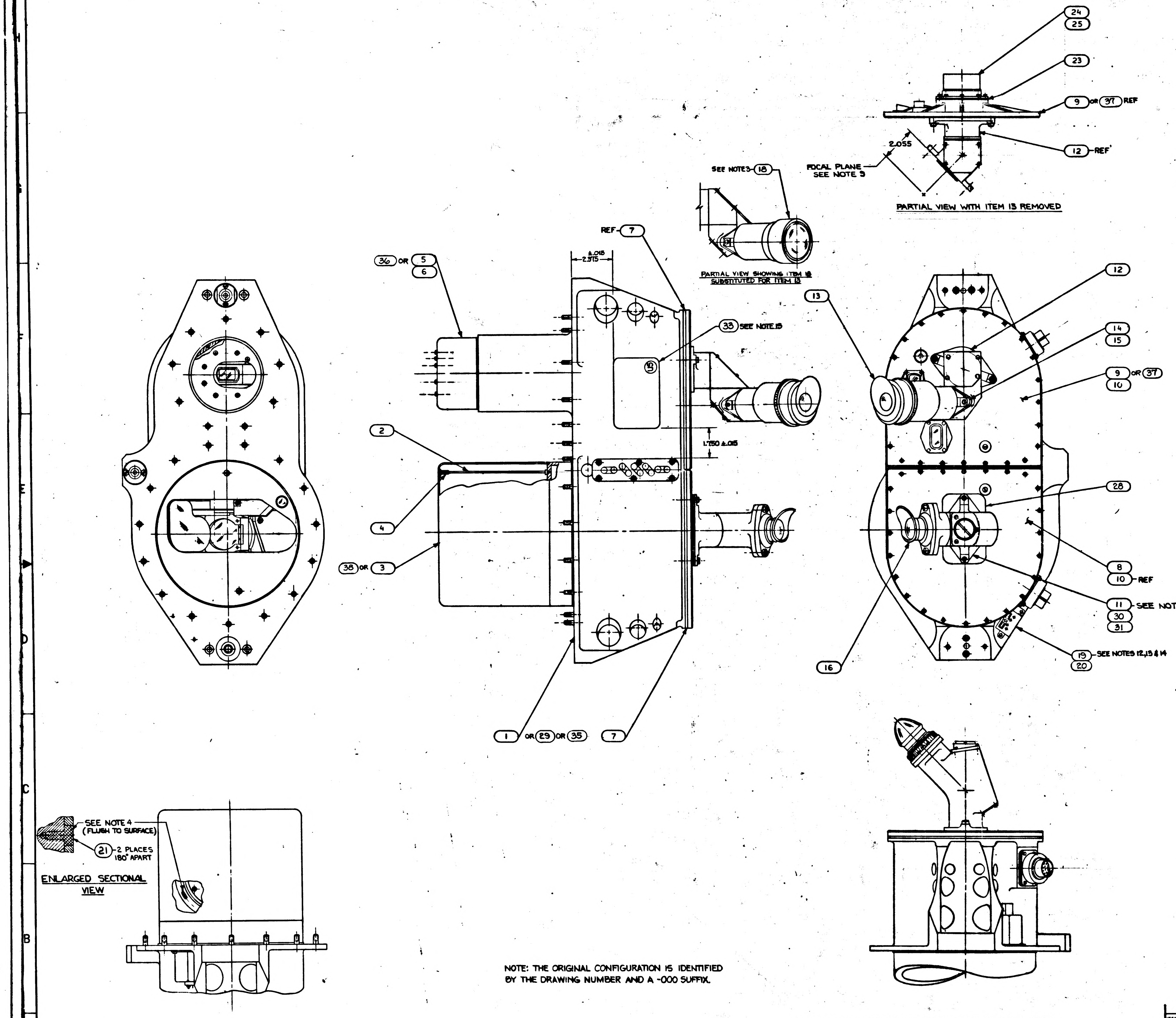
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 G

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO.19197	[illegible]	[illegible]
C		REVISED PER TDR? NO.19851	[illegible]	[illegible]
D		REVISED PER TDRR NO.20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22620	[illegible]	



24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.015
2.315
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 35
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible] 8-4-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 1 OF 2

G 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO.22628 SHEET 2 REDRAWN		WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NOS. 2012390 & 2012391.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES).
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II.
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2011000.

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
			34									
1	1	1	33			1004260-300			NAMEPLATE			
			32									
2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	1	0	29			2011890-011			OPTICAL UNIT SUB ASS'Y STAGE II			
	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
			27									
			26									
8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC.HD., SELF LOCKING			
1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	23			2011955-1/6T	7358691 0681 thru 0686		SPACER			
			22									
AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC.HD., SELF-LOCKING			
1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
			17									
1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	14			2011887-1/7T	5638391 0480 thru 0486		SHIM, SPACER (SCT TURRET)			
1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	10			NAS135C04LL8	74455157015		SCREW, CAP, SOC.HD., SELF-LOCKING			
0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	6			NAS1190C04P4L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2			2011608	53386910040		ROD, THREADED			
0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

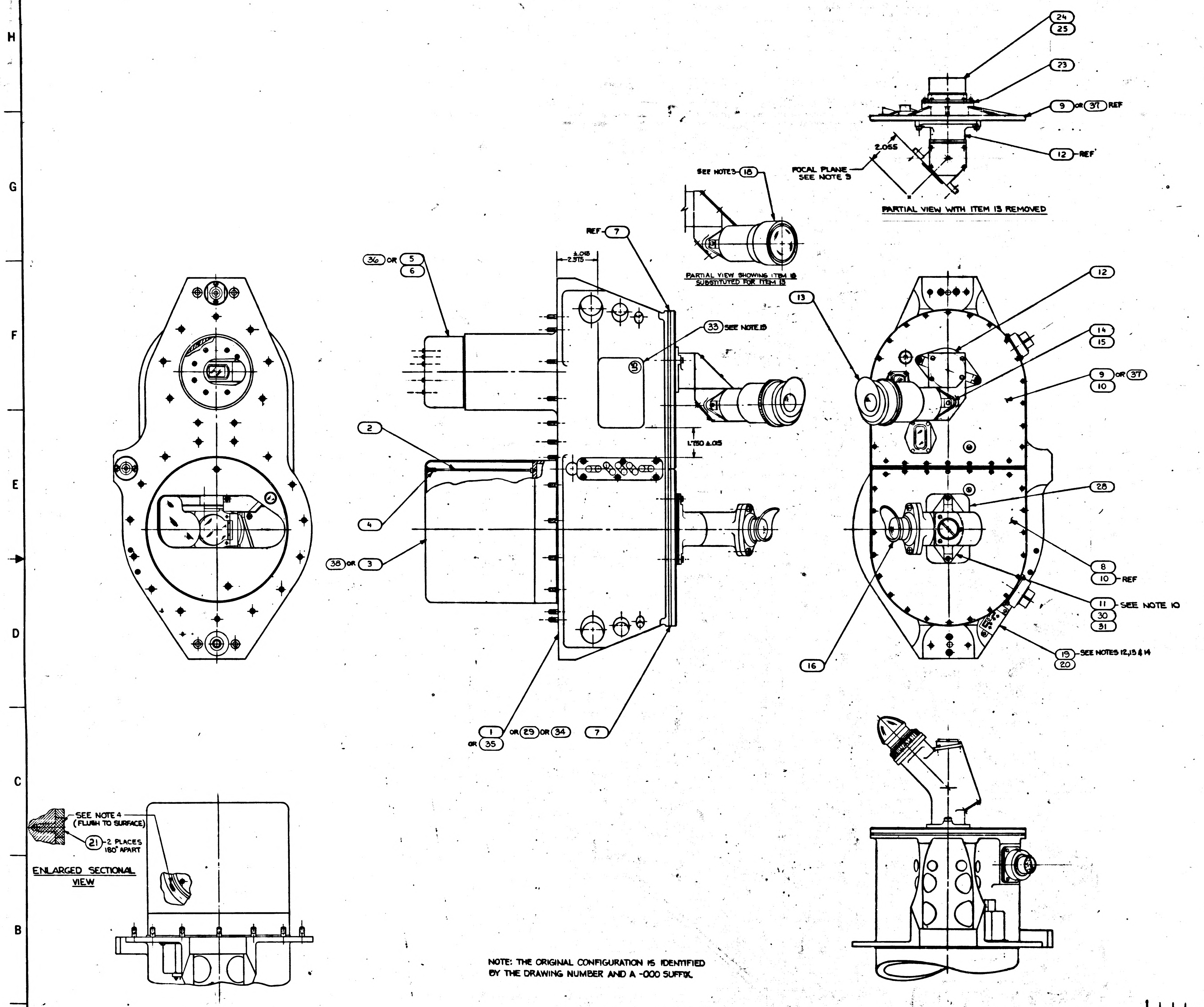
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT
CALC ACTUAL
SHEET 2 OF 2

H 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		



24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
.018
2.515
33 SEE NOTE 15
1.150 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35
7
12
13
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011000
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 1 OF 2

2011000 H

H 2011000

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REV ED PER TDRR NO. 22628 SH ET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NOS. 2012390 & 2012391.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES).
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 8 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II.
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2011000.

031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
1	0	0	0	34			2011890-031			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	33			1004260-300			NAMEPLATE			
				32									
2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
				27									
				26									
8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	23			2011955-1/6T	7358691 [illegible]		SPACER			
				22									
AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
1	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
				17									
1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	15			NAS1189C02P5L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	14			2011887-1/4T	5636391 [illegible]		SHIM, SPACER (SCT TURRET)			
1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	10			NAS135C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	6			NAS1190C04P8L	—*—		SCREW, SELF-LOCKING PAN HD. FULL TH'D .250"			
0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2			2011608	53386910040		ROD, THREADED			
0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED F. Maynard 9/[illegible]/65
APPROVAL
APPROVAL [illegible] [illegible]/65
NOT REQUIRED PER LETTER NASA PP7-65-812
MIT APPROVAL [illegible]

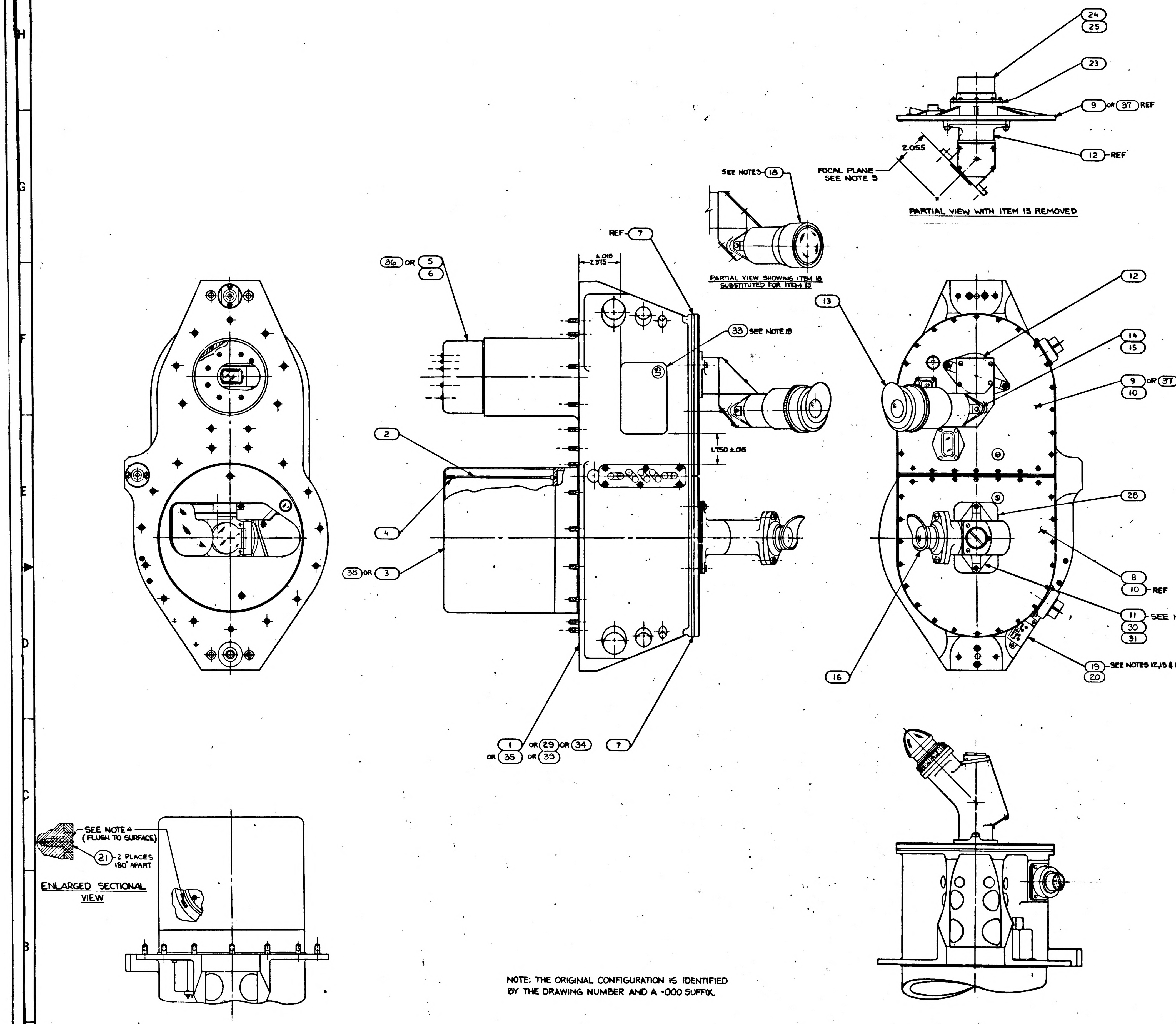
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 J

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		


24
25
23
9 OR 37 REF
12 -REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 - 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF - 7
36 OR 5
6
±.015
2.375
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34 OR 35 OR 39
7
13
12
14
15
9 OR 37
10
28
8
10 -REF
11 - SEE NOTE 10
30
31
19 - SEE NOTES 12, 13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 - 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED
APPROVAL
APPROVAL E. Pherg 7/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

J 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NOS. 2012390 & 2012391.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES).
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II.
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PS 2011000.

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 23325 SHEET 2 REDRAWN	9/11/	WK
H		REVISED PER TDRR 23057	[illegible]	[illegible]
J		REVISED PER TDRR 23362	11/4/65	WK

LIST OF PARTS AND MATERIALS

QTY REQ'D 001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	0	34			2011890-031			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	33			1004260-300			NAMEPLATE			
					32									
2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
					27									
					26									
8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7938691 0631 THRU 0686		SPACER			
					22									
AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
1	1	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
					17									
1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 0400 THRU 0486		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	10			NAS135C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	6			NAS1190C04P4L	—"—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED F. Maynard 9/20-65
APPROVAL
APPROVAL E. Thomas 10/6/65
NOT REQUIRED PER LETTER
NASA APPROVAL NASA PP7 65-312
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

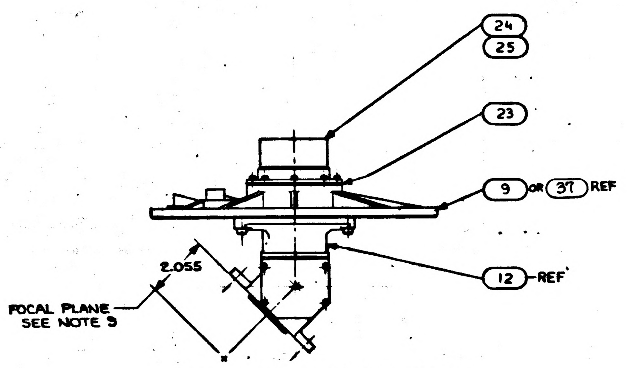
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

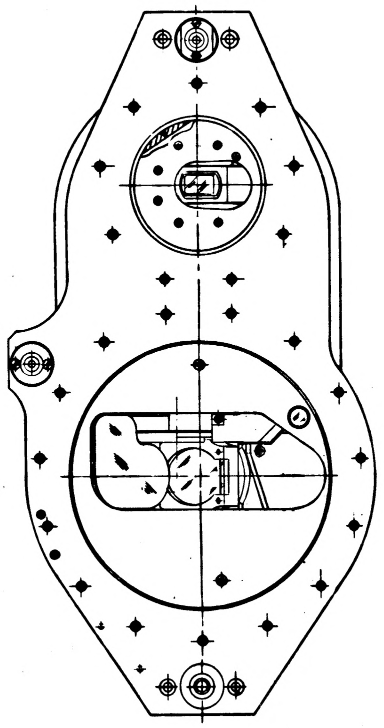
2011000 J

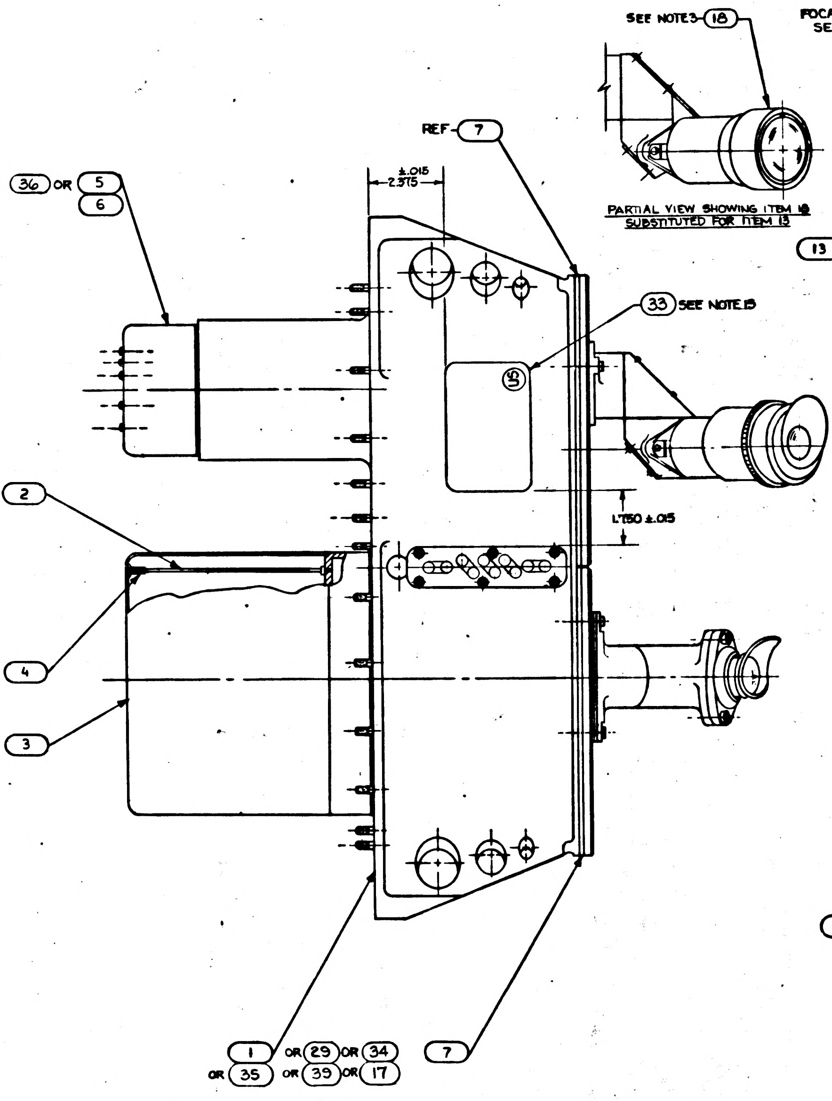
2011000 K

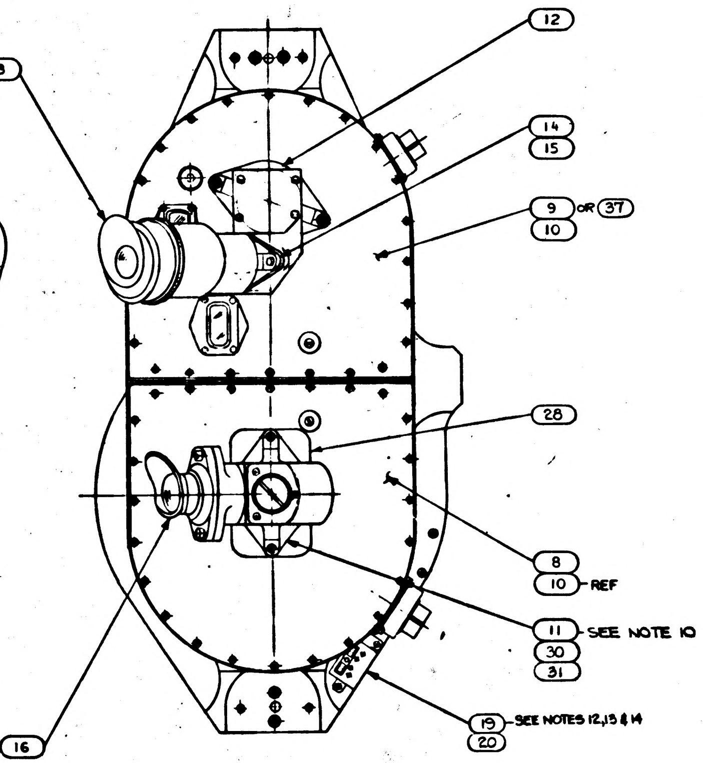
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		

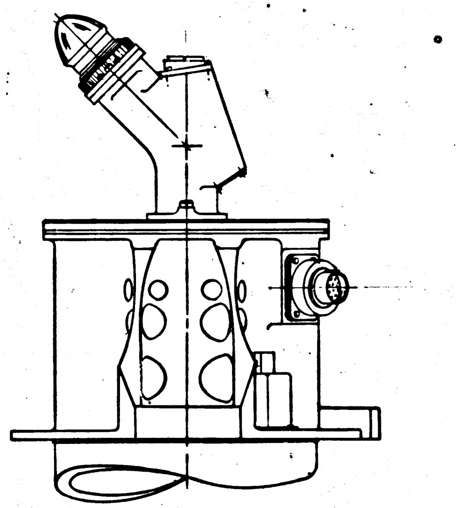

24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9

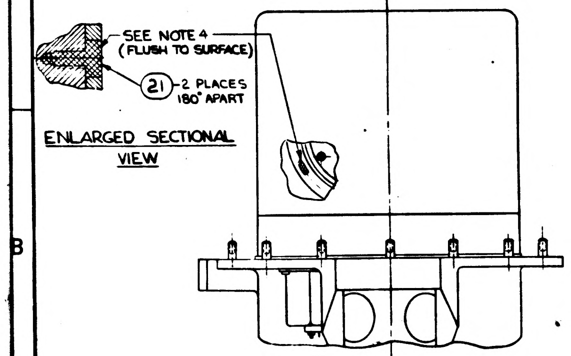
PARTIAL VIEW WITH ITEM 13 REMOVED




SEE NOTE 5 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
.018
2.375
33 SEE NOTE 15
2
4
1.150 ±.015
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
7


13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 SEE NOTES 12,13 & 14
20
16




SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART

ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED C. Langstaff 8-25-64
APPROVAL
APPROVAL E. Thomas 9/1/64
NASA APPROVAL
MIT APPROVAL 1 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

K 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	9/14/64	WK
H		REVISED PER TDRR 23067	1/15/65	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/13/66	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1, 7 & 8) OR (29, 7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ± .005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732
000	*	*	NA
011	*	*	NA
021	*	*	NA
031	*	NA	NA
001	*	*	NA
030	*	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205
000	*	NA	NA
011	*	NA	NA
021	NA	*	NA
031	NA	NA	NA
001	*	NA	NA
030	NA	NA	*

030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	34			2011890-031			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
						32									
2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	1	28			2012573	45386910050		SHIM, FOCUSING AIR (SXT)			
						27									
						26									
8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7358691 0601 THRU 0606		SPACER			
						22									
AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
1	1	1	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
1	0	0	0	0	0	17			2012730	85386911790		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 THRU 0406		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	6			NAS1190C04P4L	— # —		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Maynard 9/20/65
APPROVAL
APPROVAL E. Thomas 12/6/65
NOT REQUIRED PER LETTER NASA PP7-65-612
MIT APPROVAL

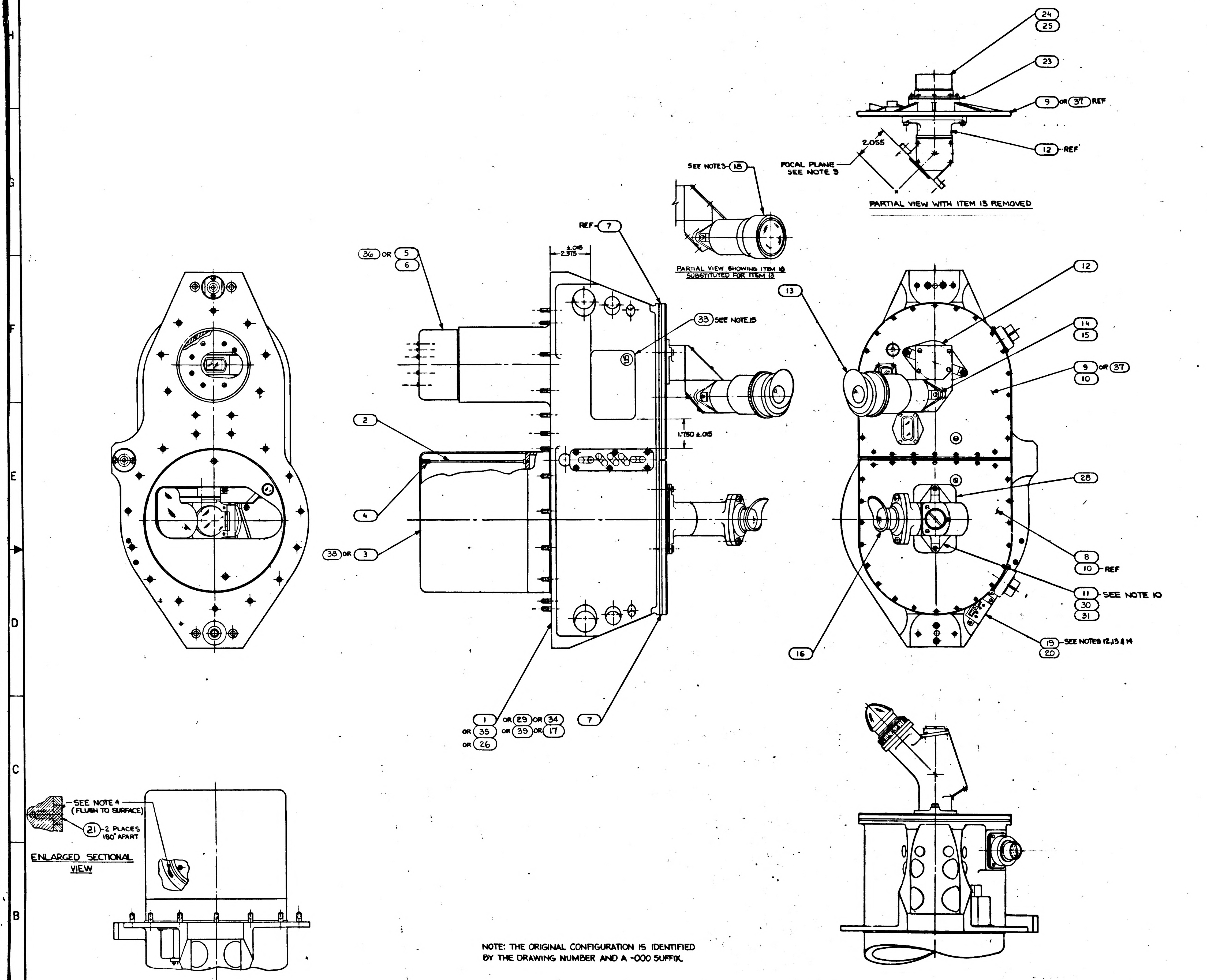
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 L

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS		
A		REVISED PER TDRR NO.17390		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25766		



24
25
23
9 OR 37 REF
12 -REF
2.055
FOCAL PLANE
SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 - 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF - 7
±.015
2.375
36 OR 5
6
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 - SEE NOTE 10
30
31
19 - SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 - 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED
APPROVAL
APPROVAL E. Moray 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

L 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO.22628 SHEET 2 REDRAWN	9/24/65	WK
H		REVISED PER TDRR 23067	10/4/65	WK
J		REVISED PER TDRR 23362	11/4/65	WK
K		REVISED PER TDRR 25241	1/13/66	WK
L		REVISED PER TDRR 25766	2/4/66	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG.SUFFIX	2012390	2012391	2012732
000	*	*	NA
011	*	*	NA
021	*	*	NA
031	*	NA	*
001	*	*	NA
030	*	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205
000	*	NA	NA
011	*	NA	NA
021	NA	*	NA
031	NA	NA	*
001	*	NA	NA
030	NA	NA	*

LIST OF PARTS AND MATERIALS

QTY REQ'D 030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	34			2011890-031			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
						32									
2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
						27									
0	0	1	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC.HD., SELF LOCKING			
1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7358691 [illegible]		SPACER			
						22									
AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC.HD., SELF-LOCKING			
1	1	1	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC.HD., SELF-LOCKING			
0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	6			NAS1190C04P6L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2			2011608	53386910040		ROD, THREADED			
0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Raymond 9/20/65
APPROVAL
APPROVAL E. Thomas 9/24/65
NOT REQUIRED PER LETTER
NASA PP7-65-812
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

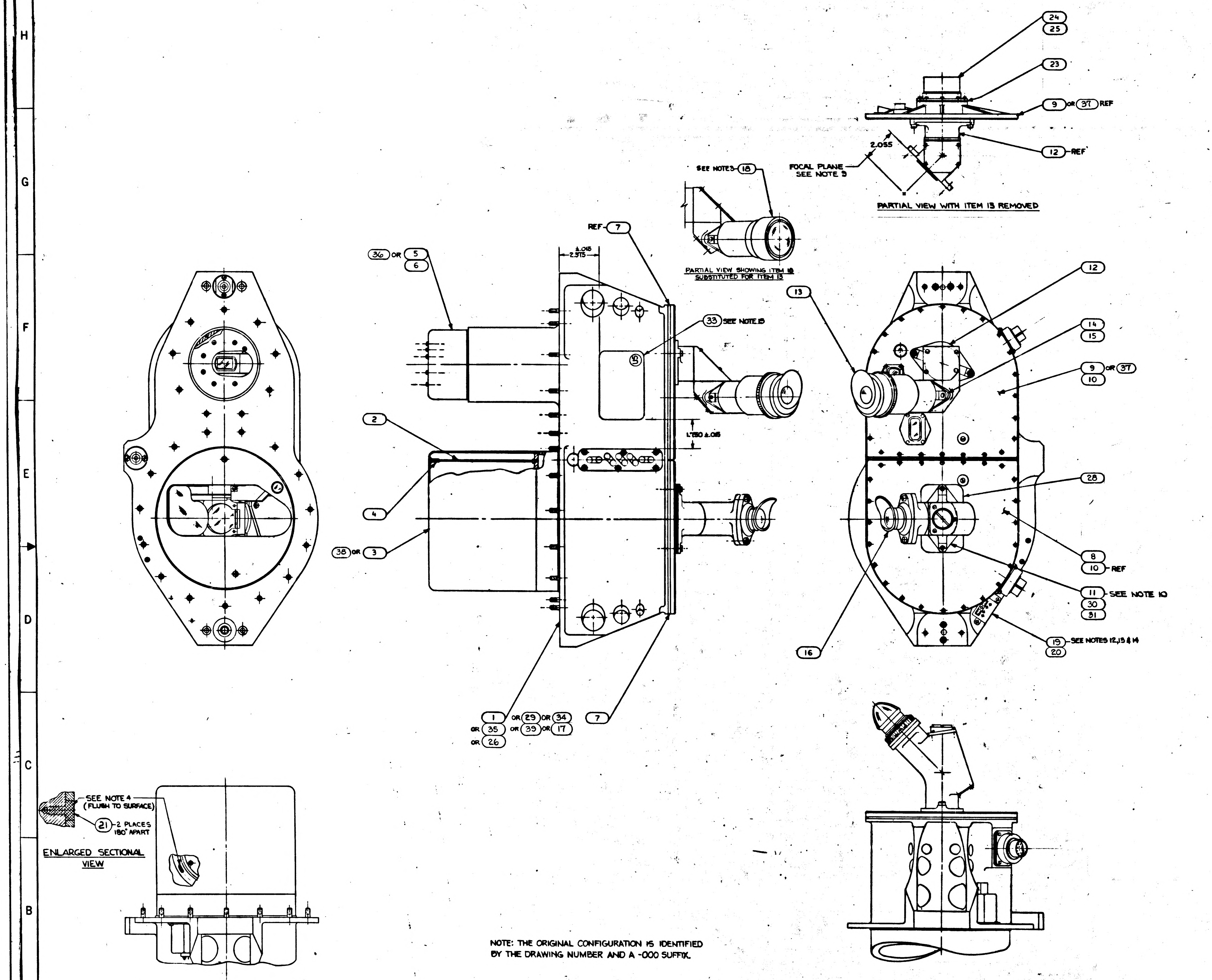
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 M

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22623	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]

12217


24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 5
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.015
2.315
33 SEE NOTE 15
1.250 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED
APPROVAL
APPROVAL E. Phorey 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE OPTICAL UNIT
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 2

M 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22228 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/13/66	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG.SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG.SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
	1	1	1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
	0	0	1	0	0	0	34			2012736	85386911810		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
							32									
	2	2	2	2	2	2	31			NAS1352C02LL5	74455157005		SCREW, CAP, HEX SOC. HD.			
	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
							27									
	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691 [illegible]		SPACER			
							22									
	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
	1	1	1	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
	1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
	2	2	2	2	2	2	15			NAS1189C02P5L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
	48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
	1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
	2	2	2	2	2	2	7		*	1011745-4	74426615004		GASKET			
	4	4	4	4	4	4	6			NAS1190C04P6L	— * —		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
	0	0	0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Raymond 9/20/65
APPROVAL
APPROVAL E. Thomas 10/65
NOT REQUIRED PER LETTER NASA PP7/65-812
MIT APPROVAL

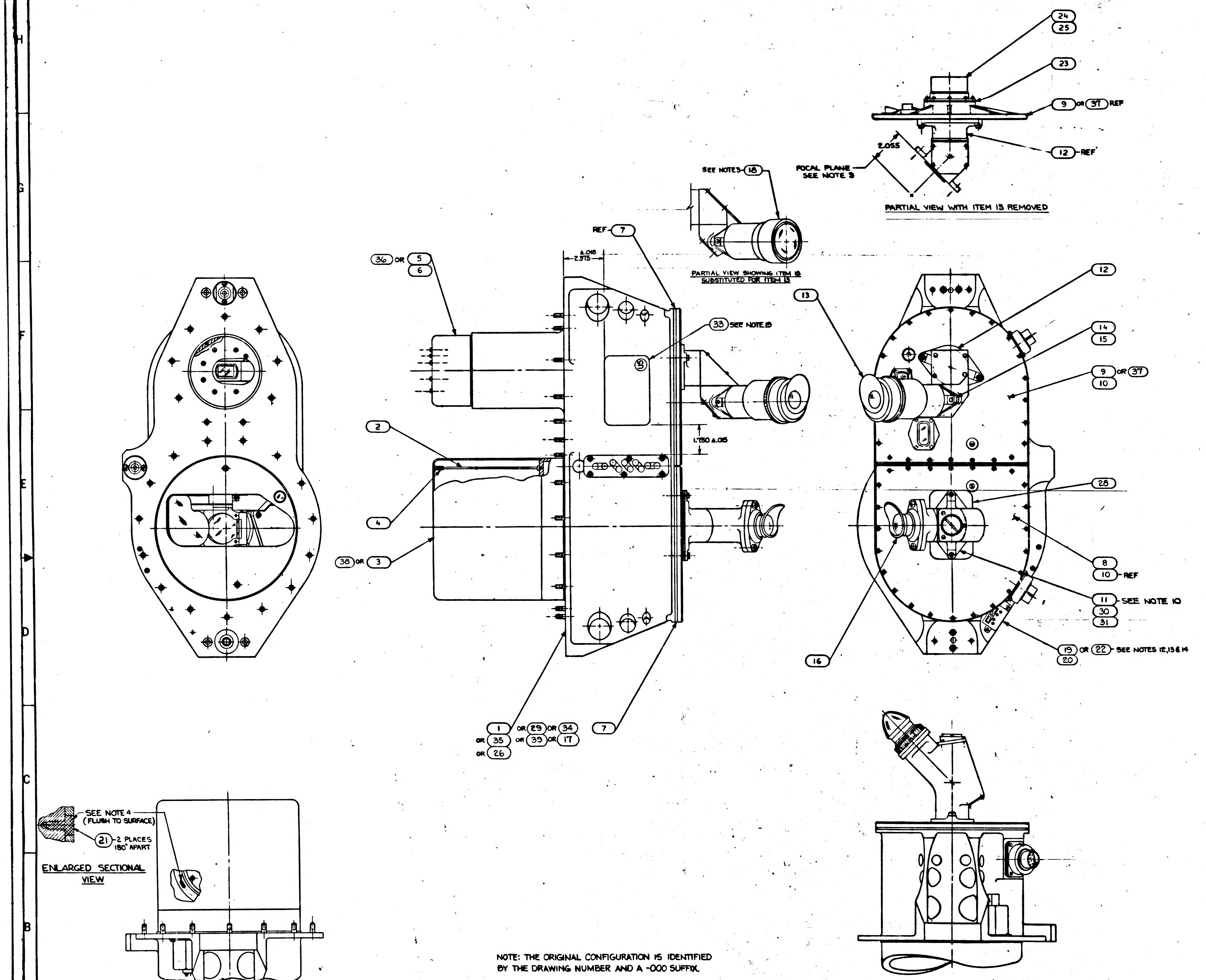
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

N 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17330	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25769	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/1/66	



24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 3
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
±.015
2.375
36 OR 5
6
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
12
13
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

NEXT ASSY | USED ON
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
SHEET 1 OF 2

N 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/18/66	WK
L		REVISED PER TDRR 25766	2/[illegible]/66	WK
M		REVISED PER TDRR 25764	2/[illegible]	WK
N		REVISED PER TDRR 26441	3/1/66	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	0	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	0	34			2012736	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
						32									
2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
						27									
0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7358691 [illegible]		SPACER			
0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	6			NAS1190C04P8L	—"—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	1	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Raymond 9/20/65
APPROVAL
APPROVAL E. Thomas 10/4/65
NOT REQUIRED PER LETTER NASA PP7-65-912
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

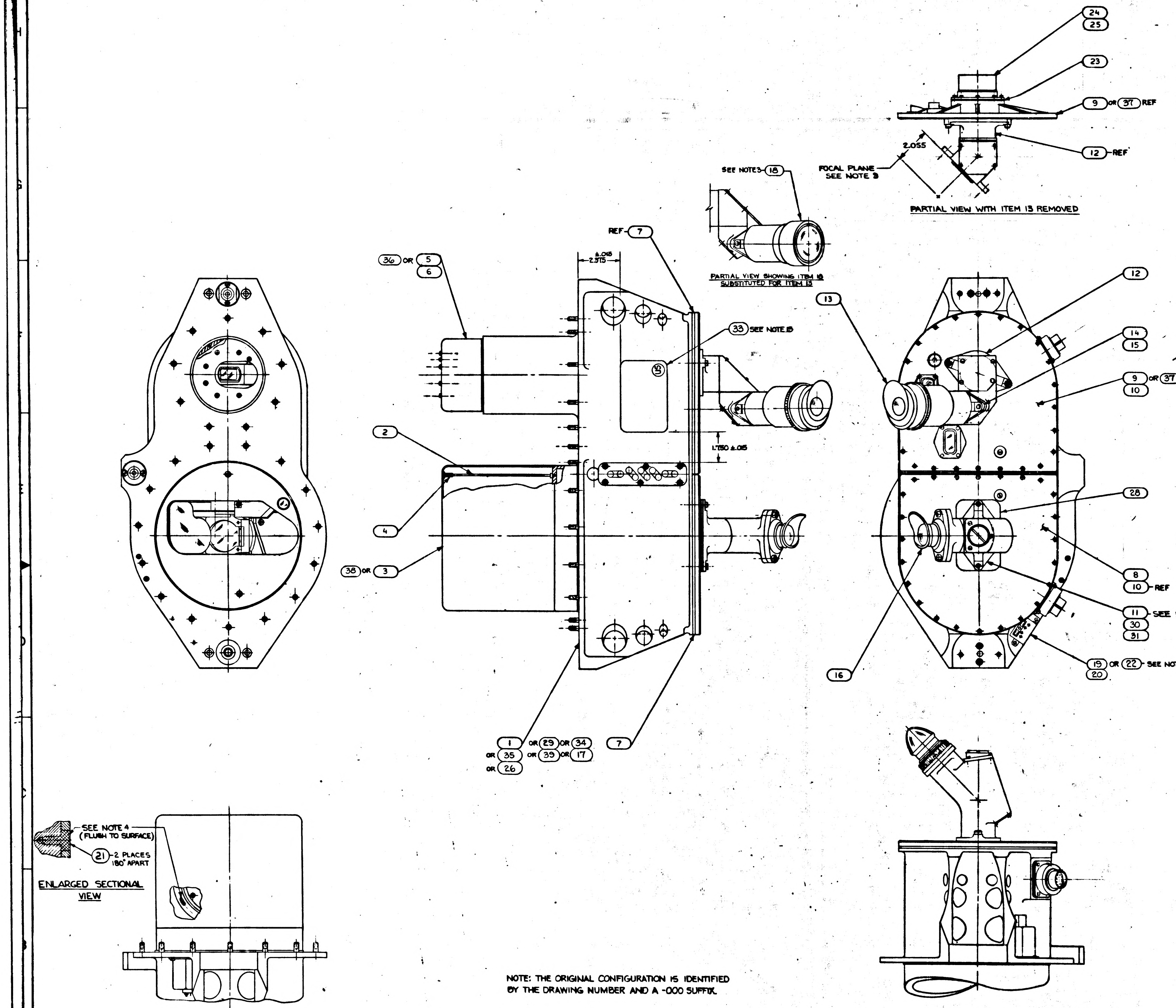
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 N

N 0001102

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/[illegible]	[illegible]
P		REVISED PER TDRR 27722	[illegible]	[illegible]



24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 3
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.018
2.515
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

NEXT ASSY —
USED ON —
APPLICATION
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-28-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible] 9/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 1 OF 2

N 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	1/18/66	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

LIST OF PARTS AND MATERIALS

	QTY REQ'D 030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	0	0	38			2012675			COVER. SEXTANT HEAD			
	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
	0	0	1	0	0	0	34			2012736	85386911810		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
							32									
	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
							27									
	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC.HD., SELF LOCKING			
	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7358691 [illegible]		SPACER			
	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC.HD., SELF-LOCKING			
	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
	1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
	AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 [illegible]		SHIM, SPACER (SCT TURRET)			
	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
	1	1	1	1	1	1	11			2011756	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC.HD., SELF-LOCKING			
	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
	1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
	4	4	4	4	4	4	6			NAS1190C04P6L	— # —		SCREW, SELF-LOCKING PAN HD. FULL THD 250°			
	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
	2	2	2	2	2	2	4			2011602	57386910560		NUT, SLOTTED FLAT, CSK HEAD			
	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
	2	2	2	2	2	2	2			2011608	53386910040		ROD, THREADED			
	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Maynard 9/20/65
APPROVAL
APPROVAL E. Thomas 10/6/65
NOT REQUIRED PER LETTER
NASA PP7-65-012
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

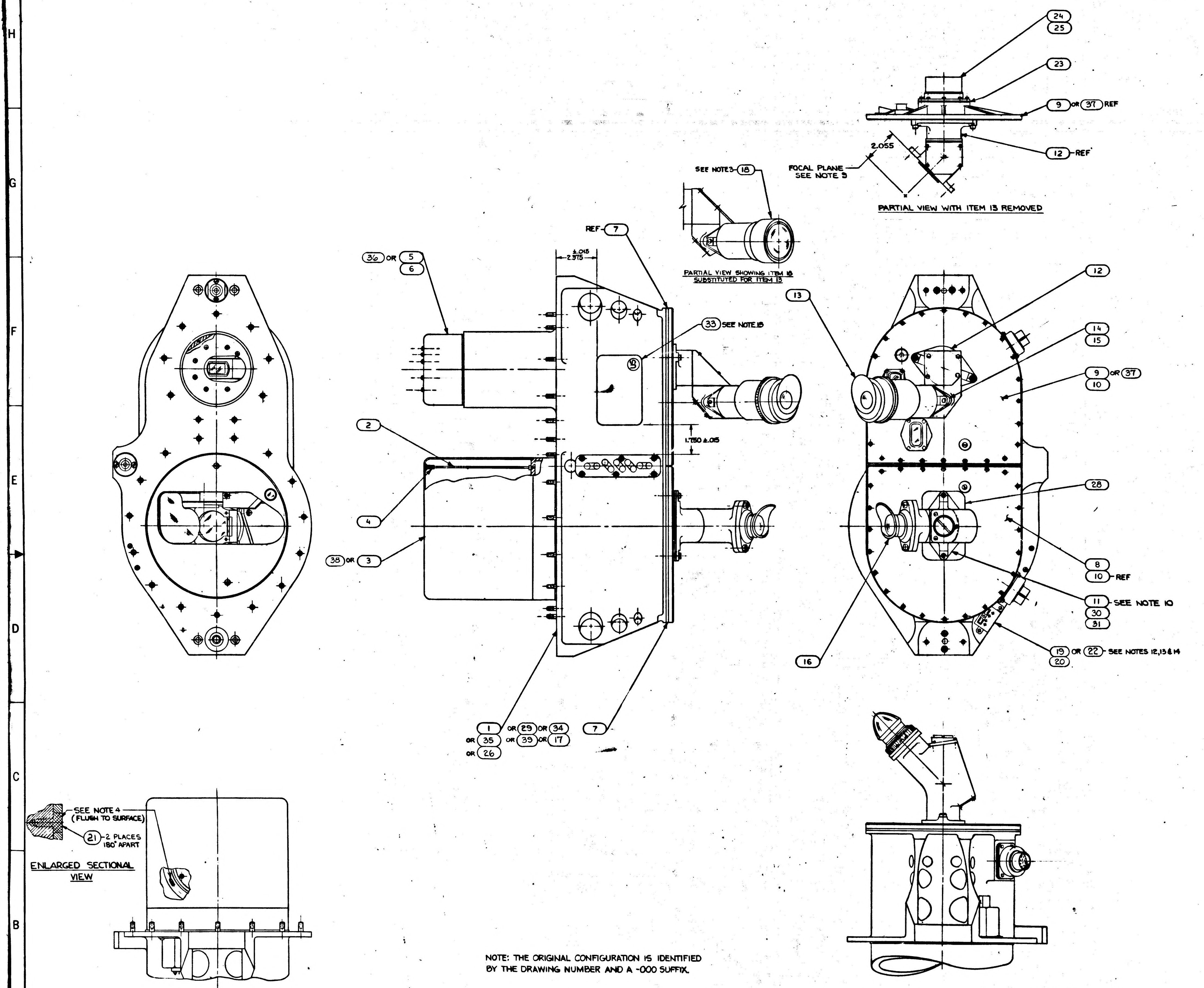
TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF

MASTER

2011000 R

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17330		
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20136		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25766		
M		REVISED PER TDRR 25764		
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	4/5/66	
R		REVISED PER TDRR 28088		



24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 5
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 15
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 88386910000
APPLICATION		DO NOT SCALE THIS DRAWING MATERIAL — CONTRACT	DRAWN DATE 7-22-64 CHECKED 8-4-64 APPROVAL APPROVAL 9/1/64 NASA APPROVAL MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011000

SCALE 1/2 WEIGHT CALC ACTUAL SHEET 1 OF 2

2011000 R

R 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN		WK
H		REVISED PER TDRR 23067		WK
J		REVISED PER TDRR 23362		WK
K		REVISED PER TDRR 25241		WK
L		REVISED PER TDRR 25766		WK
M		REVISED PER TDRR 25764		WK
N		REVISED PER TDRR 26441		WK
P		REVISED PER TDRR 27722		WK
R		REVISED PER TDRR 28088		WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
	0	0	1	0	0	0	34			2012736	85386911810		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
							32									
	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
							27									
	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691 0601 0606		SPACER			
	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
	1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 0400 0406		SHIM, SPACER (SCT TURRET)			
	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
	48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
	1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
	4	4	4	4	4	4	6			NAS1190C04R6L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000

DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Haywood 9/20/65
APPROVAL
APPROVAL E. Thomas
NOT REQUIRED PER LETTER NASA PP7-65-812
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

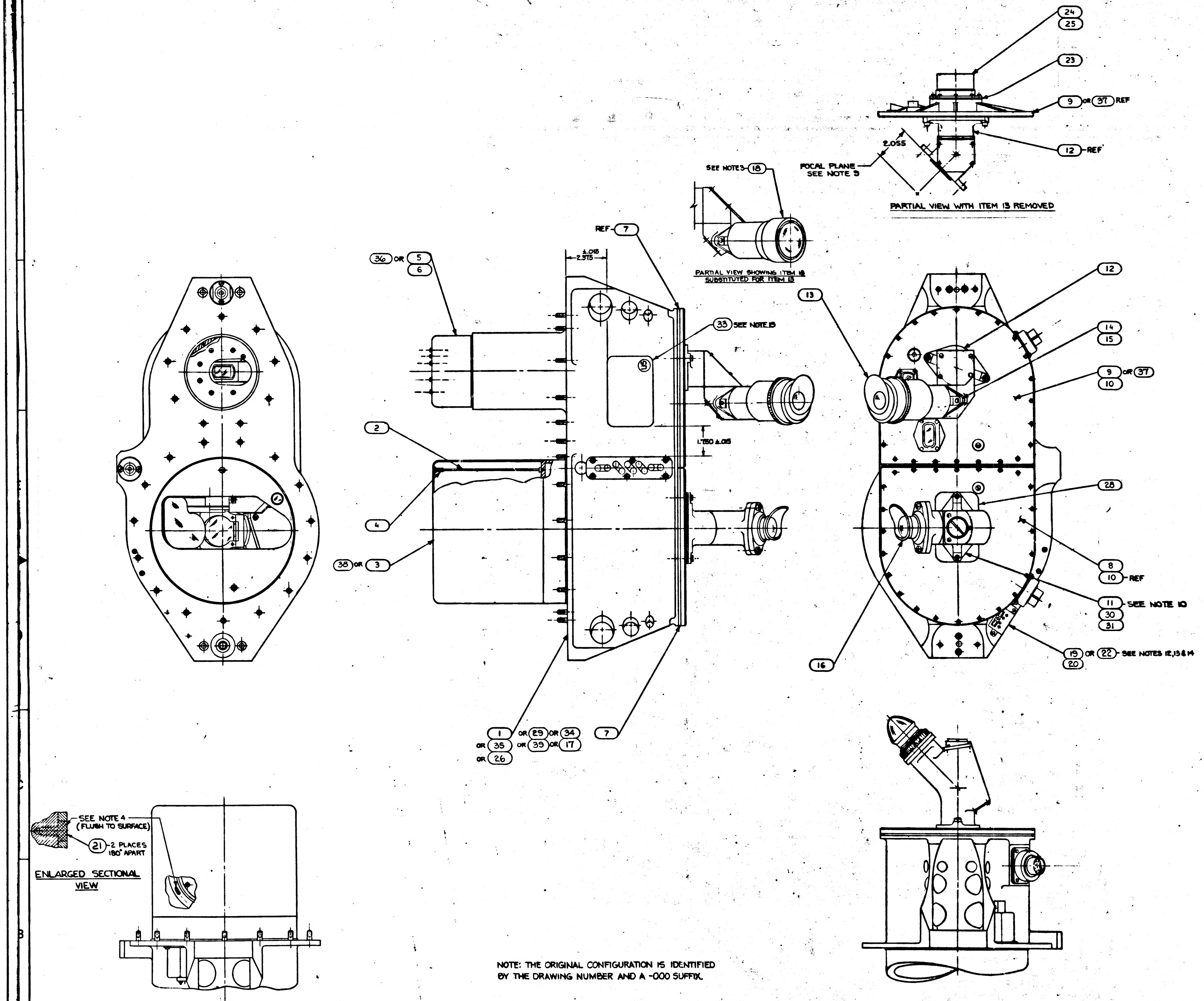
CODE IDENT NO. 30230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011000 R

MASTER

S 2011000

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO.19197	[illegible]	
C		REVISED PER TDRR NO.19851	[illegible]	[illegible]
D		REVISED PER TDRR NO.20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043	5-1-[illegible]	


24
25
23
9 OR 37 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 5
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
REF 7
36 OR 5
6
±.015
2.375
33 SEE NOTE 15
2
4
38 OR 3
1.750 ±.015
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26
7
13
12
14
15
9 OR 37
10
28
8
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-28-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 3

S 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
G		REVISED PER TDRR NO.22628 SHEET 2 REDRAWN	9/1/64	WK
H		REVISED PER TDRR 23067	11/5/64	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/13/66	WK
L		REVISED PER TDRR 25766	2/8/66	WK
M		REVISED PER TDRR 25764	2/15/66	WK
N		REVISED PER TDRR 26441	3/1/66	WK
P		REVISED PER TDRR 27722	4/8/66	WK
R		REVISED PER TDRR 28088	11/21/66	WK
S		REVISED PER TDRR 29643	5-[illegible]	[illegible]

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS (1,7 & 8) OR (29,7 & 8).
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-041 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

022	041	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	1	0	0	1	0	0	0	34			2012736	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
								32									
2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	1	1	1	28			2012573	45386910050		SHIM, FOCUSING AIR (SXT)			
								27									
0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	24			2011782	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7358691 0601 thru 0606		SPACER			
0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 thru 0406		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	1	1	8			2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	6			NAS1190C04P4L	—"—		SCREW, SELF-LOCKING PAN HD. FULL TH'D .250"			
0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Raymond 9/20/65
APPROVAL
APPROVAL E. Thomas 10/4/65
NOT REQUIRED PER LETTER NASA PP7-65-012
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 3

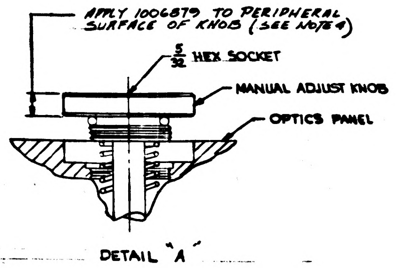
MASTER

S 2011000

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED Fr. MEC. 29043	·19·	

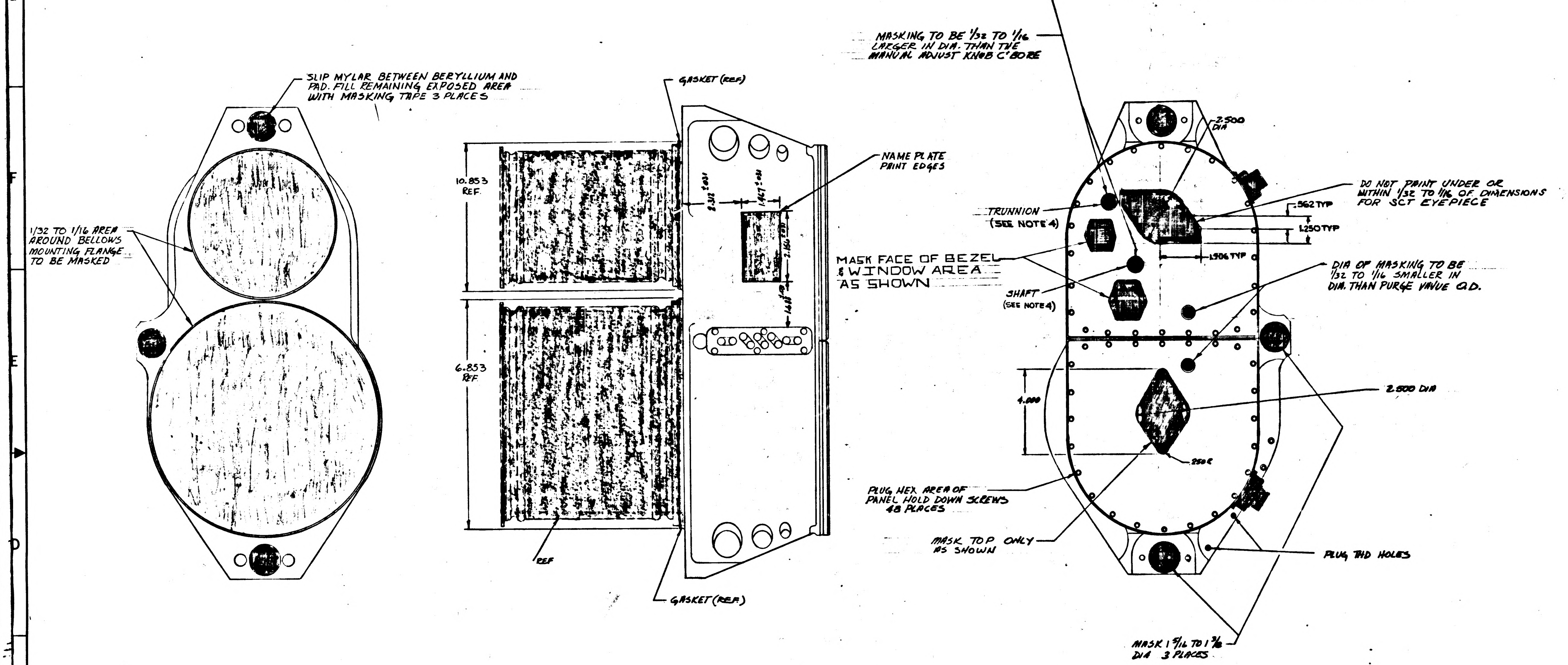
NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

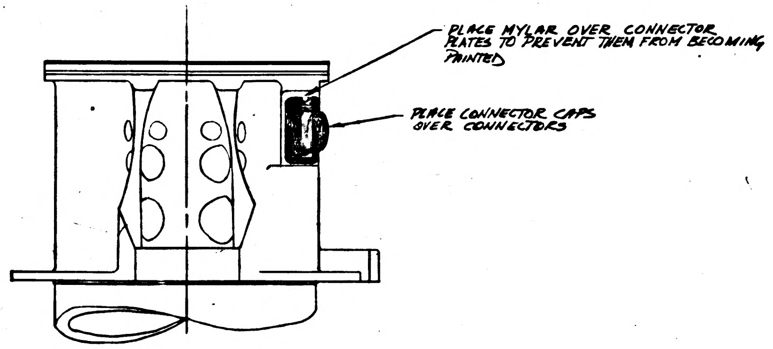

APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"

AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019


MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
10.853 REF.
6.853 REF
2.312 ±.031
1.467 ±.011
2.156 ±.011
1.618 ±.011
REF
GASKET (REF)
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
2.500 DIA
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.506 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES

MASK 1 5/16 TO 1 3/16 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL D. Brungll 4-18-66
APPROVAL
NASA APPROVAL 5/1/66
MIT APPROVAL 5/19/66

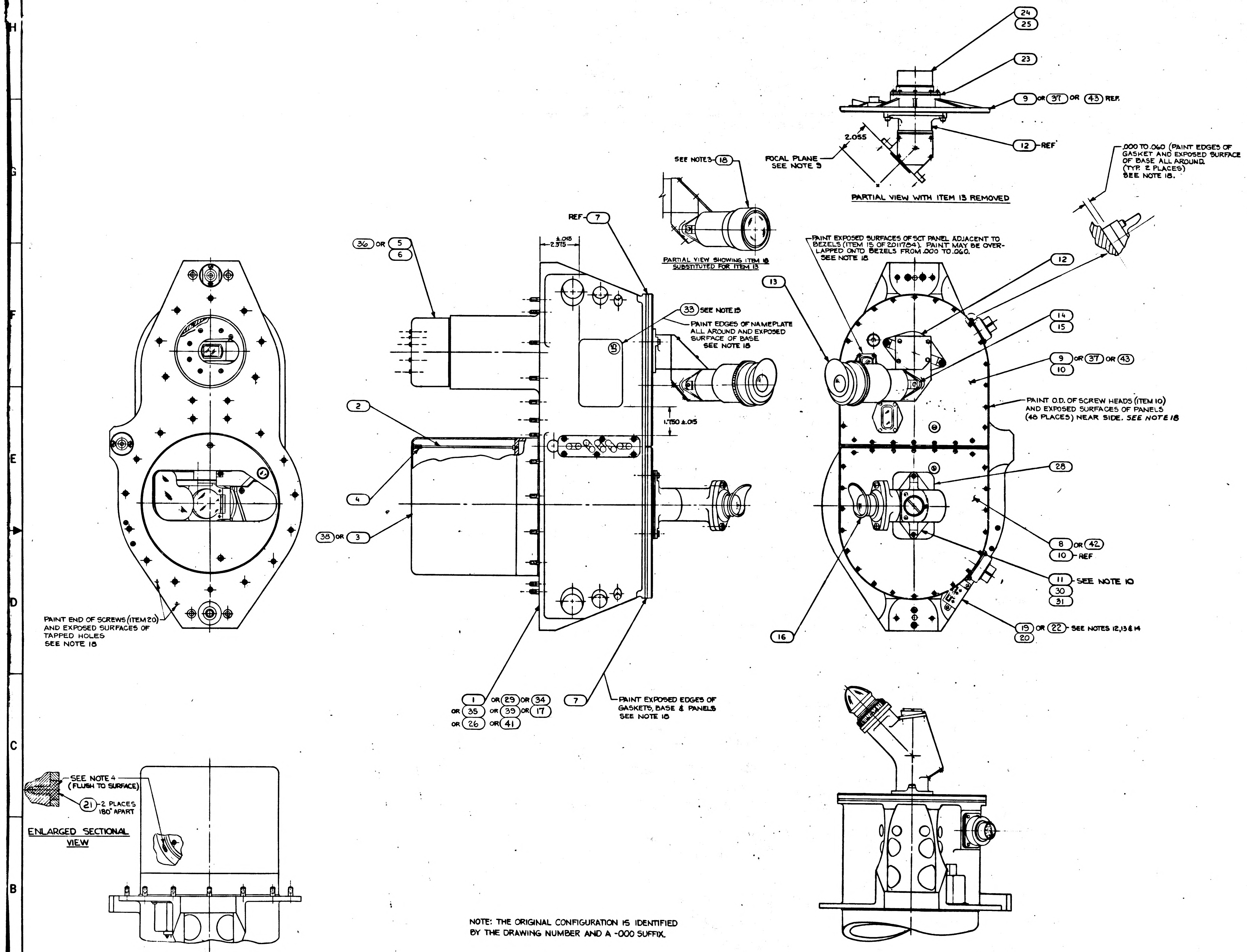
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 3

U 2011000

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17390	16 May 64	
B		REVISED PER TDRR NO. 19197		
C		REVISED PER TDRR NO. 19851		
D		REVISED PER TDRR NO. 20186		
E		REVISED PER TDRR 20691		
F		REVISED PER TDRR 22642		
G		REVISED PER TDRR 22628		
H		REVISED PER TDRR 23067		
J		REVISED PER TDRR 23362		
K		REVISED PER TDRR 25241		
L		REVISED PER TDRR 25766		
M		REVISED PER TDRR 25769		
N		REVISED PER TDRR 26441		
P		REVISED PER TDRR 27722	4/5/66	
R		REVISED PER TDRR 28088	4/21/66	
S		REVISED PER TDRR 29043		
T		REVISED PER TDRR 29144	6/1	
U		REVISED PER TDRR 29152		


24
25
23
9 OR 37 OR 43 REF.
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015
2.375
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVERLAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12, 13 & 14
20
16
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

- PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED 8-1964
APPROVAL 8/27/64
APPROVAL E. Thomy 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 3

U 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT AIR RETICLE. THIS CONDITION SHALL BE OBTAINED WITH SXT. PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN OPTICAL UNIT SUB-ASS'Y STAGE II, GASKET & SEXTANT PANEL ASSEMBLY.
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING ITEM 30 (COUNTERBORED SIDE). AFTER MACHINING, PASSIVATE PER MIL-STD-171 TABLE V FINISH NO. 5.4.1.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
11.
12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (*USING ITEM 21*)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	9/[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	11/5/65	WK
K		REVISED PER TDRR 25241	1/18/66	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	3/1/66	WK
P		REVISED PER TDRR 27722	4/5/66	WK
R		REVISED PER TDRR 28088	4/21/66	WK
S		REVISED PER TDRR 29043	5-[illegible]-66	[illegible]
T		REVISED PER TDRR 29144	6-1-66	[illegible]
U		REVISED PER TDRR 29152	6-[illegible]-66	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206
000	*	NA	NA	NA
011	*	NA	NA	NA
021	NA	*	NA	NA
031	NA	NA	NA	*
001	*	NA	NA	NA
030	NA	NA	*	NA

041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
									32									
2	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
1	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
									27									
0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7938691 0601 / 0606		SPACER			
1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
1	1	1	1	1	1	1	1	1	18			2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
2	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
AR	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 0405 / 0406		SHIM, SPACER (SCT TURRET)			
1	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
1	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
1	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	6			NAS1190C04P4L	— " —		SCREW, SELF-LOCKING PAN HD. FULL THD .250"			
0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED F. Haymond 9/20/65
APPROVAL
APPROVAL E. Thomas 10/4/65
NOT REQUIRED PER LETTER NASA PP7-55-812
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 30230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 3

2011000 E

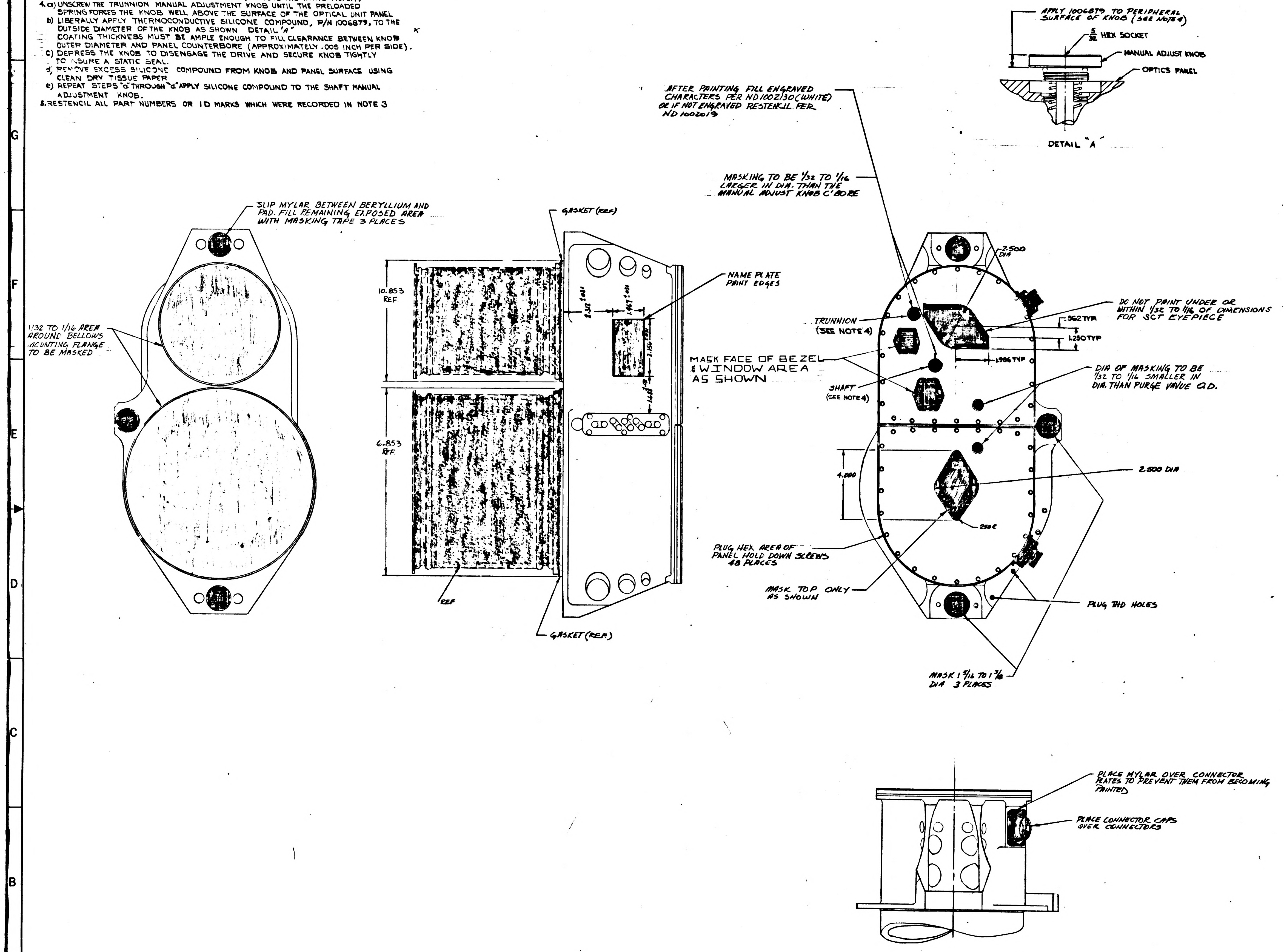
MASTER

2011000 U

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	6-1-66	
U		REVISED PER TDRR 29152	6-7-66	

NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
10.853 REF
6.853 REF
REF
GASKET (REF)
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.688 ±.031
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/16 DIA 3 PLACES
PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± —; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-18-66
CHECKED
APPROVAL N. Brangolla 4-18-66
APPROVAL Robt. E. Thompson 5/1/66
NASA APPROVAL 5/1/66
MIT APPROVAL M G Meade 5-1966

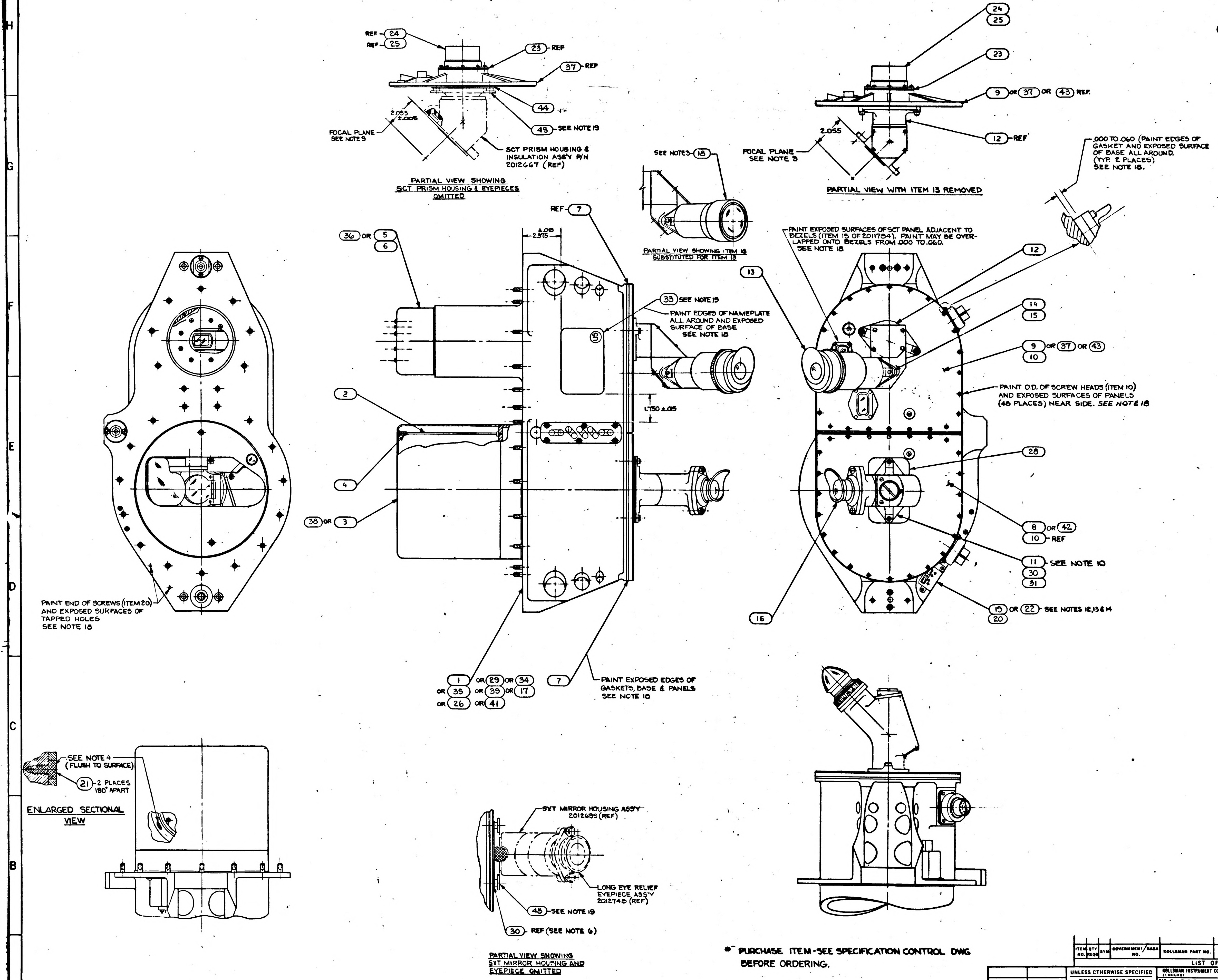
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET 3 OF 3

2011000 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17330	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25769	[illegible]	
N		REVISED PER TDRR 26441	[illegible]	
P		REVISED PER TDRR 27722	4/5/66	
R		REVISED PER TDRR 28088	4/12/66	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	


REF 24
REF 25
23 REF
37 REF
44
45 SEE NOTE 19
2.055
2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
FOCAL PLANE SEE NOTE 9
2.055
24
25
23
9 OR 37 OR 43 REF
12 REF
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
36 OR 5
6
REF 7
±.015
2.375
33 SEE NOTE 19
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible] 8-20-64
APPROVAL [illegible]
APPROVAL E. [illegible] 9/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 3

V 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	WK
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	6-14-66	
V		REVISED PER TDRR 29300	6-28-66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.

8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.

B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33, SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. *(USING ITEM 21)*
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*

041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
									32									
0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
									27									
0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6 T	7358691 0601 [illegible] 0606		SPACER			
1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	8538691[illegible]40		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7 T	5638391 0400 [illegible] 0406		SHIM, SPACER (SCT TURRET)			
0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	6			NAS1190C04P8L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C.WILLIAMS DATE 9-17-65
CHECKED F. Haywood 9/16/65
APPROVAL
APPROVAL E. Thomas 10/4/65
NOT REQUIRED PER LETTER
NASA PP7-65-012
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 3

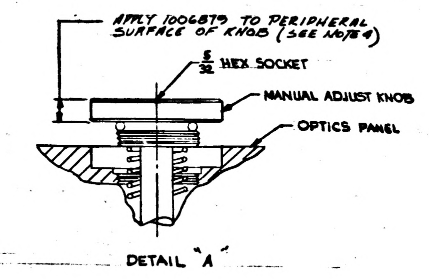
MASTER

∧ 0001102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	6-1-66	
U		REVISED PER TDRR 29152	6-14-66	
V		REVISED PER TDRR 29300		

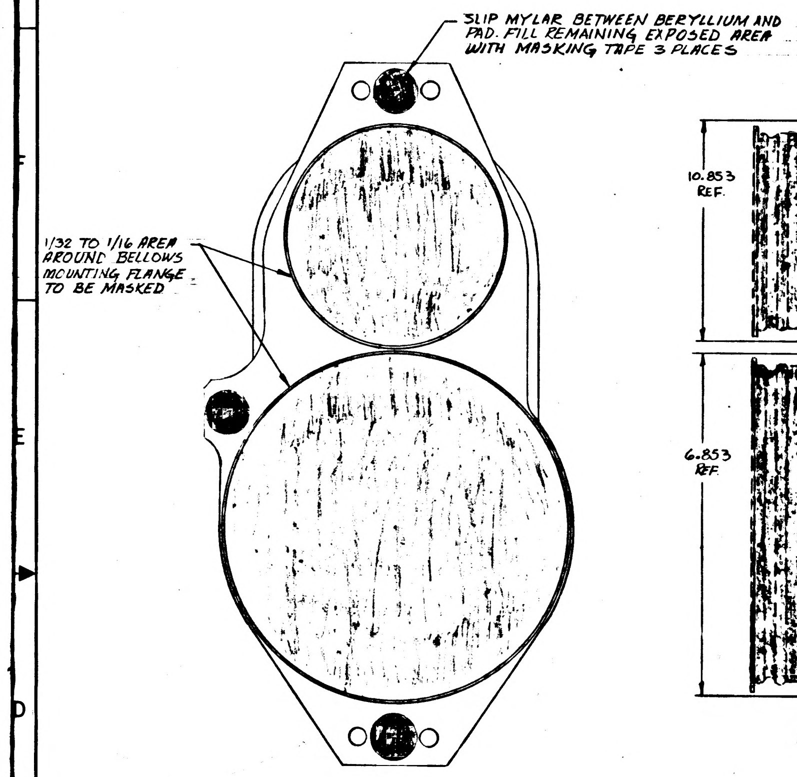
NOTES:

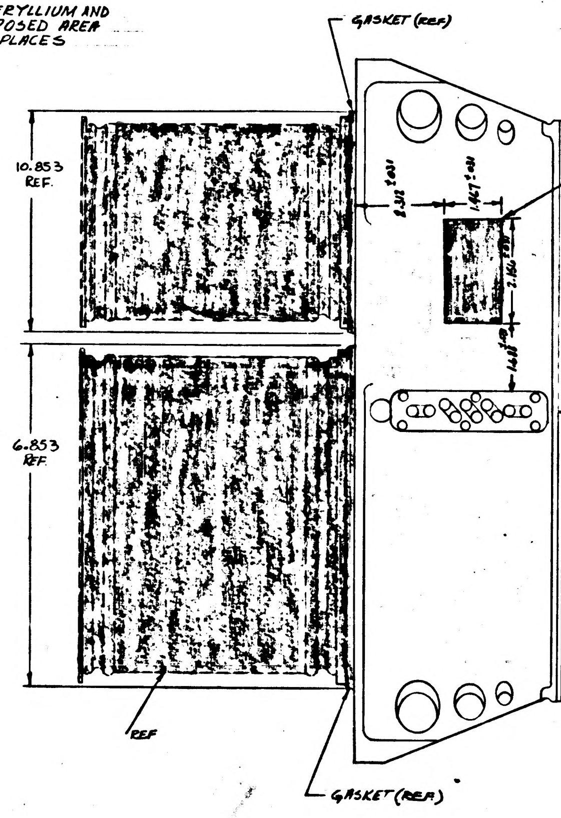
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR [illegible]NG MUST BE LOCATED WITH RESPECT TO [illegible] EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

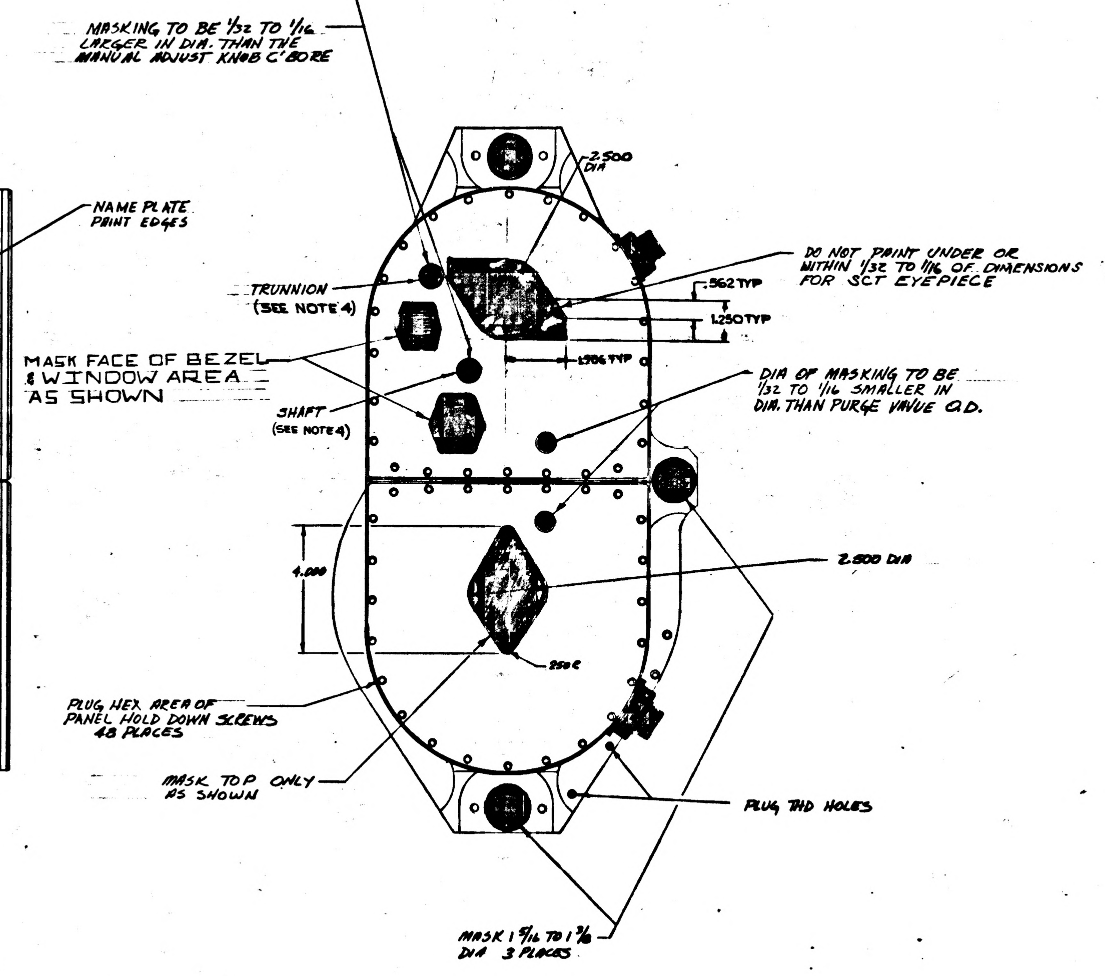

APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

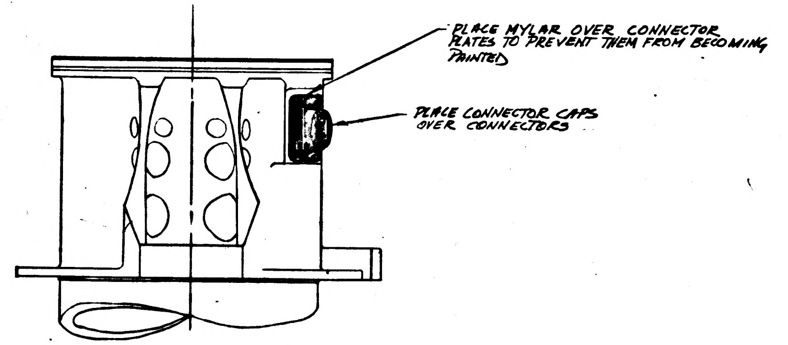
DETAIL "A"

AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


GASKET (REF)
10.853 REF.
6.853 REF.
2.312 ±.031
1.467 ±.031
2.160 ±.031
1.618 ±.031
REF
GASKET (REF)
NAME PLATE PAINT EDGES


MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
TRUNNION (SEE NOTE 4)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
2.500 DIA
4.000
.250R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN AMB DATE 4-15-66
CHECKED
APPROVAL 4-18-66
APPROVAL
NASA APPROVAL 5/66
MIT APPROVAL 5 1966

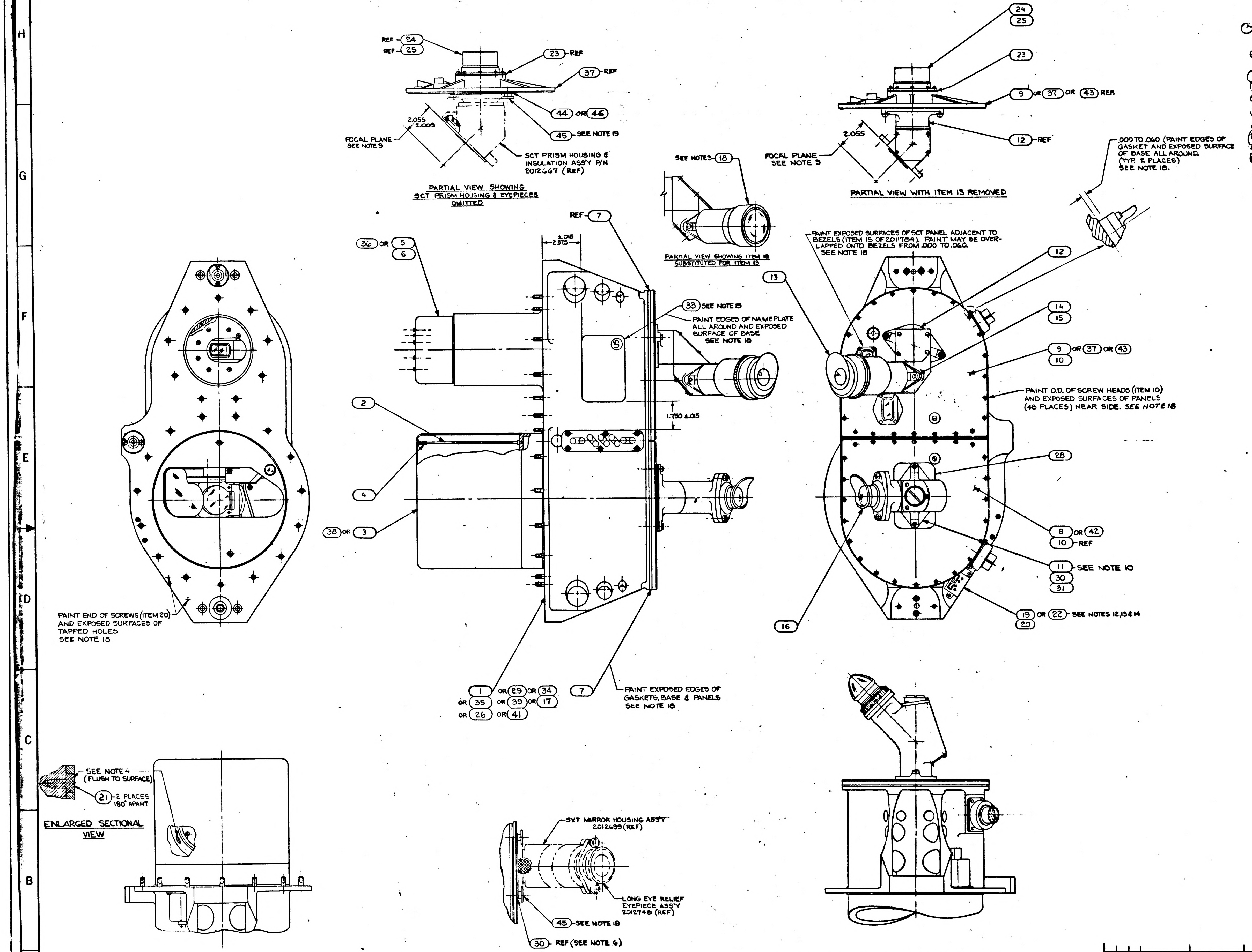
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 5

M 0001102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR N. 19197	[illegible]	[illegible]
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22542	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 22767	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	4/1/66	
R		REVISED PER TDRR 28088	4/26/66	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055
2.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
24
25
23
9 OR 37 OR 43 REF
12 REF
2.055
FOCAL PLANE SEE NOTE 9
PARTIAL VIEW WITH ITEM 13 REMOVED
SEE NOTE 3 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
36 OR 5
6
REF 7
±.015
2.315
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012695 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYE IECE OMITTED

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

NEXT ASSY — USED ON —
APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F. Schulle DATE 7-22-64
CHECKED C. [illegible] 8-10-64
APPROVAL [illegible] 8/7/64
APPROVAL E. Thomp 9/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 3

2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. WITH THE SEXTANT PANEL ASSY FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   - a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   - b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
7. AFTER MACHINING [illegible] ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO ⅓ OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    - A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    - B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23 62	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28038	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	6-[illegible]	[illegible]
V		REVISED PER TDRR 29300	6-28-66	[illegible]
W		REVISED PER TDRR 29558	7-12-[illegible]	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA

LIST OF PARTS AND MATERIALS

QTY REQ'D 034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-005			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
															32									
0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910050		SHIM, FOCUSING AIR (SXT)			
															27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE I			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691 [illegible]		SPACER			
1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	* SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 0485 0486		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM ASSY OF			
0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157016		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R6L	—#—		SCREW, SELF-LOCKING PAN HD. FULL TH'D 250°			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL: ___
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED [illegible] 9/20/65
APPROVAL
APPROVAL [illegible] 10/4/65
NOT REQUIRED PER LETTER NASA PP7-65-812
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 8C230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT
CALC / ACTUAL
SHEET 2 OF 3

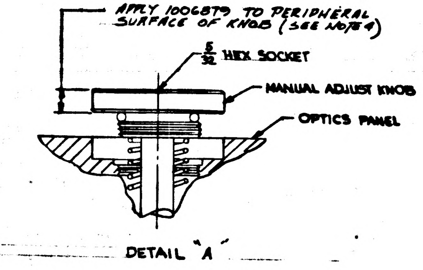
MASTER

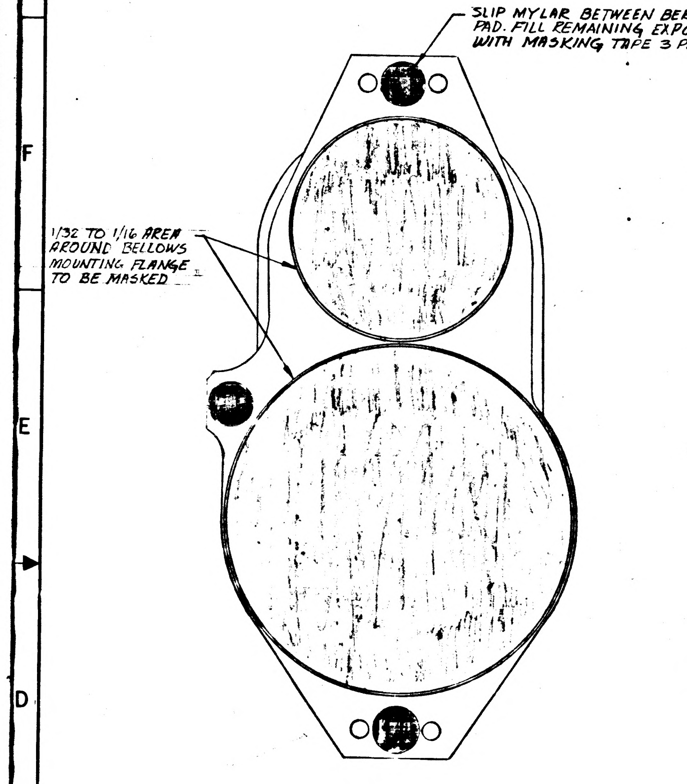
NOTES:

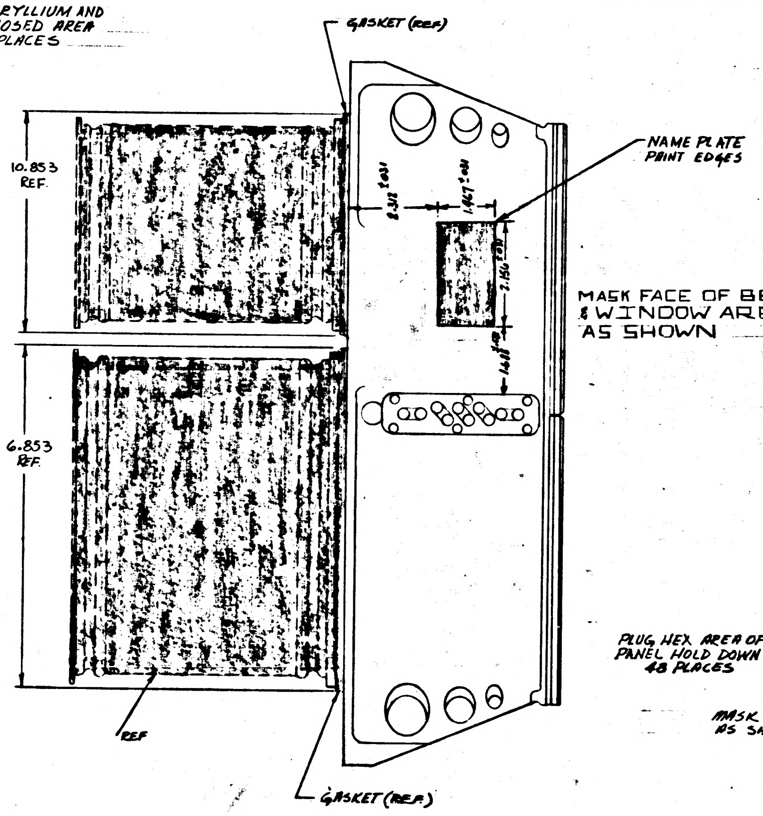
1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A" COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

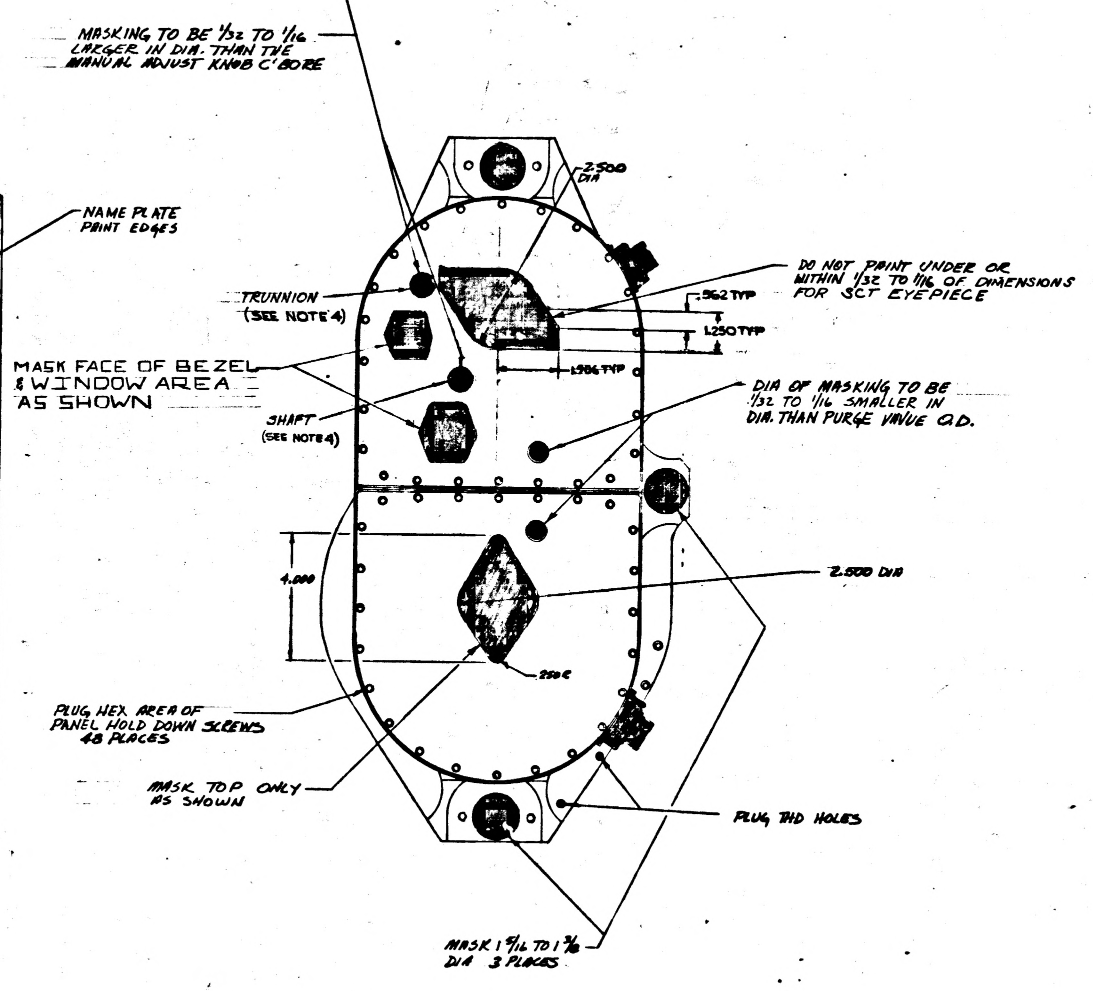
M 0001102

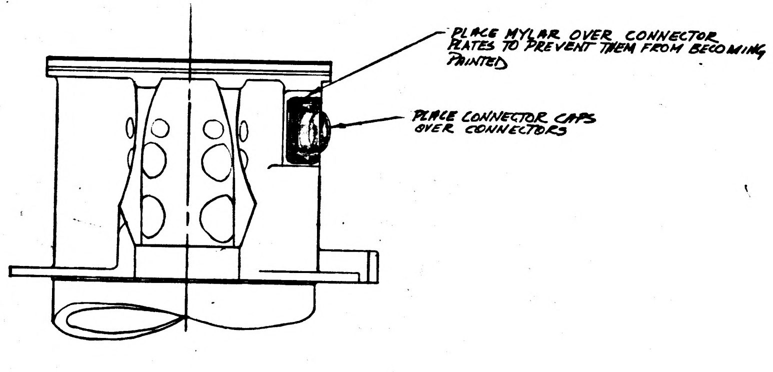
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	6-1-66	
U		REVISED PER TDRR 29152	6-14-66	
V		REVISED PER TDRR 29300	6-28-66	
W		REVISED PER TDRR 29558	7-12-66	


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


GASKET (REF)
10.853 REF.
6.853 REF.
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.608 ±.031
NAME PLATE PAINT EDGES
REF
GASKET (REF)


AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
2.500 DIA
TRUNNION (SEE NOTE 4)
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
SHAFT (SEE NOTE 4)
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

2011000 W

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL D. Brungold 4-8-66
APPROVAL
NASA APPROVAL 5/1/66
MIT APPROVAL 5-1966

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

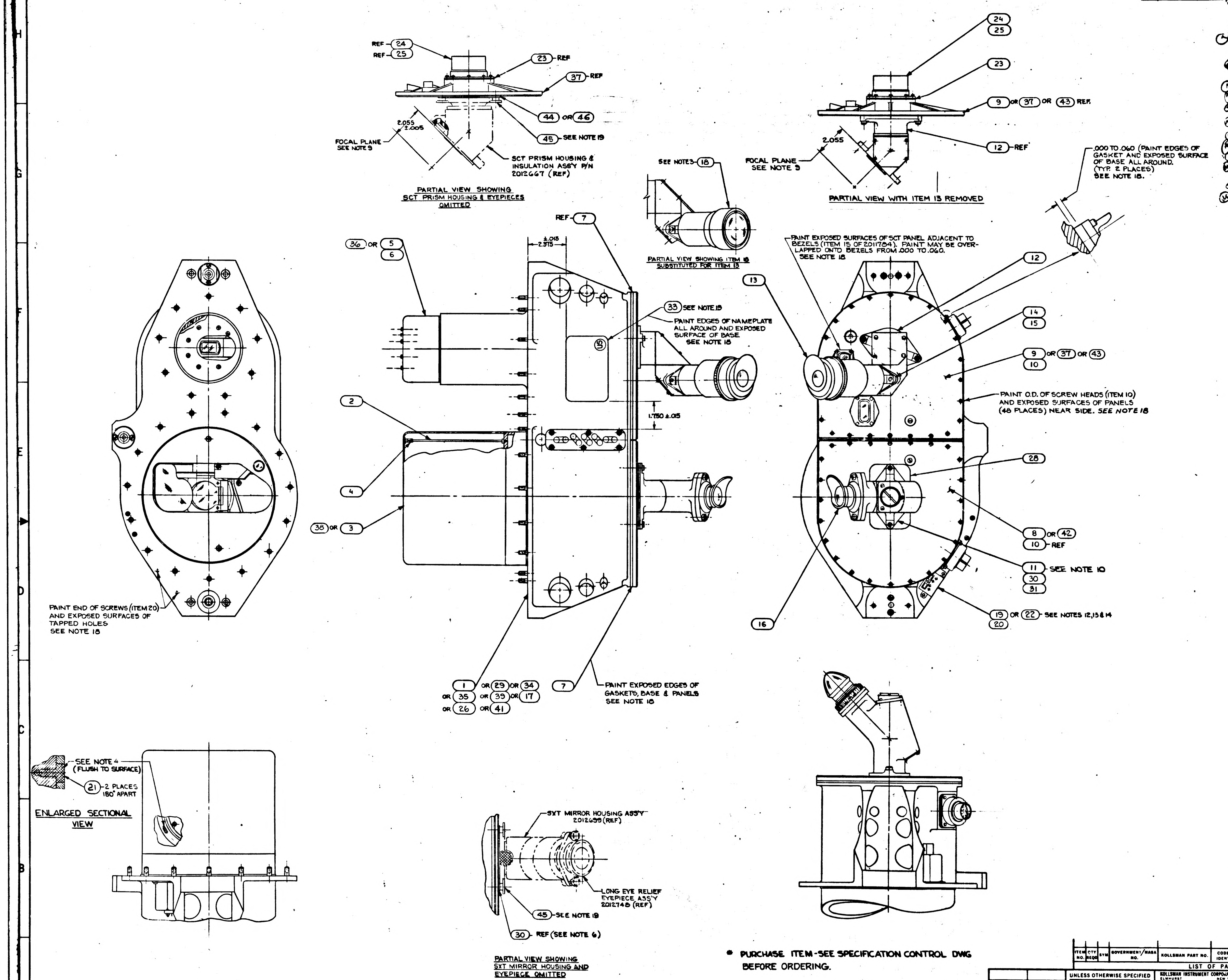
TITLE
OPTICAL UNIT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011000
SCALE 1/2	WEIGHT CALC ACTUAL	SHEET 3 OF 3

2011000 Y

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO. 19197	[illegible]	
C		REVISED PER TDRR NO. 19851	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20186	[illegible]	
E		REVISED PER TDRR 20691	[illegible]	
F		REVISED PER TDRR 22642	[illegible]	
G		REVISED PER TDRR 22628	[illegible]	
H		REVISED PER TDRR 23067	[illegible]	
J		REVISED PER TDRR 23362	[illegible]	
K		REVISED PER TDRR 25241	[illegible]	
L		REVISED PER TDRR 25766	[illegible]	
M		REVISED PER TDRR 25764	[illegible]	
N		REVISED PER TDRR 26441	3/1/64	
P		REVISED PER TDRR 27722	[illegible]	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560	[illegible]	


REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055 ±.005
FOCAL PLANE SEE NOTE 9
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
SEE NOTE 3 18
24
25
23
9 OR 37 OR 43 REF
2.055
FOCAL PLANE SEE NOTE 9
12 REF
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP. 2 PLACES) SEE NOTE 18.
REF 7
36 OR 5
6
±.015 2.375
33 SEE NOTE 19
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.015
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)

PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED

PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13

PARTIAL VIEW WITH ITEM 13 REMOVED

ENLARGED SECTIONAL VIEW

PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± —; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN [illegible] DATE 7-22-64
CHECKED [illegible] 8-1964
APPROVAL [illegible]
APPROVAL E. [illegible] 9/11/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 1 OF 4

Y	2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE (USING ITEM 21).
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASSY, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   - +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   - -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.
7. AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   B. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO ⅓ OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 26

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22628 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	WK
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035.	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA

SEE CHART TABLE III SH4

035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE BEARING (SCT)			
4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																32									
0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-1/6T	7358691 [illegible]		SPACER			
1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		*	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		*	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189CC2P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-1/7T	5638391 0400 [illegible] 0406		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	42	48	48	10			NAS1352C04LL8	74455157018		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		*	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04P8L	— " —		SCREW, SELF-LOCKING PAN HD. FULL TH'D .250"			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ——; DECIMALS ± ——; ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN A.C. WILLIAMS DATE 9-17-65
CHECKED [illegible] 9/16/65
APPROVAL
APPROVAL [illegible]
NOT REQUIRED PER LETTER NASA PP7 55-612
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 4

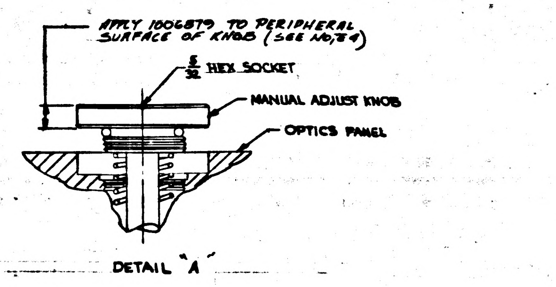
MASTER

2011000 Y

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043	[illegible]	
T		REVISED PER TDRR 29144	6-7-66	
U		REVISED PER TDRR 29152	6-17-66	
V		REVISED PER TDRR 29300	6-28-66	
W		REVISED PER TDRR 29558	7-12-66	
Y		REVISED PER TDRR 29560	7-26-66	

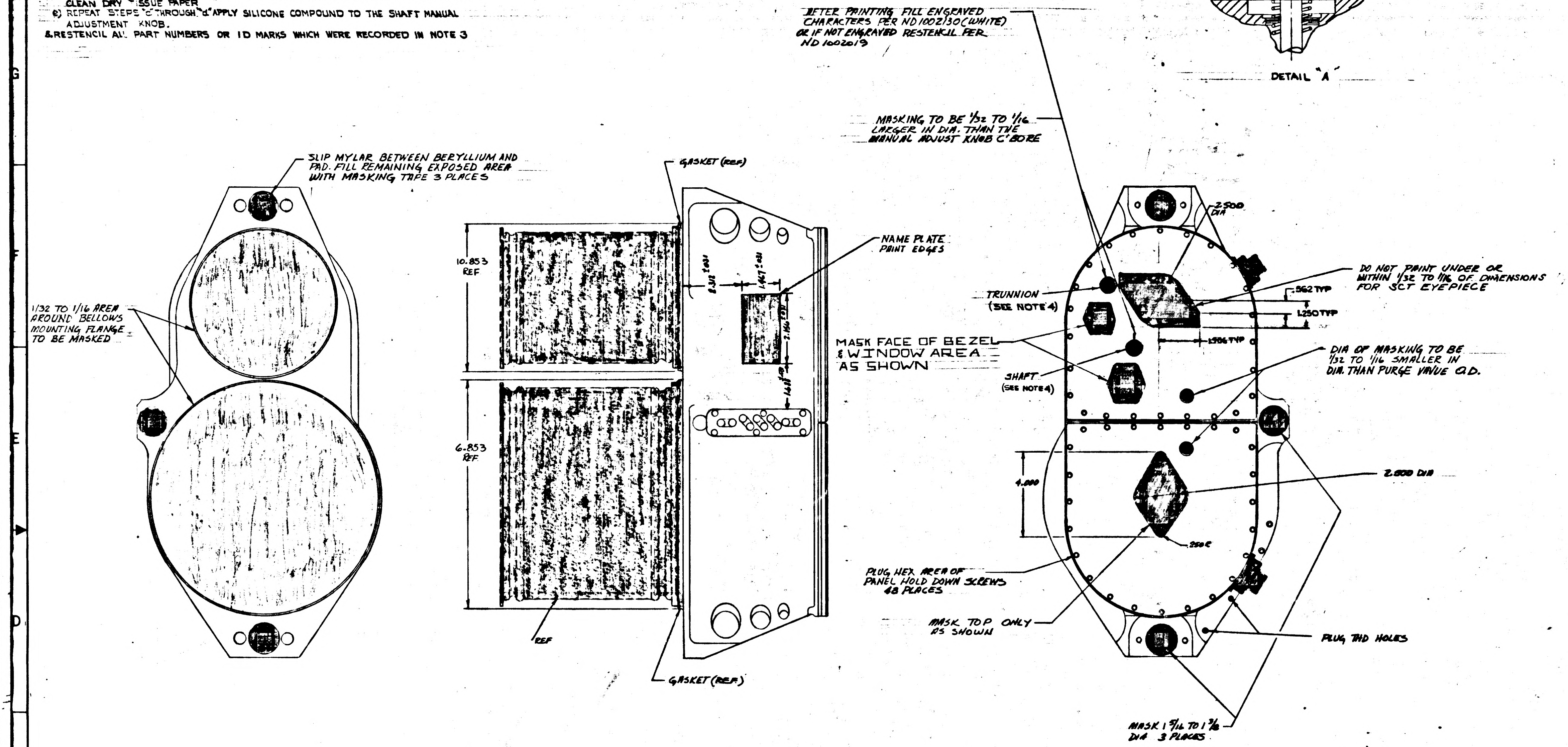
NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "c" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3

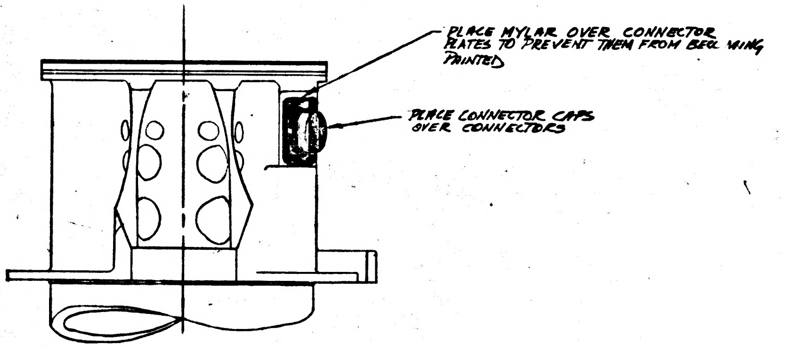


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL

DETAIL "A"



AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED
GASKET (REF)
10.853 REF
6.853 REF
REF
GASKET (REF)
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.608 ±.031
NAME PLATE PAINT EDGES
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.506 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES



PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BEING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN AMB DATE 4-8-66
CHECKED
APPROVAL 4-8-66
APPROVAL
NASA APPROVAL 5/66
MIT APPROVAL 5-1966

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

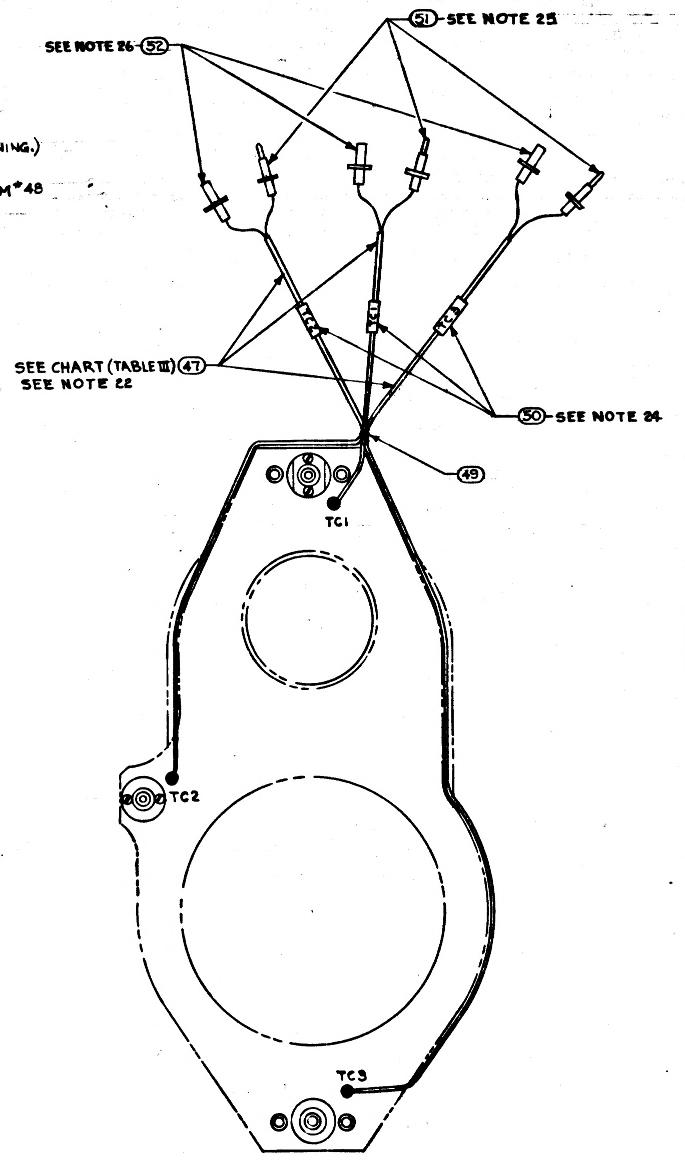
TITLE
OPTICAL UNIT

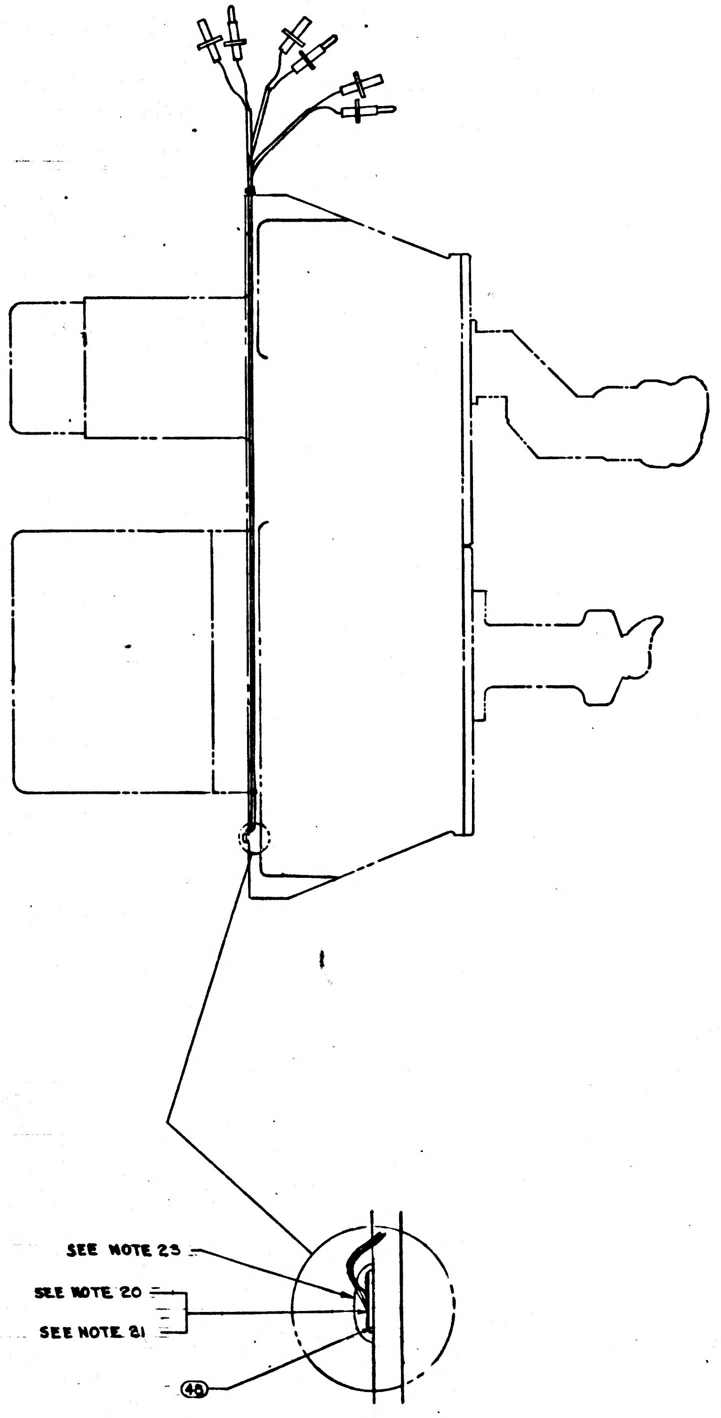
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 3 OF 7

Y 2011000

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-D-66	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
    - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
    - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
    - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE. WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN Al Rhodes DATE 5-18-66
CHECKED R Jackson 5-19-66
APPROVAL
APPROVAL E. Wang 6-9-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL W G Newly 6-14

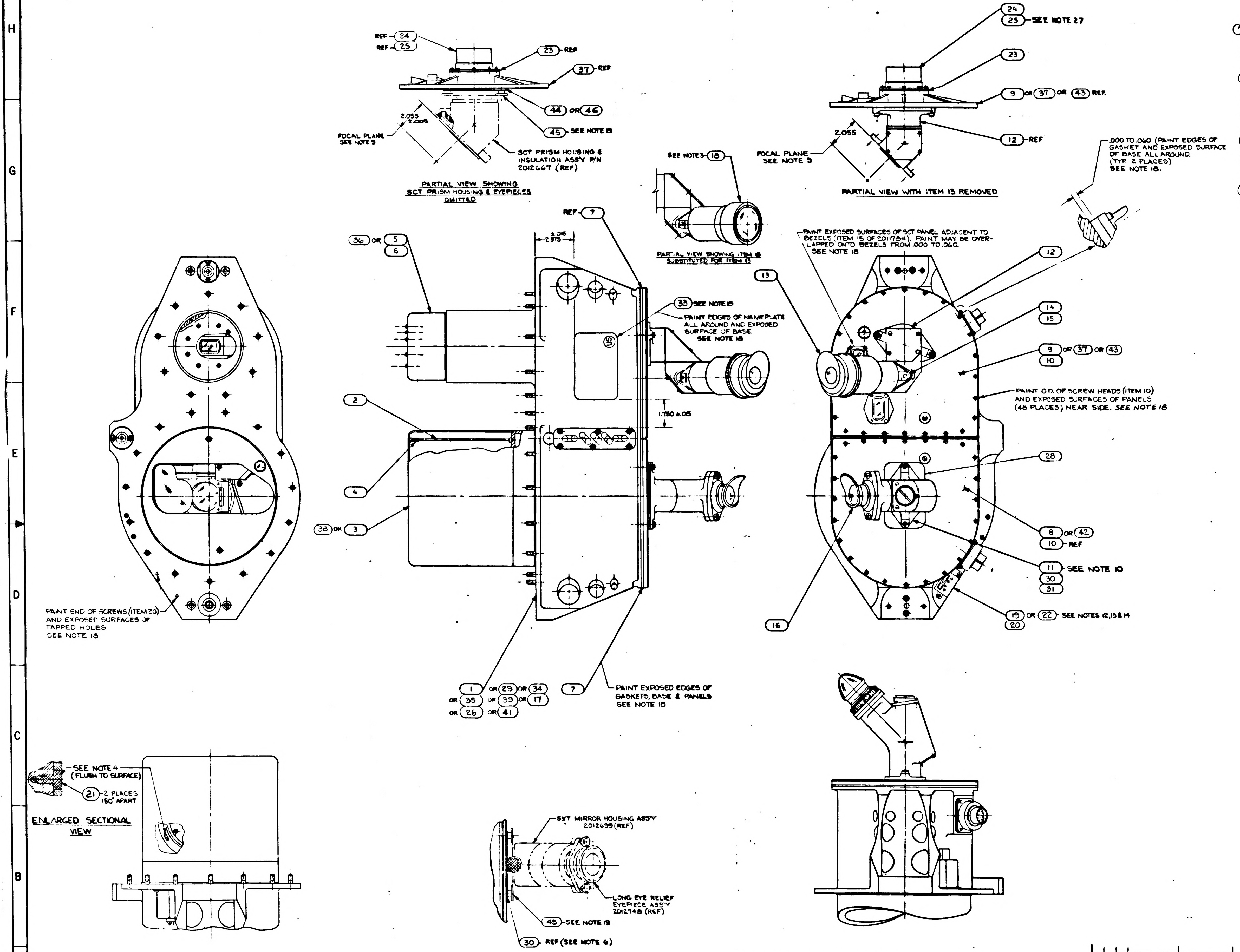
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET 4 OF 4

Z 0001102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO.17390	[illegible]	[illegible]
B		REVISED PER TDRR NO.19197	[illegible]	[illegible]
C		REVISED PER TDRR NO.19851	[illegible]	[illegible]
D		REVISED PER TDRR NO 20186	[illegible]	[illegible]
E		REVISED PER TDRR 20691	[illegible]	[illegible]
F		REVISED PER TDRR 22642	[illegible]	[illegible]
G		REVISED PER TDRR 22628	[illegible]	[illegible]
H		REVISED PER TDRR 23067	[illegible]	[illegible]
J		REVISED PER TDRR 23362	[illegible]	[illegible]
K		REVISED PER TDRR 25241	[illegible]	[illegible]
L		REVISED PER TDRR 25766	[illegible]	[illegible]
M		REVISED PER TDRR 25764	[illegible]	[illegible]
N		REVISED PER TDRR 26441	3/1/66	
P		REVISED PER TDRR 27722	4/1/66	
R		REVISED PER TDRR 28088	[illegible]	
S		REVISED PER TDRR 29643	[illegible]	
T		REVISED PER TDRR 29144	[illegible]	
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	
W		REVISED PER TDRR 29558	[illegible]	
Y		REVISED PER TDRR 29560		
Z		REVISED PER TDRR 30742	8-8-66	[illegible]



REF 24
REF 25
23 REF
37 REF
44 OR 46
45 SEE NOTE 19
2.055
2.005
FOCAL PLANE SEE NOTE 5
SCT PRISM HOUSING & INSULATION ASS'Y P/N 2012667 (REF)
PARTIAL VIEW SHOWING SCT PRISM HOUSING & EYEPIECES OMITTED
SEE NOTES 18
PARTIAL VIEW SHOWING ITEM 18 SUBSTITUTED FOR ITEM 13
24
25 SEE NOTE 27
23
9 OR 37 OR 43 REF.
12 REF
2.055
FOCAL PLANE SEE NOTE 5
PARTIAL VIEW WITH ITEM 13 REMOVED
.000 TO .060 (PAINT EDGES OF GASKET AND EXPOSED SURFACE OF BASE ALL AROUND. (TYP 2 PLACES) SEE NOTE 18.
REF 7
2.375 ±.015
36 OR 5
6
33 SEE NOTE 15
PAINT EDGES OF NAMEPLATE ALL AROUND AND EXPOSED SURFACE OF BASE SEE NOTE 18
1.750 ±.05
2
4
38 OR 3
PAINT EXPOSED SURFACES OF SCT PANEL ADJACENT TO BEZELS (ITEM 15 OF 2011784). PAINT MAY BE OVER-LAPPED ONTO BEZELS FROM .000 TO .060. SEE NOTE 18
13
12
14
15
9 OR 37 OR 43
10
PAINT O.D. OF SCREW HEADS (ITEM 10) AND EXPOSED SURFACES OF PANELS (48 PLACES) NEAR SIDE. SEE NOTE 18
28
8 OR 42
10 REF
11 SEE NOTE 10
30
31
19 OR 22 SEE NOTES 12,13 & 14
20
16
PAINT END OF SCREWS (ITEM 20) AND EXPOSED SURFACES OF TAPPED HOLES SEE NOTE 18
1 OR 29 OR 34
OR 35 OR 39 OR 17
OR 26 OR 41
7
PAINT EXPOSED EDGES OF GASKETS, BASE & PANELS SEE NOTE 18
SEE NOTE 4 (FLUSH TO SURFACE)
21 2 PLACES 180° APART
ENLARGED SECTIONAL VIEW
SXT MIRROR HOUSING ASS'Y 2012699 (REF)
LONG EYE RELIEF EYEPIECE ASS'Y 2012748 (REF)
45 SEE NOTE 19
30 REF (SEE NOTE 6)
PARTIAL VIEW SHOWING SXT MIRROR HOUSING AND EYEPIECE OMITTED

● PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 8838691000
DRAWN F. S. Cullo DATE 7-22-64
CHECKED C. [illegible] 8-1964
APPROVAL [illegible]
APPROVAL E. [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC
ACTUAL
SHEET 1 OF 4

Z 2011000

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2.
3. ITEM 18 REPRESENTS THE SUBSTITUTION OF ITEM 13 WITH LONG EYE RELIEF EYEPIECE. ITEM 18 (NOT INCLUDED IN 2011000) IS AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION (2 PLACES) IN ACCORDANCE WITH ND1002219, METHOD II.
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. WITH THE SEXTANT PANEL ASS'Y FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN THE OPTICAL BASE, GASKET AND SXT PANEL ASS'Y, MACHINE ITEM 30 (COUNTERBORED SIDE) TO OBTAIN A FOCUS RANGE OF:
   a. +2 TO -2 DIOPTERS (MINIMUM) USING THE SEXTANT EYEPIECE, ITEM 16, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. -1.00 ±.025 DIOPTERS USING THE LONG EYE RELIEF EYEPIECE, PART NO. 2012748 WITH PART NO. 2012699 OF 2015000 OR EQUIVALENT, MEASURED TO THE SEXTANT AIR RETICLE, FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES.

AFTER MACHINING PASSIVATE ITEM 30 PER MIL-STD-171, TABLE V.

8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.

9A. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. USE A MAXIMUM OF TWO SPACERS (ITEM 23) AS REQUIRED TO ACHIEVE THE 2.055 ±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION, FOR CONFIGURATIONS FURNISHED WITH EYEPIECES.
   b. FOR CONFIGURATIONS FURNISHED WITHOUT EYEPIECES, USE A MAXIMUM OF 2 SPACERS (ITEM 23) TO ACHIEVE THE 2.055 ±.005 DIMENSION.

10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.

12. REMOVE COVER FROM ITEM 19 OR 22
    A. TRIM ELECTRICAL ZERO OF SXT 64x (TRUNNION) RESOLVER TO WITHIN 3 SECONDS OF ARC OF ITS TDA ZERO REFERENCE POINT BY ADJUSTING R1.
    B. TRIM ELECTRICAL ZERO OF SXT 16x (SHAFT) RESOLVER TO WITHIN 10 SECONDS OF ITS SDA ZERO REFERENCE POINT BY ADJUSTING R2.
13. MODULE AND OPTICAL UNIT (2011000) MUST BE IDENTIFIED AS MATCHED PAIRS. MARK MODULE ASSY USING NASA DWG. NO., REVISION LETTER, OPTICAL UNIT SERIAL NO. & MANUFACTURER'S SYMBOL .125 ±.020 HIGH IN ACCORDANCE WITH ND1002019.
14. POT CLEARANCE CAVITIES FOR TRIM RESISTORS IN ACCORDANCE WITH ND1002240 METHOD A OR B. DO NOT DISTURB RESISTOR SETTING. REPLACE COVER.
15. NAMEPLATE, ITEM 33 SHALL BE APPLIED IN ACCORDANCE WITH ND1002219, METHOD II. (USING ITEM 21)
16. COMPLETE ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH, AND SHALL MEET ALL THE REQUIREMENTS OF PROCUREMENT SPEC. (SEE TABLE II)
17. FOR 2011000-022 CONFIGURATION MASK IN ACCORDANCE WITH ND1002294 AND PAINT IN ACCORDANCE WITH ND1002291. FOR 2011000-032 CONFIGURATION MASK AS SHOWN ON SHEET 3 OF THIS DWG. AND PAINT IN ACCORDANCE WITH ND1002291.
18. AFTER COMPLYING WITH THE REQUIREMENTS OF THE APPLICABLE PROCUREMENT SPEC. FOR -041 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING ITEM 40 IN ACCORDANCE WITH ND1002291 WHERE INDICATED ON SHEET 1. (PRIMER MAY BE OMITTED FROM ANODIZED SURFACES)
19. VIBRATION PROOF ITEM 45, USING GRADE "A" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

REFER TO SHEET 4 FOR NOTES 20 THRU 27

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
G		REVISED PER TDRR NO. 22-29 SHEET 2 REDRAWN	[illegible]	WK
H		REVISED PER TDRR 23067	[illegible]	WK
J		REVISED PER TDRR 23362	[illegible]	WK
K		REVISED PER TDRR 25241	[illegible]	WK
L		REVISED PER TDRR 25766	[illegible]	WK
M		REVISED PER TDRR 25764	[illegible]	WK
N		REVISED PER TDRR 26441	[illegible]	WK
P		REVISED PER TDRR 27722	[illegible]	WK
R		REVISED PER TDRR 28088	[illegible]	[illegible]
S		REVISED PER TDRR 29043	[illegible]	[illegible]
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-66	[illegible]

TABLE I (SCHEMATIC REF)

DWG. SUFFIX	2012390	2012391	2012732	2012741
000	*	*	NA	NA
011	*	*	NA	NA
021	*	*	NA	NA
031	*	NA	NA	*
001	*	*	NA	NA
030	*	NA	*	NA
032	*	NA	NA	*
022	*	*	NA	NA
041	*	NA	NA	*
002	*	*	NA	NA
012	*	*	NA	NA
023	*	*	NA	NA
024	*	*	NA	NA
033	*	NA	NA	*
034	*	NA	NA	*
035	*	NA	NA	*

TABLE II (PROCUREMENT SPEC)

DWG. SUFFIX	2011000	2016203	2016205	2016206	2016207
000	*	NA	NA	NA	NA
011	*	NA	NA	NA	NA
021	NA	*	NA	NA	NA
031	NA	NA	NA	*	NA
001	*	NA	NA	NA	NA
030	NA	NA	*	NA	NA
032	NA	NA	NA	*	NA
022	NA	*	NA	NA	NA
041	NA	NA	NA	NA	*
002	*	NA	NA	NA	NA
012	*	NA	NA	NA	NA
023	NA	*	NA	NA	NA
024	NA	*	NA	NA	NA
033	NA	NA	NA	*	NA
034	NA	NA	NA	*	NA
035	NA	NA	NA	*	NA

SEE CHART TABLE III SH4

035	034	033	024	023	012	002	041	022	032	030	001	031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52			1008883-003			CONTACT, CRIMP TYPE (SOC)			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51			1008883-002			CONTACT, CRIMP TYPE (PIN)			
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50			1010490-112			SLEEVE, INSULATION			
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49			1012507-002			TAPE, LACING			
AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48			MIL-I-15126			INSUL. TAPE, PRESS SENS. TYPE MFT-2.5			
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47			1008887-001			CABLE, THERMOCOUPLE, TWIST PRF (81" TOT)			
1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	46			2012712-2			PLATE, BEARING (SCT)			
4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	45			2012636			SCREW SHOULDER			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	44			2012712-1			PLATE BEARING, EYEPIECE (SCT)			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	43			2011784-021			PANEL ASS'Y SCT			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	42			2011711-011			PANEL ASS'Y SXT			
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	41			2012736-011			OPTICAL UNIT SUB-ASSY STAGE II			
AR	AR	0	AR	0	0	0	AR	AR	AR	0	0	0	0	0	0	40			1012543-003			COATING KIT, LIGHT DIFFUSING			
0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	39			2011890-001			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	38			2012675			COVER, SEXTANT HEAD			
1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	0	37			2011784-011			PANEL ASSEMBLY SCT			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	36			2012547-011			COVER & BAFFLE ASSY (SCT)			
0	0	0	1	1	0	0	0	1	0	0	0	0	1	0	0	35			2011890-021			OPTICAL UNIT SUBASSY STAGE II			
1	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0	34			2012736-000	85386911810		OPTICAL UNIT SUBASSY STAGE II			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	33			1004260-300			NAMEPLATE			
																32									
0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	31			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC. HD.			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30			2012608	45386910120		SHIM, FOCUSING			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	29			2011890-011			OPTICAL UNIT SUBASS'Y STAGE II			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	28			2012573	45386910090		SHIM, FOCUSING AIR (SXT)			
																27									
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26			2012730-011			OPTICAL UNIT SUBASSY STAGE II			
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	25			NAS1352C04-6	74455157014		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24			2011732	85386910580		LENS TELESCOPE RELAY, ASSY OF			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	23			2011955-$\frac{1}{6}$T	7358691 $\frac{0601}{0606}$		SPACER			
1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	22			2012568	85386911360		RESOLVER TRIMMING MODULE ASSY			
AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	AR	21		#	1011541	74471435001		ADHESIVE, EPOXY			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20		#	1011625-28	74455151028		SCREW, CAP, HEX SOC. HD., SELF-LOCKING			
0	0	0	1	1	1	1	0	1	0	1	1	0	1	1	1	19			2011946	85386910810		RESOLVER, TRIMMING MODULE ASSY			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	18	SEE NOTE 3		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	17			2012730-000	85386911790		OPTICAL UNIT SUBASSY STAGE II			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	16			2011932	85386910830		SXT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	15			NAS1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
0	0	0	0	0	0	0	0	AR	AR	AR	AR	AR	AR	AR	AR	14			2011887-$\frac{1}{7}$T	5638391 $\frac{0400}{0406}$		SHIM, SPACER (SCT TURRET)			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	13			2011960	85386910560		SCT EYEPIECE ASSEMBLY			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	12			2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	11			2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	10			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD., SELF-LOCKING			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	9			2011784	85386910650		PANEL ASSEMBLY, SCT			
1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	8			2011711-000	85386910760		PANEL ASSEMBLY, SEXTANT			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	7		#	1011745-4	74426015004		GASKET			
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6			NAS1190C04R4L	— # —		SCREW, SELF-LOCKING PAN HD. FULL THD 250°			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5			2012547	85386911330		COVER AND BAFFLE, ASSY OF			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4			2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3			2011604	50386910010		COVER, SEXTANT HEAD			
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			2011603	53386910040		ROD, THREADED			
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1			2011890-000	85386910690		OPTICAL UNIT SUBASSY STAGE II			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910000
DRAWN A. C. WILLIAMS DATE 9-17-65
CHECKED F. Haymond 9/20/65
APPROVAL
APPROVAL E. T. Berry
NOT REQUIRED PER LETTER NASA PP7-55-113
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011000
SCALE NONE
WEIGHT CALC ACTUAL
SHEET 2 OF 4

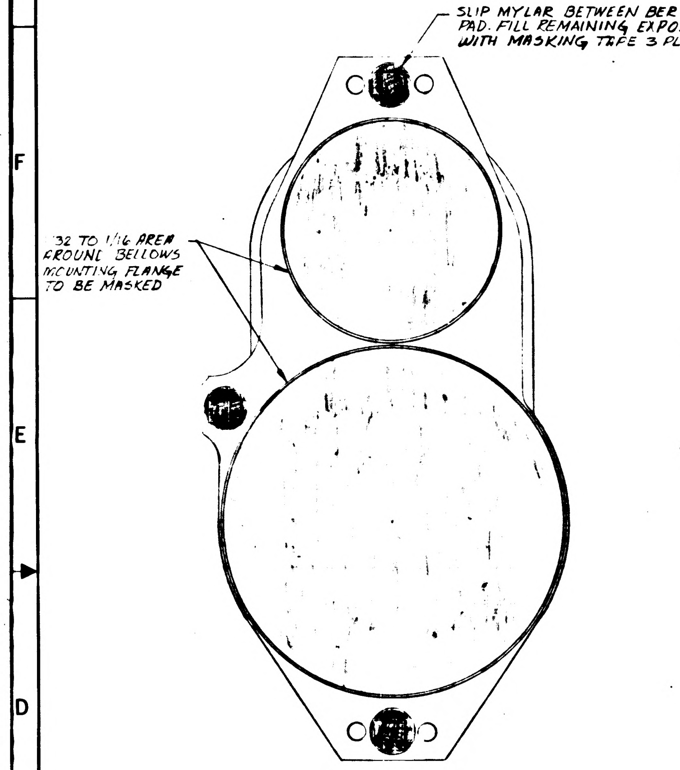
MASTER

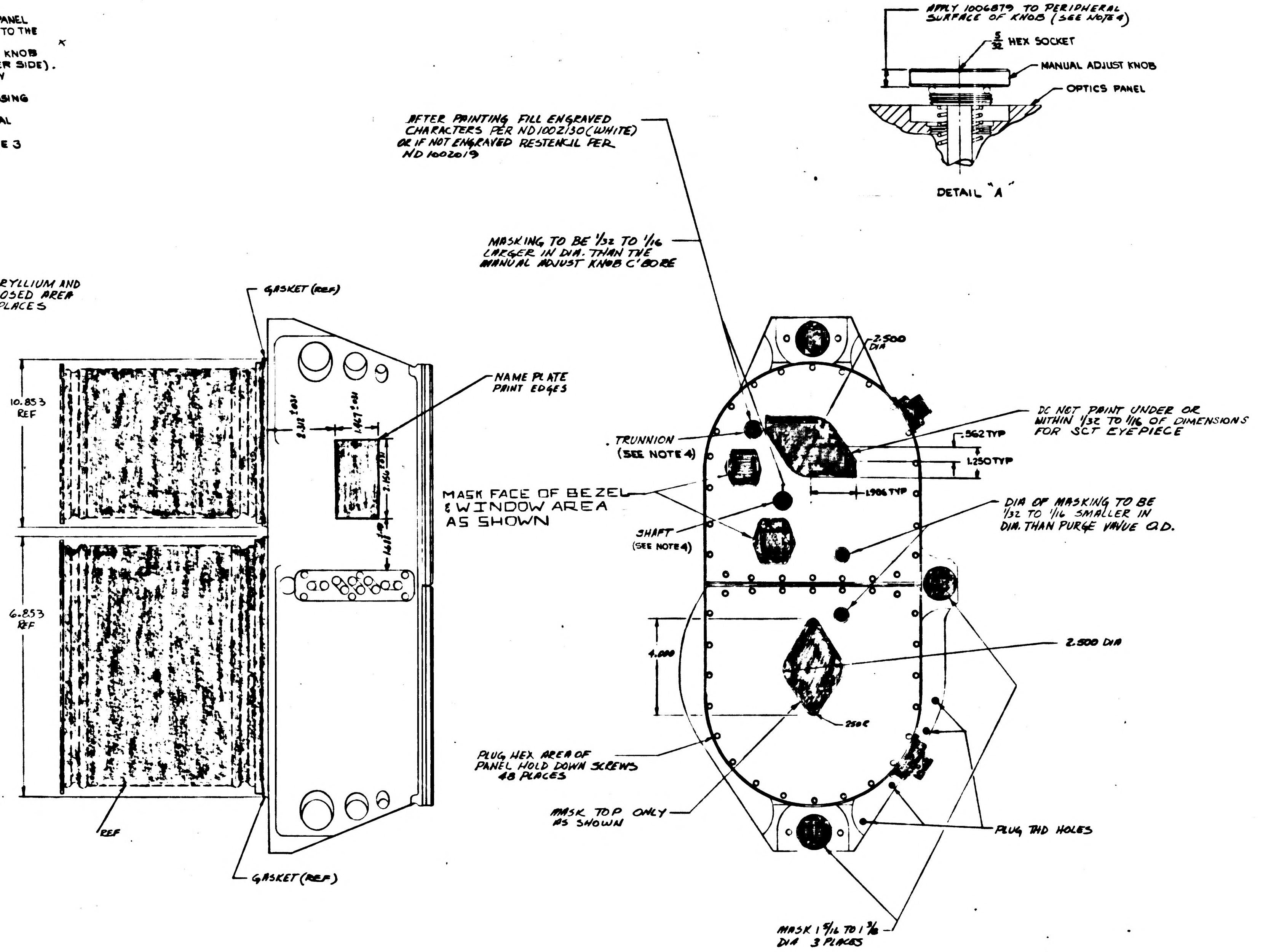
Z 2011000

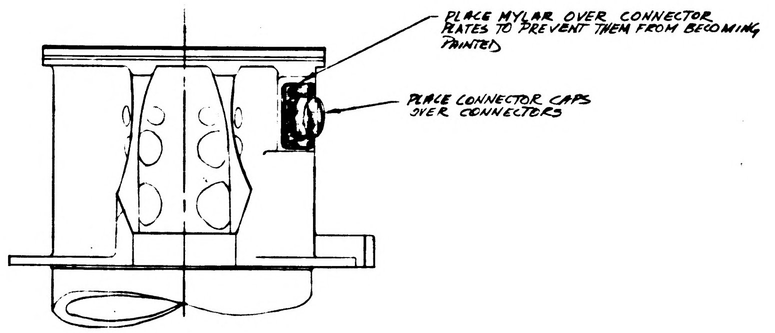
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
S		RELEASED PER TDRR 29043		
T		REVISED PER TDRR 29144	[illegible]	[illegible]
U		REVISED PER TDRR 29152	[illegible]	[illegible]
V		REVISED PER TDRR 29300	[illegible]	[illegible]
W		REVISED PER TDRR 29558	[illegible]	[illegible]
Y		REVISED PER TDRR 29560	[illegible]	[illegible]
Z		REVISED PER TDRR 30742	8-18-64	[illegible]

NOTES:

1. SHADED AREAS ARE TO BE PLUGGED OR MASKED AS REQUIRED.
2. MASKING TAPE, TEMPLATE OR TOOLING MUST BE LOCATED WITH RESPECT TO THE EYEPIECE MOUNTING HOLES
3. RECORD ALL PART NUMBERS, MOD MARKS, OR I D MARKINGS WHICH WILL BE COVERED BY THE ENAMEL COAT. IF THE TRUNNION SHAFT COUNTER DESIGNATIONS ARE ENGRAVED, REMOVE THE WHITE FILTER.
4. a) UNSCREW THE TRUNNION MANUAL ADJUSTMENT KNOB UNTIL THE PRELOADED SPRING FORCES THE KNOB WELL ABOVE THE SURFACE OF THE OPTICAL UNIT PANEL
   b) LIBERALLY APPLY THERMOCONDUCTIVE SILICONE COMPOUND, P/N 1006879, TO THE OUTSIDE DIAMETER OF THE KNOB AS SHOWN DETAIL "A"
   COATING THICKNESS MUST BE AMPLE ENOUGH TO FILL CLEARANCE BETWEEN KNOB OUTER DIAMETER AND PANEL COUNTERBORE (APPROXIMATELY .005 INCH PER SIDE).
   c) DEPRESS THE KNOB TO DISENGAGE THE DRIVE AND SECURE KNOB TIGHTLY TO INSURE A STATIC SEAL.
   d) REMOVE EXCESS SILICONE COMPOUND FROM KNOB AND PANEL SURFACE USING CLEAN DRY TISSUE PAPER
   e) REPEAT STEPS "a" THROUGH "d" APPLY SILICONE COMPOUND TO THE SHAFT MANUAL ADJUSTMENT KNOB.
5. RESTENCIL ALL PART NUMBERS OR I D MARKS WHICH WERE RECORDED IN NOTE 3


SLIP MYLAR BETWEEN BERYLLIUM AND PAD. FILL REMAINING EXPOSED AREA WITH MASKING TAPE 3 PLACES
1/32 TO 1/16 AREA AROUND BELLOWS MOUNTING FLANGE TO BE MASKED


APPLY 1006879 TO PERIPHERAL SURFACE OF KNOB (SEE NOTE 4)
5/32 HEX SOCKET
MANUAL ADJUST KNOB
OPTICS PANEL
DETAIL "A"
AFTER PAINTING FILL ENGRAVED CHARACTERS PER ND1002130(WHITE) OR IF NOT ENGRAVED RESTENCIL PER ND 1002019
MASKING TO BE 1/32 TO 1/16 LARGER IN DIA. THAN THE MANUAL ADJUST KNOB C'BORE
GASKET (REF)
10.853 REF
6.853 REF
REF
2.312 ±.031
1.467 ±.031
2.156 ±.031
1.611 ±.031
NAME PLATE PAINT EDGES
GASKET (REF)
MASK FACE OF BEZEL & WINDOW AREA AS SHOWN
TRUNNION (SEE NOTE 4)
SHAFT (SEE NOTE 4)
2.500 DIA
DO NOT PAINT UNDER OR WITHIN 1/32 TO 1/16 OF DIMENSIONS FOR SCT EYEPIECE
.562 TYP
1.250 TYP
1.906 TYP
DIA OF MASKING TO BE 1/32 TO 1/16 SMALLER IN DIA. THAN PURGE VALVE O.D.
4.000
2.500 DIA
.250 R
PLUG HEX AREA OF PANEL HOLD DOWN SCREWS 48 PLACES
MASK TOP ONLY AS SHOWN
PLUG THD HOLES
MASK 1 5/16 TO 1 3/8 DIA 3 PLACES


PLACE MYLAR OVER CONNECTOR PLATES TO PREVENT THEM FROM BECOMING PAINTED
PLACE CONNECTOR CAPS OVER CONNECTORS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN

DRAWN AMB DATE 4-8-64
CHECKED
APPROVAL [illegible] 4-9-64
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 5-19-64

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HOUSTON, TEXAS

TITLE
OPTICAL UNIT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011000

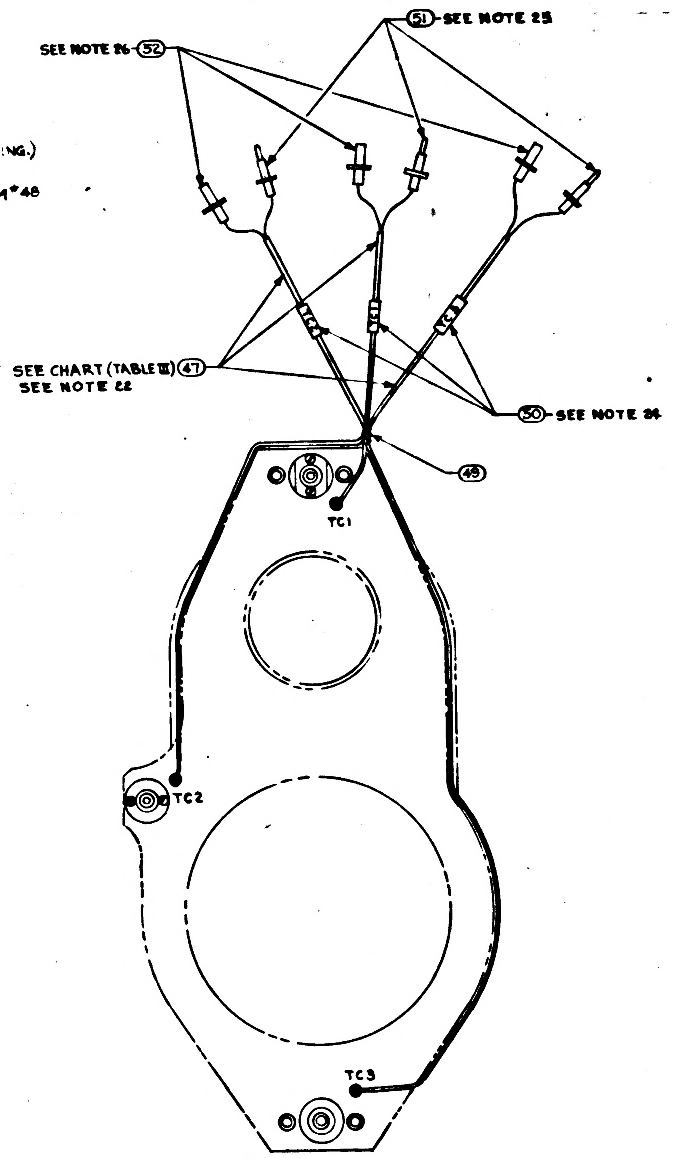
SCALE 1/2 WEIGHT CALC ACTUAL SHEET 3 OF

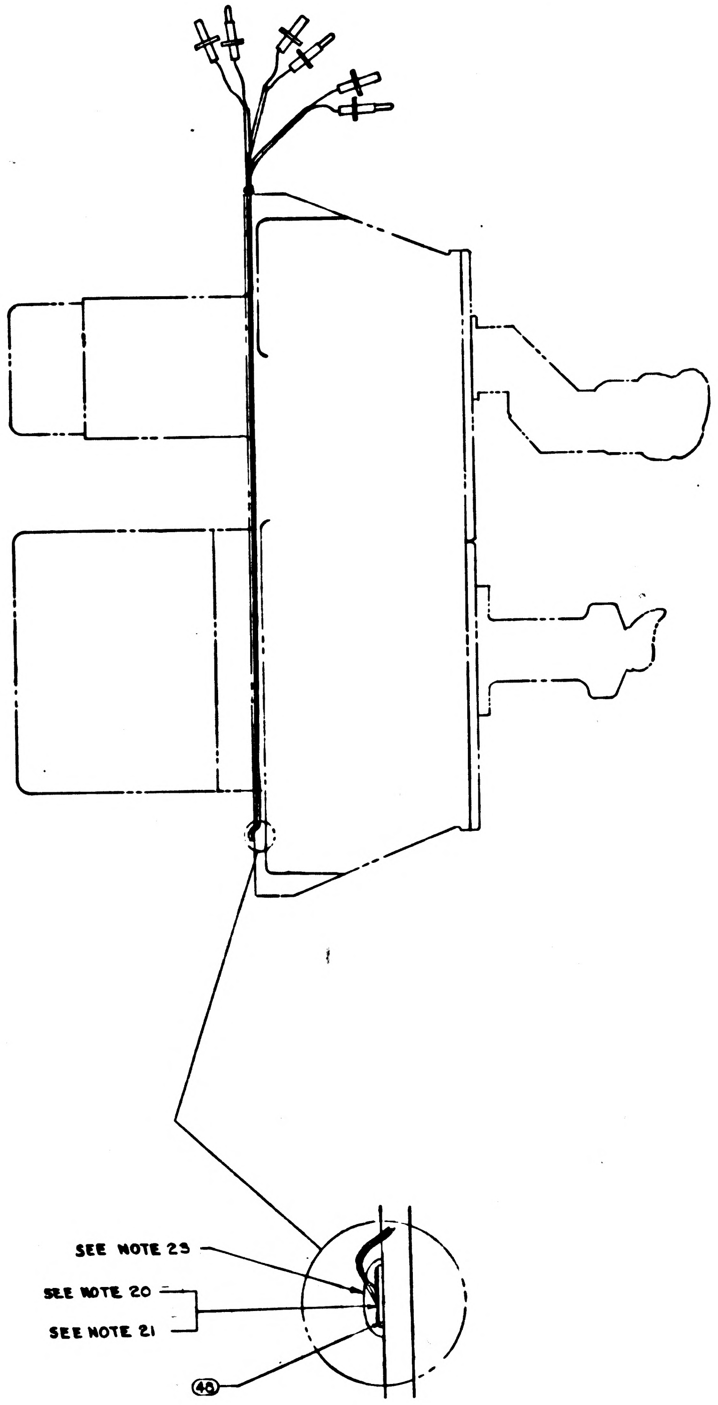
Z	2011000

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Y		THIS SHEET ADDED PER TDRR 29560	6-2-66	
Z		REVISE PER TDRR 30742	8-18-66	

20. ASSEMBLE THERMOCOUPLES (ITEM 47) IN THE FOLLOWING MANNER:
   - A- REMOVE 3/8 INCH OF INSULATION FROM THE ENDS OF BOTH THERMOCOUPLE WIRES.
   - B- TWIST UNINSULATED ENDS OF WIRE TOGETHER.
   - C- FLATTEN AND FUSE THE TWISTED ENDS OF WIRE. (DO NOT BREAK WIRE STRANDS WHEN FLATTENING.)
21. PRIOR TO INSTALLATION OF ITEM NO. 47 COVER ITEM NO. 48 AND MATING AREAS ON BASE WITH TACKING AGENT PER ND1002187 TYPE III. WIRES & ITEM #48 MUST BE HELD IMMOBILE IN PLACE UNTIL TACKING AGENT HAS FIRMLY "SET UP".
22. AFFIX THERMOCOUPLE CABLES TO EDGE SURFACE AS SHOWN, WITH CEMENT PER ND1002004 TYPE I.
23. AFTER INSTALLATION OF ITEM NO. 47 COVER UNINSULATED SURFACES OF ITEM NO. 47 AND ADJOINING AREA WITH CEMENT PER ND 1002004 TYPE I.
24. MARK TC 1, TC 2, TC3 AS SHOWN PER ND 1002019 (HOT IMPRESSION STAMPING).
25. CRIMP ITEM NO. 51 (PIN) ONTO COPPER CONDUCTOR. (BLUE COLORED INSULATION) AS SHOWN PER ND 1002206
26. CRIMP ITEM NO. 52 (SOCKET) ONTO CONSTANTAN CONDUCTOR. (RED COLORED INSULATION) AS SHOWN PER ND 1002206
27. VIBRATION PROOF ITEM 25 USING LOCKING COMPOUND GRADE "CV" OF MIL-S-22473, IN ACCORDANCE WITH ND 1002211.





THERMOCOUPLE DATA (TABLE III)

ITEM NO	TC NO	LENGTH
47	TC 1	16 INCHES
47	TC 2	28 INCHES
47	TC 3	37 INCHES

FOR 2011000-035 CONFIGURATION ONLY

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING	MATERIAL —
CONTRACT	
NEXT ASSY	USED ON
APPLICATION	

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 88386910000

DRAWN A.L. Rhodes DATE 5-18-66
CHECKED R Jackson 5-19-66
APPROVAL
APPROVAL E. Thorp 6-9-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL W G Thurlby 6-13

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TITLE
OPTICAL UNIT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011000

SCALE 1/2 WEIGHT CALC ACTUAL SHEET 4 OF 4

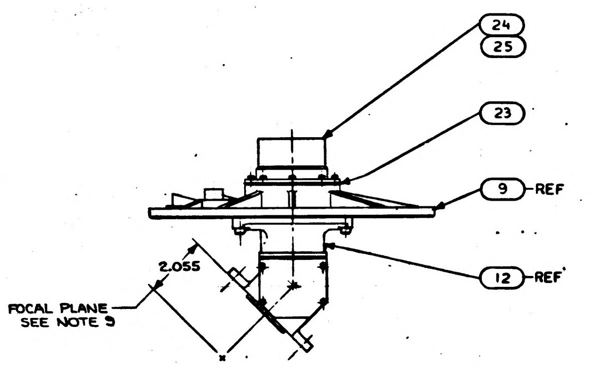
2011000 Z

0001102

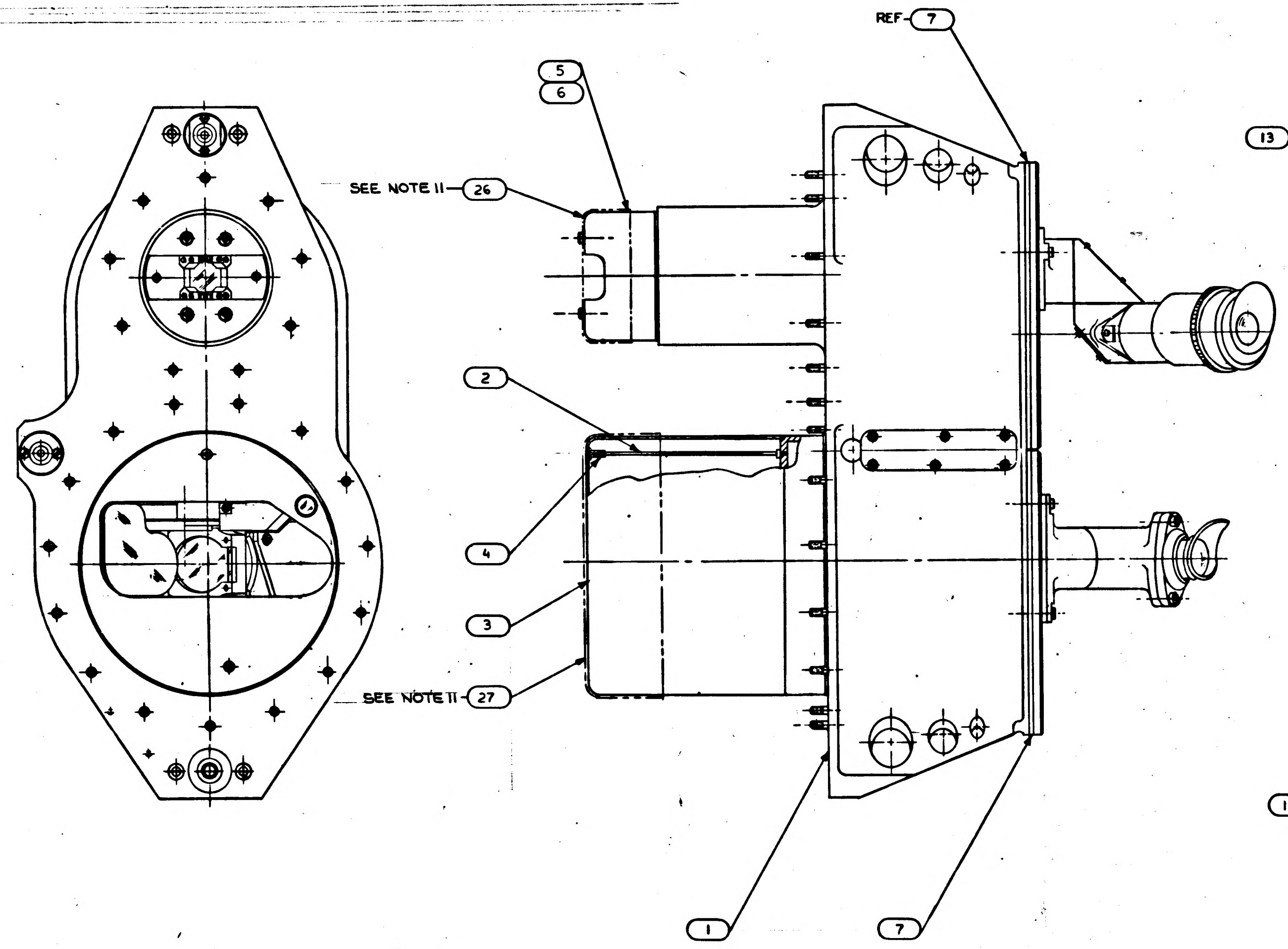
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

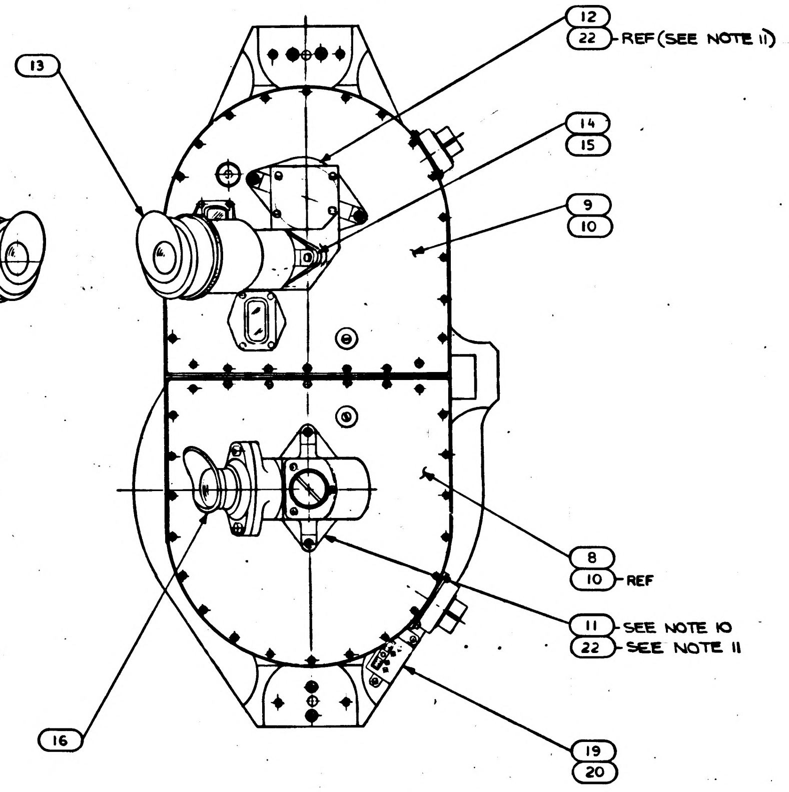
NOTES:

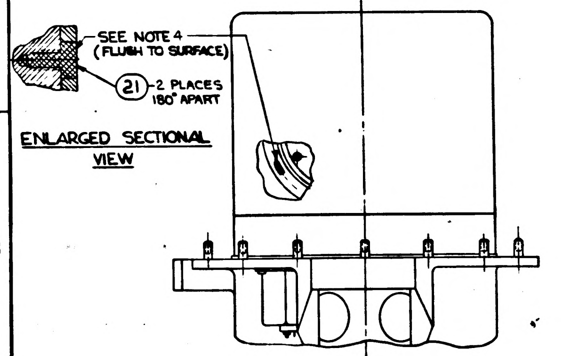
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFERENCE WIRING DIAGRAM NO'S 2012390 & 2012391.
3. SHEET 2 OF 2 REPRESENTS THE SUBSTITUTION OF EYEPIECES, ITEMS 13 & 16 WITH LONG EYE RELIEF EYEPIECES, ITEMS 17 & 18. LONG EYE RELIEF ASSEMBLIES ITEMS 17 & 18 (NOT INCLUDED IN 2011000) ARE AVAILABLE AS OPTIONAL EQUIPMENT FOR USE WITH OPTICAL UNIT. SEE SHEET 2 OF 2.
4. AFTER INSPECTION OF 64, 2 & 1 SPEED RESOLVER MECHANICAL ZERO SETTING, USE ITEM 21 TO FILL CAVITY TO LOCK RESOLVER IN POSITION. (2 PLACES)
5. ITEM 8 SHALL BE POSITIONED WITHIN THE FREEDOM OF THE HOLD DOWN SCREWS TO OPTIMIZE THE CENTRALIZATION OF SXT RETICLE IN THE EYEPIECE.
6. ITEM 16 SHALL HAVE A MINIMUM FOCUS RANGE OF +2 TO -2 DIOPTERS MEASURED TO THE SXT RETICLE. ITEM 17 SHALL FOCUS AT -1.0 DIOPTERS ±0.15 DIOPTERS TO THE SAME. THESE CONDITIONS SHALL BE OBTAINED WITH ITEM 8, SXT PANEL ASSY, FASTENED TO MAKE METAL TO METAL CONTACT BETWEEN ITEMS 1, 7 & 8.
7. THE CONDITIONS OF NOTE 6 SHALL BE OBTAINED BY MACHINING OF SPACER 2011665 WHICH IS ITEM 4 ON DWG 2011786 & SECURING THE LENS HOLDER ASSY, 2011794 OF THE SAME ASSY TIGHT AGAINST THIS SPACER. VIBRATION PROOF PART NO. 2011794 USING TWO (2) DROPS OF LOCKING COMPOUND PER MIL-S-22473, GRADE "H".
8. ITEM 9 SHALL BE POSITIONED TO PERMIT FREE OPERATION OF THE MANUAL DRIVES IN THE ENGAGED (OUT) POSITION AND UNIMPEDED OPERATION OF THE RESPECTIVE MOTOR DRIVES IN THE DISENGAGED (IN) POSITION.
9. ITEMS 13 & 18 SHALL BE AT A FOCUS OF -1.0 ± 0.15 DIOPTERS ON THE SCT RETICLE. THIS CONDITION IS OBTAINED BY SELECTION OF 1 OR 2 SPACERS, ITEM 23, TO ACHIEVE THE 2.055±.005 DIMENSION FOR THE FOCUS OF ITEM 18 AND ONE OF ITEM 14 FOR MATCHING THE FOCUS OF ITEM 13 TO THE 2.055 DIMENSION.
10. VIBRATION PROOF PLUG (USED ON ITEM 11) AFTER FINAL SXT TEST BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND 1002211.
11. ITEMS 26 & 27 (SHOWN IN PHANTOM) & ITEM 22 (NOT SHOWN) ARE FOR STORAGE & SHIPPING PURPOSES ONLY



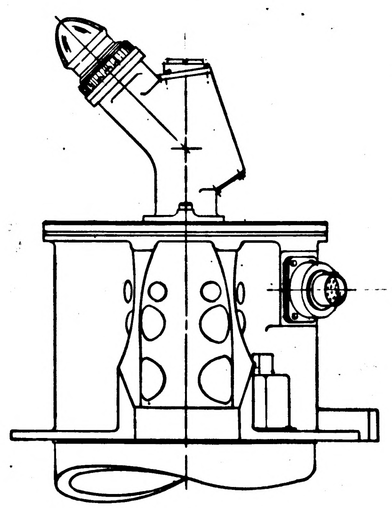
PARTIAL VIEW WITH ITEM 13 REMOVED







ENLARGED SECTIONAL VIEW



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
27	1		2012004	85386911080		COVER, PROTECTIVE, SEXTANT HD, ASSY OF			
26	1		2012003	85386911070		COVER, PROTECTIVE, TELESCOPE HD, ASSY OF			
25	8		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
24	1		2011732	85386910580		LENS, TELESCOPE RELAY, ASSY OF			
23	AR		2011955-1T	79386910601		SPACER			
22	2		2012101	85386910940		PLATE, DUST COVER, ASSY OF			
21	AR	*	1011541	74471435001		ADHESIVE, EPOXY			
20	2	*	1011625-28	74455151028		SCREW, CAP HEX SOC HD SELF-LOCKING.			
19	1		2011946	85386910810		RESOLVER TRIMMING MODULE ASSY			
18	1		2011788	85386910640		LONG EYE RELIEF EYEPIECE ASSEMBLY (SCT)			
17	1		2011787	85386910720		LONG EYE RELIEF EYEPIECE ASSEMBLY (SXT)			
16	1		2011932	85386910830		SXT EYEPIECE ASSEMBLY			
15	2		NAS 1189C02P3L	74455155001		SCREW, SELF-LOCKING, 100° FLAT HEAD			
14	AR		2011887-1T	56386910400 0406		SHIM, SPACER (SCT TURRET)			
13	1		2011960	85386910560		SCT EYEPIECE ASSEMBLY			
12	1		2011734	85386910540		HOUSING, SCT PRISM, ASSY OF			
11	1		2011786	85386910820		MIRROR HOUSING ASSY (SXT EYEPIECE)			
10	48		NAS1352C04LL8	74455157015		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
9	1		2011784	85386910650		PANEL ASSEMBLY, SCT			
8	1		2011711	85386910760		PANEL ASSEMBLY, SEXTANT			
7	2	*	1011745-4	74426015004		GASKET			
6	4		NAS 1190C04P4L	—		SCREW, SELF-LKG PAN HEAD FULL THD 250°			
5	1		2012138	85386911040		COUNTERWEIGHT & COVER ASSEMBLY			
4	2		2011602	57386910960		NUT, SLOTTED FLAT, CSK HEAD			
3	1		2011604	50386910010		COVER, SEXTANT HEAD			
2	2		2011603	53386910040		ROD, THREADED			
1	1		2011890	85386910690		OPTICAL UNIT SUBASSY STAGE II			

SEE NOTE 3 — 18
SEE NOTE 3 — 17

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
—	—

APPLICATION

UNLESS OTHERWISE SPECIFIED
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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 88386910000
DRAWN DATE 7-22-64
CHECKED 8-1964
APPROVAL
APPROVAL 9/1/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE OPTICAL UNIT

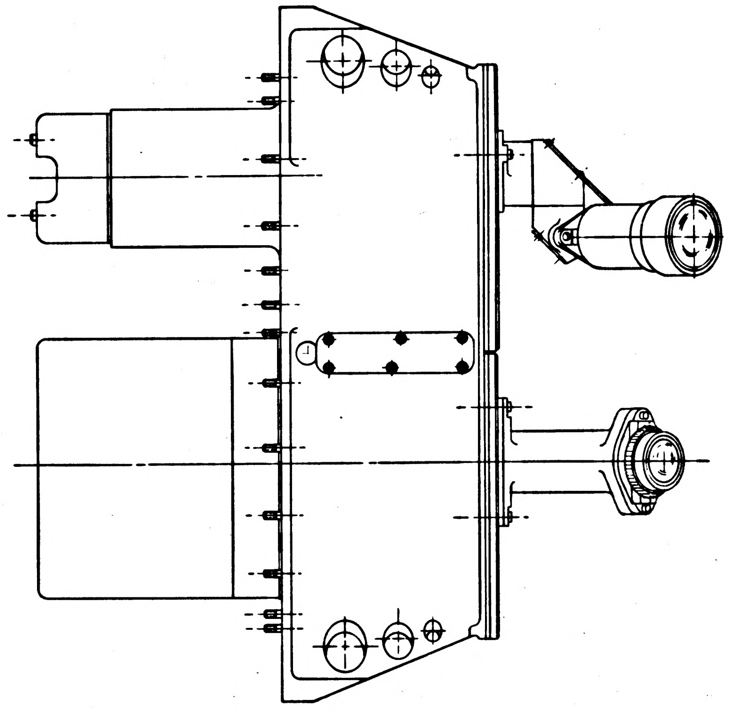
CODE IDENT NO.
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
SHEET 1 OF 2

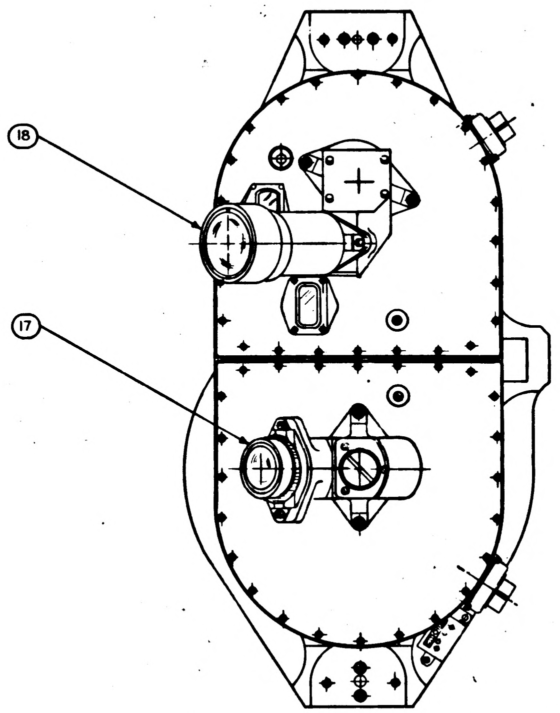
2011000

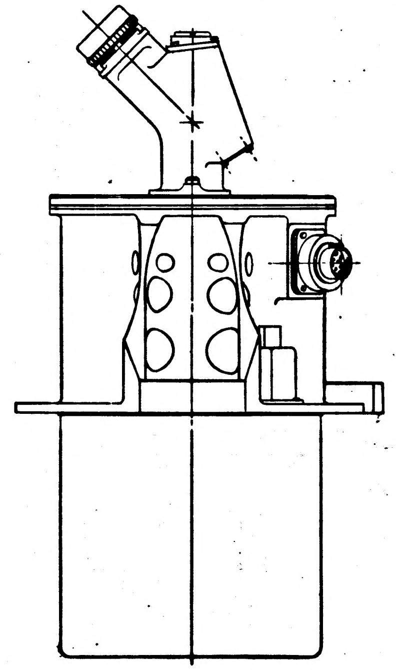
2011000

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
SEE SHEET 1 OF 2







FOR ITEM 17 AND 18 SEE SHEET 1 OF 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 88386910000
DRAWN F Schiller DATE 7-22-64
CHECKED C [illegible] 8-25-64
APPROVAL [illegible] 8/27/64
APPROVAL E. Moran 9/1/64
NASA APPROVAL
MIT APPROVAL

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TITLE
OPTICAL UNIT

CODE IDENT NO.
SIZE E
NASA NUMBER 2011000
SCALE 1/2
WEIGHT
CALC. ACTUAL
SHEET 2 OF 2

APOLLO G&N Specification
PS 2011000 Rev. –
Original Issue Date:
Release Authority: TDRR 19005
Class A Release

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

OPTICAL UNIT ASSEMBLY

DRAWING NO. 2011000

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 31 inclusive.

APPROVALS	5/12/65 NASA/MSC	5-6-65 6 May 65 MIT/IL	KIC

1. SCOPE

This specification establishes the detail requirements for complete identification and acceptance of the Optical Unit, Assembly Part No. 2011000-011.

1.1 Product Configuration and Baseline Acceptances

1.1.1 The product configuration baseline shall be established by FACI for the Optical Unit Assembly, Serial No. . This unit and all subsequent units regardless of intended use shall be accepted to the configuration defined by Serial No. unless formally approved otherwise as required by ANA Bulletin No. 445.

2. APPLICABLE DOCUMENTS. The following documents form a part of this specification to the extent specified herein.

2.1 Effective Issues.

2.1.1 Military Standards and Specifications shall be the issue in effect on the date of contract.

SPECIFICATIONS

APOLLO G&N

ND 1002214	General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.
ND 1002023	Serialization, General Specification for

STANDARDS

Military

MIL-STD-209	Clean Room and Work Station Requirements, Controlled, Environment

MIL-STD-150A Photographic Lenses

DRAWINGS

APOLLO G&N

2011000 Optical Unit Assembly

Copies of Specifications, Standards, Drawings, Bulletins and Publications required by suppliers in connection with specific procurement functions should be obtained from the Procuring Activity or as directed by the contracting officer.

2.2 Conflicting Requirements. In the event of conflict between the requirements of the contract, this document and the documents listed in this section, the following order of precedence shall apply and the Contractor shall notify MIT Apollo Management of conflict as soon as it is determined.

a. The contract
b. This Specification
c. Documents listed in this section

3 REQUIREMENTS

The Primary Performance Requirements described in Section 3.1 are derived from the Apollo mission analysis. These requirements will be demonstrated by the ability of the Assembly to meet the Functional Performance Requirements.

Functional Performance Requirements described in Section 3.2 are derived in order to demonstrate the ability of the Assembly to perform the Primary Performance Requirements.

3.1 Primary Performance Requirements. The Assembly shall meet the environmental tests specified for nominal Apollo missions and have the following accuracies. These are not Functional Performance Requirements, but are the bases from which the Functional Performance Requirements will be derived.

3.1.1 SXT LLOS to SLOS Measurement Accuracy. At the center of the field of view, the Sextant (SXT) shall be capable of measuring the Trunnion Drive Axis (TDA) angle between the star line of sight (SLOS) and landmark line of sight (LLOS) to within 10 seconds of arc.

3.1.2 SXT SLOS Positioning Accuracy. The SXT SLOS shall be perpendicular to the mounting plane to within 40 seconds of arc at zero trunnion angle.

3.1.3 SCT LOS Positioning Accuracy. The Scanning Telescope (SCT) line of sight (LOS) shall be perpendicular to the mounting plane to within six minutes of arc at zero trunnion angle.

3.1.4 Tracker Tracking Accuracy. The Star Tracker, with supporting electronics, shall be capable of developing error signals for a star between +1.0 and +2.0 S-4 magnitude, in its field of view, to within a 10 arc second (rms) repeatability and providing a star presence signal to the computer when the star is in the field of view.

3.1.5 Tracker Pointing Accuracy. The tracker LOS shall be known to within 10 arc sec. relative to the SLOS of the SXT.

3.1.6 Photometer Sensing Accuracy. The photometer shall be capable of accurately sensing the horizon intensity over a range of 4.75×10^{-6} to 1.19×10^{-6} watts/steradian/cm^2/°A.

3.1.7 Photometer Pointing Accuracy. The photometer line of sight shall be known to within 10 arc seconds in the trunnion direction relative to the LLOS.

3.2 Functional Performance Requirements. The Assembly shall perform as specified herein under the following conditions to verify its ability to perform the Primary Performance Requirements.

Drive Motor Fixed Excitation	28VAC±5%	800 cps ±1% <-90
Resolver Excitation	28VAC±1%	800 cps ±1%
Tachometer Excitation	28VAC±1%	800 cps ±1%
Tracker - Photometer	28VDC±2%	

3.2.1 SDA Orientation. The Shaft Drive Axis (SDA) shall be perpendicular with respect to the mounting plane between the Assembly and the Navigation Base within 10 seconds of arc for the SXT and to 40 sec. of arc for the SCT.

3.2.2 Orientation of the TDA Measuring Plane to the Shaft Axis. The sum of the errors resulting from the lack of perpendicularity between Trunnion Drive Axis (TDA) and SDA and the lack of perpendicularity of the SLOS and the TDA shall not exceed 20 arc seconds for the SXT and 2 arc minutes for the SCT.

3.2.3 Orientation of SLOS to TDA. The error resulting from the lack of perpendicularity between the TDA and SLOS for the SXT as when the SLOS is internally autocollimated shall not exceed 10 arc seconds.

3.2.4 Parallelism of Optical Axis to SDA Axis. (Reticle Eccentricity). The parallelism of the optical axis to SDA axis shall be within 10 seconds of arc for the ~~SXT and~~ 50 seconds of arc for the SCT.

3.2.5 Resolver Alignment. The SXT SDA and TDA resolvers and the SCT SDA TDA resolvers and counters shall be within the LOS tolerances specified in Table 1 when aligned to the specified references.

3.2.6 Resolving Power The resolving power for all lines of sight of the SXT and SCT shall be determined with the eyepiece adjusted for optimum focus at the center of the respective fields using positive black and white targets as defined by MIL-STD-150A, Photographic Lenses.

The resolving power will be tested using either high contrast or low contrast targets depending upon whether the test equipment configuration includes high or low contrast target. The resolving power for high or low contrast targets shall be as follows or better:

	Resolving Power in arc seconds					
Approximate Position in Field	SXT				SCT	
	LLOS		SLOS		LOS	
Target Contrast	Low	High	Low	High	Low	High
Center	14.4	10.3	9.1	7.2	146	64.6
1/3 Field Radius	*	*	14.4	11.5	230	91.5
2/3 Field Radius	*	*	28.7	23.0	328	184

*If the SXT SLOS resolution at the three field positions and the SXT LLOS resolution at field center are within the tolerance specified, it shall be assumed that the SXT LLOS resolution, at the field radii specified, is also within tolerance.

TABLE I
RESOLVER ALIGNMENT

FUNCTION	COMPONENT	REFERENCE	SETTING CRITERIA	TOLERANCE (LOS)
SEXTANT TRUNNION (SXT TDA)	64X RSVR (Prior to Trimming)	SXT SLOS Angle (2 times TDA Angle)	Coincidence at SLOS Zero Position of Reference	± 2 min
	2 X RSVR			± 6 min
	1 X RSVR			± 6 min
	TRIM POT		Coincidence at Zero and Error Spread	± 3 sec Zero error 24 sec Max error spread
SEXTANT SHAFT	16 X RSVR	SXT SDA ANGLE	Coincidence at SDA Zero Position of Reference	± 1 min
	1 X (SHAFT)			± 3 min
	1 X (GEARBOX)			± 2 min
	1/2X RSVR			± 8 min
	TRIM POT		Coincidence at Zero and Error Spread	±10 sec Zero error 44 sec Max error spread
TELESCOPE TRUNNION (SCT TDA)	1 X RSVR	SCT LOS ELEVATION ANGLE (2 times TDA ANGLE)	Bias Error & St'd Deviation of Trimmed SXT 64XRSVR Compared to Reference	108 Sec Bias Error 4 Min St'd Deviation 8 Min Max. ea. point
	TDA COUNTER		Bias Error & St'd Deviation of Counter Compared to Reference	54 Sec Bias Error 2 Min St'd Deviation
TELESCOPE SHAFT (SCT SDA)	1X RSVR	SCT SDA ANGLE	Bias Error & St'd Deviation of SXT Trimmed 16X RSVR Compared to Reference	54 Sec Bias Error 2 Min St'd Deviation 4 Min Max ea. point
	SDA COUNTER		Bias Error & St'd Deviation of Counter Compared to Reference	54 Sec Bias Error 2 Min St'd Deviation

3.2.7 Air/Vacuum Focusing. The focus of each standard eyepiece upon the reticle plane shall be within the tolerances specified in the following chart for standard eyepieces. If the assembly configuration includes long eye-relief eyepieces then their focus shall be within the tolerances specified in the following chart for LER eyepieces.

Eyepiece	Air Reticle	Vacuum Reticle
SXT Standard	Adjustable between -2and +2 Diopters	Adjustable between -2 and +2 Diopters
SXT LER	-1 ± .25 Diopters	-1 ± .25 Diopters
SCT Standard	-1 ± .25 Diopters	----------------
SCT LER	-1 ± .25 Diopters	________________

3.2.8 Luminous Transmittance. The luminous transmittance of the SXT SLOS to CIE illuminant "C" (6500°K) shall not be less than 25%.

The luminous transmittance of the SXT LLOS to CIE illuminant "C" shall not be less than 4%..

The luminous transmittance of the scanning telescope to CIE "C" shall not be less than 30%.

If the assembly configuration includes an eyepiece polaroid filter then the following shall be a requirement. The ratio of the luminous transmittance of the SXT,SLOS and SXT LLOS shall be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

3.2.9 Freedom of Motion. The SDA and TDA of the SCT shall move freely when rotated manually.

3.2.10 Static Friction. Breakaway friction shall be less than .04 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases.

3.2.11 Dynamic Friction Level. Dynamic friction shall be less than .03 inch-ounces on the SXT and SCT drive motor shafts as measured by the voltages on their respective motor control phases.

3.2.12 Reticle Lighting. Verify the operation of the SXT and SCT reticle lamps by making current measurements, which shall be compared to the current measurements previously made while the lamp illumination could be observed.

3.2,13 Dark Noise. With no light incident on the photomultiplier tube and an AGC voltage of 0 volts applied to the OUA, the preamplifier wide band output shall not be greater than 1.0 volts rms.

3.2.14 Reference Voltage. The tuning fork reference voltage shall be greater than 6.0 volts peak-to-peak.

3.2.15 Tracker Frequency. The frequency of the "X" tuning fork shall be 455 cps ±1cps and the frequency of the "Y" tuning fork shall be 356 cps ± 1 cps as measured at the reference point.

3.2.16 Error Signal Gradient. With a ~~+2.0 magnitude star~~ and +1.8 volts AGC, measure the ac voltage at the preamplifier output with the simulated star at the following coordinates.

a. Every 20 seconds for 1 minute on either side of null.

b. Every 1 minute until the edge of the 15 minute field of view on either side of null.

These coordinates should be first taken along the X axis and then along the Y axis.

The error signal gradient shall be greater than 26 volts/radian over a 4 minute field of view ~~centered~~ at null.
With a ~~dimmer~~ star ~~of +1.0 magnitude~~, set the AGC to 2.6 volts and repeat the ± 1, 2, 3, 4 and 5 minute points along each axis. The error signal gradient shall be less than 38 volts/radian. over a 4 minute field of view centered at null.

3.2.17 Star Presence Output. The star presence output shall be less than 5.0 volts when an AGC input of 0 volts is applied to the OUA.

The star presence output shall be greater than 14.0 volts when an AGC input of 1.6 volts is applied to the OUA.

3.2.18 SXT Star LOS to Tracker LOS Alignment and Accuracy. The SXT star line of sight and the star tracker line of sight shall be parallel to within 20 arc seconds in the trunnion axis and 3 arc minutes in the cross trunnion axis.

The error angle between the SXT star line of sight and the star tracker line of sight shall be known to within 10 arc seconds.

3.2.19 Horizon Photometer Output. The preamplifier output shall be 275 millivolts ± 20% for the maximum horizon intensity which is 4.75 x 10^{-6} watts/steradian/cm^2/ Å.

The preamplifier output at 1/2 the maximum horizon intensity level shall be 1/2 the output at the maximum level ± 5%.

The preamplifier output at 1/4 the maximum horizon intensity level shall be 1/2 the output at the 1/2 maximum level ± 5%.

3.2.20 Photometer Frequency. The frequency measured at the preamplifier output shall be 550 ± 1 cps.

3.2.21 SXT LLOS to Photometer LOS Alignment and Accuracy. The sextant landmark line of sight and photometer line of sight shall be parallel to within 3 arc minutes. The error between the two lines of sight shall be known tb within 10 arc seconds.

3.3 Product Performance and Repeatability. The Assembly shall meet the Functional Requirements of Section 3.2 and furthermore shall withstand specified environmental stresses without degradation of performance characteristics. This performance characteristic repeatability shall be demonstrated by subjecting the OUA to the following test procedures.

> NOTE: The following sequence of test procedures is mandatory except that (a) the sequence of Vibration and Thermal Vacuum tests may be interchanged, and (b) the sequence of the Pressure Leak Rate and the Functional Performance tests may be interchanged:

1. Baseline Performance Tests
2. Environmental Tests
    a) Vibration
    b) Thermal Vacuum
3. Final Visual and Mechanical Inspection
4. Pressure Leak Rate Test
5. Functional Performance Tests

3.3.1 **Baseline Performance Tests.** These tests, as a minimum, shall demonstrate the following Functional Performance Requirements from Section 3.2.

3.2.1	SDA Orientation
3.2.2	Orientation of the TDA Measuring Plane to the Shaft Axis
3.2.4	Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)
3.2.18	SXT Star LOS to Tracker LOS Alignment and Accuracy
3.2.21	SXT LLOS to Photometer LOS Alignment and Accuracy

3.3.2 **Environmental Tests.**

3.3.2.1 **Vibration Procedure.** The Assembly shall be vibrated according to these requirements.

Random vibration with the indicated characteristics shall be applied along each of three mutually perpendicular axes for a period of one minute per axis.

Linear increase from $.0054g^2$/cps at 20 cps to $.02g^2$/cps at 70 cps and constant to 1000 cps; then linear decrease to $0.004g^2$/cps at 2000 cps with a -3db limit.

3.3.2.2 **Thermal-Vacuum Test.** The Assembly shall be subjected to simulated flight conditions in a Space Simulator chamber.

The command module conditions shall include the following:

Pressure - 5 psi of air or greater

Temperature - greater than $0^{\circ}F$
less than $160^{\circ}F$

The space side conditions shall include the following two conditions:

(1) Simultaneous cold wall and vacuum.
(2) Simultaneous cold wall, vacuum and sun. Cold wall, vacuum and sun are defined as follows:

Cold Wall (temperature of wall) - $320^{\circ}F \, {}^{+10^{\circ}F}_{-0^{\circ}F}$

Vacuum: less than 1 x 10^{-6} torr
Sun: A collimated radiation source simulating one sun in spectrum and intensity.

CAUTION

The Star Tracker and Photometer objective lenses shall be shielded from the direct rays of the Sun Source.

The SCT and SXT shall be successfully driven in the shaft and trunnion axes once during each hour of the simulation to insure proper general functioning. The focus of the SXT upon the vacuum reticle shall also be verified.

3.3.3 Final Visual and Mechanical Inspection. The Assembly shall be inspected to ensure that it conforms to the highest quality standards of general workmanship, optical cleanliness and mechanical and operational integrity.

3.3.4 Pressure Leak Rate. With the optical head in vacuum, a differential pressure of 5 psi across the optic base shall not cause a leakage rate in excess of 9.99 x 10^{-5} st'd cc/sec of air.

3.3.5 Functional Performance and Repeatability. The Assembly will then be tested to show compliance to the Functional Performance Requirements of Section 3.2 by the procedures described in Section 4.2 of this Procurement Specification.

In order to demonstrate that there has been no measureable change in characteristics of the Assembly between Baseline Testing and Final Test, the data from these tests shall be compared. The maximum allowable differences between the two sets of data for corresponding tests shall be as follows:

TABLE II

Test	Performance Requirements	Maximum allowable difference between Baseline and Final Test
SDA Orientation (3.2.1)		
SXT SDA	10 arc sec.	6 arc sec.
SCT SDA	40 arc sec.	10 arc sec.
Orientation TDA Meas. Plane to SDA (3.2.2)		
SXT	20 arc sec.	6 arc sec.
SCT (not applicable		
Parrallelism of Optical Axis to SDA Axis (Reticle Eccentricity (3.2.4)		
SXT reticle	10 arc sec.	4 arc sec.
SCT reticle	50 arc sec.	25 arc sec.
SXT SLOS to Tracker LOS Alignment and Accuracy (3.2.18) Error Angle	20 arc sec. (trunnion) 3 arc min. (cross trunnion)	6 arc sec. 6 arc sec.
SXT LLOS to Photometer LOS Alignment and Accuracy (3.2.21) Error Angle	3 arc min.	6 arc sec.

NOTE; The allowable difference between baseline and final test does not represent changes in the Assembly characteristics, but rather allowable errors in measurement accuracy and stability.

3.4 Product Configuration

3.4.1 Drawings – The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2011000 and all drawings and engineering data referenced thereon.

3.4.2 Nameplate and Serialization. Each Assembly identified by General Arrangement (or Assembly) Drawing shall be identified by a serial number assigned in accordance with ND 1002023. This number shall be affixed to the optical base.

4. QUALITY ASSURANCE PROVISIONS

4.1 General – The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein. The failure of the end product to pass any examination or test of this section will automatically classify the unit as nonconforming. When non-conformance units are corrected by the contractor, the unit shall be reinspected. When corrective action has been taken, the reinspection of a nonconforming unit may be limited to the test or examination which defined the non-conformance or, when so directed by the cognizant inspector, a complete reexamination and retest of the unit may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assemblies shall be tested under the following ambient conditions:

(a) Temperature: $25^{\circ} \pm 10^{\circ}$C
(b) Relative Humidity: 90% maximum
(c) Barometric Pressure: 28 to 32 inches Hg

4.2 Tests – The following chart shall be used to correlate between the Functional Performance Requirements specified in Section 3 and the tests specified in Section 4.

Paragraph Title	Section 3	Section 4
SDA Orientation	3.2.1	4.2.1.1 4.2.1.2
Orientation of the TDA Measuring Plane to the Shaft Axis	3.2.2	4.2.1.3
Orientation of SLOS to TDA	3.2.3	4.2.1.3.2
Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity)	3.2.4	4.2.1.1 4.2.1.2
Resolver Alignment	3.2.5 (Table I)	4.2.1.4 4.2.1.5
Resolving Power	3.2.6	4.2.1.10
Air/Vacuum Focusing	3.2.7	4.2.1.11
Luminous Transmittance	3.2.8	4.2.1.12
Freedom of Motion	3.2.9	4.2.1.13
Static Friction	3.2.10	4.2.1.14 4.2.1.15
Dynamic Friction Level	3.2.11	4.2.1.14 4.2.1.15
Reticle Lighting	3.2.12	4.2.1.16
Dark Noise	3.2.13	4.2.1.17
Reference Voltage	3.2.14	4.2.1.18
Tracker Frequency	3.2.15	4.2.1.19
Error Signal Gradient	3.2.16	4.2.1.20
Star Presence Output	3.2.17	4.2.1.21
SXT Star LOS to Tracker LOS Alignment and Accuracy	3.2.18	4.2.1.22
Horizon Photometer Output	3.2.19	4.2.1.23
Photometer Frequency	3.2.20	4.2.1.24
SXT LLOS to Photometer LOS Alignment and Accuracy	3.2.21	4.2.1.23
Baseline Performance	3.3.1	4.2.1.26
Environmental Tests	3.3.2	4.2.1.27
Final Visual Mechanical Inspection	3.3.3	4.2.1.28
Pressure Leak Rate	3.3.4	4.2.1.29
Functional Performance & Repeatability	3.3.5	4.2.1.30

4.2.1 Test Sequence – Except as noted in Section 3.3 the sequence of Functional testing as presented herein is optional and may be performed in any order which will permit most economical use of manpower and equipment.

4.2.1.1 SXT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity). The SXT reticle shall be observed through a certified reference LOS afforded by the Precision Test Fixture's SXT Vertical Autocollimator via the LLOS as shown schematically in Figure 1. A series of angular displacement measurements of the reticle through the complete excursion of SDA shall be taken with the autocollimator filar micrometers. The results shall be charted and analyzed to yield the reticle's eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall not exceed 10 seconds of arc and SDA perpendicularity shall be within 10 seconds of arc.

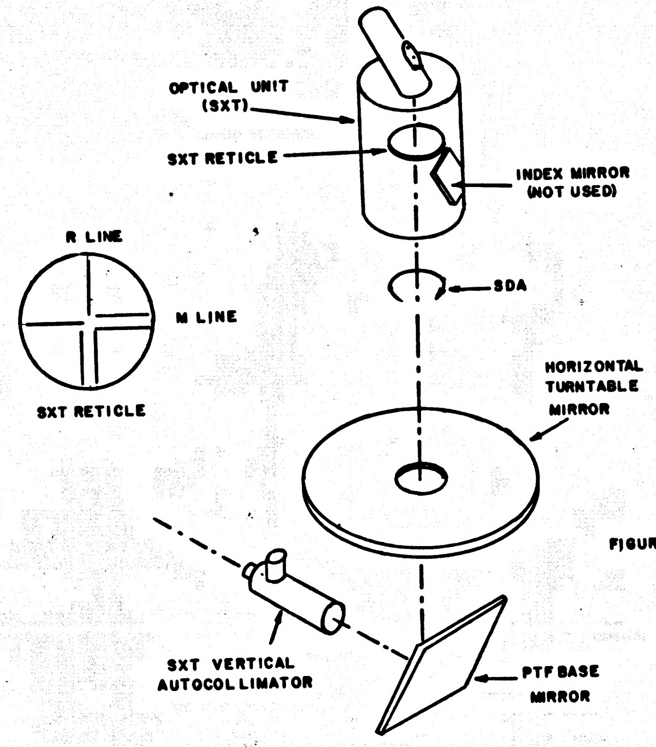

OPTICAL UNIT (SXT)
SXT RETICLE
INDEX MIRROR (NOT USED)
R LINE
M LINE
SXT RETICLE
SDA
HORIZONTAL TURNTABLE MIRROR
SXT VERTICAL AUTOCOLLIMATOR
PTF BASE MIRROR

FIGURE 1

4.2.1.2 SCT Parallelism of Optical Axis to SDA Axis (Reticle Eccentricity). and SDA Orientation. The SCT reticle and PTF's SCT Vertical Collimator reticle shall be observed through the SCT eyepiece as shown schematically in Figure 2. A series of angular displacement measurements between the SCT reticle's "R" line (reference Figure 3) and the Collimator reticle's parallel component, at the cardinal angles of SDA rotation shall be made with reference to the reticle line thickness. The results shall be charted and analyzed to yield the SCT reticle eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity and SDA perpendicularity error with respect to the Assembly ball mount plane. Reticle eccentricity shall be within 50 seconds of arc and the SDA shall be perpendicular to the ball plane mount to within 40 seconds of arc.

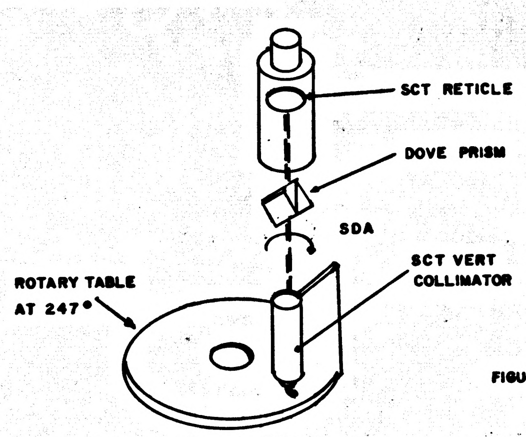


FIGURE 2

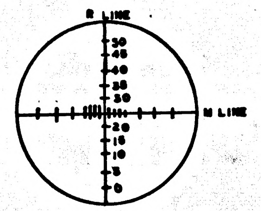


FIGURE 3

4.2.1.3 Orientation of the TDA Measuring Plane to the Shaft Axis.

4.2.1.3.1 SXT. The SXT reticle and its autocollimated SLOS reflection shall be observed through the SXT eyepiece as shown schematically in Figure 4. A series of angular displacement measurements between the reticle "R" line and its reflection, through the complete excursion of SDA, shall be made with reference to the reticle line pattern. The results shall be charted and analyzed to yield the parallelism error between the SLOS and LLOS and the eccentricity of the reflected SLOS reticle image to the SDA, both of which are related to the lack of perpendicularity between the TDA and SDA. The sum of the errors resulting from the lack of perpendicularity between the TDA and SDA and the lack of perpendicularity of the SLOS and TDA shall not exceed 20 arc seconds.

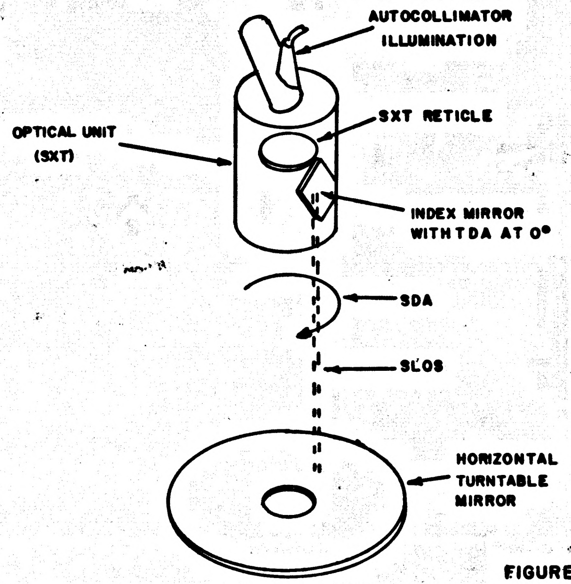

AUTOCOLLIMATOR ILLUMINATION
SXT RETICLE
OPTICAL UNIT (SXT)
INDEX MIRROR WITH TDA AT 0°
SDA
SLOS
HORIZONTAL TURNTABLE MIRROR

FIGURE 4

4.2.1.3.2 Orientation of SLOS to TDA. With the SXT TDA set to internally autocollimate the SLOS, the electrical angle corresponding to the coincidence of the "M" line and the reflection of the "M" line shall be recorded as the Self Collimation Angle. The position of the "R" line reflection shall be within 10 seconds of the "R" line at this position.

4.2.1.3.3 SCT. The SCT azimuth and elevation collimator shall be observed via the SCT eyepiece through an SCT TDA excursion as indicated in Figure 5. The lateral (normal to trunnion axis) displacement of the SCT reticle "R" line, between the ends of its excursion shall be estimated utilizing the collimator reticle pattern as a reference. The variation of "R" line thus measured, which results from a lack of perpendicularity between LOS and TDA and a lack of perpendicularity between TDA and SDA, shall not exceed 2 arc minutes.

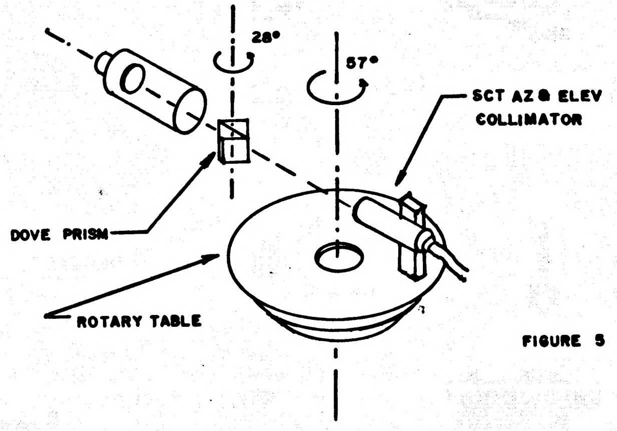


FIGURE 5

4.2.1.4. SXT TDA Accuracy. The SXT TDA accuracy shall be based on the statistical analysis of a series of positional measurements made with the Optical Unit, as its index mirror is rotated about its vertically oriented trunnion axis; while the unit is in a horizontal position. The SXT shall be autocollimated via SLOS off the Precision Test Fixture elevation mirror as shown in Figure 6. At each index mirror position the SXT TDA 64X Resolver readout, converted to SXT Trunnion LOS angle, shall be compared to the Precision Test Fixture rotary table angular position when coincidence between the SXT reticle and its reflection is achieved. The maximum error at zero reference shall not exceed 3 arc seconds. The peak to peak error shall not exceed 24 arc seconds.

error at any point shall not exceed 18 arc seconds.

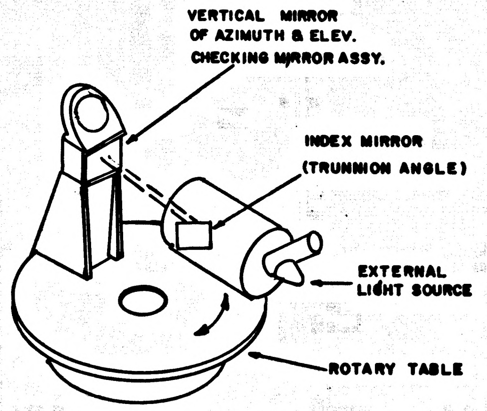

VERTICAL MIRROR
OF AZIMUTH & ELEV.
CHECKING MIRROR ASSY.
INDEX MIRROR
(TRUNNION ANGLE)
EXTERNAL
LIGHT SOURCE
ROTARY TABLE

FIGURE 6

4.2.1.5 SXT SDA Accuracy. The SXT SDA accuracy shall be based on the statistical analysis of a series of positional measurements made with the SXT as it is rotated about its vertically positioned Shaft Axis. The SXT shall be autocollimated via the SLOS off the PTF 57° Azimuth Mirror as shown in Figure 7. At each position the SXT SDA 16X Resolver readout, converted to SXT Shaft Angle shall be compared to the PTF rotary table position when coincidence between the SXT reticle and its reflection is achieved. The maximum error at zero reference shall not exceed 10 arc seconds. The peak to peak error at any point shall not exceed 44 arc seconds. seconds, the standard deviation shall not exceed 16 arc seconds, and the maximum error at any point shall not exceed 30 arc seconds.

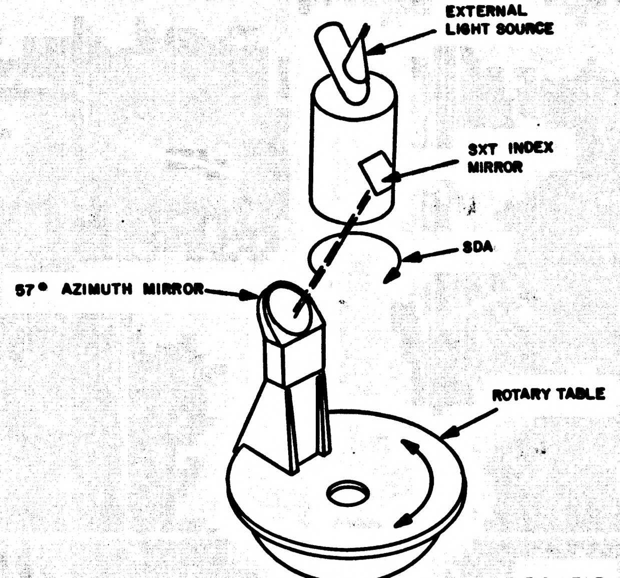


FIGURE 7

4.2.1.6 SCT TDA Electrical Accuracy. The SCT TDA electrical positional accuracy shall be based on the statistical analysis of a series of measurements made with the OUA mounted on the PTF. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) TDA's angular position via the 64X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 0° in azimuth and aligning the SCT's reticle "M" line to the PTF's azimuth and elevation collimator as shown in Figure 8 by positioning the SXT TDA. The data shall be reduced to yield a mean error, or bias error, and the standard deviation about the bias. The bias error shall not exceed 108 seconds and the standard deviation shall be 4 minutes maximum. The maximum allowable error at each point shall be 8 minutes.

4.2.1.7 SCT TDA Mechanical Accuracy. The SCT TDA mechanical positional accuracy shall be measured simultaneously and by a similar statistical technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define a TDA angle which shall be compared to the angle read out the SCT TDA counter. The OUA shall be positioned at the SCT LOS to 0° in azimuth and then the SCT's reticle "M" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 8. The data shall be reduced to yield a mean error, or bias error, and standard deviation about the bias. The bias error shall not exceed 54 seconds and the standard deviation shall not exceed 2 minutes.

4.2.1.8 SCT SDA Electrical Accuracy. The SCT SDA electrical accuracy shall be based on the statistical analysis of a series of measurements made with the OUA mounted on the PTF. The PTF's rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to an electrical angle readout on the functional tester. The electrical readout represents the SXT (to which the SCT is slaved) SDA's angular position via the 16X RSVR. The OUA shall be positioned at the PTF reference angles by adjusting the SCT LOS to 57° in elevation and then aligning the SCT's reticle "R" line to the PTF's azimuth and elevation collimator as shown in Figure 9 by positioning the SXT SDA. The data shall be reduced to yield a mean error or bias error and the standard deviation about the bias. The bias error shall not exceed 54 seconds and the standard deviation shall be 2 minutes maximum. The maximum allowable error at each point shall be 4 minutes.

4.2.1.9 SCT SDA Mechanical Accuracy. The SCT SDA mechanical positional accuracy shall be measured simultaneously and by a similar statistical technique as the electrical accuracy. The PTF's rotary table and SCT azimuth and elevation collimator shall define an SDA angle which shall be compared to the angle read off the SCT SDA counter. The OUA shall be positioned at the SCT LOS to 57° in elevation and then the SCT's reticle "R" line aligned to the PTF's azimuth and elevation collimator as shown in Figure 9. The data shall be reduced to yield a mean error, or bias error, and standard deviation about the bias. The bias error shall not exceed 54 seconds and the standard deviation shall not exceed 2 minutes.

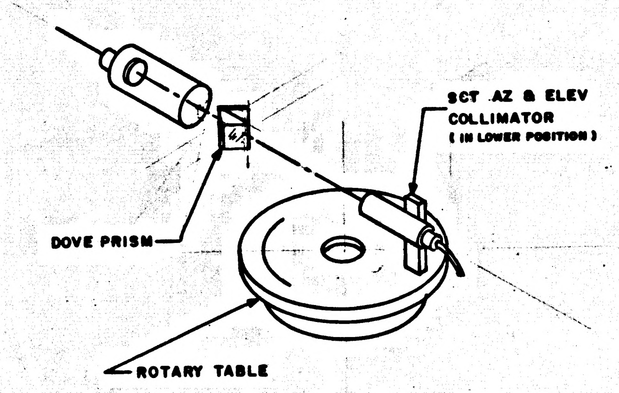


FIGURE 8 8

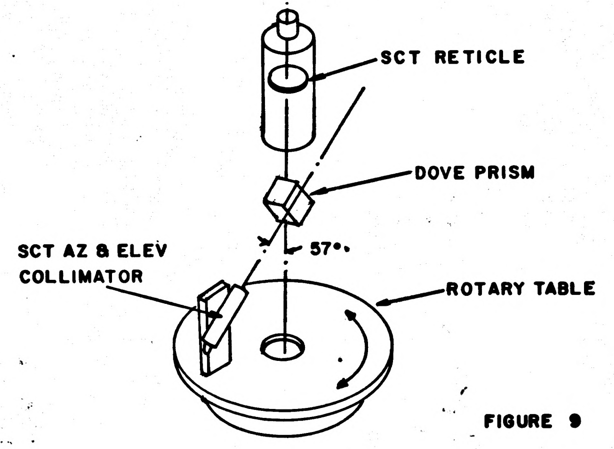


FIGURE 9

4.2.1.10 Resolving Power: The SXT LLOS shall be positioned such that the reticle "R" line and "M" line approximately bisects the negative black and white resolution target and the SXT eyepiece adjusted for optimum focus. The LLOS resolution for patterns which are parallel to the reticle "M" lines and patterns which are parallel to the reticle "R" lines when converted to are seconds shall be 14.4 arc seconds or better, or 10.3 arc sec or better depending on whether the test equipment used has a low or high contrast target respectively.

The fore mentioned tests shall be repeated while positioning the SXT SLOS to bisect the resolution target. The SLOS resolution at the center of the field shall be 9.1 arc sec or better or 7.2 arc seconds or better, depending on whether the test equipment used has a low or high contrast target respectively. In addition, with a low contrast target the resolution at 1/3 field radius shall be 14.4 arc seconds or better and at 2/3 field radius shall be 28.7 arc seconds or better, while the corresponding values shall be 11.5 arc seconds for 1/3 field radius and 23.0 arc seconds for 2/3 field radius if a high contrast target is being used in the test equipment.

The SCT LOS shall be positioned such that the reticle "R" line and "M" line bisect the resolution target and the SCT eyepiece shall be adjusted for optimum focus. The LOS resolution at the center of the field shall be 146 arc seconds or better if the test equipment has a low contrast target and 64.6 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 15 or 35 gradicule bisects the resolution target. The LOS resolution, at approximately 1/3 field radius, shall be 230 arc seconds or better if the test equipment has a low contrast target and 91.5 arc seconds or better if it has a high contrast target.

The SCT LOS shall be positioned such that the 5 or 45 gradicule bisects the resolution target. The LOS resolution, at approximately 2/3 field radius, shall be 328 arc seconds or better if the test equipment has a low contrast target and 184 arc seconds or better if it has a high contrast target.

4.2.1.11 Air/Vacuum Focusing. The focus adjustment of each eyepiece shall be measured by means of a dioptmeter. Each eyepiece shall be mounted in place with sufficient entrance light to illuminate the air and vacuum reticle to which the focus is set. The adjustable SXT Standard eyepiece shall have a focusing range of -2 to +2 diopters. All other eyepieces are fixed and shall be set at a -1 ± .25 diopter focus.

4.2.1.12 Luminous Transmittance. The luminous transmittance at the assembly lines of sight shall be tested using a CIE illuminant "C" as a light source and a light transmittance meter to monitor the light intensity. The light intensity at the source (Io) shall be measured prior to testing the assembly.

The assembly shall be positioned such that the light emitted from the source enters the eyepiece and appears centralized in the optics when viewed via the objective lens. The light intensity at the objective lens (I_R) shall then be measured with the transmittance meter. The luminous transmittance shall be determined as follows:

Intensity Ratio ($Io:I_R$) X 100 = % Transmittance. The luminous transmittance of the SXT LLOS to CIE illuminate "C" shall not be less than 4%.

The luminous transmittance of the SCT to CIE illuminate "C" shall not be less than 30%.

The luminous transmittance of the SXT SLOS shall be tested as specified above while monitoring the light intensity at the SXT Indexing Mirror. The luminous transmittance of the SXT SLOS to CIE illuminate "C" shall not be less than 25%.

If the assembly configuration includes an eyepiece polaroid filter then the following test shall be performed:

The ratio of the luminous transmittance of the SXT SLOS and SXT LLOS shall be less than 12 to 1 for CIE illuminant "C" when the eyepiece polaroid filter is positioned for minimum transmission through the LLOS.

4.2.1.13 Freedom of Motion. Unscrew and pop out the SCT Shaft Manual Input Adapter and rotate control. SCT Shaft shall move freely. Unscrew and pop out the SCT Trunnion Manual Input Adapter and rotate control. SCT Trunnion shall move freely.

4.2.1.14 SXT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC, 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SXT Shaft or trunnion starts to rotate. The input voltage shall not exceed 5.3 VAC. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage, for an increasing angular rotation of the shaft (SDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the shaft. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a positive direction and in a negative direction for decreasing angular rotation of the trunnion.

4.2.1.15 SCT TDA and SDA Dynamic Friction, Stiction, and Rate Generator Phasing. With a variable AC 800 cps, input voltage applied to the Motor-Generator control windings, the voltage shall be increased until the SCT shaft or trunnion starts to rotate. The input voltage shall not exceed 6.6 VAC when the shaft or trunnion is at the shade flip position, or 5.3 VAC at all other positions. The input voltage shall then be decreased to the lowest level required to maintain rotation. The input voltage shall not exceed 4.2 VAC.

With the use of a phase sensitive voltmeter, the generator output voltage for an increasing angular rotation of the shaft (SDA), shall cause the meter to deflect in a positive direction and the generator output for a decreasing angular rotation of the shaft shall cause the meter to deflect in a negative direction. The generator output voltage for an increasing angular rotation of the trunnion (TDA) shall cause the meter to deflect in a negative direction and in a positive direction for a decreasing angular rotation of the trunnion.

4.2.1.16 Reticle Lighting. Reticle lamp operation shall be determined by means of their current drain. The current shall be measured by means of a milliammeter when 5.0 VAC is applied across each bank of 4 parallel lamps that illuminate the SXT and SCT reticles. The current drain shall be within 10% of the current measurements previously made while the lamp illumination could be observed.

4.2.1.17 Dark Noise. With input power applied to the OUA, a 0 volt AGC signal applied to the Tracker High Voltage Power Supply, and the SCT head covered with a opaque black cloth;the tracker preamplifier output shall not exceel 10 volts rms when measured with a wide band meter.

4.2.1.18 Reference Voltage. The tuning fork reference voltages measured at the outputs of the X and Y Drive Amplifiers shall be greater than 6 volts peak-to-peak as measured with an oscilloscope.

4.2.1.19 Tracker Frequency. The fundamental component of the signal frequencies measured at the Tracker preamplifier output shall be 455 cps ± 1 cps and 356 ± 1 cps respectively as measured with a wave analyzer and frequency counter.

4.2.1.20 Error Signal Gradient. With a +1.8 volt AGC signal applied to the OUA, a +2.0 magnitude, simulated 6 second star shall be positioned, in the tracker field of view, to obtain a minimum output of both fundamental components of the tracker preamplifier output when utilizing a wave analyzer and an A.C. Voltmeter.

The star shall then be off set from null, to each position specified in Table III, along the Shaft axis coordinate and then along the Trunnion axis coordinate. The fundamental components of the tracker preamplifier output shall be as specified in Table III for each corresponding star displacement from null with a wave analyzer and an A.C. Voltmeter.

The error signal gradient shall then be tested with a +2.6 volt AGC signal applied to the OUA and utilizing a +1.0 magnitude, simulated 6 second star. The star shall be positioned to obtain a minimum output of both fundamental components of the tracker preamplifier output. The star shall then be displaced 1, 2, 3, 4, and 5 minutes from null along both shaft and trunnion coordinates. The fundamental components of the preamplifier output shall be as specified in Table III for each corresponding star displacement.

TABLE III

Star Displacement From Null	OUTPUT (mv rms)			
	356 cps		455 cps	
	Min.	Max.	Min.	Max.
±20"				
±40"				
± 1'				
± 2'				
± 3'	Table III to be determined			
± 4'				
± 5'				
± 6'				
± 7'				
± 8'				
± 9'				
± 10'				
± 11'				
± 12'				
± 13'				
± 14'				

4.2.1.21 Star Presence. With a 0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply Star presence output shall be less than 5.0 volts as measured with a D.C. Voltmeter.

With a +2.0 volt AGC signal applied to the Tracker High Voltage Power Supply, the Power Supply star presence output shall be greater than 14.0 volts as measured with a D.C. Voltmeter.

4.2.1.22 Tracker LOS to SXT Star LOS. With a simulated 0 magnitude star positioned in the tracker field of view and a +3.4 volt AGC signal applied to the assembly; the star shall be translated in both trunnion and cross-trunnion directions to obtain a minimum output of both fundamental components of the tracker preamplifier output and the star position established. The star, viewed along the SXT SLOS, shall then be positioned to the center of the SXT reticle and the star position shall be established again. The difference between the two star positions shall not exceed 1 arc minute in the trunnion direction and 3 arc minutes in the cross-trunnion direction. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the Tracker LOS.

4.2.1.23 Horizon Photometer Output. A simulated horizon having a 30 minute minimum diameter and initial intensity equivalent to 4.75×10^{-6} watts/steradian/cm^2/Å shall be positioned on the photometer optical axis. The fundamental component of the photometer preamplifier output shall be 275 millivolts ± 10%. These tests shall be made using a wave analyzer and an A.C. Voltmeter.

The simulated horizon intensity shall then be decreased from its initial valve to one-half its initial valve (2.375×10^{-6} watts/steradian/cm^2/Å). The fundamental component of the preamplifier output shall be one-half the output attained a one-half initial value horizon intensity ± 5%.

4.2.1.24 Photometer Fork Frequency. The fundamental component of the signal frequency measured at the photometer preamplifier output shall be 550 cps ± 1 cps using a wave analyzer and a frequency counter.

4.2.1.25 Photometer LOS to SXT LLOS. A simulated star shall be positioned in the photometer field of view. The fundamental component of the photometer preamplifier output shall be monitored as the star is translated in the trunnion direction and the preamplifier output graphically plotted versus the position of the star. The center of the aperture in the trunnion direction, shall be determined by analyzing this plot.

Similarly, the star shall then be positioned to the "known" center determined above, and the fundamental component of the preamplifier output monitored as the star is translated in the cross-trunnion direction. The preamplifier output, graphically plotted versus the position of the star, determines the center of the aperture, as above.

The star shall be positioned to the center of the aperture in both trunnion and cross-trunnion directions. The position of the star shall be measured. The star, viewed via the SXT LLOS, shall then be positioned on the SXT reticle center and the star position measured. The difference between the two star positions shall not exceed 3 arc minutes. The error angle shall be known to within 10 arc seconds relative to the error angle specified for the photometer LOS.

4.2.1.26 Baseline Performance. See applicable portions of Section 4.

4.2.1.27 Environmental Tests. Not applicable.

4.2.1.28 Final Visual Mechanical Inspection. Not applicable.

4.2.1.29 Pressure Leak Rate. The Leak Detector shall be calibrated prior to testing. The external side of the OUA shall be evacuated and back-filled with a 10% Helium mixture of 5 psi. The leak rate shall be determined using the following formula. The leak rate shall not exceed 9.99×10^{-5} st'd cc/sec.

$$\left[\begin{matrix}\text{Unit Leak Rate}\\ \text{St'd cc/sec-He}\end{matrix}\right] = \frac{\left[\begin{matrix}\text{Leak Detector}\\ \text{Reading}\end{matrix}\right] \left[\begin{matrix}\text{Calibration St'd}\\ \text{Leak Rate}\end{matrix} \left(\frac{\text{St'd cc He}}{\text{Sec}}\right)\right]}{\left[\begin{matrix}\text{Calibrated Leak}\\ \text{Detector reading}\end{matrix}\right] \left[\begin{matrix}\text{\% He in Mixture}\end{matrix}\right]}$$

4.2.1.30 Functional Performance and Repeatability. Same as section 3.3.5.

4.2.2 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Apollo G&N Drawing 2011000. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulants, defects, contaminants, pin misalignment, and legibility and appearance of markings.

5. PREPARATION FOR DELIVERY

5.1 General. Preparation for delivery shall be in accordance with Specification ND 1002214, General Specification for Preservation, Packaging, Packing and Container Marking of Apollo Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment.

The assembly shall be shipped and stored in a special container. It shall be purged with dry nitrogen gas prior to shipping and periodically after installation in the spacecraft.

The assembly shall be installed in or removed from its shipping container only under Class II or better clean room conditions in accordance with MIL-STD-209, Clean Room and Work Station Requirements Controlled, Environment.

6. NOTES.

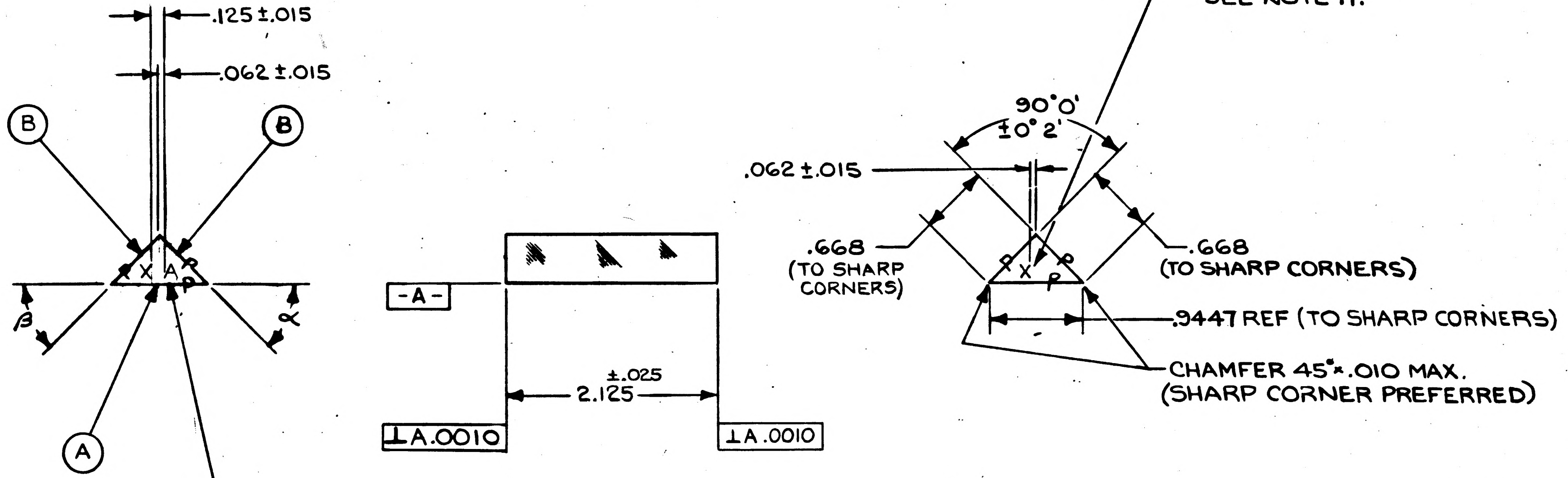
Notice: When APOLLO G&N drawings, specifications, or other data are used for any purpose other than in connection with a definitely related APOLLO G&N procurement operation, the National Aeronautics and Space Administration thereby incurs no responsibility nor any obligation whatsoever; and the fact that APOLLO G&N may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

2011150 A

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15426	1/7/65	WR

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. ELEMENT IN ACCORD WITH SPEC MIL-O-13830.
3. MATL. FOR REFERENCE ONLY: GLASS, OPTICAL BARIUM CROWN-LBC-2 TYPE 573-574, GRADE A PRECISION ANNEALED, MIL-G-174
4. SURF. Ⓐ TO BE FLAT BY TEST WITH INTERFEROMETER TO 1/4 λ AT 5,460 A°
5. SURF. Ⓑ TO BE FLAT BY TEST WITH INTERFEROMETER TO 1/2 λ AT 5,460 A°
6. ANGLE α MUST BE EQUAL TO ANGLE β WITHIN 0°-0'-10" (DEVIATION WEDGE NOT TO EXCEED 0°-0'-10")
7. TOTAL PYRAMIDAL WEDGE NOT TO EXCEED 0°-0'-30".
8. SURFACE Ⓐ TO HAVE SURFACE QUALITY 60-40 PER MIL-O-13830.
9. SURFACE Ⓑ TO HAVE SURFACE QUALITY 20-10 PER MIL-O-13830.
10. SURFACE MKD "P" POL, ALL OTHERS GRD.
11. IDENT NO. "X" (BEGINNING WITH 1, 2, ETC) IS TO BE USED FOR MFG PURPOSES ONLY, TO INSURE PROPER ASSY PROCEDURE.
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002015 (BAGGING)

DIAMOND SCRATCH IDENTIFICATION NUMBER .125±.015 HIGH ONE END IN APPROX LOCATION SHOWN. SEE NOTE 11.



DIAMOND SCRATCH IDENTIFICATION NUMBER "X" AND LETTER "A", .125±.015 HIGH ONE END, IN APPROX LOCATION SHOWN. SEE NOTE 11.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011151	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± SEE NOTES

DO NOT SCALE THIS DRAWING
MATERIAL 1011898
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910150
DRAWN J. Colillo DATE 4-6-64
CHECKED J. SULLIVAN 5-26-64
APPROVAL J. Rushman 5-29-64
APPROVAL E. Thorup 6-12-64
NASA APPROVAL J Barnard
MIT APPROVAL J J Nelson 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM

CODE IDENT NO.
SIZE C
NASA NUMBER 2011150
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

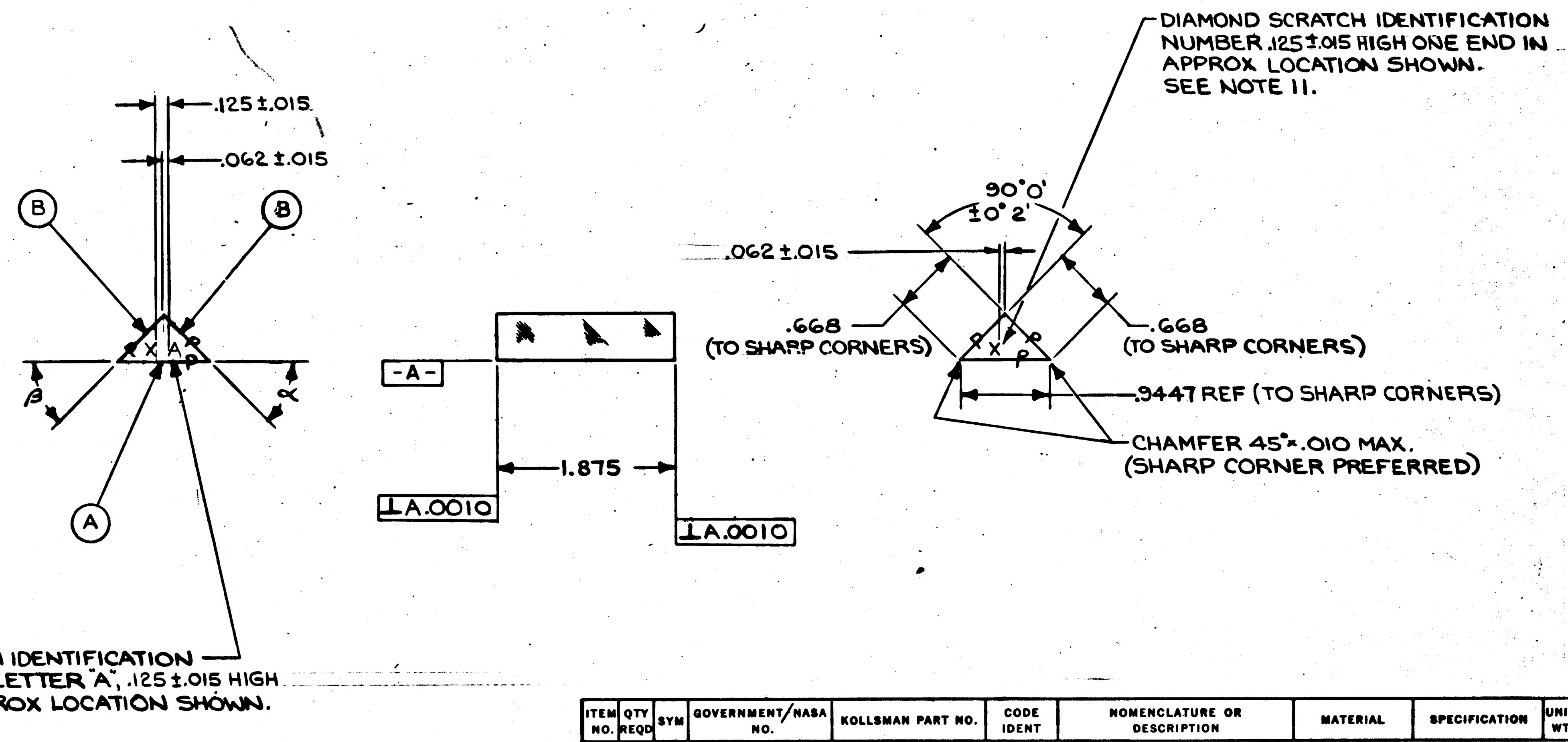
E-154

2011150		

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. ELEMENT IN ACCORD WITH SPEC MIL-O-13830.
3. MATL: FOR REFERENCE ONLY
   - GLASS, OPTICAL
   - BARIUM CROWN - LBC-2
   - TYPE 573-574, GRADE A
   - PRECISION ANNEALED, JAN-G-174
4. SURF. Ⓐ TO BE FLAT BY TEST WITH INTERFEROMETER TO ¼ λ AT 5,460 A°
5. SURF. Ⓑ TO BE FLAT BY TEST WITH INTERFEROMETER TO ½ λ AT 5,460 A°
6. ANGLE α MUST BE EQUAL TO ANGLE β WITHIN 0°-0'-10" (DEVIATION WEDGE NOT TO EXCEED 0°-0'-10")
7. TOTAL PYRAMIDAL WEDGE NOT TO EXCEED 0°-0'-30".
8. SURFACE Ⓐ TO HAVE SURFACE QUALITY 60-40 PER MIL-O-13830.
9. SURFACE Ⓑ TO HAVE SURFACE QUALITY 20-10 PER MIL-O-13830.
10. SURFACE MKD "P" POL, ALL OTHERS GRD.
11. IDENT NO. "X" (BEGINNING WITH 1, 2, ETC) IS TO BE USED FOR MFG PURPOSES ONLY, TO INSURE PROPER ASSY PROCEDURE.
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019 (BAGGING)


.125±.015
.062±.015
Ⓑ
Ⓑ
X
A
P
P
β
α
Ⓐ
-A-
1.875
⊥A.0010
⊥A.0010
DIAMOND SCRATCH IDENTIFICATION NUMBER "X" AND LETTER "A", .125±.015 HIGH ONE END, IN APPROX LOCATION SHOWN. SEE NOTE 11.
DIAMOND SCRATCH IDENTIFICATION NUMBER .125±.015 HIGH ONE END IN APPROX LOCATION SHOWN. SEE NOTE 11.
90°0' ±0°2'
.062±.015
.668 (TO SHARP CORNERS)
.668 (TO SHARP CORNERS)
P
X
P
.9447 REF (TO SHARP CORNERS)
CHAMFER 45°×.010 MAX. (SHARP CORNER PREFERRED)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011151	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± SEE NOTES

DO NOT SCALE THIS DRAWING

MATERIAL 1011898

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910150

DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 5-26-64
APPROVAL Rushman 5-29-64
APPROVAL E. Thorup 6-12-64
NASA APPROVAL Bernard
MIT APPROVAL J.J. Nelson 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM

CODE IDENT NO.
SIZE C
NASA NUMBER 2011150
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

2011150

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

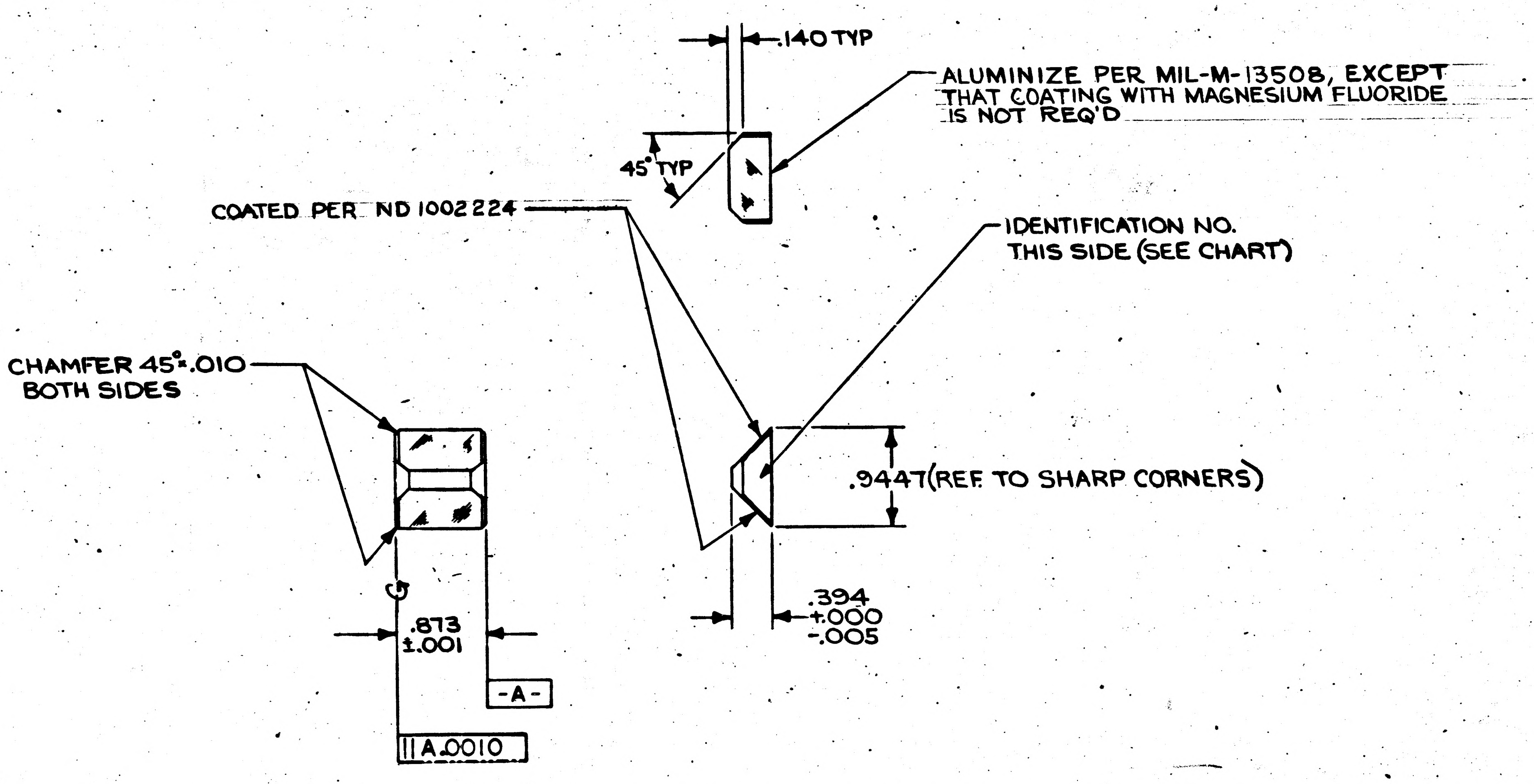
DRAWING NO.		IDENT NO.	MATL PART NO.		QTY REQD
NASA	KIC		NASA	KIC	
2011151 - 1	28386910160	"X"	2011150	28386910150	1
2011151 - 2	28386910170	"XA"			1

A | 2011151

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12673		

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. THIS PART IS PRODUCED BY USING MATL SPECIFIED IN CHART, AND CUTTING THIS MATL IN HALF. PRISM IS THEN GROUND TO DIMENSIONS INDICATED.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)


.140 TYP
ALUMINIZE PER MIL-M-13508, EXCEPT THAT COATING WITH MAGNESIUM FLUORIDE IS NOT REQ'D
45° TYP
COATED PER ND 1002224
IDENTIFICATION NO. THIS SIDE (SEE CHART)
CHAMFER 45°±.010 BOTH SIDES
.9447 (REF. TO SHARP CORNERS)
.873 ±.001
.394 +.000 -.005
-A-
// A .0010

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011153	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2
REF- BARIUM CROWN GLASS TYPE 573-574

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910160 / 0170

DRAWN J. Schilling DATE 4-6-64
CHECKED T. SULLIVAN 5-26-64
APPROVAL 5-29-64
APPROVAL E. Thorup 6-12-64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, HALF
(TELESCOPE)

CODE IDENT NO. | SIZE C | NASA NUMBER 2011151

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

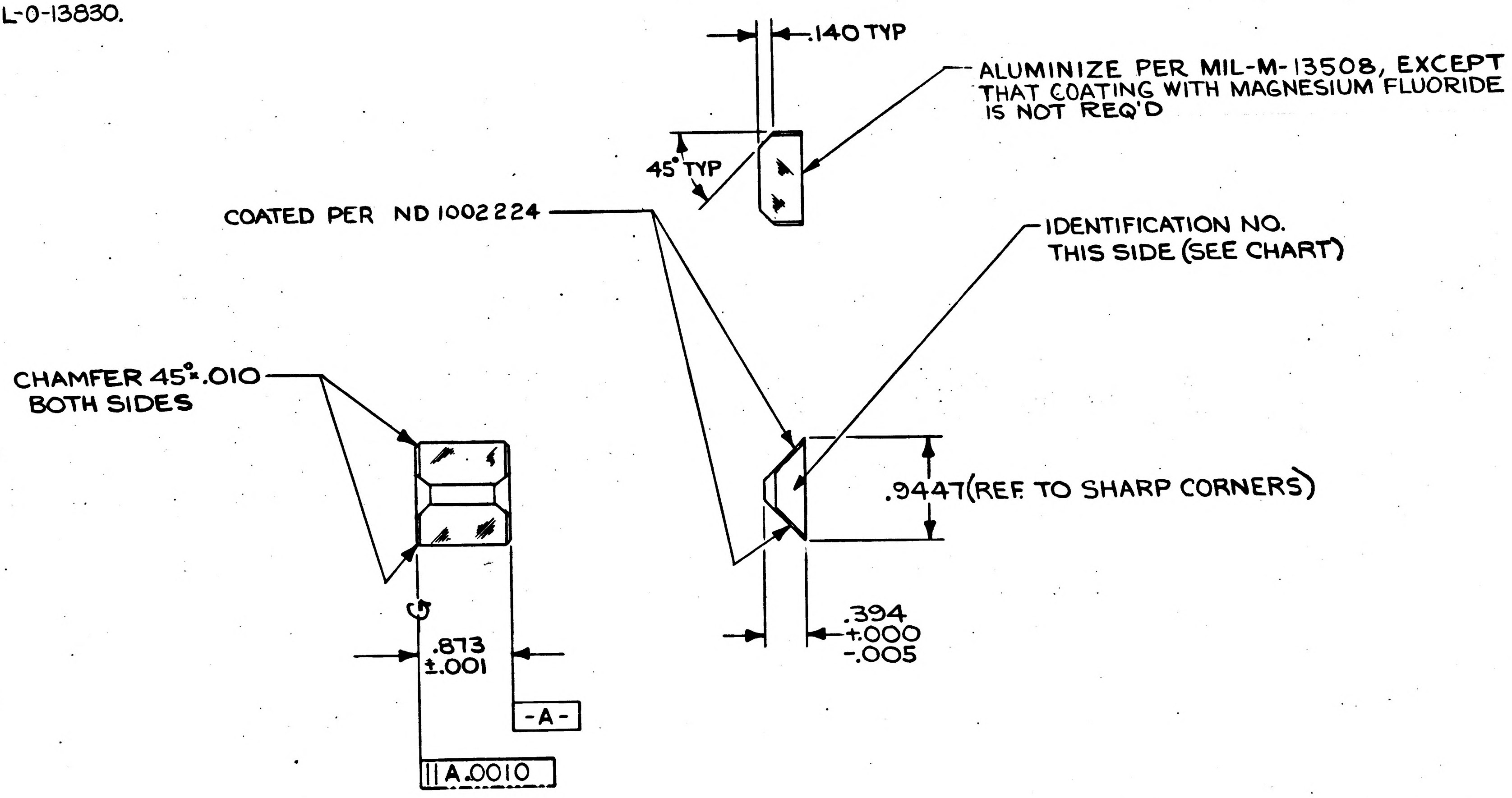
B 2011151

DRAWING NO.		IDENT NO.	MATL PART NO.		QTY REQD
NASA	KIC		NASA	KIC	
2011151 -1	28386910160	"X"	2011150	28386910150	1
2011151 -2	28386910170	"XA"			1

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12679	8/5/64	
B		REVISED PER TDRR 15850	1/27/65	WR

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. THIS PART IS PRODUCED BY USING MATL SPECIFIED IN CHART, AND CUTTING THIS MATL IN HALF. PRISM IS THEN GROUND TO DIMENSIONS INDICATED.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)
4. ELEMENT IN ACCORDANCE WITH MIL-0-13830.



.140 TYP
ALUMINIZE PER MIL-M-13508, EXCEPT THAT COATING WITH MAGNESIUM FLUORIDE IS NOT REQ'D
45° TYP
COATED PER ND 1002224
IDENTIFICATION NO. THIS SIDE (SEE CHART)
CHAMFER 45°±.010 BOTH SIDES
.9447(REF. TO SHARP CORNERS)
.873 ±.001
-A-
.394 +.000 -.005
‖ A .0010

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011153	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2
REF- BARIUM CROWN GLASS TYPE 573-574

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 2838691 0160 0170

DRAWN J Schiller DATE 4-6-64
CHECKED J SULLIVAN 5-26-64
APPROVAL 5-29-64
APPROVAL E. Dhoup 6-12-64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, HALF
(TELESCOPE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011151
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

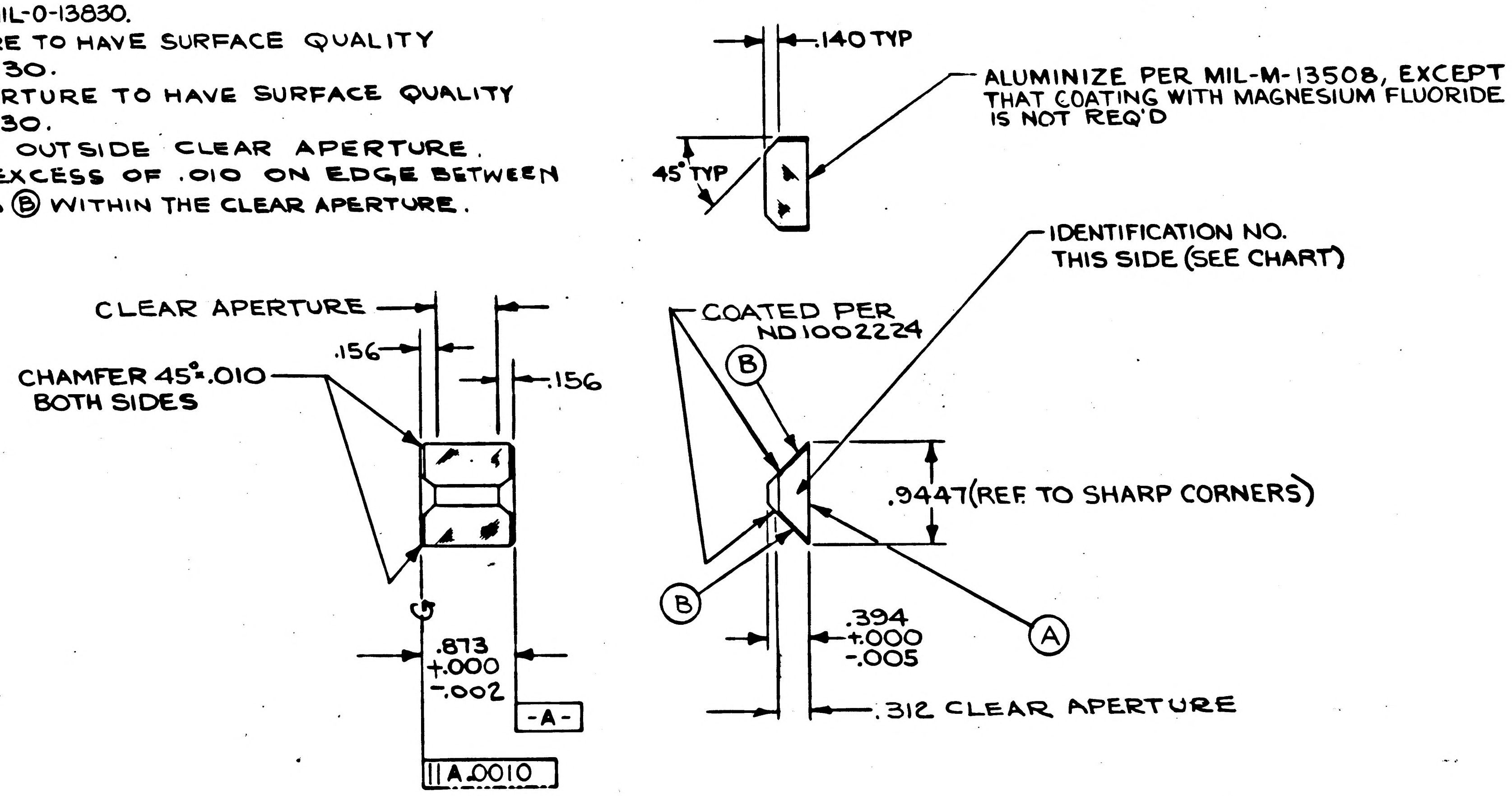
DRAWING NO.		IDENT NO.	MATL PART NO.		QTY REQD
NASA	KIC		NASA	KIC	
2011151 - 1	28386910160	"X"	2011150	28386910150	1
2011151 - 2	28386910170	"XA"			1

2011151 C

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12679	9/4/64	
B		REVISED PER TDRR 15850	1/27/65	WK
C		REVISED PER TDRR 30825	8/25/66	JWB

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. THIS PART IS PRODUCED BY USING MATL SPECIFIED IN CHART, AND CUTTING THIS MATL IN HALF. PRISM IS THEN GROUND TO DIMENSIONS INDICATED.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)
4. ELEMENT IN ACCORDANCE WITH MIL-O-13830.
   - A, SURFACE Ⓐ CLEAR APERTURE TO HAVE SURFACE QUALITY 60-40 PER MIL-O-13830.
   - B, SURFACE Ⓑ CLEAR APERTURE TO HAVE SURFACE QUALITY 20-10 PER MIL-O-13830.
   - C, JIG MARKS PERMITTED OUTSIDE CLEAR APERTURE.
   - D. NO CHIPS PERMITTED IN EXCESS OF .010 ON EDGE BETWEEN SURFACE Ⓐ AND SURFACES Ⓑ WITHIN THE CLEAR APERTURE.


.140 TYP
45° TYP
ALUMINIZE PER MIL-M-13508, EXCEPT THAT COATING WITH MAGNESIUM FLUORIDE IS NOT REQ'D
IDENTIFICATION NO. THIS SIDE (SEE CHART)
CLEAR APERTURE
.156
.156
CHAMFER 45° x .010 BOTH SIDES
COATED PER ND1002224
Ⓑ
Ⓑ
Ⓐ
.9447 (REF TO SHARP CORNERS)
.873 +.000 -.002
-A-
∥ A .0010
.394 +.000 -.005
.312 CLEAR APERTURE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011153	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2
REF- BARIUM CROWN GLASS TYPE 573-574

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 2838691 0160 0170

DRAWN J. Scholley DATE 4-6-64
CHECKED J SULLIVAN 5-26-64
APPROVAL 5-29-64
APPROVAL E. Thorup 6-12-64
NASA APPROVAL
MIT APPROVAL 4/10/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, HALF
(TELESCOPE)

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011151
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

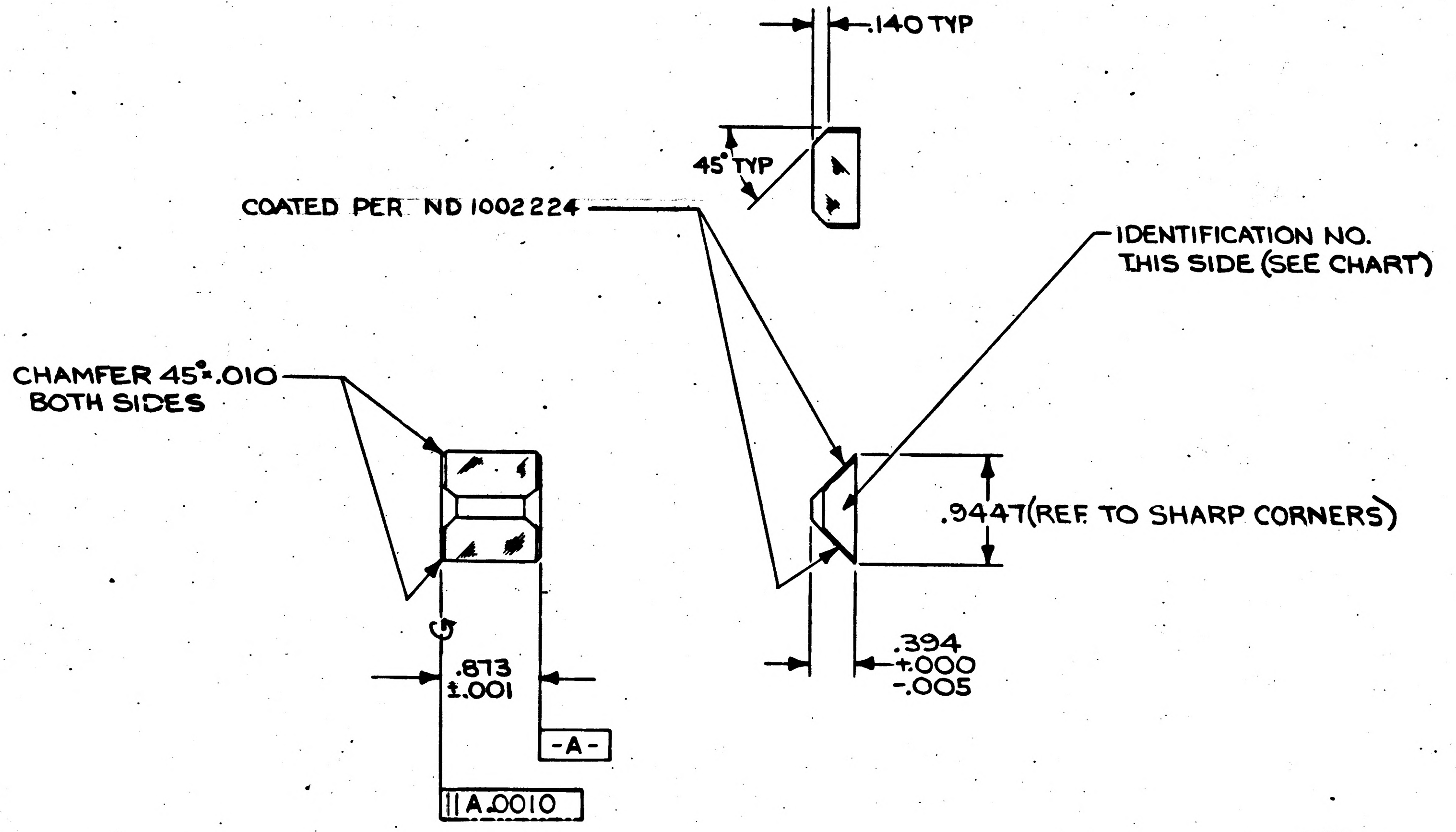
2011151 C

2011151

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

DRAWING NO.		IDENT NO.	MATL PART NO.		QTY REQD
NASA	KIC		NASA	KIC	
2011151 -1	28386910160	"X"	2011150	28386910150	1
2011151 -2	28386910170	"XA"			1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. THIS PART IS PRODUCED BY USING MATL SPECIFIED IN CHART, AND CUTTING THIS MATL IN HALF. PRISM IS THEN GROUND TO DIMENSIONS INDICATED.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



.140 TYP
45° TYP
COATED PER ND 1002224
IDENTIFICATION NO. THIS SIDE (SEE CHART)
CHAMFER 45° x .010 BOTH SIDES
.9447 (REF. TO SHARP CORNERS)
.873 ±.001
-A-
.394 +.000 -.005
// A .0010

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011153	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2
REF- BARIUM CROWN
GLASS TYPE 573-574

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 2838691 0160 / 0170

DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 5-26-64
APPROVAL 5-29-64
APPROVAL E. Dhonep 6-12-64
NASA APPROVAL
MIT APPROVAL 4/10/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, HALF
(TELESCOPE)

CODE IDENT NO. SIZE C NASA NUMBER 2011151

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

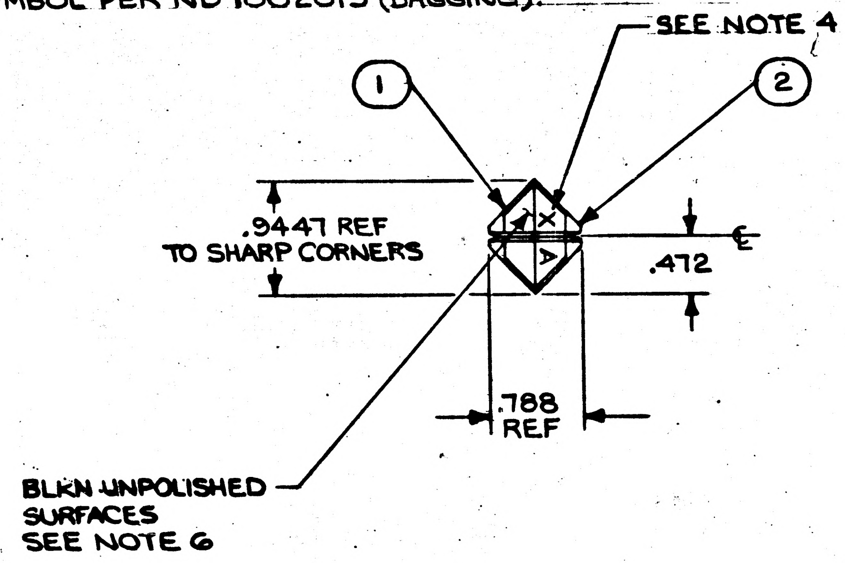
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

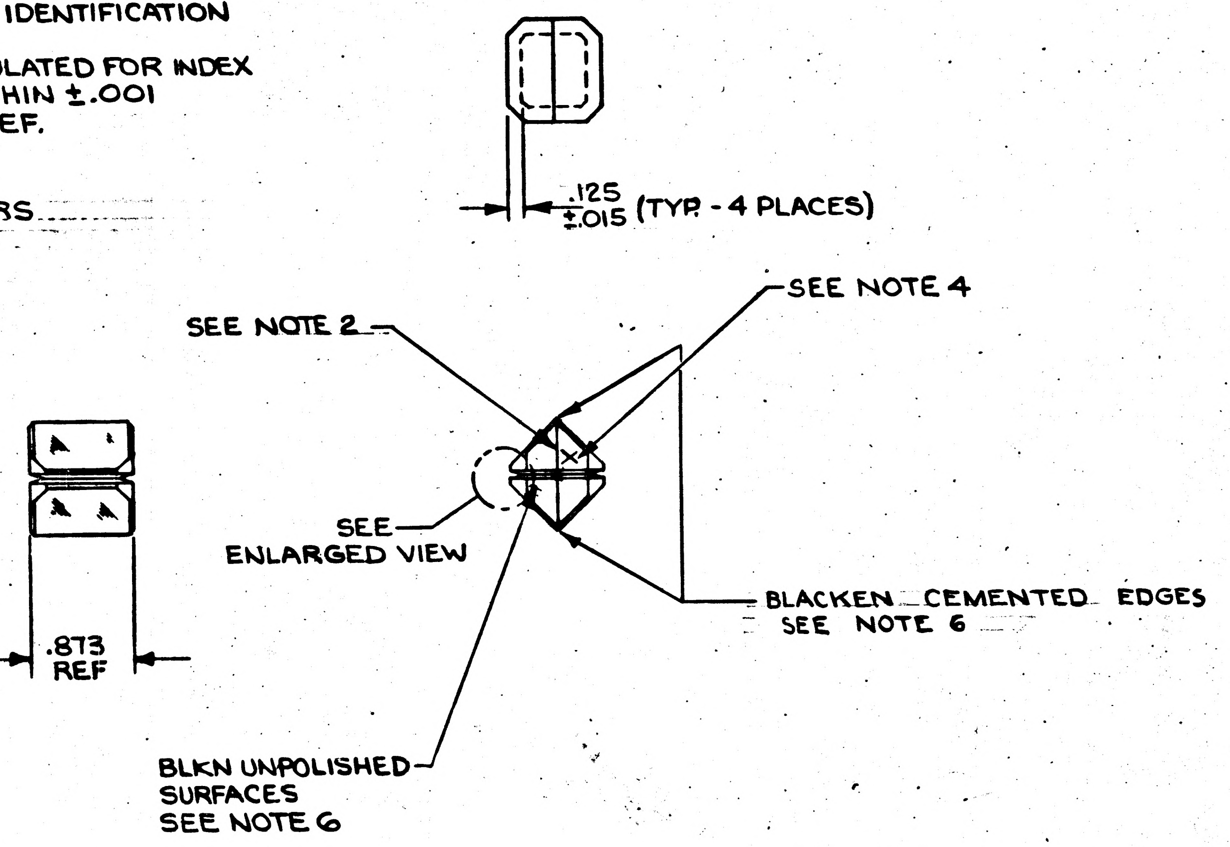
2011153 A

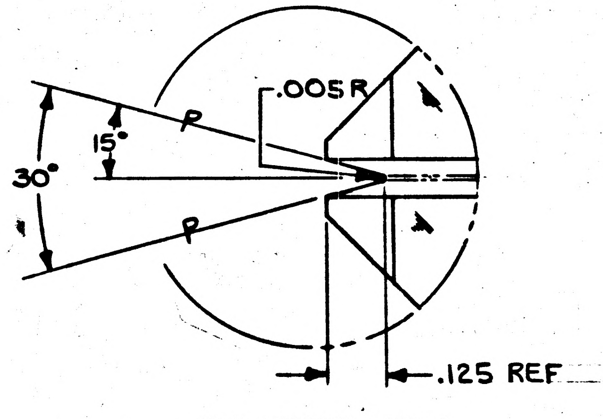
SYM	ZONE	REVISIONS 10952 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12672	9/17/4	

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT IN FIXTURE IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.11 USING ADHESIVE PER MIL-A-3920.
3. RESOLUTION TEST AFTER POLISHING VEE GROOVE:
   a. WITH SIGHT LINES NORMAL TO FACES ONE HALF OF EACH PRISM ASS'Y SHALL RESOLVE 14.4 SECONDS. FOR PATTERN LINES PARALLEL TO THE CEMENTED FACE ("P" LINES) AND 10.3 SECONDS FOR PATTERN LINES NORMAL TO THE CEMENTED FACE ("N" LINES). THE HALF WHICH BEST MEETS THIS RESOLUTION SHALL BE NOTED AS SIDE "X" OR SIDE "XA".
   b. SIMILARLY THE OTHER HALF SHALL RESOLVE 16.2 SECONDS FOR "P" LINES AND 11.5 SECONDS FOR "N" LINES.
   c. WITH SIGHT LINES PARALLEL TO THE CEMENTED FACE THE PRISM ASSEMBLY SHALL RESOLVE 25.7 SECONDS FOR "P" LINES, 11.5 SECONDS FOR "N" LINES.
   CAUTION - GUARD AGAINST SPURIOUS RESOLUTION BY CHECKING NO. OF LINES SEEN WITH NO. OF LINES ON PATTERN
4. AFTER CEMENTING ITEMS ① AND ② TOGETHER, CORRESPONDING IDENTIFICATION NO.-LETTER "XA" AND NO. "X" SHALL BE IN POSITION SHOWN.
5. BLACKEN VEE GROOVE (IN ENLARGED VIEW) WITH "LUXORB" FORMULATED FOR INDEX OF REFRACTION OF THIS MELT (AS GIVEN BY MANUFACTURER) WITHIN ±.001 PER ND 1002091. NOMINAL VALUE FOR THIS GLASS N_D = 1.5735 REF.
6. BLACKEN IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.12. BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).







ENLARGED VIEW
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011151-2	28386910170		PRISM, HALF	—	—	
1	1		2011151-1	28386910160		PRISM, HALF	—	—	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ±.005 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL REF ONLY: (BARIUM CROWN GLASS TYPE 573-574)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910060
DRAWN F. Schilley DATE 4-6-64
CHECKER C. LEINZ (CRF) 7/13/64
APPROVAL E. Ruehmann 7/13/64
APPROVAL E. Thoeny 7/13/64
NASA APPROVAL W J Kline 7-14-64
MIT APPROVAL W Kupfer 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM - ASSY OF
(TELESCOPE)

CODE IDENT NO. | SIZE C | NASA NUMBER 2011153
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

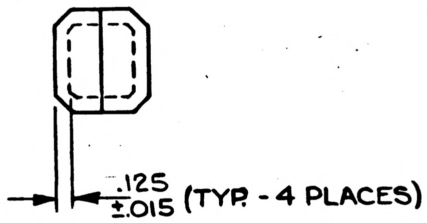
2011153	B

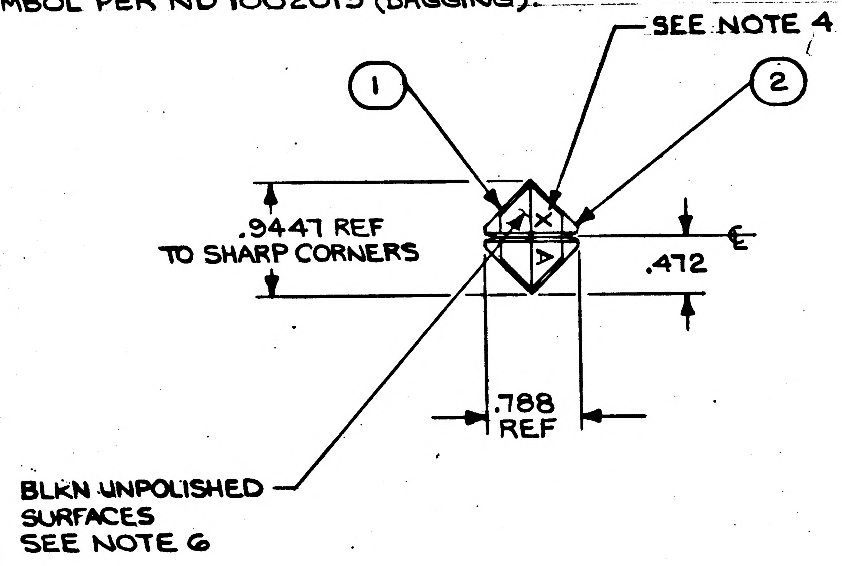
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12672	9/17/4	
B		REVISED PER TDRR 17998	4/13/66	WR.

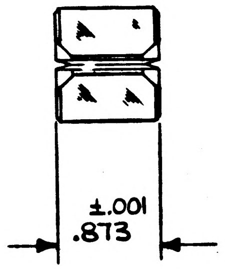
NOTES:

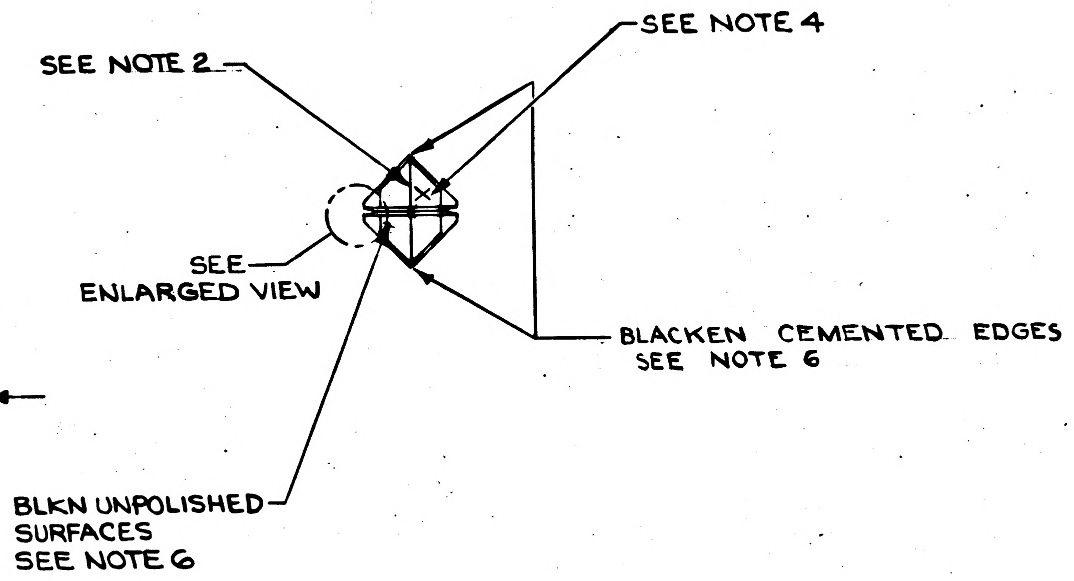
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT IN FIXTURE IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.11 USING ADHESIVE PER MIL-A-3920.
3. RESOLUTION TEST AFTER POLISHING VEE GROOVE:
   a. WITH SIGHT LINES NORMAL TO FACES ONE HALF OF EACH PRISM ASS'Y SHALL RESOLVE 14.4 SECONDS, FOR PATTERN LINES PARALLEL TO THE CEMENTED FACE ("P" LINES) AND 10.3 SECONDS FOR PATTERN LINES NORMAL TO THE CEMENTED FACE ("N" LINES). THE HALF WHICH BEST MEETS THIS RESOLUTION SHALL BE NOTED AS SIDE "X" OR SIDE "XA".
   b. SIMILARLY THE OTHER HALF SHALL RESOLVE 16.2 SECONDS FOR "P" LINES AND 11.5 SECONDS FOR "N" LINES.
   c. WITH SIGHT LINES PARALLEL TO THE CEMENTED FACE THE PRISM ASSEMBLY SHALL RESOLVE 25.7 SECONDS FOR "P" LINES, 11.5 SECONDS FOR "N" LINES.

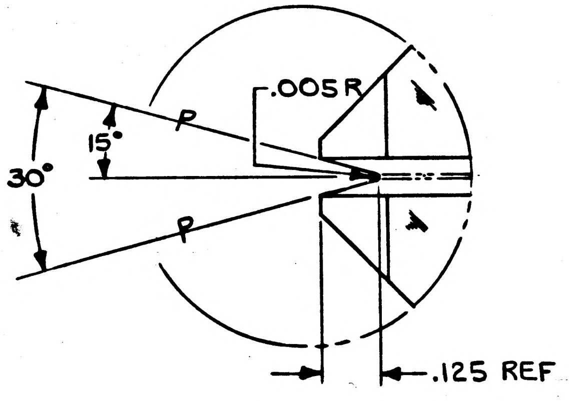
   CAUTION-GUARD AGAINST SPURIOUS RESOLUTION BY CHECKING NO. OF LINES SEEN WITH NO. OF LINES ON PATTERN
4. AFTER CEMENTING ITEMS ① AND ② TOGETHER, CORRESPONDING IDENTIFICATION NO.-LETTER "XA" AND NO. "X" SHALL BE IN POSITION SHOWN.
5. BLACKEN VEE GROOVE (IN ENLARGED VIEW) WITH "LUXORB" FORMULATED FOR INDEX OF REFRACTION OF THIS MELT (AS GIVEN BY MANUFACTURER) WITHIN ±.001 PER ND 1002091. NOMINAL VALUE FOR THIS GLASS N_D = 1.5735 REF.
6. BLACKEN IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.12. BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).











ENLARGED VIEW
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011151-2	28386910170		PRISM, HALF	—	—	
1	1		2011151-1	28386910160		PRISM, HALF	—	—	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ | DECIMALS ±.005 | ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL REF ONLY: (BARIUM CROWN GLASS TYPE 573-574)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910060
DRAWN F. Schuller DATE 4-6-64
CHECKED C. LEINZ (CRF) 7/13/64
APPROVAL F. Ruchmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL W Ruffe 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM - ASSY OF
(TELESCOPE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011153
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

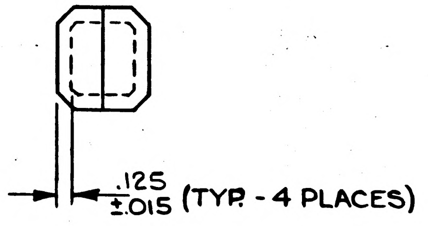
2011153B

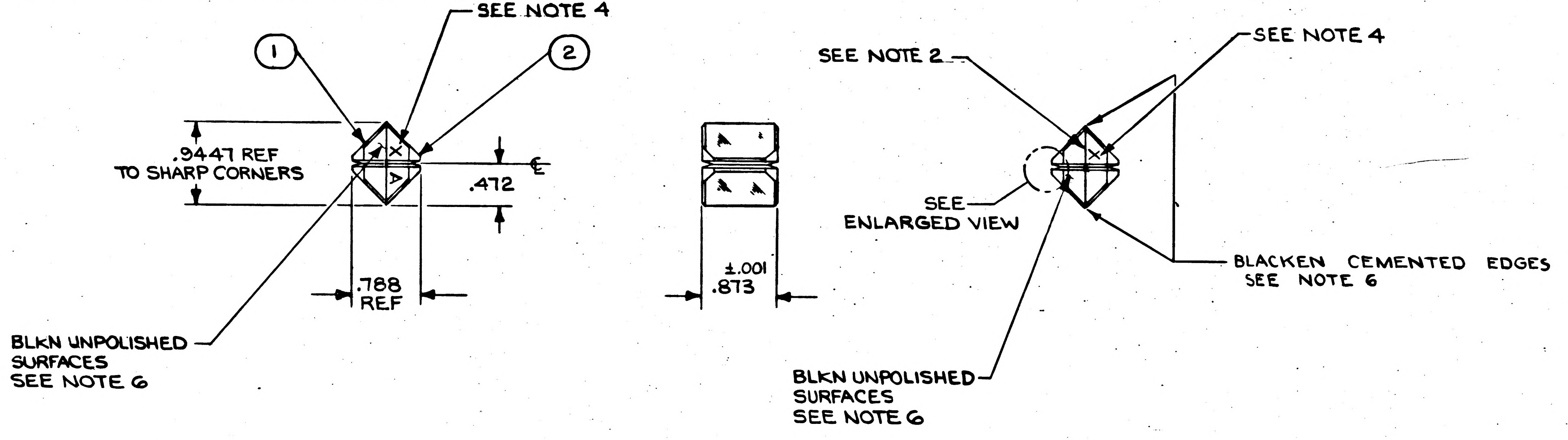
MASTER

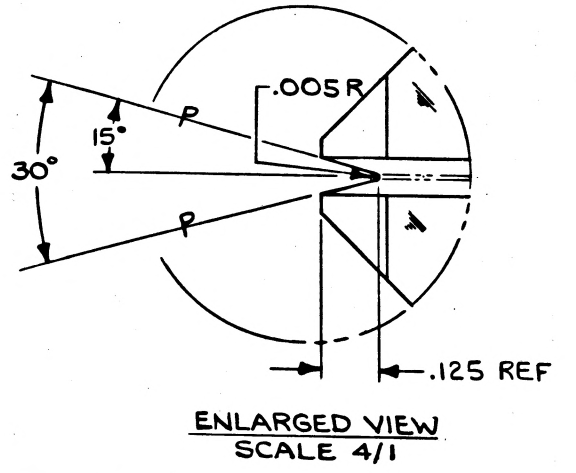
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12672	9/17/64	
B		REVISED PER TDRR 17998	4/13/65	WR.
C		REVISED PER TDRR 26786 WITH NEW MASTER TO REPLACE INADVERTENTLY DESTROYED MASTER		3/9/66 W H.

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT IN ACCORDANCE WITH SPEC. MIL-0-13830 USING ADHESIVE PER MIL-A-3920.
3. RESOLUTION TEST AFTER POLISHING VEE GROOVE:
   a. WITH SIGHT LINES NORMAL TO FACES ONE HALF OF EACH PRISM ASS'Y SHALL RESOLVE 14.4 SECONDS. FOR PATTERN LINES PARALLEL TO THE CEMENTED FACE ("P" LINES) AND 10.3 SECONDS FOR PATTERN LINES NORMAL TO THE CEMENTED FACE ("N" LINES). THE HALF WHICH BEST MEETS THIS RESOLUTION SHALL BE NOTED AS SIDE "X" OR SIDE "XA".
   b. SIMILARLY THE OTHER HALF SHALL RESOLVE 16.2 SECONDS FOR "P" LINES AND 11.5 SECONDS FOR "N" LINES.
   c. WITH SIGHT LINES PARALLEL TO THE CEMENTED FACE THE PRISM ASSEMBLY SHALL RESOLVE 25.7 SECONDS FOR "P" LINES, 11.5 SECONDS FOR "N" LINES.
   CAUTION-GUARD AGAINST SPURIOUS RESOLUTION BY CHECKING NO. OF LINES SEEN WITH NO. OF LINES ON PATTERN
4. AFTER CEMENTING ITEMS ① AND ② TOGETHER, CORRESPONDING IDENTIFICATION NO.-LETTER "XA" AND NO. "X" SHALL BE IN POSITION SHOWN.
5. BLACKEN VEE GROOVE (IN ENLARGED VIEW) WITH "LUXORB" FORMULATED FOR INDEX OF REFRACTION OF THIS MELT (AS GIVEN BY MANUFACTURER) WITHIN ±.001 PER ND 1002091. NOMINAL VALUE FOR THIS GLASS N_D = 1.5735 REF.
6. BLACKEN IN ACCORD WITH SPEC MIL-0-13830.
   BLKING MATL: BLACK INK PER FED. SPEC TT-1-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).







ENLARGED VIEW
SCALE 4/1

2	1		2011151-2	28386910170		PRISM, HALF	—	—	
1	1		2011151-1	28386910160		PRISM, HALF	—	—	
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 5°

DO NOT SCALE THIS DRAWING

MATERIAL REF ONLY: (BARIUM CROWN GLASS TYPE 573-574)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC 76386910060

DRAWN F. Schuller DATE 4-6-64
CHECKED C. LEINZ (CRF) 7/13/64
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. Morey 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL W Ruffe 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM - ASSY OF
(TELESCOPE)

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011153
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

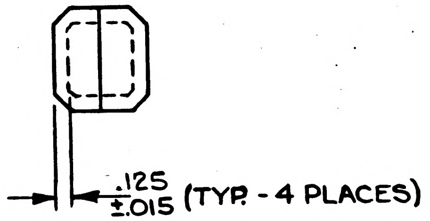
2011153C

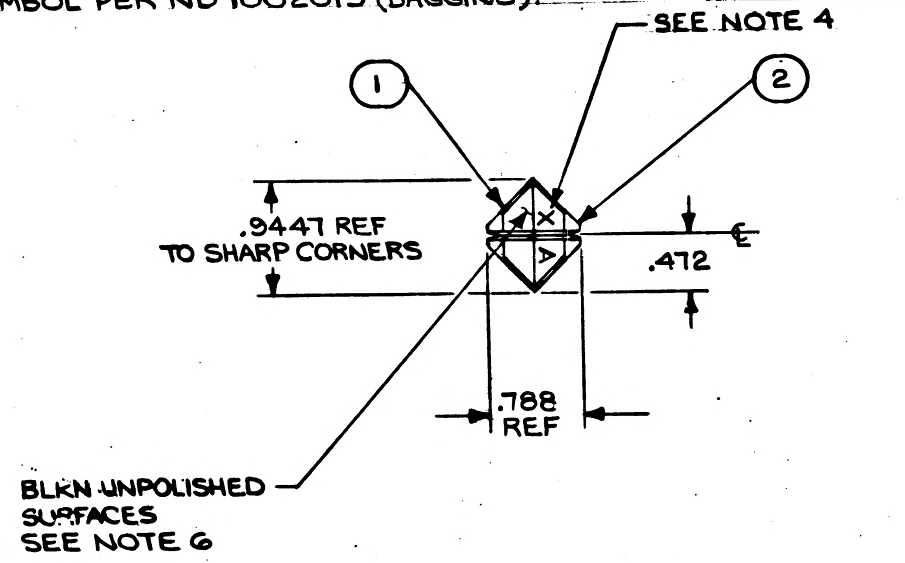
2011153

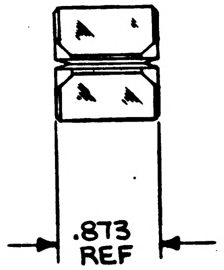
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

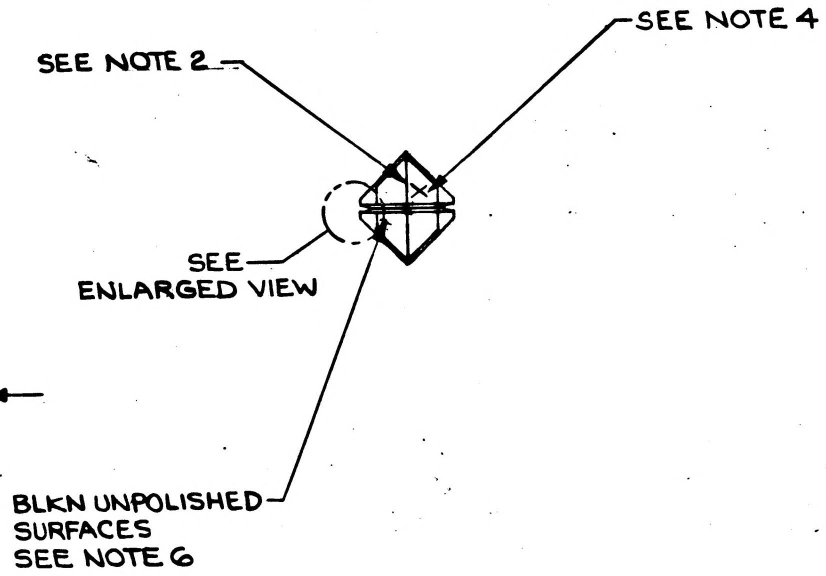
NOTES:

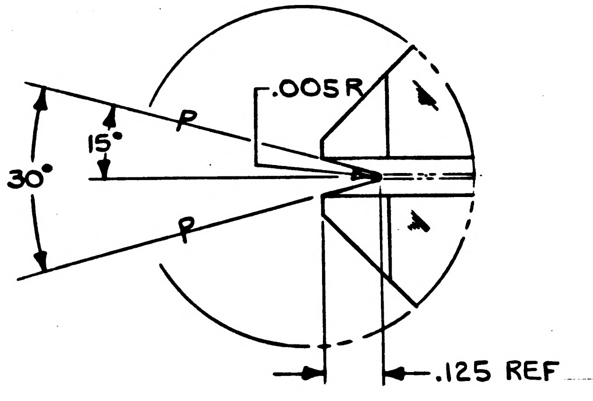
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT IN FIXTURE IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.11 USING ADHESIVE PER MIL-A-3920.
3. RESOLUTION TEST (BEFORE AND AFTER CURING AND POLISHING OF VEE GROOVE.
   a. WITH SIGHT LINES NORMAL TO FACES, EACH PRISM ASSY MUST RESOLVE 13 SECONDS AT ALL ORIENTATIONS OF THE RESOLUTION PATTERNS.
   b. WITH SIGHT LINES PARALLEL TO THE CEMENTED FACE, PRISM ASSY MUST RESOLVE 13 SECONDS WHEN PATTERN LINES ARE ORIENTED NORMAL TO THIS FACE AND 26 SECONDS WITH PATTERN LINES PARALLEL TO THIS FACE. GUARD AGAINST SPURIOUS RESOLUTION BY CHECKING NO. OF LINES SEEN WITH NO. OF LINES ON PATTERN.
   c. RESOLUTION TEST MUST BE MADE WITH RESOLUTION PATTERNS AND VIEWING TELESCOPE FOCUSSED AT INFINITY WITHIN 10 MILLIDIOPTERS AND AT THE SAME FOCUS FOR ALL POSITIONS.
4. AFTER CEMENTING ITEMS ① AND ② TOGETHER, CORRESPONDING IDENTIFICATION NO.-LETTER "XA" AND NO. "X" SHALL BE IN POSITION SHOWN.
5. BLACKEN VEE GROOVE (IN ENLARGED VIEW) WITH "LUXORB" FORMULATED FOR INDEX OF REFRACTION OF THIS MELT (AS GIVEN BY MANUFACTURER) WITHIN ±.001 ~~PER ND 1002091~~. NOMINAL VALUE FOR THIS GLASS N_D = 1.5735 REF.
6. BLACKEN IN ACCORD WITH SPEC MIL-O-13830 PAR 3.5.12. BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).











ENLARGED VIEW
SCALE 4/1

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011152	28386910180		PRISM, HALF, COATED	—	—	
1	1		2011151-1	28386910160		PRISM, HALF	—	—	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 5°

DO NOT SCALE THIS DRAWING

MATERIAL REF ONLY: (BARIUM CROWN GLASS TYPE 573-574)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910060

DRAWN F. Schuller DATE 4-6-64
CHECKER C. LEINZ (CRF) 7/13/64
APPROVAL F. Ruchmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W J [illegible] 7-14-64
MIT APPROVAL W Ruppel 14 July 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM - ASSY OF (TELESCOPE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011153
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-184

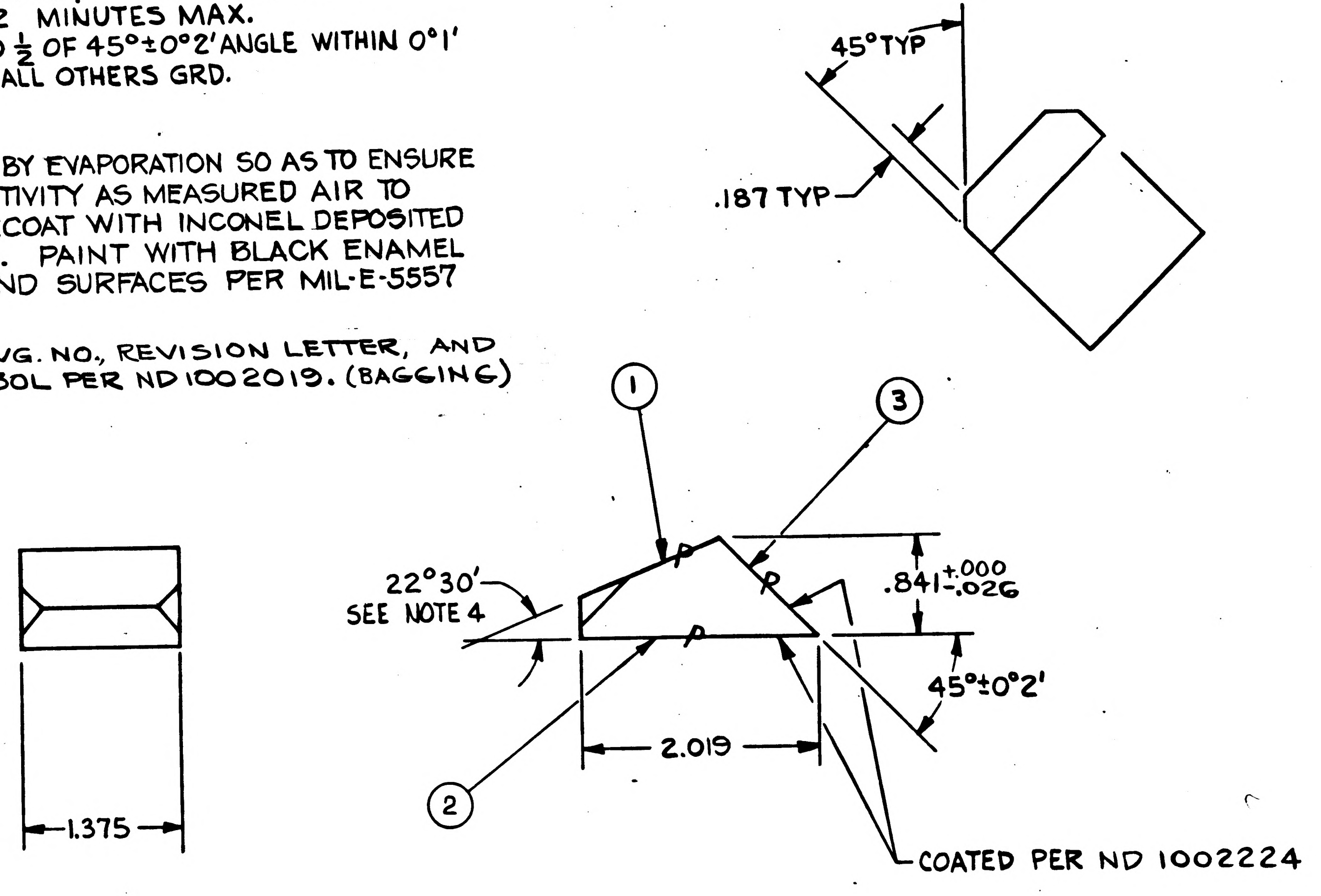
A 2011169

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18875	6/5/65	W.K.

REVISIONS 10420

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE A-FINE ANNEALED
   TYPE 573-574
4. CA: ENT= 1.18 DIA EXIT= 1.18 DIA
   SURF. QUAL: 60-40
   RESOLN 10. SEC OR BETTER.
   SURF. ① & ② FLAT WITHIN 1/2 FRNG SPHER, 1/4 FRNG IRREGTY.
   SURF ③ FLAT WITHIN 1 FRNG, 1/2 FRNG IRREGTY.
   ERROR DUE TO PYRAMID 2 MINUTES MAX.
   22°30' ANGLE TO BE EQUAL TO 1/2 OF 45°±0°2' ANGLE WITHIN 0°1'
5. SURFACES MARKED "P" POL, ALL OTHERS GRD.
6. SURFACE ① TO BE SILVERED BY EVAPORATION SO AS TO ENSURE A MINIMUM OF 98% REFLECTIVITY AS MEASURED AIR TO SILVER AT 5893°A. OVERCOAT WITH INCONEL DEPOSITED TO A THICKNESS OF 300°A. PAINT WITH BLACK ENAMEL INCLUDING ALL (5) GROUND SURFACES PER MIL-E-5557 TYPE IV.
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)



2011169 A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011724	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910210

DRAWN ~~R. BRUNELLE~~ DATE ~~4-9-64~~
CHECKED 4/20/64
APPROVAL F. Ruchmann (ECT)
APPROVAL E. Thorup (WPM) 6-17-64
NASA APPROVAL
MIT APPROVAL W Kaffar 4/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, TELESCOPE BODY

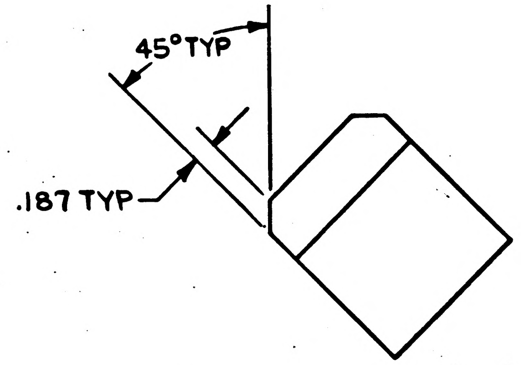
CODE IDENT NO.
SIZE C
NASA NUMBER 2011169
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

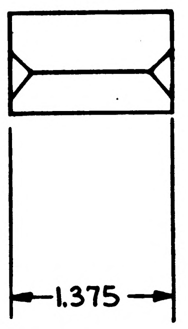
6911102

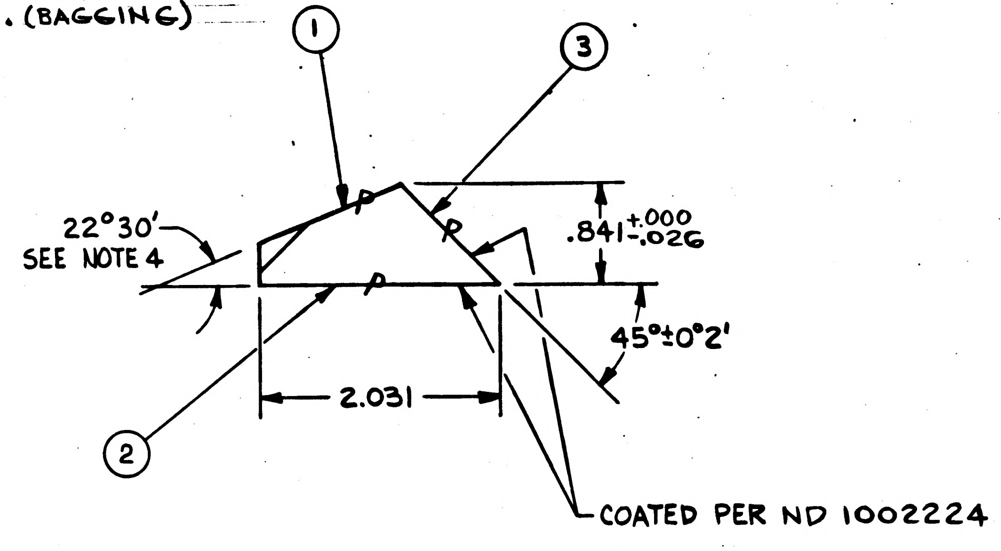
REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE A-FINE ANNEALED
   TYPE 573-574
4. CA: ENT= 1.18 DIA EXIT= 1.18 DIA
   SURF. QUAL: 60-40
   RESOLN 10 SEC OR BETTER.
   SURF. ① & ② FLAT WITHIN 1/2 FRNG SPHER, 1/4 FRNG IRREGTY.
   SURF ③ FLAT WITHIN 1 FRNG, 1/2 FRNG IRREGTY.
   ERROR DUE TO PYRAMID 2 MINUTES MAX.
   22°30' ANGLE TO BE EQUAL TO $\frac{1}{2}$ OF 45°±0°2' ANGLE WITHIN 0°1'
5. SURFACES MARKED "P" POL, ALL OTHERS GRD.
6. SURFACE ① TO BE SILVERED BY EVAPORATION SO AS TO ENSURE A MINIMUM OF 98% REFLECTIVITY AS MEASURED AIR TO SILVER AT 5893°A. OVERCOAT WITH INCONEL DEPOSITED TO A THICKNESS OF 300°A. PAINT WITH BLACK ENAMEL INCLUDING ALL (5) GROUND SURFACES PER MIL-E-5557 TYPE IV.
7. ~~IDENTIFY USING NASA DWG. NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019.~~ (BAGGING)







2011169

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011724	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910210

DRAWN R. BRUNELLE DATE ~~4-9-64~~
CHECKED [illegible] 4/20/64
APPROVAL F. [illegible] (ECT)
APPROVAL E. Thorup (wpm) 6-12-64
NASA APPROVAL
MIT APPROVAL W. Kupfer 4/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, TELESCOPE BODY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011169

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

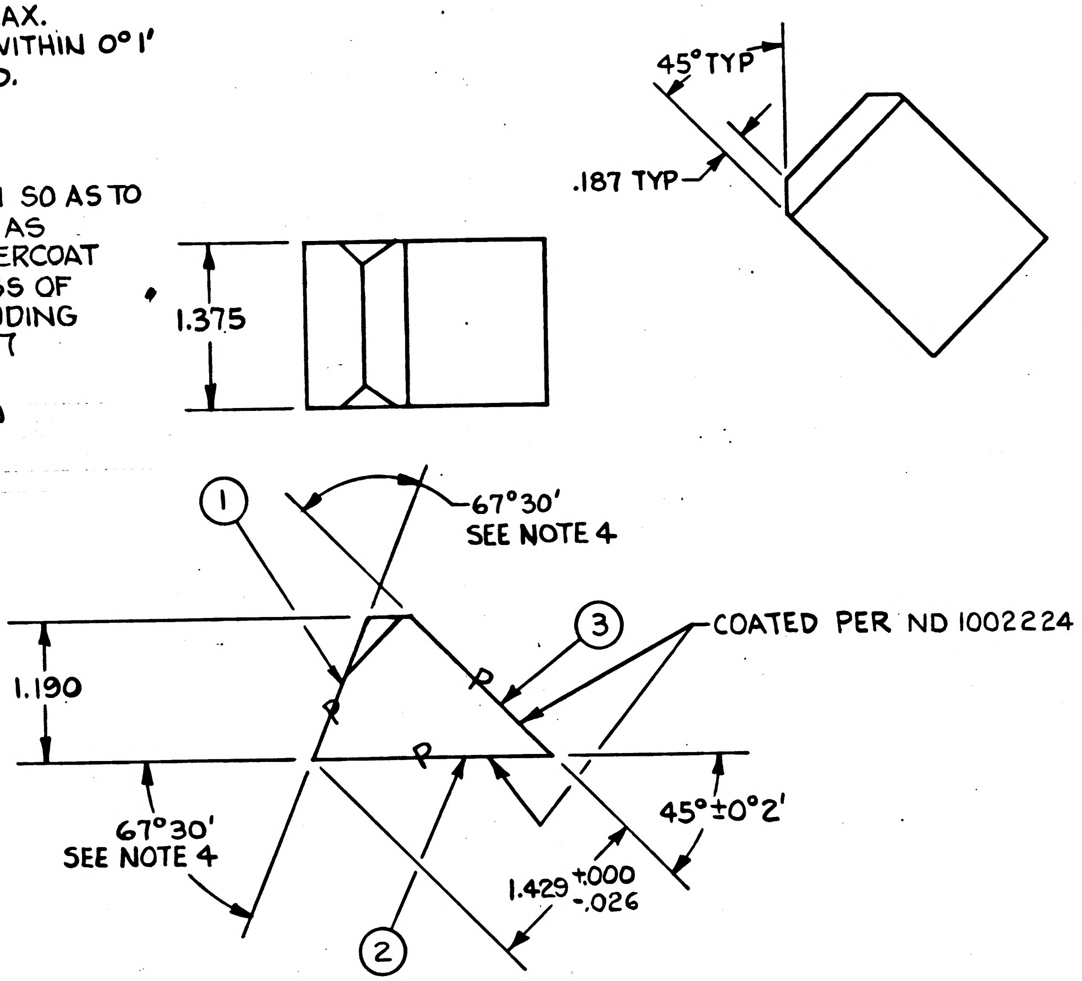
REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18874	5/5/65	WK

A 2011170

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE A-FINE ANNEALED
   TYPE 573-574
4. CA: EXIT= 1.18 DIA EXIT= 1.18 DIA
   SURF. QUAL: 60-40
   RESOLN 10 SEC OR BETTER.
   ALL THREE (3) POLISHED SURFACES TO BE FLAT WITHIN 1/2 FRNG SPHER. 1/4 FRNG IRREGTY.
   ERROR DUE TO PYRAMID 2 MINUTES MAX.
   67°30' ANGLES TO BE EQUAL TO EACH OTHER WITHIN 0°1'
5. SURFACES MARKED "P" POL, ALL OTHERS GRD.

7. SURFACE ① TO BE SILVERED BY EVAPORATION SO AS TO ENSURE A MINIMUM OF 98% REFLECTIVITY AS MEASURED AIR TO SILVER AT 5893 Å. OVERCOAT WITH INCONEL DEPOSITED TO A THICKNESS OF 300 Å. PAINT WITH BLACK ENAMEL INCLUDING ALL (5) GROUND SURFACES PER MIL-E-5557 TYPE IV.
8. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011724	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910220

DRAWN R. BRUNELLE DATE 4-8-64
CHECKED 5/27/64
APPROVAL 5-29-64
APPROVAL E. Dhong 6-12-64
NASA APPROVAL J. Barnard
MIT APPROVAL 6/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, TELESCOPE BODY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011170

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011170A

E-154

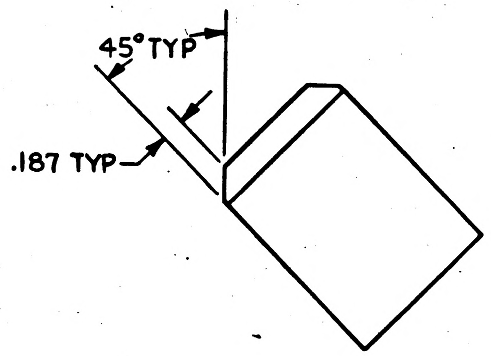
2011170

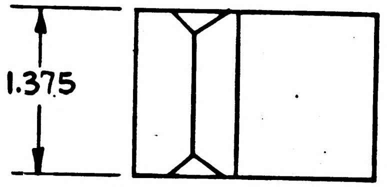
SYM	ZONE	REVISIONS TDRR 10230 DESCRIPTION	DATE	APPROVAL

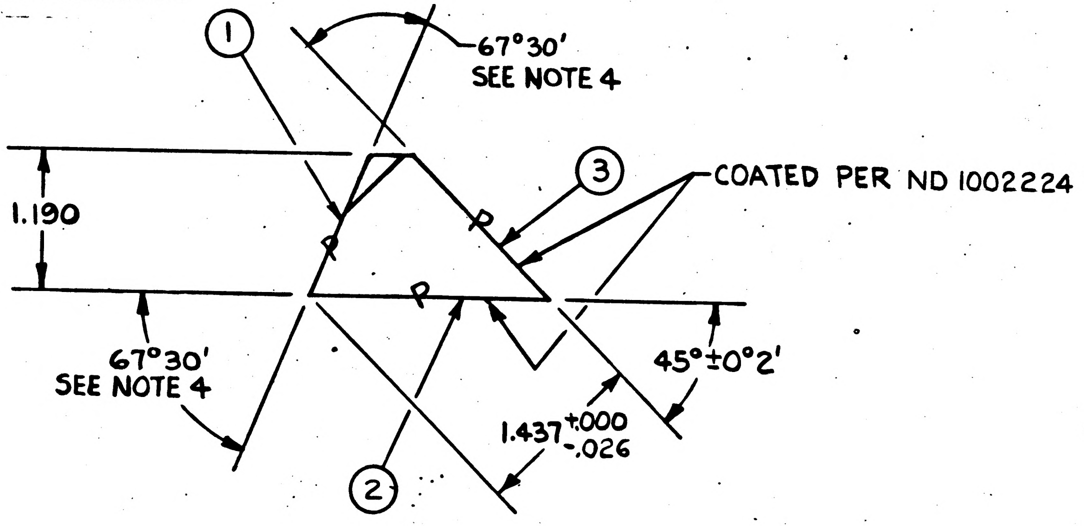
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE A-FINE ANNEALED
   TYPE 573-574
4. CA: EXIT= 1.18 DIA EXIT= 1.18 DIA
   SURF. QUAL: 60-40
   RESOLN 10 SEC OR BETTER.
   ALL THREE (3) POLISHED SURFACES TO BE FLAT WITHIN 1/2 FRNG SPHER. 1/4 FRNG IRREGTY.
   ERROR DUE TO PYRAMID 2 MINUTES MAX.
   67°30' ANGLES TO BE EQUAL TO EACH OTHER WITHIN 0°1'
5. SURFACES MARKED "P" POL, ALL OTHERS GRD.

7. SURFACE ① TO BE SILVERED BY EVAPORATION SO AS TO ENSURE A MINIMUM OF 98% REFLECTIVITY AS MEASURED AIR TO SILVER AT 5893 Å. OVERCOAT WITH INCONEL DEPOSITED TO A THICKNESS OF 300 Å. PAINT WITH BLACK ENAMEL INCLUDING ALL (5) GROUND SURFACES PER MIL-E-5557 TYPE IV.
8. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)







ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011724	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910220

DRAWN R. BRUNELLE DATE 4-8-64
CHECK 5/27/64
APPROVAL 5-29-64
APPROVAL E. Thomas 6-12-64

NASA APPROVAL
MIT APPROVAL 6/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, TELESCOPE BODY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011170

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

2011170

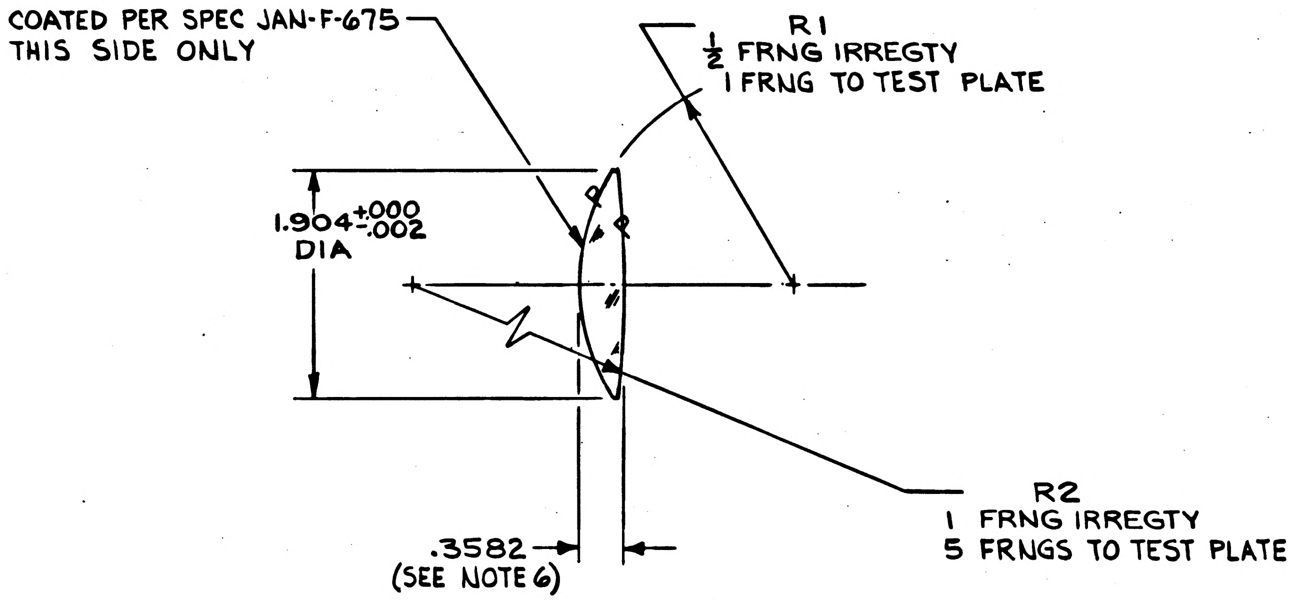
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011173

REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 691-548
4. CA: ENT = 1.806 EXIT = 1.749
   SURF. QUAL: 60-40
   CTRG ERROR ½ MINUTE
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. SEE DWG 2011175 FOR THICKNESS TOLERANCE.
7. IDENTIFY USING NASA DWG, REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)

N_D	R1	R2 CONVEX
1.69130	1.7948±.0003	-33.508±.797



COATED PER SPEC JAN-F-675 THIS SIDE ONLY
R1
½ FRNG IRREGTY
1 FRNG TO TEST PLATE
1.904 +.000 -.002 DIA
P
P
.3582 (SEE NOTE 6)
R2
1 FRNG IRREGTY
5 FRNGS TO TEST PLATE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011175	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910250
DRAWN R. BRUNELLE DATE ~~4-8-64~~
CHECKED 5/27/64
APPROVAL 5/28/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(TELESCOPE RELAY)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011173
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

3-1

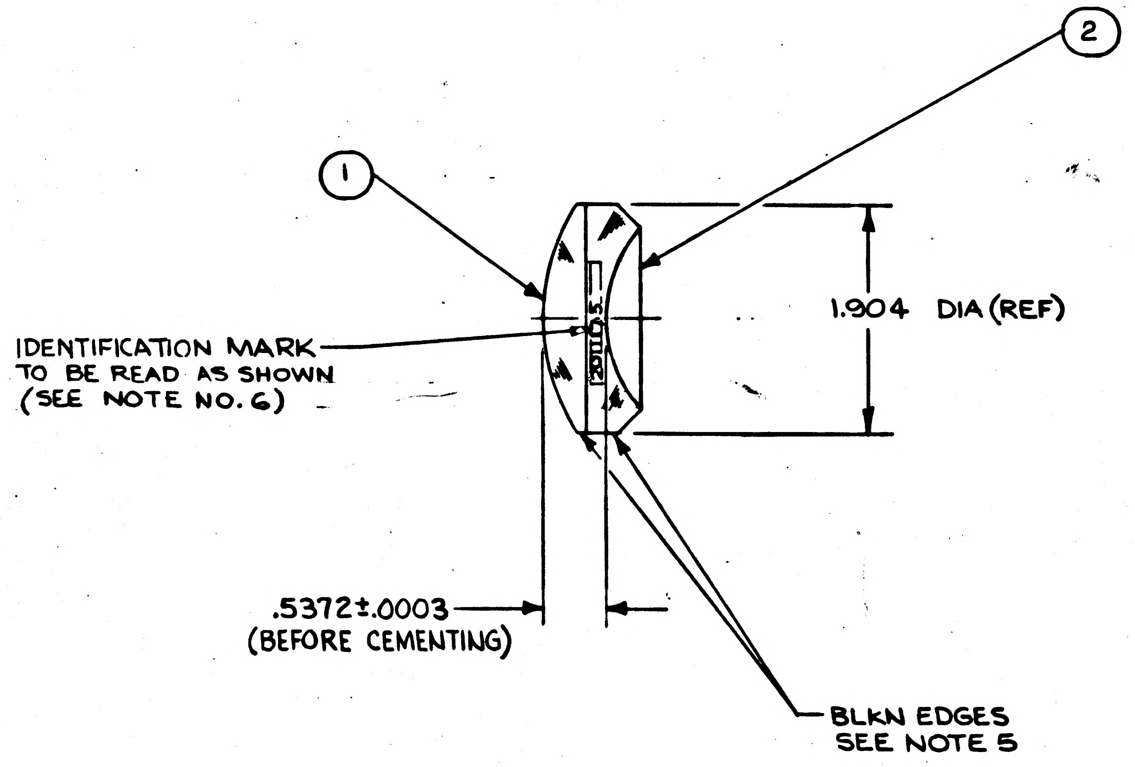
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011175

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. CEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.11. USING ADHESIVE PER MIL-A-3920.
4. CTRG ERROR ½ MINUTE MAX.
5. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.12 BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



②
①
1.904 DIA (REF)
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE NO. 6)
2011175
.5372±.0003 (BEFORE CEMENTING)
BLKN EDGES SEE NOTE 5

2011175

2	1		2011174	28386910240		LENS, NEGATIVE			
1	1		2011173	28386910250		LENS, POSITIVE			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011792	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910070

DRAWN B. BRUNELLE DATE ~~4-8-64~~
CHECKED C. LEINZ (CRC) 7/13/64
APPROVAL E. Ruchmann 7/14/64
APPROVAL E. Phorup 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, ASSY OF
(TELESCOPE RELAY)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011175
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

MASTER

E-154

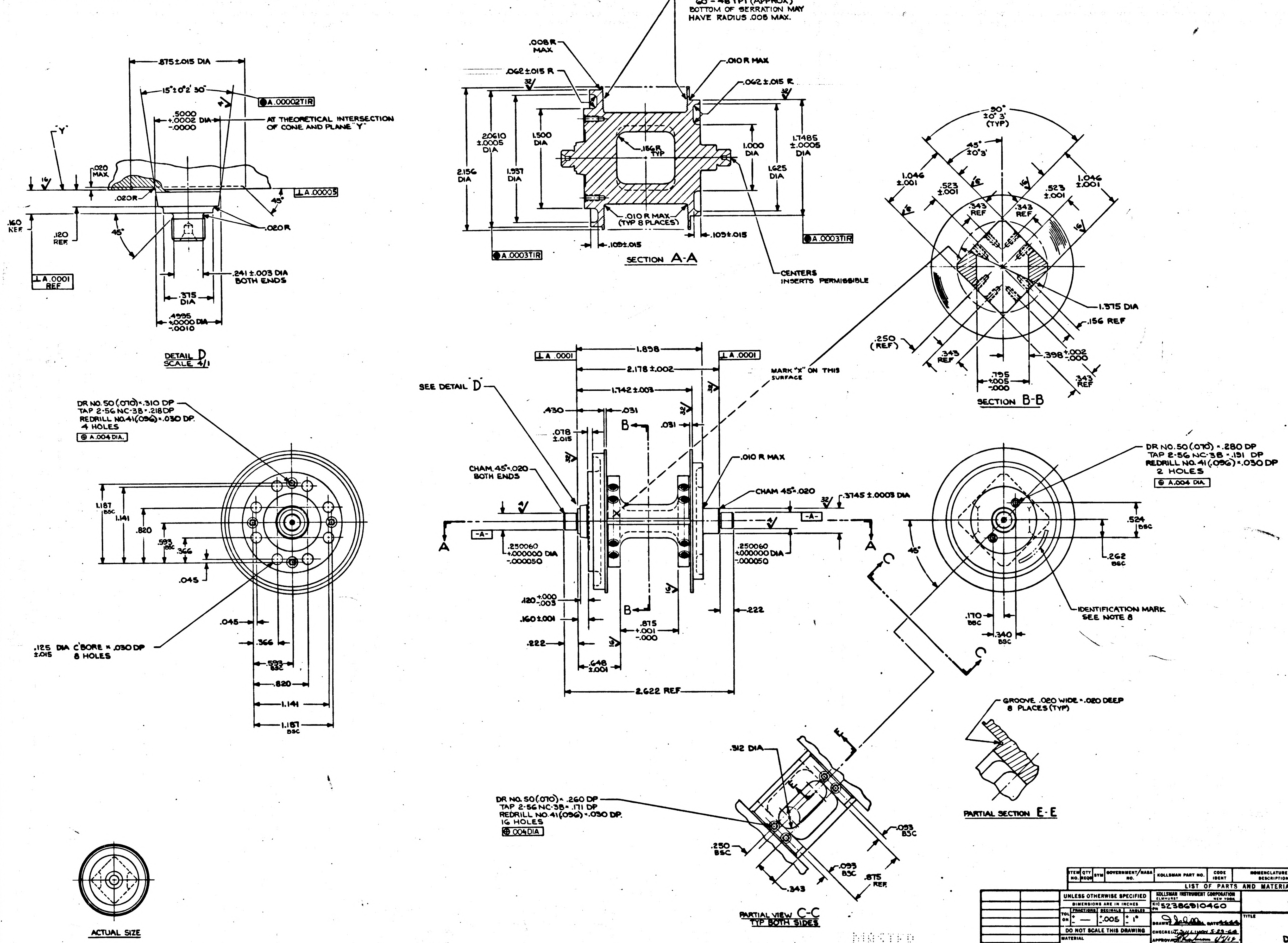
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002079
5. MATL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
7. ALL MEASUREMENTS ARE BASED ON 68°F.
8. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

2011176

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



SHARP "V" SERRATIONS 60° - 48 TPI (APPROX) BOTTOM OF SERRATION MAY HAVE RADIUS .005 MAX.
.875±.015 DIA
15°±0°2' 30"
A .00002TIR
.5000 +.0002 -.0000 DIA
AT THEORETICAL INTERSECTION OF CONE AND PLANE "Y"
"Y"
.020 MAX
.020R
⊥ A .00005
45°
.160 REF
.120 REF
46°
.020R
⊥ A .0001 REF
.241±.003 DIA BOTH ENDS
.375 DIA
.4995 +.0000 -.0010 DIA
DETAIL D SCALE 4/1
.008R MAX
.062±.015 R
.010R MAX
.062±.015 R
2.0610 ±.0005 DIA
1.500 DIA
2.156 DIA
1.557 DIA
.156R TYP
1.000 DIA
1.625 DIA
1.7485 ±.0005 DIA
.010 R MAX (TYP 8 PLACES)
.105±.015
.105±.015
A .0003TIR
A .0003TIR
SECTION A-A
CENTERS INSERTS PERMISSIBLE
90° ±0°3' (TYP)
45° ±0°3'
1.046 ±.001
.523 ±.001
.343 REF
1.375 DIA
.156 REF
.250 (REF)
.398 +.002 -.000
.795 +.005 -.000
SECTION B-B
⊥ A .0001
1.898
2.178±.002
1.742±.003
SEE DETAIL "D"
.430
.031
.031
.078 ±.015
MARK "X" ON THIS SURFACE
.010 R MAX
CHAM. 45°×.020 BOTH ENDS
CHAM 45°×.020
.3145±.0003 DIA
-A-
.250060 +.000000 -.000050 DIA
.120 +.000 -.003
.160±.001
.222
.815 +.001 -.000
.648 ±.001
2.622 REF.
.222
DR NO. 50 (.070)×.310 DP TAP 2-56 NC-3B×.218 DP REDRILL NO. 41 (.096)×.030 DP. 4 HOLES
⊕ A .004 DIA.
1.187 BSC
1.141
.820
.593 BSC
.366
.045
.125 ±.015 DIA C'BORE ×.030 DP 8 HOLES
DR NO. 50 (.070)×.280 DP TAP 2-56 NC-3B×.131 DP REDRILL NO. 41 (.096)×.030 DP 2 HOLES
⊕ A .004 DIA
.524 BSC
.262 BSC
46°
.170 BSC
.340 BSC
IDENTIFICATION MARK SEE NOTE 8
GROOVE .020 WIDE×.020 DEEP 8 PLACES (TYP)
PARTIAL SECTION E-E
.312 DIA
DR NO. 50 (.070)×.260 DP TAP 2-56 NC-3B×.171 DP REDRILL NO. 41 (.096)×.030 DP. 16 HOLES
⊕ .004 DIA
.250 BSC
.093 BSC
.093 BSC
.343
.875 REF
PARTIAL VIEW C-C TYP BOTH SIDES
ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 52386010460
DRAWN
CHECKED T. SULLIVAN 5-29-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: MOUNT, DOVE PRISM

CODE IDENT NO. | SIZE E | NASA NUMBER 2011176
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011177	SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

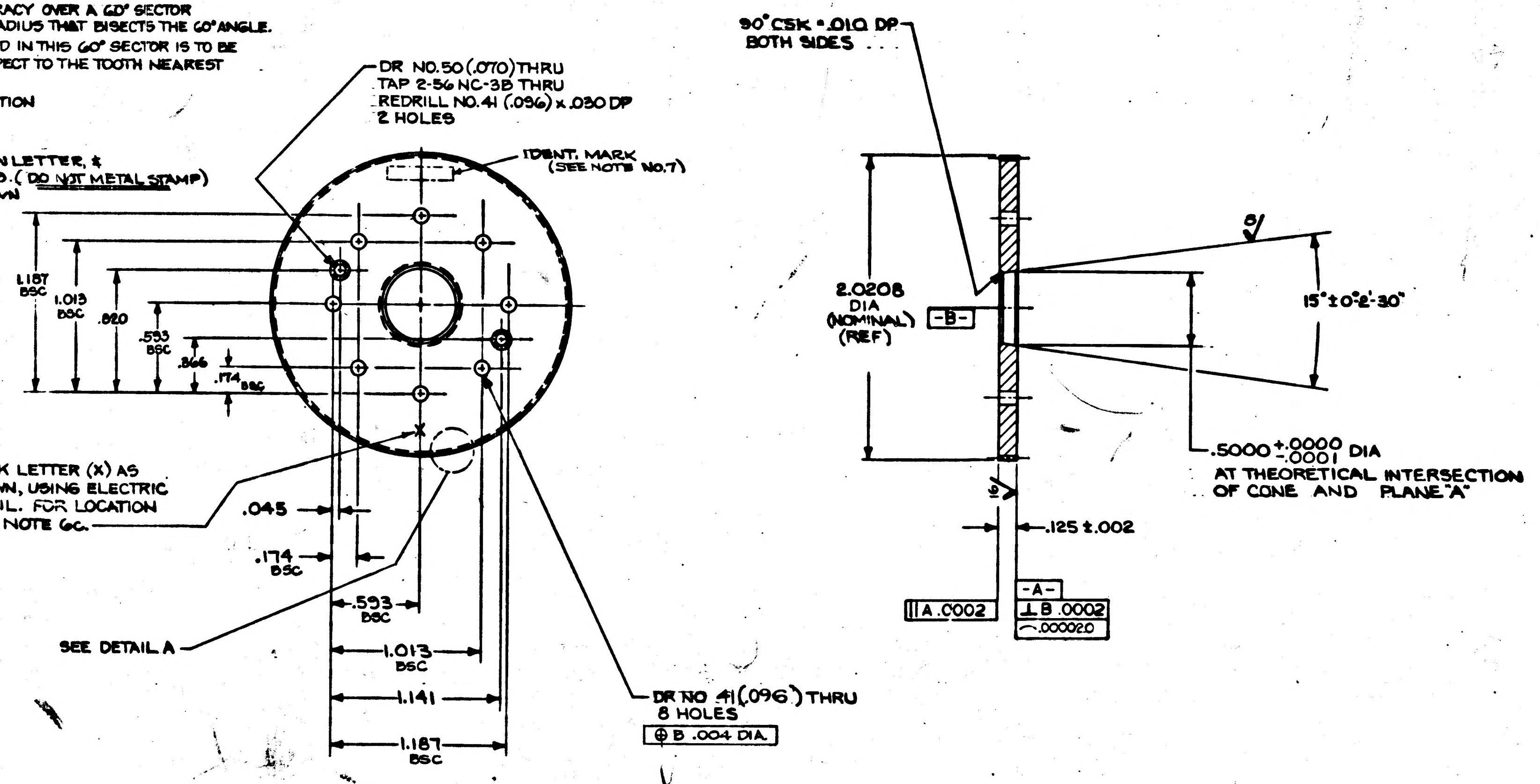
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 32√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: TOOL STEEL
   CONSISTS OF THE FOLLOWING ANALYSIS:

ELEMENT	PERCENT
IRON	BALANCE
CARBON	0.10 TO 0.45
MANGANESE	0.60 TO 1.56
PHOSPHORUS	0.02 TO 0.12
SULPHUR	0.08 TO 0.33
SILICON	0.30 MAX.

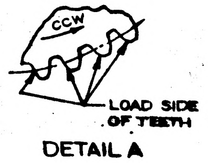
ORIGINAL SOURCE OF SUPPLY: JONES & LAUGHLIN STEEL CORP.
AS: SPEED TREAT STEEL

6. INDEXING ACCURACY:
   - a. THE GEAR MUST HAVE A TOOTH INDEXING ACCURACY OVER A 60° SECTOR WITH ONE OF THE 8-.1015 DIA. HOLES ON THE RADIUS THAT BISECTS THE 60° ANGLE.
   - b. THE INDEXING ERROR OF ALL TEETH CONTAINED IN THIS 60° SECTOR IS TO BE NOT MORE THAN 5 ARC SECONDS WITH RESPECT TO THE TOOTH NEAREST TO THIS REFERENCE RADIUS.
   - c. THE REFERENCE HOLE SELECTED BY INSPECTION IS TO BE MARKED AS SHOWN.
   - d. MEASUREMENTS TO BE MADE AT 68°F. ± 2°
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND. 1002019. (DO NOT METAL STAMP) LOCATE NEAR O.D. ON NEAR SIDE FACE AS SHOWN WITH RESPECT TO TAPERED HOLE.
8. HEAT TREATMENT
   - a. HEAT TO 1550°F. AND SOAK 5 MINUTES PER INCH OF THICKNESS.
   - b. QUENCH IN OIL HEATED TO 90°F.-100°F.; COOL TO OIL TEMP.
   - c. DRAW IN 350°F. SEASONING OIL TO ROCKWELL C48-51.



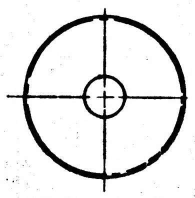
DR NO.50 (.070) THRU
TAP 2-56 NC-3B THRU
REDRILL NO.41 (.096) x .030 DP
2 HOLES
IDENT. MARK
(SEE NOTE NO.7)
1.187 BSC
1.013 BSC
.820
.593 BSC
.366
.174 BSC
MARK LETTER (X) AS SHOWN, USING ELECTRIC PENCIL. FOR LOCATION SEE NOTE 6c.
X
.045
.174 BSC
.593 BSC
SEE DETAIL A
1.013 BSC
1.141
1.187 BSC
DR NO 41 (.096") THRU
8 HOLES
⊕ B .004 DIA.
90° CSK × .010 DP
BOTH SIDES
2.0208
DIA
(NOMINAL)
(REF)
-B-
8√
15° ± 0° 2' 30"
.5000 +.0000 -.0001 DIA
AT THEORETICAL INTERSECTION OF CONE AND PLANE "A"
16√
.125 ± .002
∥ A .0002
-A-
⊥ B .0002
⌒ .000020

GEAR DATA	
DIAMETRAL PITCH	96
NO. OF TEETH	192
PITCH DIA. (THEORETICAL)	2.0000
PRESSURE ANGLE	14½°
OUTSIDE DIA	2.0208
HOBBED WITH STANDARD 14½° GROUND HOB	
ROOT DIA (NOMINAL)	1.871
CENTER DISTANCE (ACTUAL)	1.1718
MESHES WITH	2011198
AGMA	PRECISION 3D SEE NOTE 6



CCW
LOAD SIDE OF TEETH

DETAIL A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910100

DRAWN DATE 4-6-64
CHECKED T. SULLIVAN 4-28-64
APPROVAL 5/29/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER,
HOUSTON, TEXAS

TITLE GEAR, SPUR

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011177

SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011177

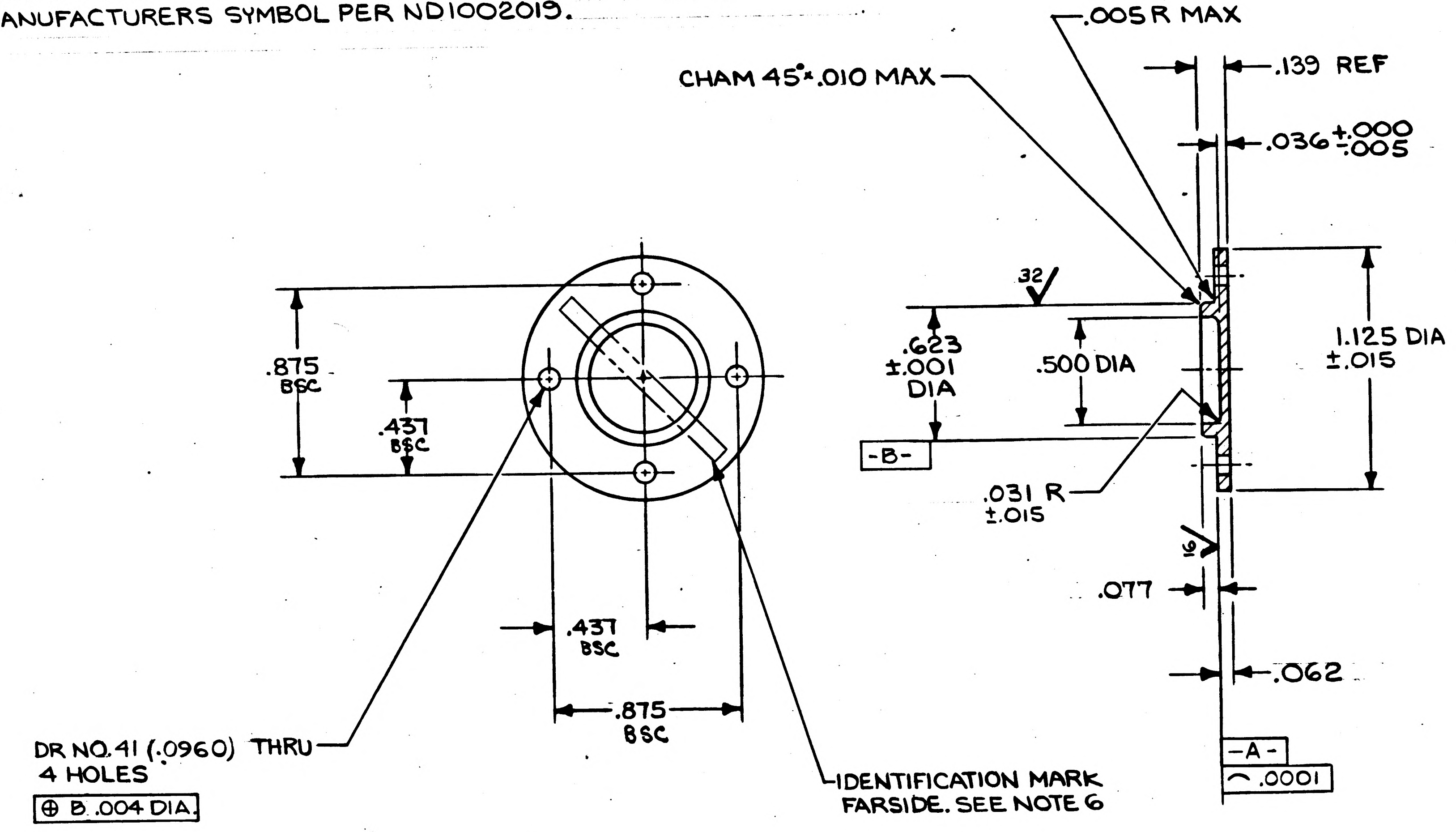
2011181 A

REVISIONS TDRR 10230

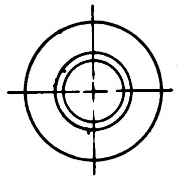
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15854	1/27/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



.005 R MAX
.139 REF
CHAM 45° × .010 MAX
.036 +.000 -.005
32√
.623 ±.001 DIA
.500 DIA
1.125 DIA ±.015
.875 BSC
.437 BSC
-B-
.031 R ±.015
16√
.077
.437 BSC
.875 BSC
.062
DR NO. 41 (.0960) THRU 4 HOLES
⊕ B .004 DIA
IDENTIFICATION MARK FARSIDE. SEE NOTE 6
-A-
⌒ .0001



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011215	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910410

DRAWN J. Schiller DATE 4-7-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL F. Rushman 5/27/64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CAP, RETAINING,
TRUNNION BEARING (R.H)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011181

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

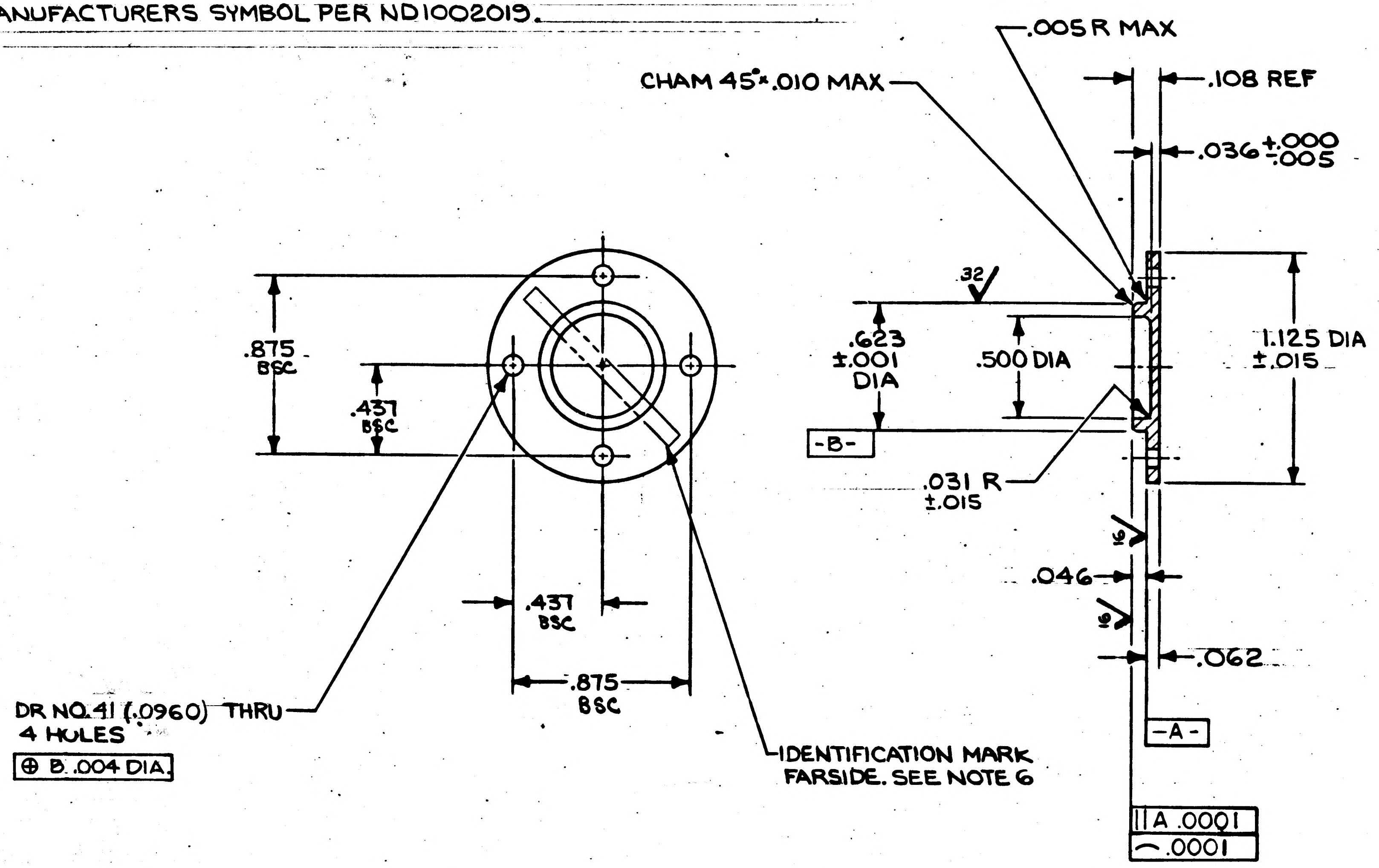
K+E E-154

2011181

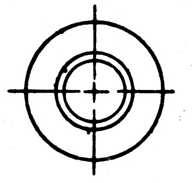
REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



.005 R MAX
CHAM 45°×.010 MAX
.108 REF
.036 +.000 -.005
32√
.623 ±.001 DIA
.500 DIA
1.125 DIA ±.015
.875 BSC
.437 BSC
-B-
.031 R ±.015
16√
.046
16√
.062
.437 BSC
.875 BSC
DR NO.41 (.0960) THRU 4 HOLES
⊕ B .004 DIA
IDENTIFICATION MARK FARSIDE. SEE NOTE 6
-A-
∥ A .0001
⌒ .0001


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011215	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED.SPEC QQ-S-763 CLASS 416, COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910410

DRAWN J. Schiller DATE 4-7-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL E. Rushmore 5/27/64
APPROVAL E. Dhoney 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CAP, RETAINING,
TRUNNION BEARING (R.H)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011181
SCALE 2/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

2011181

E-184

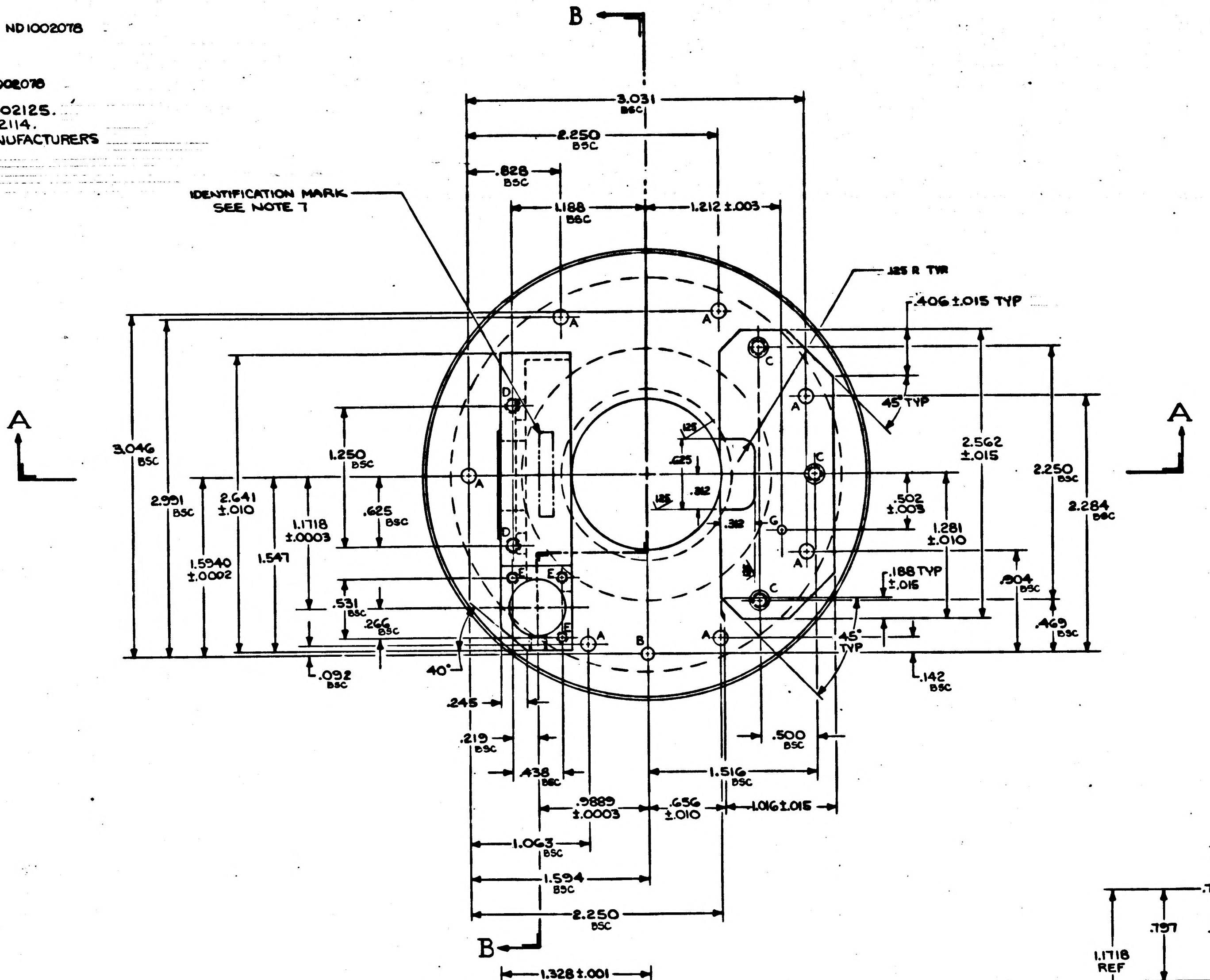
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011182

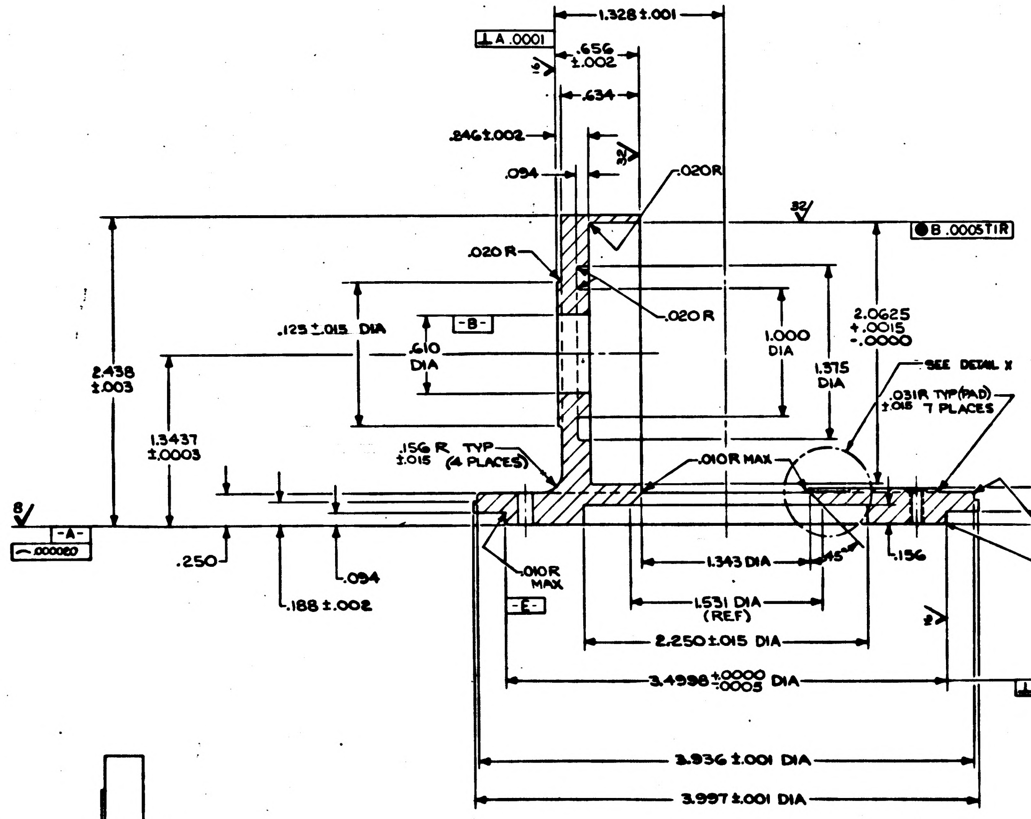
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TAAL 10230

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
8. ALL MEASUREMENTS ARE BASED ON 68°F.

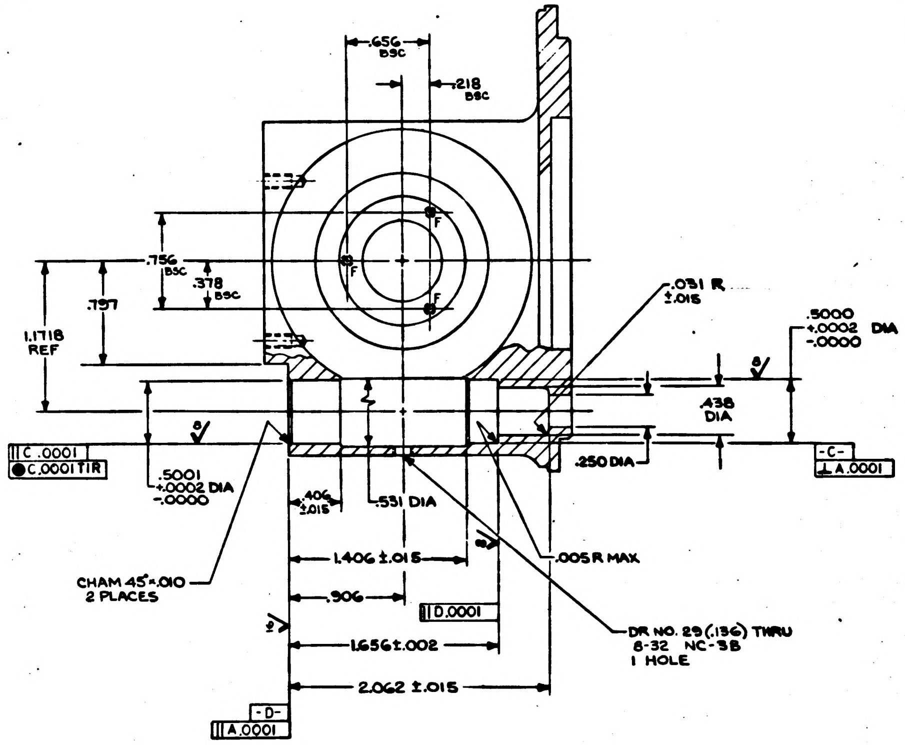


B
A
A
3.031 BSC
2.250 BSC
.828 BSC
1.188 BSC
1.212 ±.003
IDENTIFICATION MARK SEE NOTE 7
.125 R TIR
.406 ±.015 TYP
45° TYP
3.046 BSC
2.951 BSC
2.641 ±.010
1.5940 ±.0002
1.547
1.1718 ±.0003
1.250 BSC
.625 BSC
.531 BSC
.266 BSC
.092 BSC
40°
2.562 ±.015
2.250 BSC
2.284 BSC
.502 ±.003
1.281 ±.010
.188 TYP ±.015
.904 BSC
.465 BSC
45° TYP
.142 BSC
.245
.219 BSC
.438 BSC
.9889 ±.0003
.656 ±.010
1.016 ±.015
1.516 BSC
.500 BSC
1.063 BSC
1.594 BSC
2.250 BSC
A
B
C
D
E
F
G



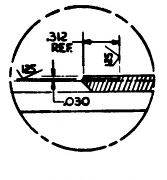
B
1.328 ±.001
⊥ A .0001
.656 ±.002
.634
.246 ±.002
.094
.020 R
.020 R
.020 R
⊙ B .0005 TIR
.125 ±.015 DIA
-B-
.610 DIA
1.000 DIA
1.375 DIA
2.0625 +.0015 -.0000
2.438 ±.003
1.3437 ±.0003
SEE DETAIL X
.031 R TYP (PAD) ±.015 7 PLACES
.156 R TYP ±.015 (4 PLACES)
.010 R MAX
.2807 ±.0010
// A .0005
⌒ .000020
// A .0001
-A-
⌒ .000020
.250
.094
.188 ±.002
.010 R MAX
-E-
1.343 DIA
45°
.156
1.531 DIA (REF)
2.250 ±.015 DIA
CHAM 45° ×.010
3.4998 +.0000 -.0005 DIA
⊥ A .0001
3.936 ±.001 DIA
3.997 ±.001 DIA

SECTION A-A



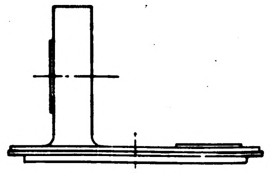
.656 BSC
.218 BSC
.756 BSC
.378 BSC
.797
1.1718 REF
.031 R ±.015
.5000 +.0002 -.0000 DIA
.438 DIA
-C-
⊥ A .0001
// C .0001
⊙ C .0001 TIR
.5001 +.0002 -.0000 DIA
.406 ±.015
.531 DIA
.250 DIA
CHAM 45° ×.010 2 PLACES
1.406 ±.015
.906
// D .0001
.005 R MAX
DR NO. 29 (.136) THRU 8-32 NC-3B 1 HOLE
1.656 ±.002
2.062 ±.015
-D-
⊥ A .0001
F

SECTION B-B



.312 REF
.125
.030

DETAIL-X



ACTUAL SIZE

HOLE	DESCRIPTION	QTY	
G	DR 1/16 (.0625) THRU	1	
F	DR NO. 49 (.073) THRU REDRILL NO. 38 (.1015) × .018 DP 2-56 NC-3B THRU	3	⊕ D .004 DIA.
E	DR NO. 49 (.073) × .326 DEEP REDRILL NO. 38 (.1015) × .018 DP 2-56 NC-3B × .218 DEEP	3	⊕ C .004 DIA.
D	DR NO. 41 (.0960) × .400 DEEP REDRILL NO. 30 (.1285) × .025 DP 4-40 NC-3B × .250 DEEP	2	⊕ E .010 DIA.
C	DR NO. 41 (.0960) THRU REDRILL NO. 30 (.1285) × .025 DP 4-40 NC-3B THRU	3	⊕ E .010 DIA.
B	.2497 DIA. +.0003 -.0000	1	
A	DR NO. 30 (.1285) THRU	7	⊕ E .010 DIA.

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011185	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910370
DRAWN DATE 4-7-64
CHECKED T. SULLIVAN 5-29-64
APPROVAL 6/5/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SUPPORT,
WORM AND DOVE PRISM MOUNT

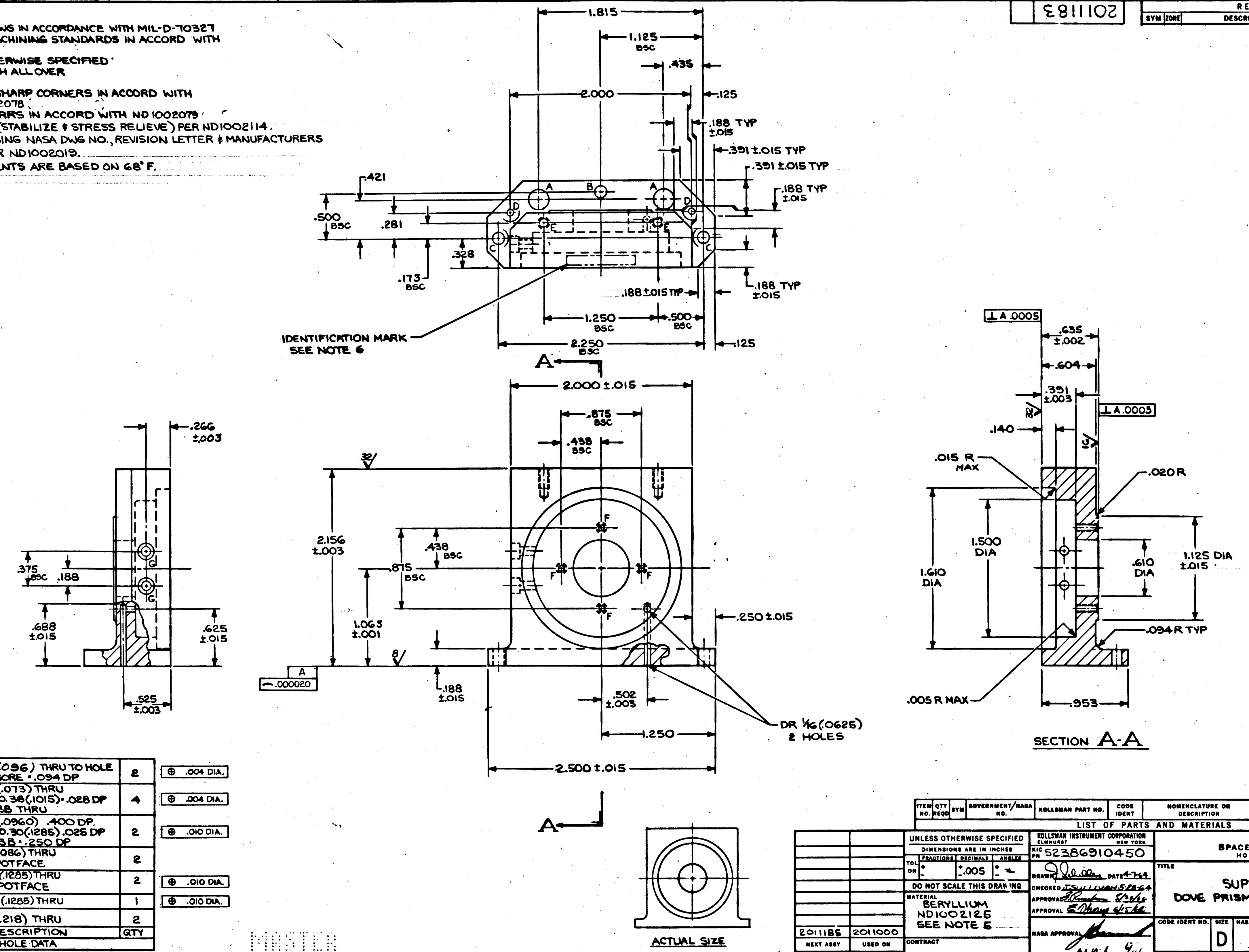
CODE IDENT NO.
SIZE E
NASA NUMBER 2011182
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011183

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
7. MEASUREMENTS ARE BASED ON 68° F.


1.815
1.125 BSC
.435
2.000
.125
.188 TYP ±.015
.391 ±.015 TYP
.391 ±.015 TYP
.188 TYP ±.015
.421
.500 BSC
.281
.328
.173 BSC
.188 ±.015 TYP
.188 TYP ±.015
1.250 BSC
.500 BSC
2.250 BSC
.125
A B A D D C C E E
IDENTIFICATION MARK SEE NOTE 6
A
2.000 ±.015
.875 BSC
.438 BSC
32√
2.156 ±.003
.438 BSC
.875 BSC
1.063 ±.001
8√
A
.000020
.188 ±.015
.502 ±.003
1.250
2.500 ±.015
.250 ±.015
F F F F
DR 1/16 (.0625) 2 HOLES
A
.266 ±.003
.375 BSC
.188
G G
.688 ±.015
.625 ±.015
.525 ±.003
⊥ A .0005
.635 ±.002
.604
.391 ±.003
⊥ A .0003
32√
.140
.015 R MAX
.020 R
1.500 DIA
1.610 DIA
.610 DIA
1.125 DIA ±.015
.094 R TYP
.005 R MAX
.953
SECTION A-A
ACTUAL SIZE

HOLE	DESCRIPTION	QTY	
G	DR NO. 41 (.096) THRU TO HOLE .172 DIA CBORE × .094 DP	2	⊕ .004 DIA.
F	DR NO. 49 (.073) THRU REDRILL NO. 38 (.1015) × .028 DP 2-56 NC-3B THRU	4	⊕ .004 DIA.
E	DR NO. 41 (.0960) .400 DP. REDRILL NO. 30 (.1285) .025 DP 4-40 NC-3B × .250 DP	2	⊕ .010 DIA.
D	DR NO. 44 (.086) THRU 7/32 DIA SPOTFACE	2	
C	DR NO. 30 (.1285) THRU 7/32 DIA SPOTFACE	2	⊕ .010 DIA.
B	DR NO. 30 (.1285) THRU	1	⊕ .010 DIA.
A	DR 7/32 (.218) THRU	2	

HOLE DATA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011185	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ±.005 ; ANGLES ± ½
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910450
DRAWN J Schiller DATE 4-7-64
CHECKED J SULLIVAN 5-28-64
APPROVAL J. Rusafuu 5/28/64
APPROVAL E Nhang 6/15/64
NASA APPROVAL
MIT APPROVAL J J Nilson 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SUPPORT,
DOVE PRISM MOUNT

CODE IDENT NO.
SIZE D
NASA NUMBER 2011183
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

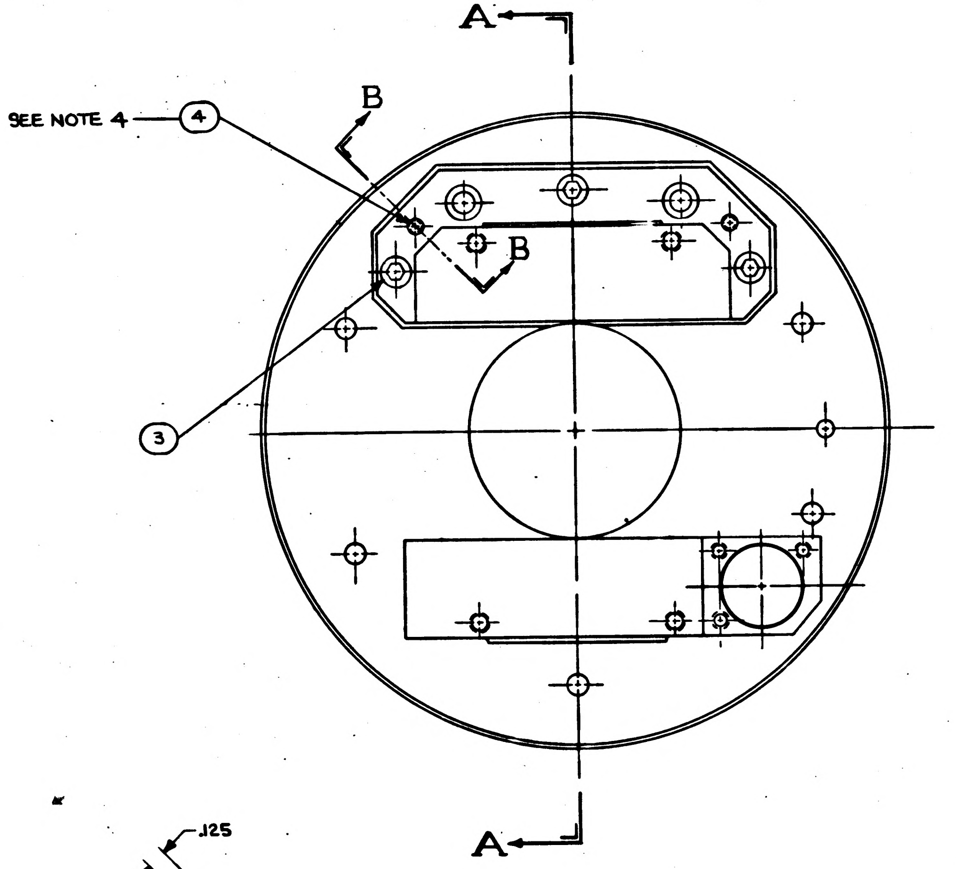
2011183

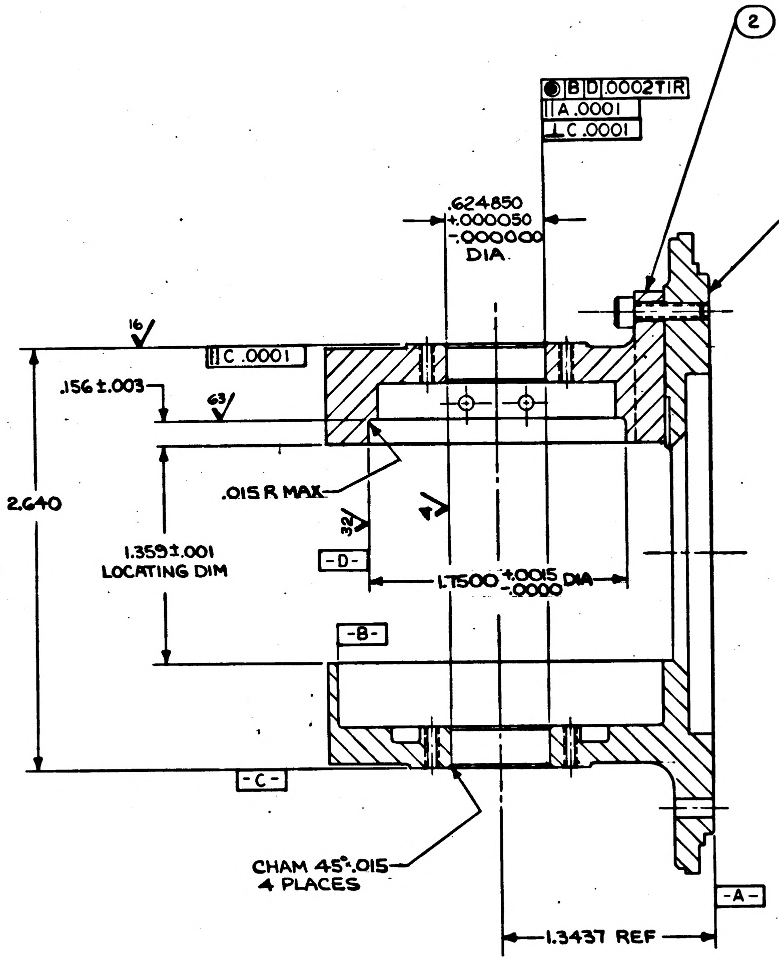
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011185

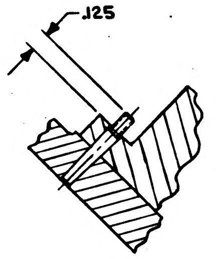
REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. REMOVE BURRS IN ACCORD WITH ND 1002079.
4. DRILL AND REAM THRU FOR ITEM ④
5. ALL MEASUREMENTS ARE BASED ON 68°F.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)


A
B
SEE NOTE 4
④
B
③
A


②
●|B|D|.0002TIR
‖A.0001
⊥C.0001
①
.624850 +.000050 -.000000 DIA.
16
‖C.0001
.156±.003
63
.015 R MAX
2.640
32
1.359±.001 LOCATING DIM
-D-
1.7500 +.0015 -.0000 DIA
-B-
-C-
CHAM 45°×.015 4 PLACES
-A-
1.3437 REF

SECTION A-A



PARTIAL SECTION B-B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	2		2011196-4	39386910103		PIN, TAPERED, THREADED			
3	3	*	1011625-30	74455151030		SCREW, CAP, HEX SOC HD, SELF LOCKING			
2	1		2011183	52386910450		SUPPORT, DOVE PRISM MOUNT			
1	1.		2011182	52386910440		SUPPORT, WORM AND DOVE PRISM MOUNT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

MASTER

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910370
DRAWN J. Schilles DATE 4-7-64
CHECKED J. SULLIVAN 7-22-64
APPROVAL E. Rushman 7/22/64
APPROVAL E. Murray 8/6/64
NASA APPROVAL 8/14/64
MIT APPROVAL J. Hafel 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SUPPORT, DOVE PRISM MOUNT, ASSY OF (MACHINING)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011185
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

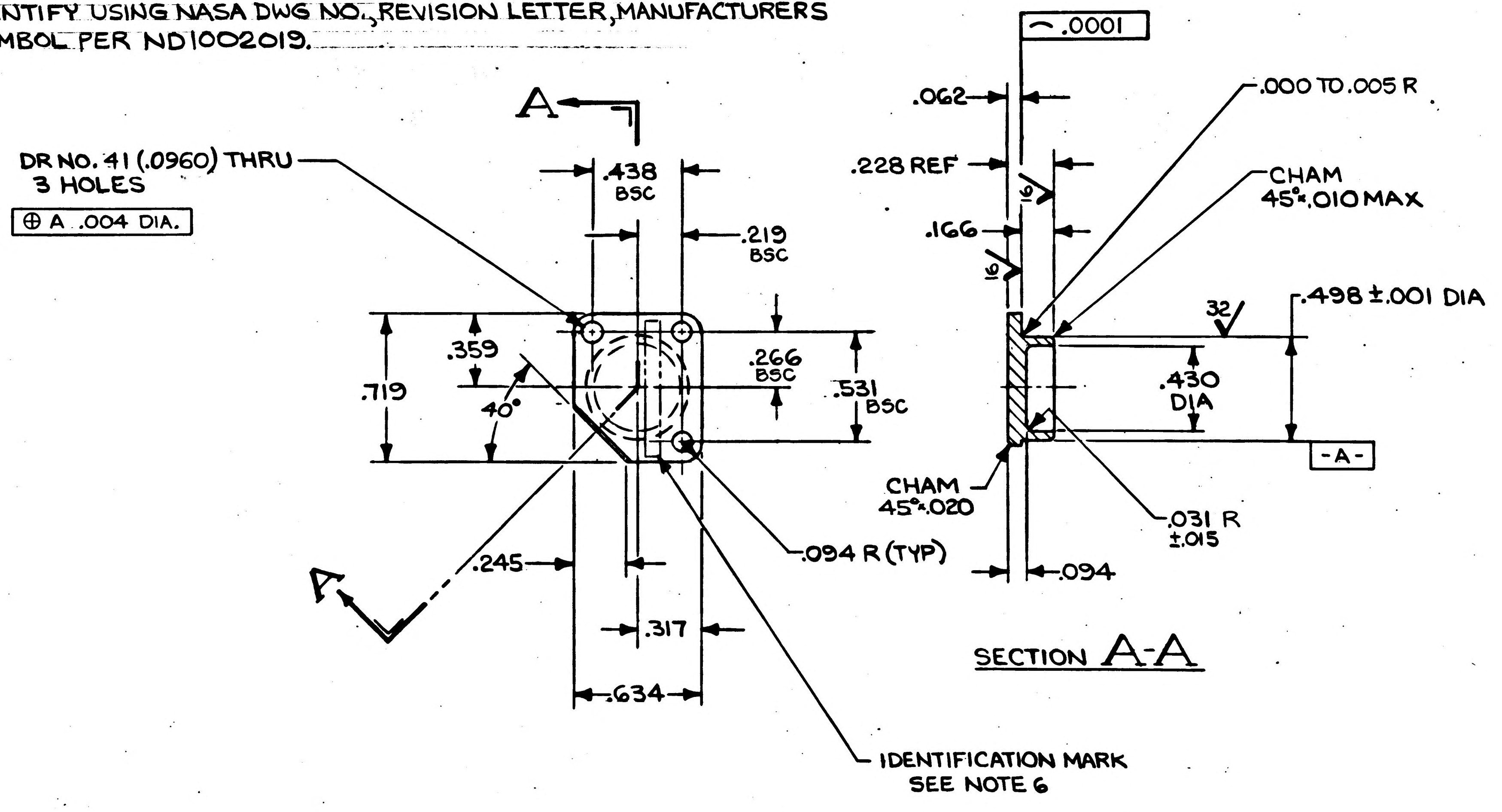
2011186 A

REVISIONS TDRR 10230

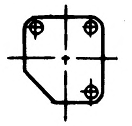
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 19199	5/26/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, MANUFACTURERS SYMBOL PER ND1002019.



DR NO. 41 (.0960) THRU
3 HOLES
⊕ A .004 DIA.
A
.438 BSC
.219 BSC
.359
.719
40°
.266 BSC
.531 BSC
.245
.317
.634
.094 R (TYP)
IDENTIFICATION MARK
SEE NOTE 6
A
⌒ .0001
.062
.228 REF
.166
16
16
.000 TO .005 R
CHAM 45°×.010 MAX
32
.498 ±.001 DIA
.430 DIA
-A-
CHAM 45°×.020
.031 R ±.015
.094
SECTION A-A



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910420

DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL G. Ruelman 5/29/64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE

CAP, RETAINING,
WORM SHAFT BEARING

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011186

SCALE 8/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-154

2011186A

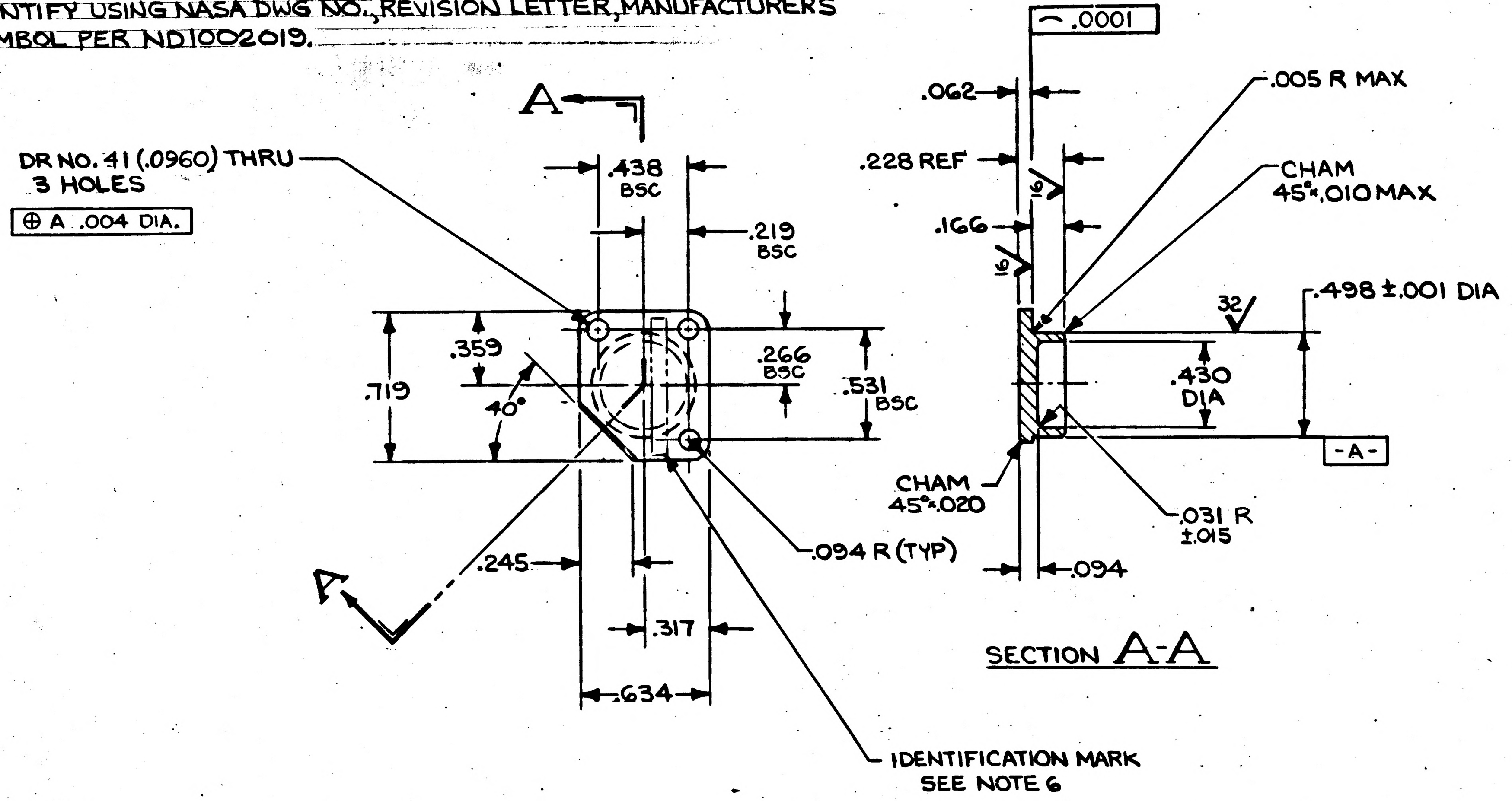
2011186

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TOAR 10230

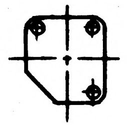
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, MANUFACTURERS SYMBOL PER ND1002019.



A
DR NO. 41 (.0960) THRU
3 HOLES
⊕ A .004 DIA.
.438 BSC
.219 BSC
.359
.719
40°
.266 BSC
.531 BSC
.245
.317
.634
.094 R (TYP)
IDENTIFICATION MARK
SEE NOTE 6
A
⌒ .0001
.062
.228 REF
.166
16
16
.005 R MAX
CHAM 45°×.010 MAX
32
.498 ±.001 DIA
.430 DIA
-A-
CHAM 45°×.020
.031 R ±.015
.094

SECTION A-A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910420
DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL J. Rushman 5/29/64
APPROVAL E. Morey 6-5-64
NASA APPROVAL
MIT APPROVAL W. Coyle 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CAP, RETAINING,
WORM SHAFT BEARING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011186
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

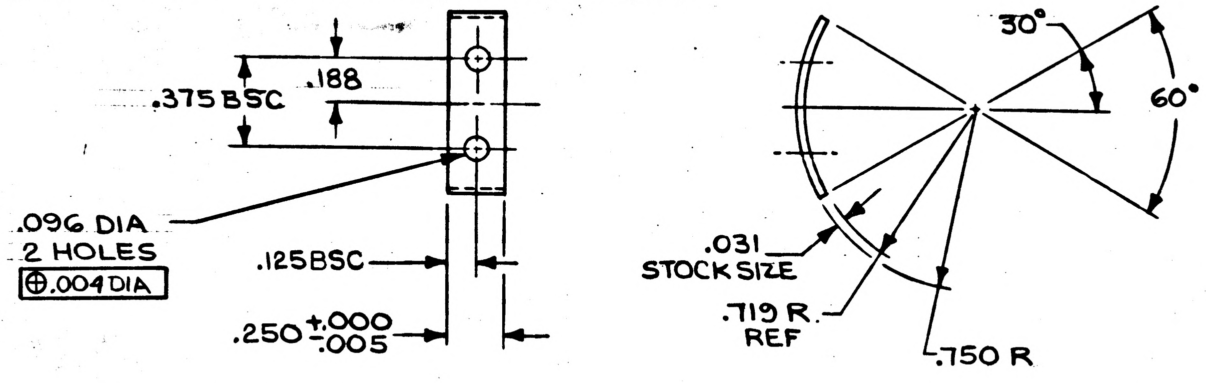
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011189

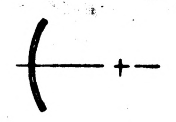
SYM	REVISIONS TDRR 10230 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. IDENTIFY USING NASA DRAWING NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.
6. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200)



MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-766 CLASS 302, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910390

DRAWN [illegible] DATE 4-6-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL [illegible] 6/15/65
APPROVAL E. Moray 6/15/69

NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER,
SPRING

CODE IDENT NO.
SIZE B
NASA NUMBER 2011189
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

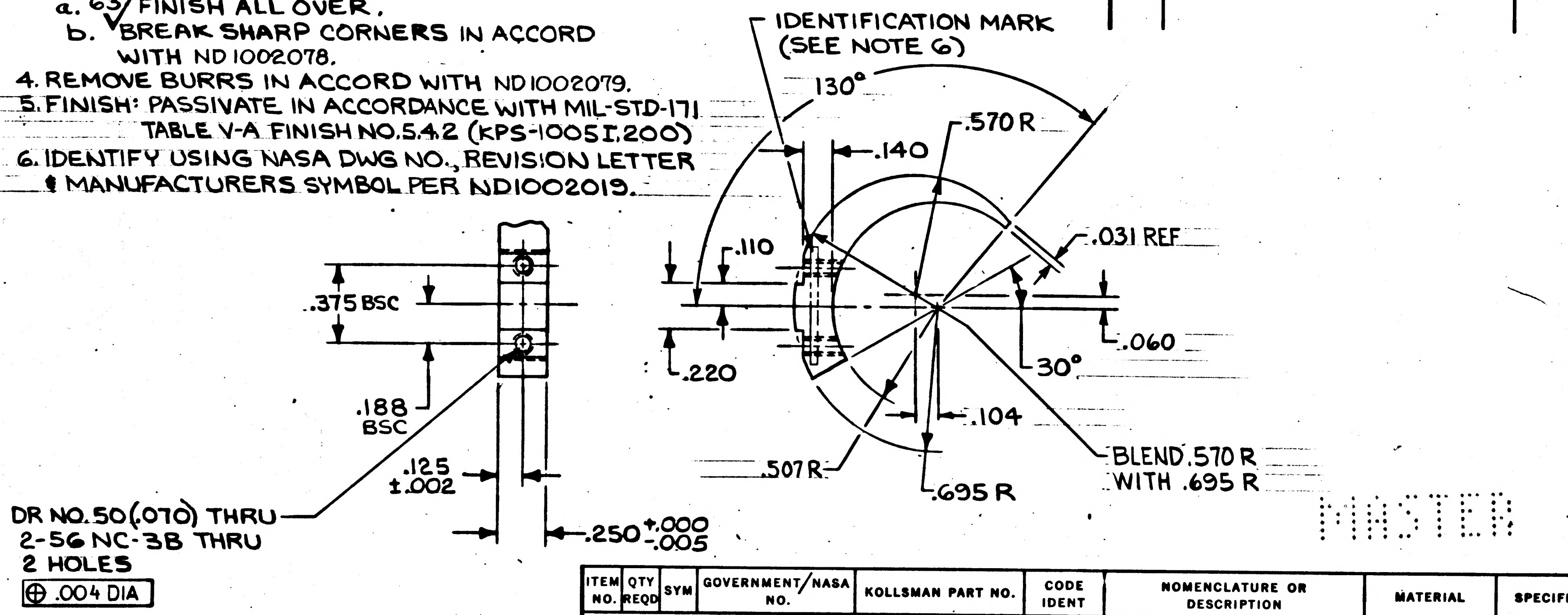
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

0611102

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 10230

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63/ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO.5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

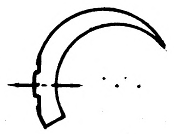


IDENTIFICATION MARK (SEE NOTE 6)
130°
.570 R
.140
.031 REF
.110
.375 BSC
.060
30°
.220
.104
.188 BSC
BLEND .570 R WITH .695 R
.507 R
.695 R
.125 ±.002
.250 +.000 -.005
DR NO.50 (.070) THRU
2-56 NC-3B THRU
2 HOLES
⊕ .004 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT.

LIST OF PARTS AND MATERIALS



ACTUAL SIZE

2011215	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910400
DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL 6/5/64
APPROVAL E. Thomp 6-12-64
NASA APPROVAL Bernard
MIT APPROVAL J. J. Nilson 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BLOCK,
SPRING MOUNTING

CODE IDENT NO.
SIZE B
NASA NUMBER 2011190
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

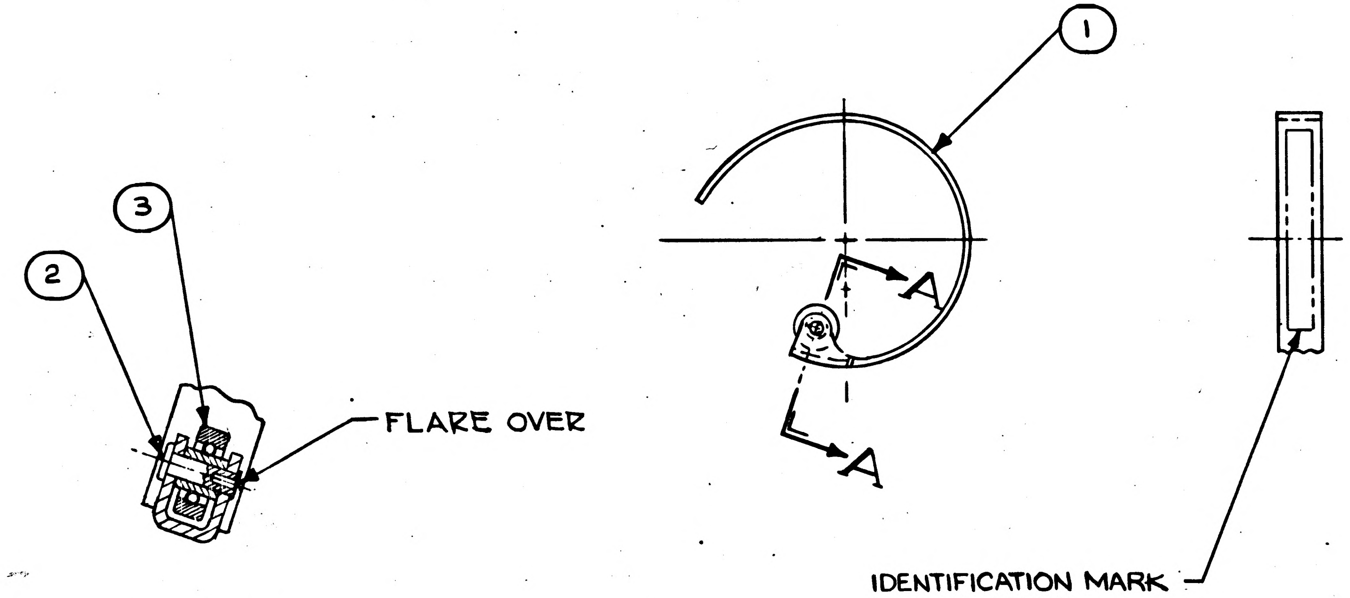
K+E E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011193

REVISIONS 11248				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND 1002019.



SECTION A-A
SCALE 4/1

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1	*	1012077	—〃—		BEARING, BALL			
2	1		2011191	57386910380		PIN, HEADED			
1	1		2011192	56386910190		SPRING, FORMED, ANTI-BACKLASH			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

2011215	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910360

DRAWN DATE 4-7-64
CHECKED J. Sullivan (CRR) 7/13/64
APPROVAL
APPROVAL E. Thorup 8/18/64
NASA APPROVAL
MIT APPROVAL 18 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CAM FOLLOWER AND SPRING, ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011193

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

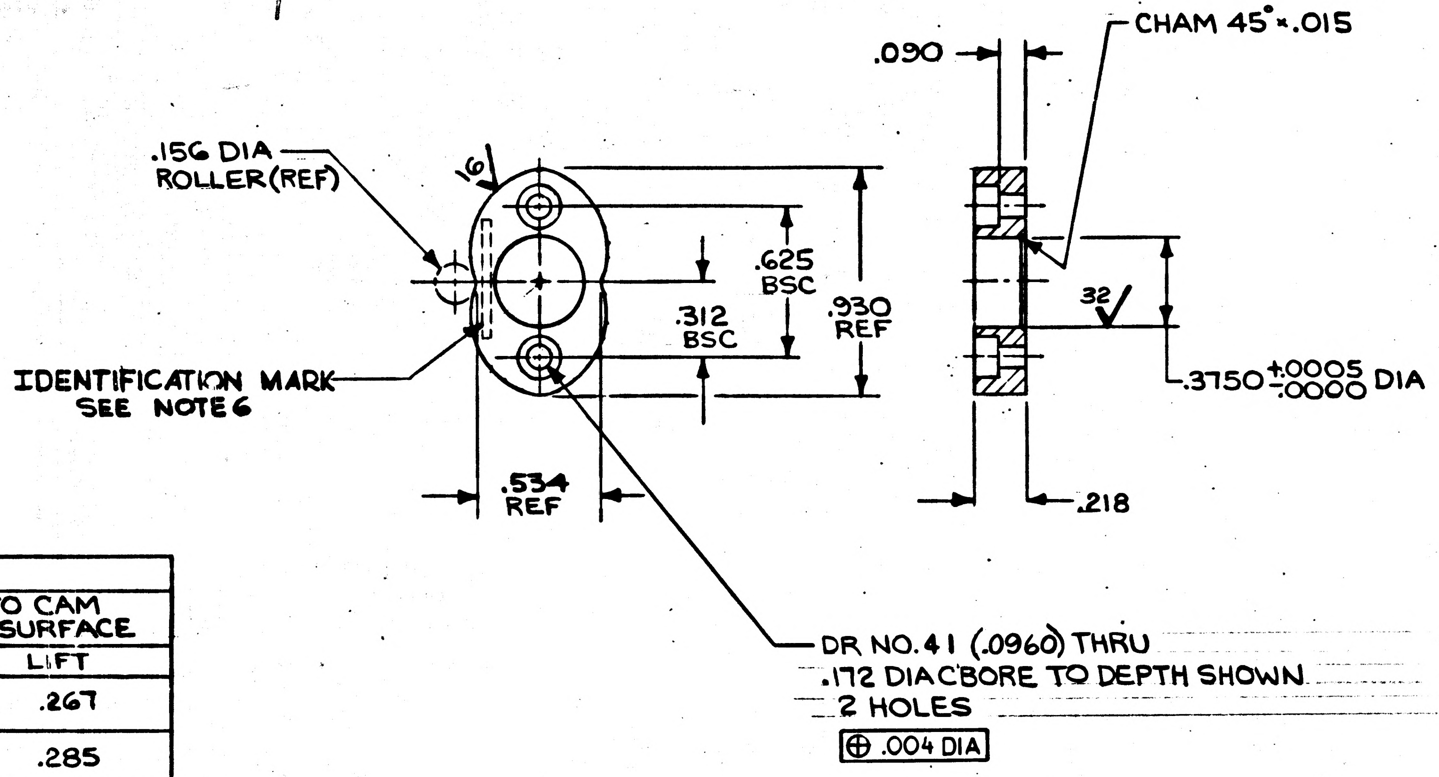
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-154

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO. REV LETTER & MANUFACTURERS SYMBOL PER ND 1002019.

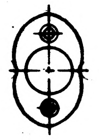
	REVISIONS	10048	
SYM / ZONE	DESCRIPTION	DATE	APPROVAL

2011194



.156 DIA ROLLER (REF)
16√
IDENTIFICATION MARK SEE NOTE 6
.625 BSC
.312 BSC
.930 REF
.534 REF
.090
CHAM 45° × .015
32√
.3750 +.0005 -.0000 DIA
.218
DR NO. 41 (.0960) THRU
.172 DIA C'BORE TO DEPTH SHOWN
2 HOLES
⊕ .004 DIA

CAM DATA			
CAM ANGLE	TO ℄ ROLLER (REF)		TO CAM SURFACE
	LIFT	Δ LIFT	LIFT
0°	.345	.018	.267
10°	.363	.024	.285
20°	.387	.024	.309
30°	.411	.024	.333
40°	.435	.024	.357
50°	.459	.024	.381
60°	.483	.024	.405
70°	.507	.024	.429
80°	.531	.012	.453
90°	.543		.465


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL
FED. SPEC: QQ-S-763 CLASS 303, COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 58386910020

DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL 6/3/64
APPROVAL E. Morup 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE CAM

CODE IDENT NO.
SIZE C
NASA NUMBER 2011194
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

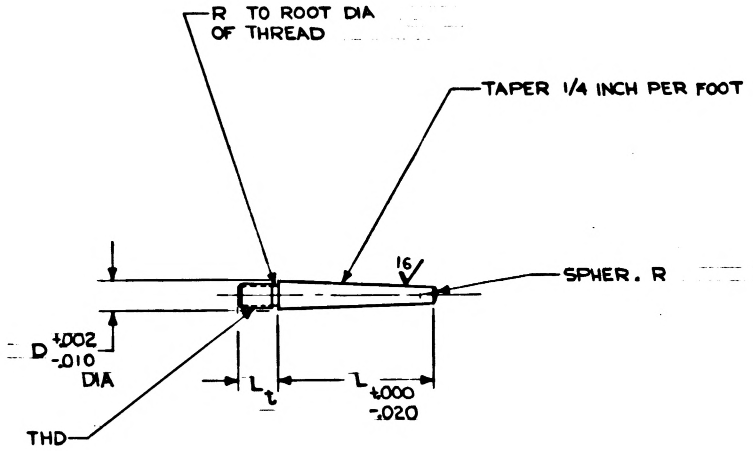
2011194

2011196 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REDRAWN IN ACCORDANCE WITH TDRR 31114		

NOTES:

1-INTERPRET DWG IN ACCORD WITH MIL-D-70327
2-GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3-UNLESS OTHERWISE SPECIFIED:
  a. 63/ FINISH ALL OVER
  b. BREAK SHARP CORNERS IN ACCORD WITH ND 002078
4-REMOVE BURRS IN ACCORD. WITH ND1002079
5-FINISH-PASSIVATE IN ACCORD. WITH MIL-STD-171, TABLE V-A, FINISH 5.4.1
6-DASH NO:S IN CHART REPRESENT PART NO:S OF:
KIC
NASA



L	5/0 D=.094	3/0 D=.125	1/0 D=.156	4 D=.250	1 D=.172
.250	39386910100 2011196-1				
.312	39386910101 -2				
.375	39386910102 -3	39386910109 2011196-10			
.438	39386910103 -4	39386910110 -11			
.500	39386910104 -5	39386910111 -12	39386910120 2011196-20		
.562	39386910105 -6	39386910112 -13	39386910121 -21		
.625	39386910106 -7	39386910113 -14	39386910122 -22		
.688	39386910107 -8	39386910114 -15	39386910123 -23		
.750	39386910108 -9	39386910115 -16	39386910124 -24		
.812		39386910116 -17	39386910125 -25	39386910130 -30	
.875		39386910117 -18	39386910126 -26		
.938		39386910118 -19	39386910127 -27		
1.000		39386910119 2011196-32	39386910128 2011196-28		39386910129 2011196-29
1.125					
1.250					

SIZE	L_t ±.015	THD	R	SPHER R
5/0	.156	2-56 NC-3A	.020	.250
3/0	.188	4-40 NC-3A	.020	.500
1/0	.250	6-32 NC-3A	.031	.500
1	.281	6-32 NC-3A	.062	.500
4	.281	8-32 NC-3A	.062	.500

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	
2011185	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL PER FED SPEC QQ-S-763, CLASS 303 COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 39386910100 / 0130
DRAWN R CARROLL DATE 10/7/66
CHECKED
APPROVAL
APPROVAL 2/14/66
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PIN, TAPER
THREADED

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011196
SCALE —
WEIGHT CALC ACTUAL
SHEET 1 OF

AD-1210

2011196 A

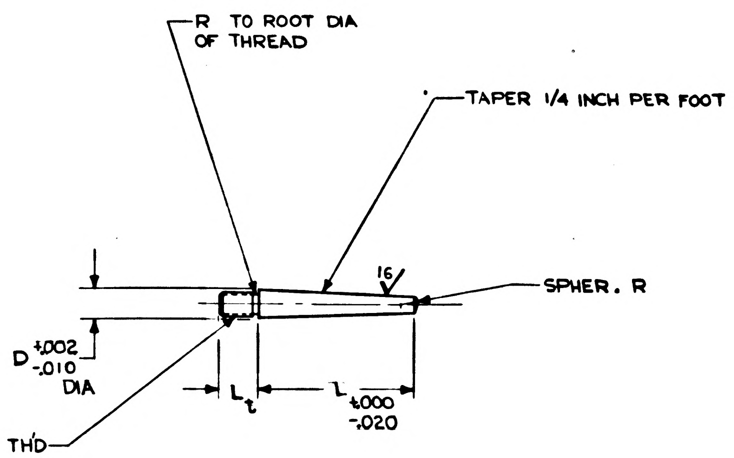
B 2011196

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REDRAWN IN ACCORDANCE WITH TDRR 31114		
B		REV SED PER TDRR 31119	9/19/6	

NOTES:

1-INTERPRET DWG IN ACCORD WITH MIL-D-70327
2-GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3-UNLESS OTHERWISE SPECIFIED:
  a. 63√ FINISH ALL OVER
  b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4-REMOVE BURRS IN ACCORD. WITH ND1002079
5-FINISH-PASSIVATE IN ACCORD. WITH MIL-STD-171, TABLE V-A, FINISH 5.4.1
6-DASH NO.'S IN CHART REPRESENT PART NO.'S OF:

KIC
NASA



L	5/0 D=.094	3/0 D=.125	1/0 D=.156	4 D=.250	1 D=.172
.250	39386910100				
	2011196-1				
.312	39386910101				
	-2	2011196-31			
.375	39386910102	39386910109			
	-3	-10			
.438	39386910103	39386910110			
	-4	-11			
.500	39386910104	39386910111	39386910120		
	-5	-12	2011196-20		
.562	39386910105	39386910112	39386910121		
	-6	-13	-21		
.625	39386910106	39386910113	39386910122		
	-7	-14	-22		
.688	39386910107	39386910114	39386910123		
	-8	-15	-23		
.750	39386910108	39386910115	39386910124		
	-9	-16	-24		
.812		39386910116	39386910125	39386910130	
		-17	-25	-30	
.875		39386910117	39386910126		
		-18	-26		
.938		39386910118	39386910127		
		-19	-27		
1.000		39386910119	39386910128		39386910129
		2011196-32	2011196-28		2011196-29
1.125					
1.250					

SIZE	L_t ±.015	THD	R	SPHER R
5/0	.156	2-56 NC-3A	.020	.250
3/0	.188	4-40 NC-3A	.020	.500
1/0	.250	6-32 NC-3A	.031	.500
1	.281	6-32 NC-3A	.062	.500
4	.281	8-32 NC-3A	.062	.500

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	
2011185	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: CORROSION RESISTANT STEEL PER FED SPEC QQ-S-763, CLASS 303 COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 3938691 0100 0130
DRAWN R CARROLL DATE 10/7/66
CHECKED
APPROVAL
APPROVAL 10/14/66
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PIN, TAPER
THREADED

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011196
SCALE —
WEIGHT CALC ACTUAL
SHEET 1 OF 1

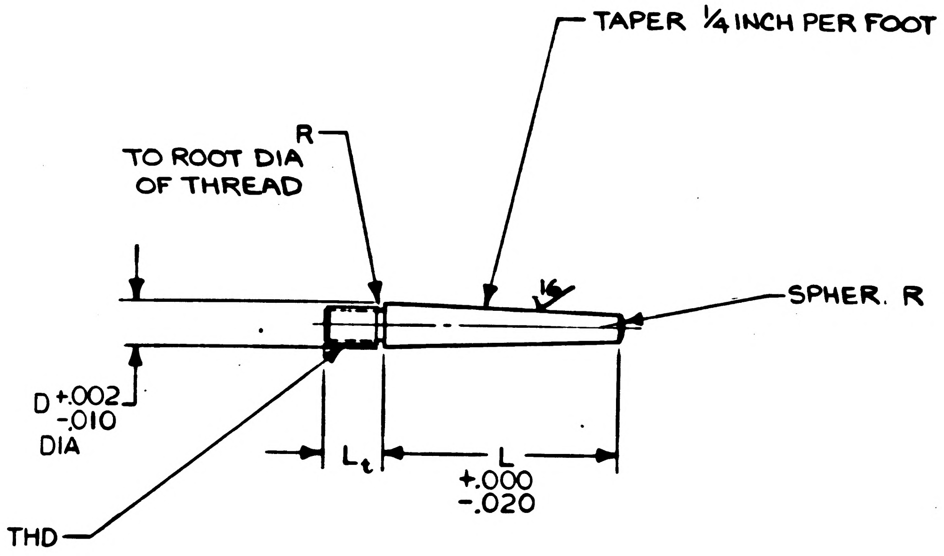
2011196

REVISIONS				10044
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REDRAWN AND REPLACED WITH CHANGES BY REV A PER TORR 31114	11/10/64 RC	

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4. REMOVE BURRS IN ACCORD WITH ND1002079.
6. FINISH - PASSIVATE IN ACCORD WITH MIL-STD-171, TABLE V-A, FINISH 5.4.2. (KPS.10051.200)
7. DASH NO.'S IN CHART REPRESENT PART NO.'S OF:

KIC
NASA



SIZE	L_t ±.015	THD	R	SPHER R
5/0	.156	2-56NC-3A	.020	.250
3/0	.188	4-40NC-3A	.020	.500
1/0	.250	6-32NC-3A	.031	.500
1	.281	6-32NC-3A	.062	.500

L	5/0	3/0	1/0
	D = .094	D = .125	D = .156
.250	3938691 0100 1011196-1		
.312	3938691 0101 -2		
.375	3938691 0102 -3	3938691 0109 1011196-10	
.438	3938691 0103 -4	3938691 0110 -11	
.500	3938691 0104 -5	3938691 0111 -12	3938691 0120 1011196-20
.562	3938691 0105 -6	3938691 0112 -13	3938691 0121 -21
.625	3938691 0106 -7	3938691 0113 -14	3938691 0122 -22
.688	3938691 0107 -8	3938691 0114 -15	3938691 0123 -23
.750	3938691 0108 -9	3938691 0115 -16	3938691 0124 -24
.812		3938691 0116 -17	3938691 0125 -25
.875		3938691 0117 -18	3938691 0126 -26
.938		3938691 0118 -19	3938691 0127 -27

L	5/0	3/0	1/0	1
	D = .094	D = .125	D = .156	D = .172
1.00		3938691 0119 1011196-20	3938691 0128 1011196-28	393869 129 1011196-29
1.125				
1.250				

REV (–) REPLACED WITH CHANGES BY REV (A)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	
2011185	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND. A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 3938691 0100 0129
DRAWN F. Schuller DATE 4-7-64
CHECKED J. SULLIVAN 5-28-64
APPROVAL 5-29-64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PIN, TAPER, THREADED

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011196
SCALE ~
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

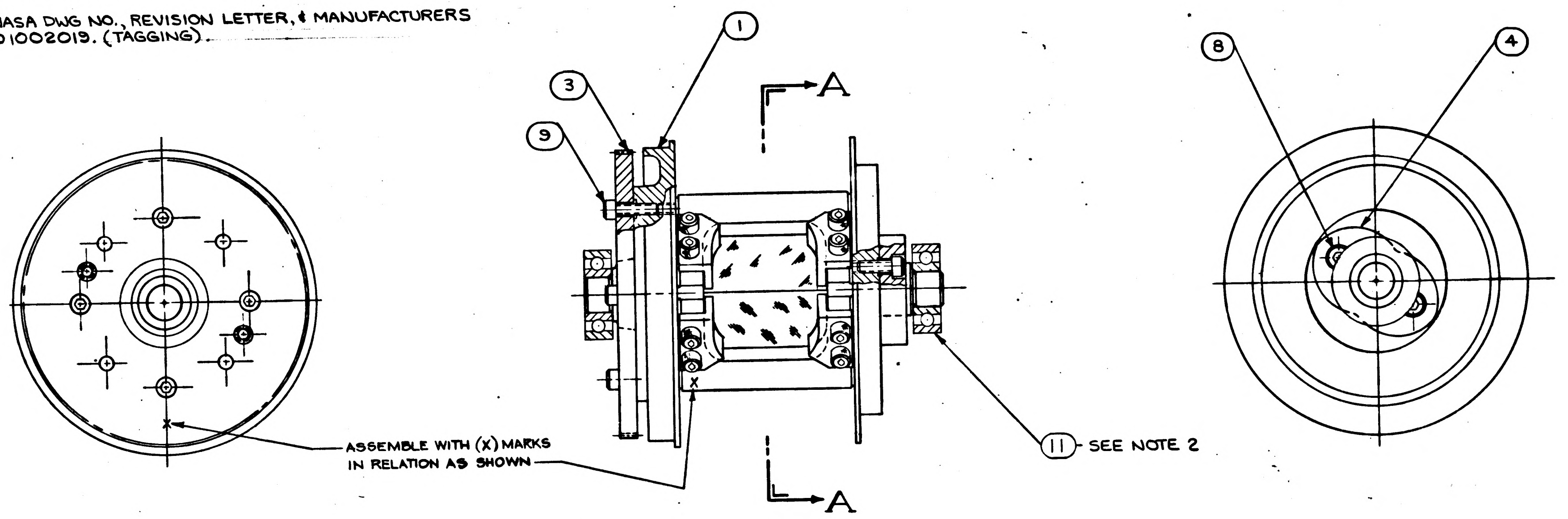
2011197 A

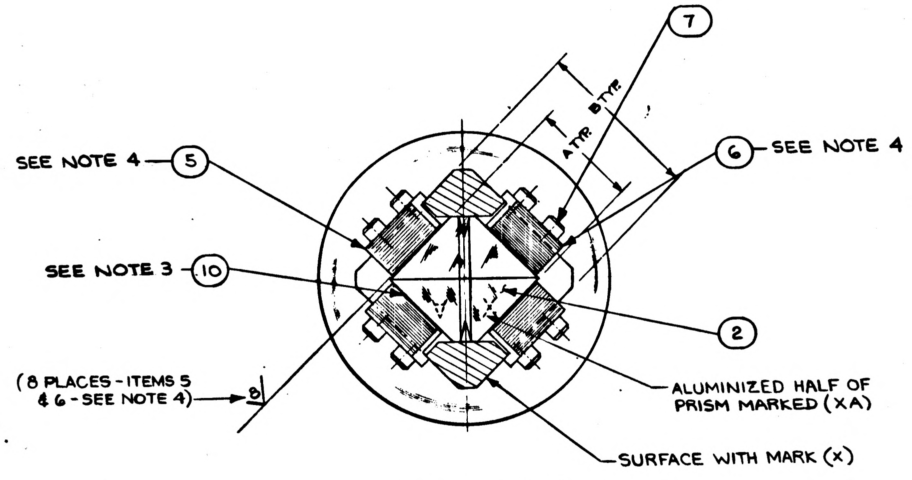
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15601	1/27/65	JLC.

REVISIONS TDRR 11109

NOTE:
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM 11 SHALL BE SELECTED FOR OPTIMUM FIT WITH ITEM 1 OF THIS ASSY AND WITH ITEM 1 OF NEXT ASSY 2011215. THIS OPTIMUM FIT SHALL BE WITHIN THE FOLLOWING LIMITS:
   a) THERE SHALL BE A CONDITION OF INTERFERENCE OF .000030 TO .000080 BETWEEN THE BEARING I.D. AND SHAFT.
   b) THERE SHALL BE A CONDITION OF CLEARANCE OF .000030 TO .000080 BETWEEN THE BEARING O.D. AND HOUSING.
3. A SINGLE THICKNESS OF ITEM 10, PRECUT TO MATCH THE CONTACT AREA SHALL BE INSERTED BETWEEN CLAMPS (8 PLACES) AND PRISM ASSEMBLY.
4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY MACHINED TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
   a) PRISM STRAIN SHALL BE LOCALIZED TO VICINITY OF CLAMPS AND NOT EXCEED ONE FRINGE OF STRAIN LEVEL.
   b) THE PRISM ASSY INTERFACE SHALL BE ORIENTED OPTICALLY PARALLEL TO THE TRUNNION AXIS WITHIN ONE (1) MINUTE OF ARC.
5. THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153.

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).





7
ATTR. BYTE
SEE NOTE 4 5
6 SEE NOTE 4
SEE NOTE 3 10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
ALUMINIZED HALF OF PRISM MARKED (XA)
SURFACE WITH MARK (X)

SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	2	*	1011611	30005770160		BEARING, BALL			
10	AR	*	1011777	60035158001		INDIUM FOIL			
9	4	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
8	2		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
7	16		NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
6	4		2011236	54386910300		CLAMP, PRISM, LEFT HAND			
5	4		2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
4	1		2011194	58386910020		CAM			
3	1		2011177	33386910100		GEAR, SPUR			
2	1		2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
1	1		2011176	52386910460		MOUNT, DOVE PRISM			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

2011197A

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390
DRAWN J. Schiller DATE 4-6-64
CHECKED J. Sullivan (CAE) 7/13/64
APPROVAL E. Ruschmann 7/15/64
APPROVAL E. [illegible] 7/15/64
NASA APPROVAL
MIT APPROVAL W [illegible] 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT, ASSY OF

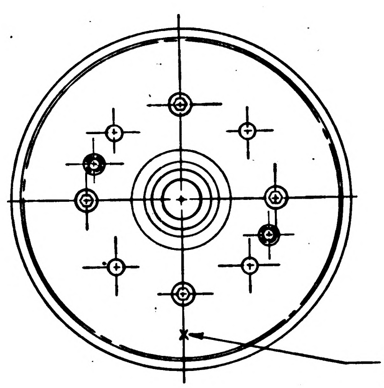
CODE IDENT NO.
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

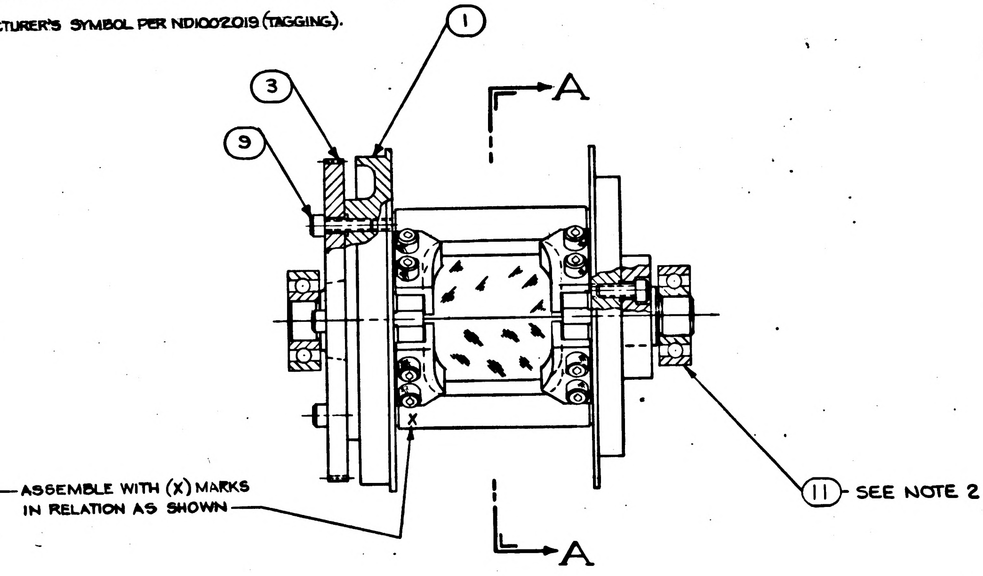
B 2011197

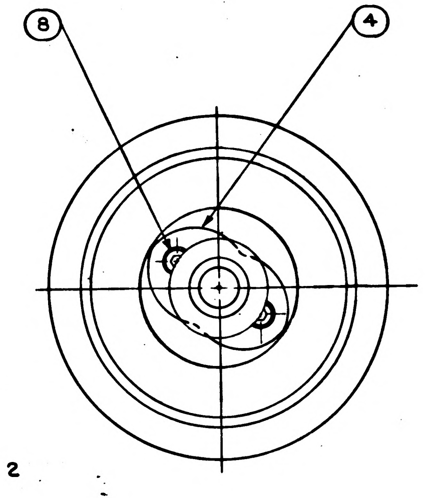
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 11109				
A		REVISED PER TDRR NO. 15601	1/27/65	JIC.
B		REVISED PER TDRR NO. 18358	4/21/65	WR

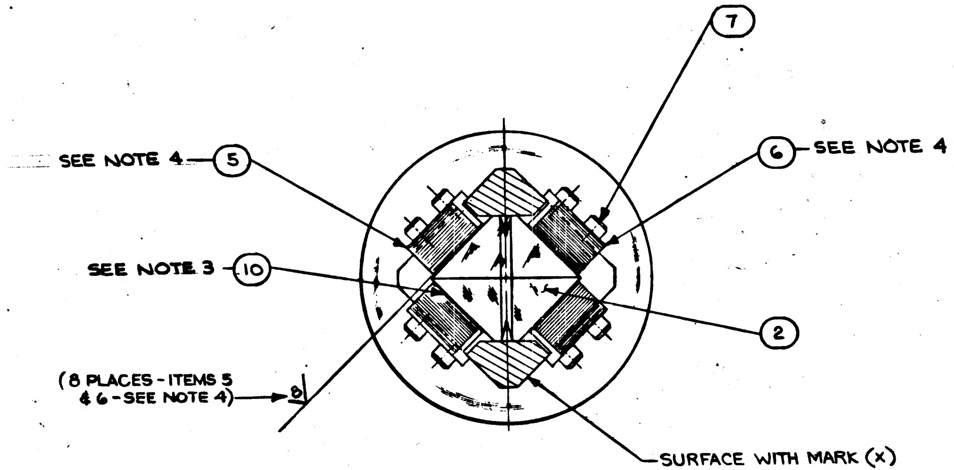
NOTE:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM 11 SHALL BE SELECTED FOR OPTIMUM FIT WITH ITEM 1 OF THIS ASSY AND WITH ITEM 1 OF NEXT ASSY 2011215. THIS OPTIMUM FIT SHALL BE WITHIN THE FOLLOWING LIMITS:
   a) THERE SHALL BE A CONDITION OF INTERFERENCE OF .000030 TO .000080 BETWEEN THE BEARING I.D. AND SHAFT.
   b) THERE SHALL BE A CONDITION OF CLEARANCE OF .000030 TO .000080 BETWEEN THE BEARING O.D. AND HOUSING.
3. A SINGLE THICKNESS OF ITEM 10, PRECUT TO MATCH THE CONTACT AREA SHALL BE INSERTED BETWEEN CLAMPS (8 PLACES) AND PRISM ASSEMBLY.
4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY MACHINED TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
   a) PRISM STRAIN SHALL BE LOCALIZED TO VICINITY OF CLAMPS AND NOT EXCEED ONE FRINGE OF STRAIN LEVEL.
   b) THE PRISM ASSY INTERFACE SHALL BE ORIENTED OPTICALLY PARALLEL TO THE TRUNNION AXIS WITHIN ONE (1) MINUTE OF ARC.
5. THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153.
6. HALF OF PRISM DESIGNATED "BEST RESOLUTION" ON INSPECTION DATA SHEET OF ITEM 2 SHALL BE ASSEMBLED ADJACENT TO X MARK OF ITEM 1.
7. IDENTIFY USING NASA DWG.NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).








7
SEE NOTE 4 5
6 SEE NOTE 4
SEE NOTE 3 10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
SURFACE WITH MARK (X) SEE NOTE 6

SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	2	*	1011611	30005770160		BEARING, BALL			
10	AR	*	1011777	60035158001		INDIUM FOIL			
9	4	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
8	2		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
7	16		NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
6	4		2011236	54386910300		CLAMP, PRISM, LEFT HAND			
5	4		2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
4	1		2011194	58386910020		CAM			
3	1		2011177	33386910100		GEAR, SPUR			
2	1		2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
1	1		2011176	52386910460		MOUNT, DOVE PRISM			

LIST OF PARTS AND MATERIALS

2011197B

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390
DRAWN J. Schiller DATE 4-6-64
CHECKED J. Sullivan (CAE) 7/13/64
APPROVAL E. Ruschmann 7/15/64
APPROVAL E. Berg 7/15/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

2011197 C

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15601	1/27/65	WC.
B		REVISED PER TDRR NO. 18358	4/21/65	WR
C		REVISED PER TDRR NO. 20027	6/15/65	WR

NOTE:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM 11 SHALL BE SELECTED FOR OPTIMUM FIT WITH ITEM 1 OF THIS ASSY AND WITH ITEM 1 OF NEXT ASSY 2011215. THIS OPTIMUM FIT SHALL BE WITHIN THE FOLLOWING LIMITS:
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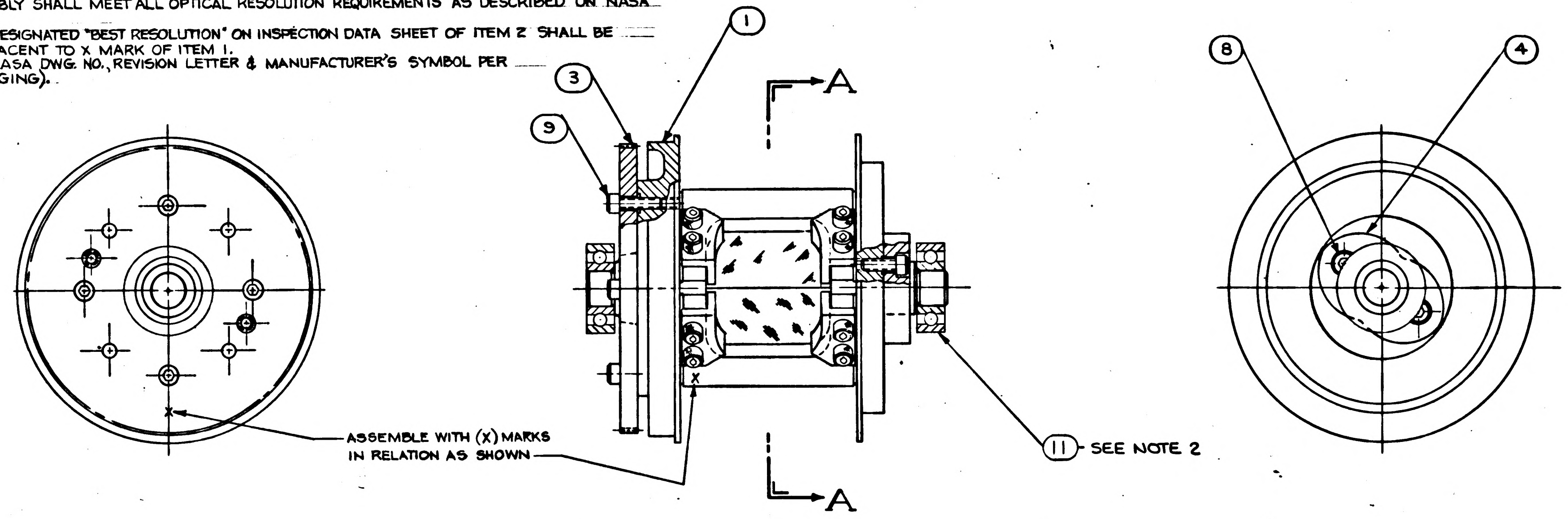
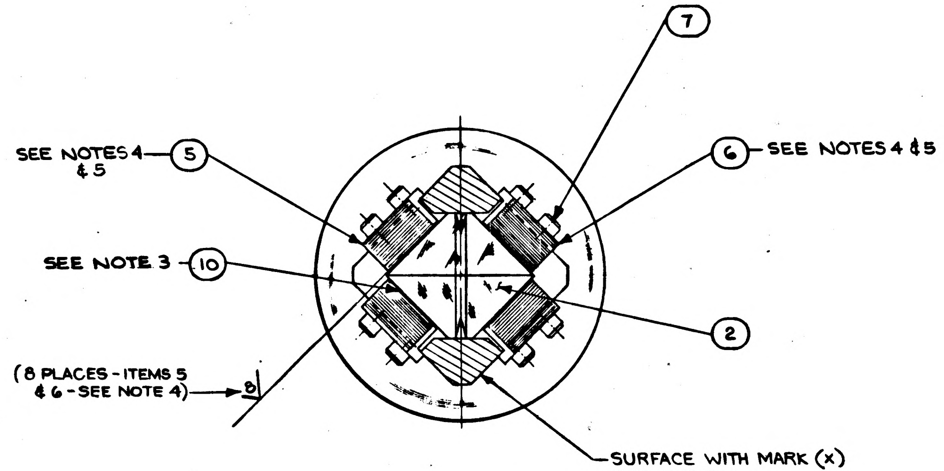
   - b) THERE SHALL BE A CONDITION OF CLEARANCE OF .000030 TO .000080 BETWEEN THE BEARING O.D. AND HOUSING.
3. A SINGLE THICKNESS OF ITEM 10, PRECUT TO MATCH THE CONTACT AREA SHALL BE INSERTED BETWEEN CLAMPS (8 PLACES) AND PRISM ASSEMBLY.
4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY MACHINED TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
   - a) PRISM STRAIN SHALL BE LOCALIZED TO VICINITY OF CLAMPS AND NOT EXCEED ONE FRINGE OF STRAIN LEVEL.
   - b) THE PRISM ASSY INTERFACE SHALL BE ORIENTED OPTICALLY PARALLEL TO THE TRUNNION AXIS WITHIN ONE (1) MINUTE OF ARC.
5. AFTER FINAL MACHINING OF ITEMS 5 & 6, FINISH:
   - a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200).
   - b) BLACKEN IN ACCORDANCE WITH MIL-C-13924, CLASS 3.
6. THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG. NO. 2011153.
7. HALF OF PRISM DESIGNATED "BEST RESOLUTION" ON INSPECTION DATA SHEET OF ITEM 2 SHALL BE ASSEMBLED ADJACENT TO X MARK OF ITEM 1.
8. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).





7
SEE NOTES 4 & 5 - 5
6 - SEE NOTES 4 & 5
SEE NOTE 3 - 10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
SURFACE WITH MARK (X) SEE NOTE 7

SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	2	*	1011611	30005770160		BEARING, BALL			
10	AR	*	1011777	60035158001		INDIUM FOIL			
9	4	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
8	2		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
7	16		NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
6	4		2011236	54386910300		CLAMP, PRISM, LEFT HAND			
5	4		2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
4	1		2011194	58386910020		CAM			
3	1		2011177	33386910100		GEAR, SPUR			
2	1		2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
1	1		2011176	52386910460		MOUNT, DOVE PRISM			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ -	+ -	+ -

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390

DRAWN J. Dillon DATE 4-6-64
CHECKED J. Sullivan (CAE) 7/13/64
APPROVAL E. Ruschmann 7/15/64
APPROVAL 7/15/64
NASA APPROVAL
MIT APPROVAL 2/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011197 C

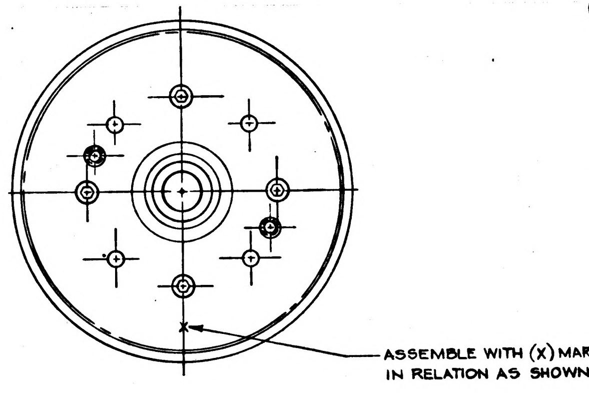
2011197 D

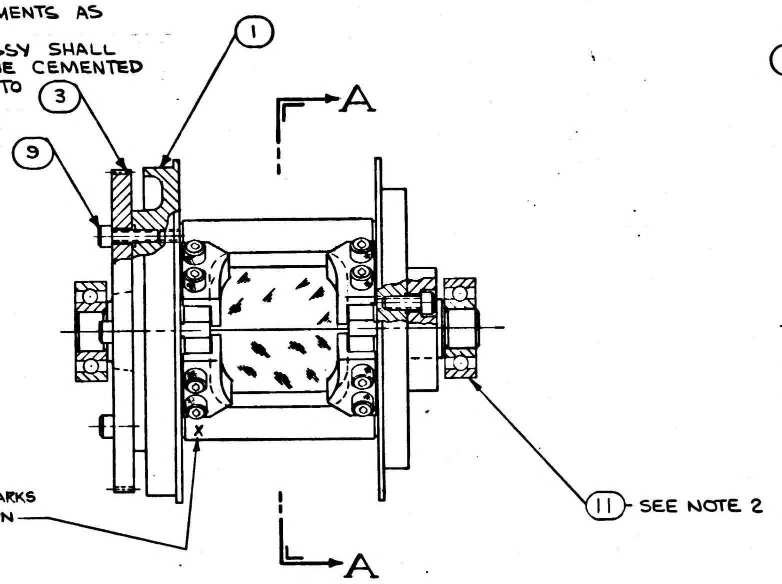
REVISIONS TDRR 11109

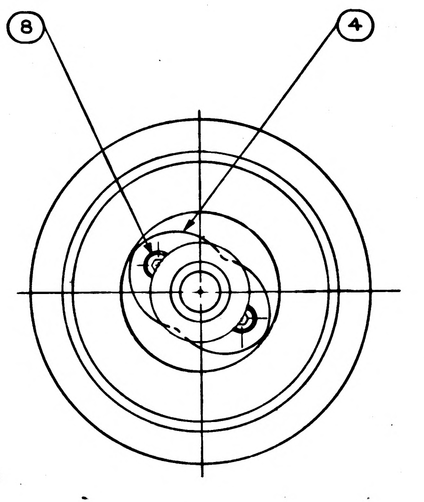
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15601	1/27/65	WK
B		REVISED PER TDRR NO. 18358	4/21/65	WK
C		REVISED PER TDRR NO. 20027	6/15/65	WK
D		REVISED PER TDRR NO. 21073	7/28/65	WK

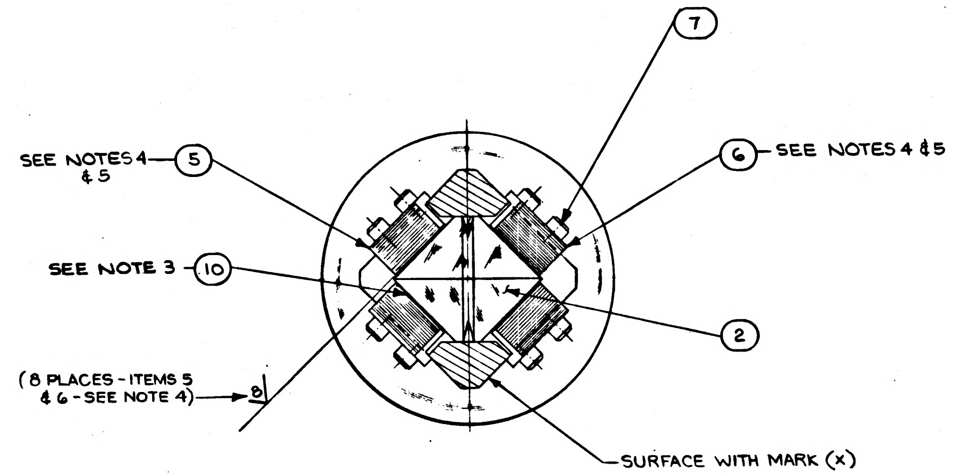
NOTE:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM 11 SHALL BE SELECTED FOR OPTIMUM FIT WITH ITEM 1 OF THIS ASSY AND WITH ITEM 1 OF NEXT ASSY 2011215. THIS OPTIMUM FIT SHALL BE WITHIN THE FOLLOWING LIMITS:
   - a) THERE SHALL BE A CONDITION OF INTERFERENCE OF .000030 TO .000080 BETWEEN THE BEARING I.D. AND SHAFT.
   - b) THERE SHALL BE A CONDITION OF CLEARANCE OF .000030 TO .000080 BETWEEN THE BEARING O.D. AND HOUSING.
3. A SINGLE THICKNESS OF ITEM 10, PRECUT TO MATCH THE CONTACT AREA SHALL BE INSERTED BETWEEN CLAMPS (8 PLACES) AND PRISM ASSEMBLY.
4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY MACHINED TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
   - a) PRISM STRAIN SHALL BE LOCALIZED TO VICINITY OF CLAMPS AND NOT EXCEED ONE FRINGE OF STRAIN LEVEL.
   - b) THE PRISM ASSY INTERFACE SHALL BE ORIENTED OPTICALLY PARALLEL TO THE TRUNNION AXIS WITHIN ONE (1) MINUTE OF ARC.
5. AFTER FINAL MACHINING OF ITEMS 5 & 6, FINISH:
   - a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200).
   - b) BLACKEN IN ACCORDANCE WITH MIL-C-13924, CLASS 3.
6. a) THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153 EXCEPT NOTE 3a
   - b) WITH SIGHT LINES NORMAL TO FACES ONE HALF OF EACH PRISM ASSY SHALL RESOLVE 16.2 SECONDS FOR PATTERN LINES PARALLEL TO THE CEMENTED FACE ("P" LINES) AND 10.3 SECONDS FOR PATTERN LINES NORMAL TO THE CEMENTED FACE ("N" LINES)
7. HALF OF PRISM DESIGNATED "BEST RESOLUTION" ON INSPECTION DATA SHEET OF ITEM 2 SHALL BE ASSEMBLED ADJACENT TO X MARK OF ITEM 1.
8. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)









7
SEE NOTES 4 & 5 - 5
6 - SEE NOTES 4 & 5
SEE NOTE 3 - 10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
SURFACE WITH MARK (X) SEE NOTE 7

SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	2	*	1011611	30005770160		BEARING, BALL			
10	AR	*	1011777	60035158001		INDIUM FOIL			
9	4	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
8	2		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
7	16		NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
6	4		2011236	54386910300		CLAMP, PRISM, LEFT HAND			
5	4		2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
4	1		2011194	58386910020		CAM			
3	1		2011177	33386910100		GEAR, SPUR			
2	1		2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
1	1		2011176	52386910460		MOUNT, DOVE PRISM			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390

DRAWN J. Schiller DATE 4-6-64
CHECKED J. Sullivan (CRE) 7/13/64
APPROVAL F. Ruschmann 7/15/64
APPROVAL E. [illegible] 7/15/64
NASA APPROVAL
MIT APPROVAL W [illegible] 21/7/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011197D

2011197 E

NOTE:
1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY MACHINED TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
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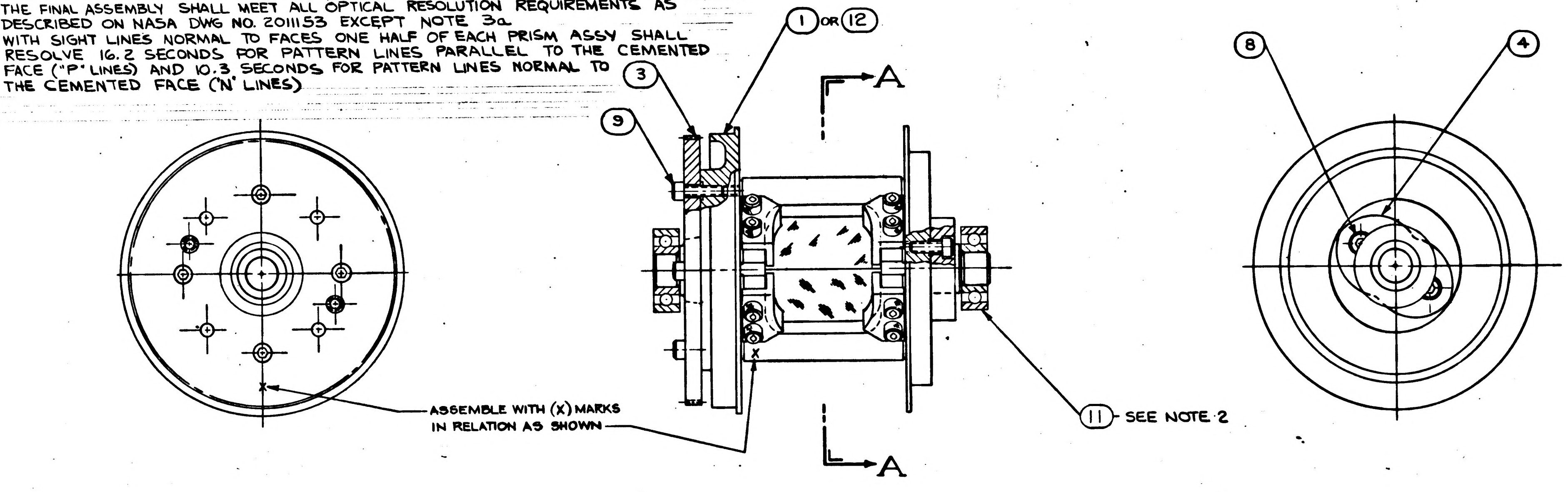
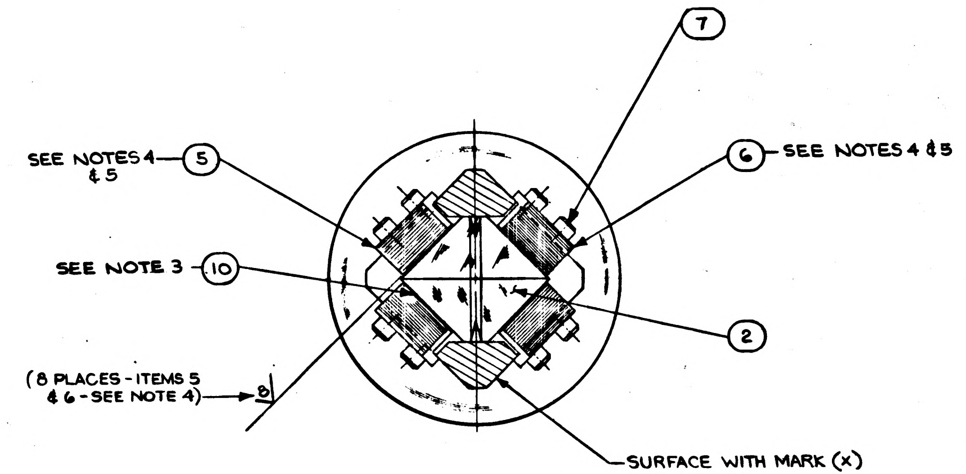
5. AFTER FINAL MACHINING OF ITEMS 5 & 6, FINISH:
   a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200).
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924, CLASS 3.
6. a) THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153 EXCEPT NOTE 3a
   b) WITH SIGHT LINES NORMAL TO FACES ONE HALF OF EACH PRISM ASSY SHALL RESOLVE 16.2 SECONDS FOR PATTERN LINES PARALLEL TO THE CEMENTED FACE ("P" LINES) AND 10.3 SECONDS FOR PATTERN LINES NORMAL TO THE CEMENTED FACE ("N" LINES)
7. HALF OF PRISM DESIGNATED "BEST RESOLUTION" ON INSPECTION DATA SHEET OF ITEM 2 SHALL BE ASSEMBLED ADJACENT TO X MARK OF ITEM 1.
8. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15601	1/27/65	WC
B		REVISED PER TDRR NO. 18358	4/21/65	WK
C		REVISED PER TDRR NO. 20027	6/15/65	WK
D		REVISED PER TDRR NO. 21073	7/28/65	WK
E		REVISED PER TDRR NO. 22649	9/28/65	WK





7
SEE NOTES 4 & 5
5
6
SEE NOTES 4 & 5
SEE NOTE 3
10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
8
SURFACE WITH MARK (X) SEE NOTE 7

SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	12			2011672	52386911020		MOUNT DOVE PRISM			
2	2	11		*	1011611	30005770160		BEARING, BALL			
AR	AR	10		*	1011777	60035158001		INDIUM FOIL			
4	4	9		*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
2	2	8			NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
16	16	7			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
4	4	6			2011236	54386910300		CLAMP, PRISM, LEFT HAND			
4	4	5			2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
1	1	4			2011134	58386910020		CAM			
1	1	3			2011177	33386910100		GEAR, SPUR			
1	1	2			2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
0	1	1			2011176	52386910460		MOUNT, DOVE PRISM			
QTY REQD											

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
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ELMHURST NEW YORK
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APPROVAL E. [illegible] 7/15/64
NASA APPROVAL
MIT APPROVAL W. [illegible] 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011197 F

NOTE:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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6. a) THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153 EXCEPT NOTE 3a
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8. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

REVISIONS TDRR 11109

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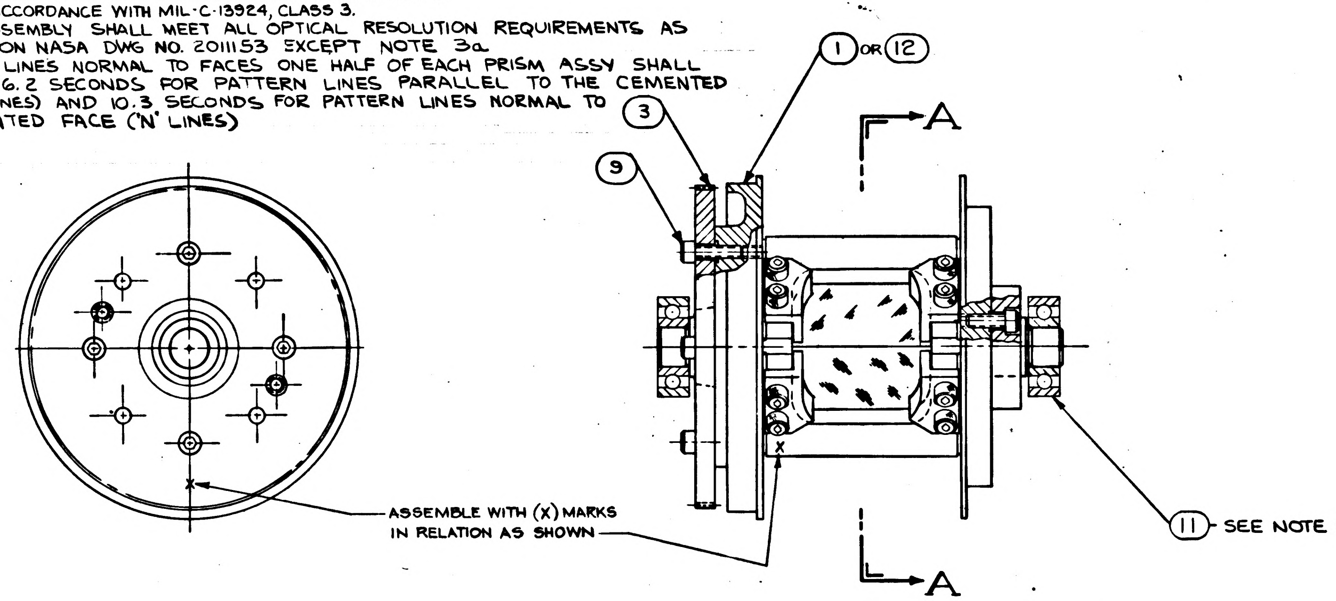
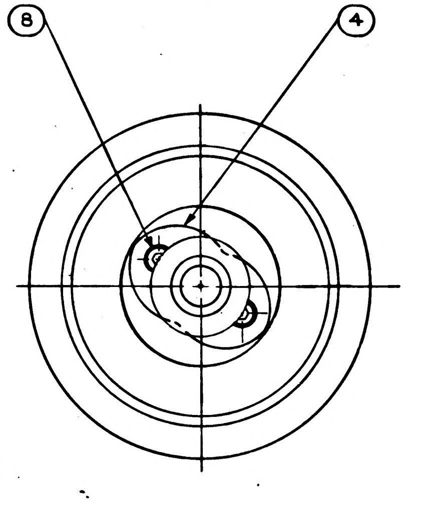
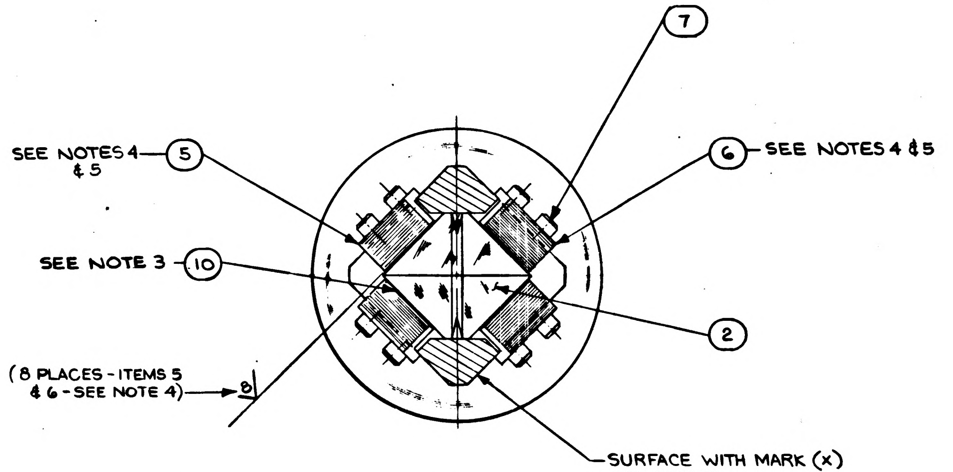
C		REVISED PER TDRR NO. 20027	6/15/65	WK
D		REVISED PER TDRR NO. 21073	7/28/65	WK
E		REVISED PER TDRR NO. 22649	9/28/65	WK
F		REVISED PER TDRR 24352	11/8/65	WK







7
SEE NOTES 4 & 5
5
6
SEE NOTES 4 & 5
SEE NOTE 3
10
2
(8 PLACES - ITEMS 5 & 6 - SEE NOTE 4)
SURFACE WITH MARK (X) SEE NOTE 7

SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	12			2012672	52386911020		MOUNT DOVE PRISM			
2	2	11		*	1011611	30005770160		BEARING, BALL			
AR	AR	10		*	1011777	60035158001		INDIUM FOIL			
4	4	9		*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
2	2	8			NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
16	16	7			NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
4	4	6			2011236	54386910300		CLAMP, PRISM, LEFT HAND			
4	4	5			2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
1	1	4			2011194	58386910020		CAM			
1	1	3			2011177	33386910100		GEAR, SPUR			
1	1	2			2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
0	1	1			2011176	52386910460		MOUNT, DOVE PRISM			

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390
DRAWN J. Schiller DATE 4-6-64
CHECKED J.S. Hinman (CAE) 7/13/64
APPROVAL F. Ruschmann 7/15/64
APPROVAL E. Maup 7/15/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 2/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011197 F

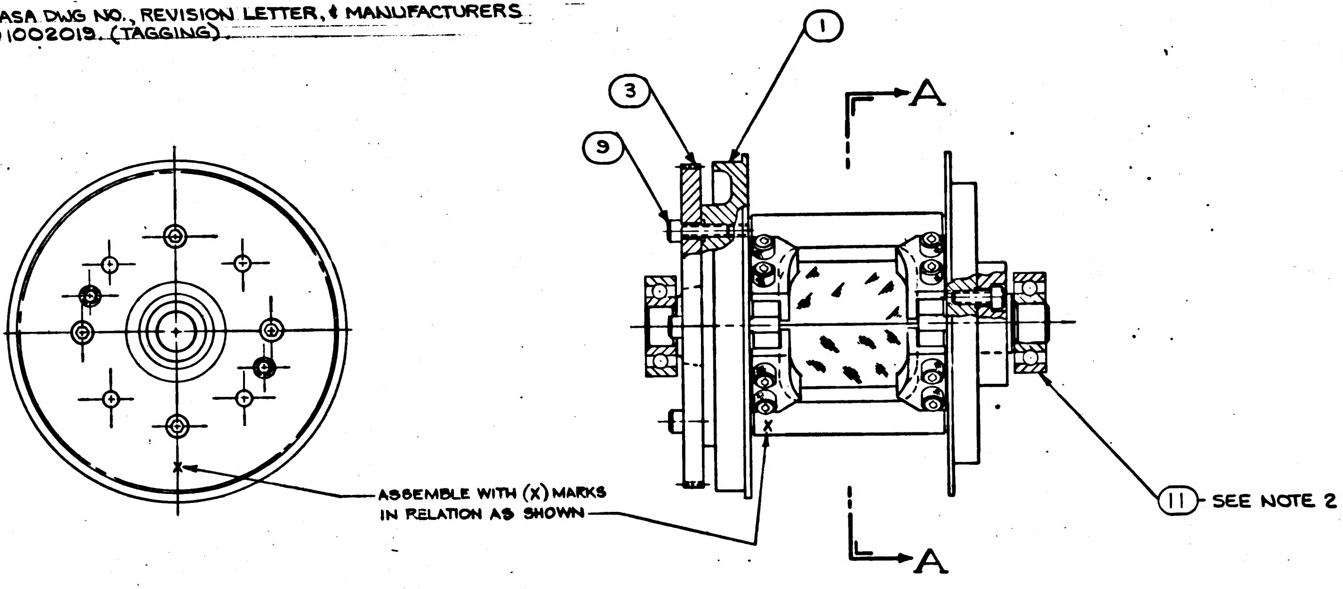
	REVISIONS TD2R 11109			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

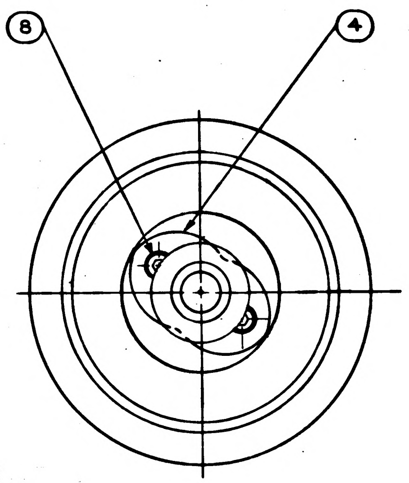
2011197

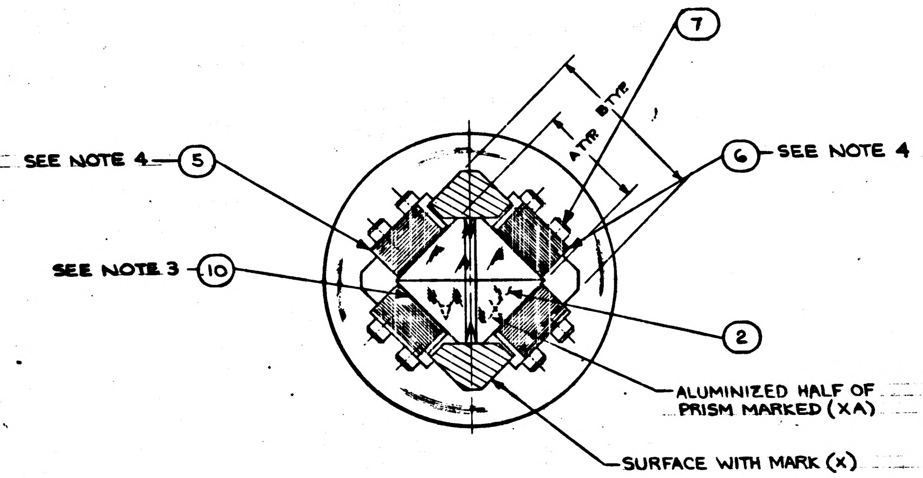
NOTE:

1. INTERPRET DWG IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM 11 SHALL BE SELECTED FOR OPTIMUM FIT WITH ITEM 1 OF THIS ASSY AND WITH ITEM 1 OF NEXT ASSY 2011215. THIS OPTIMUM FIT SHALL BE WITHIN THE FOLLOWING LIMITS:
   a) THERE SHALL BE A CONDITION OF INTERFERENCE OF .000030 TO .000080 BETWEEN THE BEARING I.D. AND SHAFT.
   b) THERE SHALL BE A CONDITION OF CLEARANCE OF .000030 TO .000080 BETWEEN THE BEARING O.D. AND HOUSING.
3. A SINGLE THICKNESS OF ITEM 10, PRECUT TO MATCH THE CONTACT AREA SHALL BE INSERTED BETWEEN CLAMPS (8 PLACES) AND PRISM ASSEMBLY.
4. FOUR (4) EACH OF ITEMS 5 & 6 ARE INDIVIDUALLY SELECTED WITH REGARD TO THERE "L" DIMENSION TO PROVIDE THE FOLLOWING ASSEMBLY CHARACTERISTICS:
   a) PRISM STRAIN SHALL BE LOCALIZED TO VICINITY OF CLAMPS AND NOT EXCEED ONE FRINGE OF STRAIN LEVEL.
   b) THE PRISM ASSY INTERFACE SHALL BE ORIENTED OPTICALLY PARALLEL TO THE TRUNNION AXIS WITHIN ONE (1) MINUTE OF ARC.
5. THE FINAL ASSEMBLY SHALL MEET ALL OPTICAL RESOLUTION REQUIREMENTS AS DESCRIBED ON NASA DWG NO. 2011153.

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).







SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	2	*	1011611	30005770160		BEARING, BALL			
10	AR	*	1011777	60035158001		INDIUM FOIL			
9	4	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD, SELF LOCKING			
8	2		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
7	16		NAS1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
6	4		2011236	54386910300		CLAMP, PRISM, LEFT HAND			
5	4		2011235	54386910200		CLAMP, PRISM, RIGHT HAND			
4	1		2011194	58386910020		CAM			
3	1		2011177	33386910100		GEAR, SPUR			
2	1		2011153	76386910060		PRISM, ASSY OF (TELESCOPE)			
1	1		2011176	52386910460		MOUNT, DOVE PRISM			

LIST OF PARTS AND MATERIALS

2011215	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910390
DRAWN J. Schiller DATE 4-6-64
CHECKED J.S. Sullivan (CRE) 7/13/64
APPROVAL E. Rischmann 7/15/64
APPROVAL E. Wesney 7/15/64
NASA APPROVAL
MIT APPROVAL W Hoffer 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOVE PRISM AND MOUNT,
ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011197
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011197

MASTER

8611102

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED: $\overset{63}{\surd}$ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (CASE HARDEN WORM AS INDICATED) TO ROCKWELL C 56-63 PER MIL-H-6875 (KPS-10015.150)
6. MEASUREMENT OVER WIRES, TO APPLY TO THE CENTRAL ½ PORTION OF THREAD.
7. ERROR IN LEAD NOT TO EXCEED .00005 ANYWHERE THRU 360° SHAFT ROTATION THRU THE CENTER THREE THREAD TURNS OF PART. MEASUREMENTS TO BE REFERENCED FROM .2500 DIAMETERS.
8. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

WORM DATA

SINGLE START WORM - INVOLUTE HELICOID - RIGHT HAND FINISHED WITH 29° INCLUDED ANGLE WHEEL, WITH GRINDING WHEEL AXIS PARALLEL TO AXIS OF WORM.

OUTSIDE DIA ———— $0.3620^{+.0000}_{-.0005}$

PITCH DIA (NOMINAL) ———— 0.3416

ROOT DIA (NOMINAL) ———— 0.3126

THREAD FINISH ———— $\overset{4}{\surd}$

LEAD OF THREAD = $\frac{\pi}{96} = .032725 = \frac{5^2 \times 7 \times 11 \times 17}{1,000,000} = \frac{7 \times 11 \times 17}{40,000}$ SEE NOTE 7

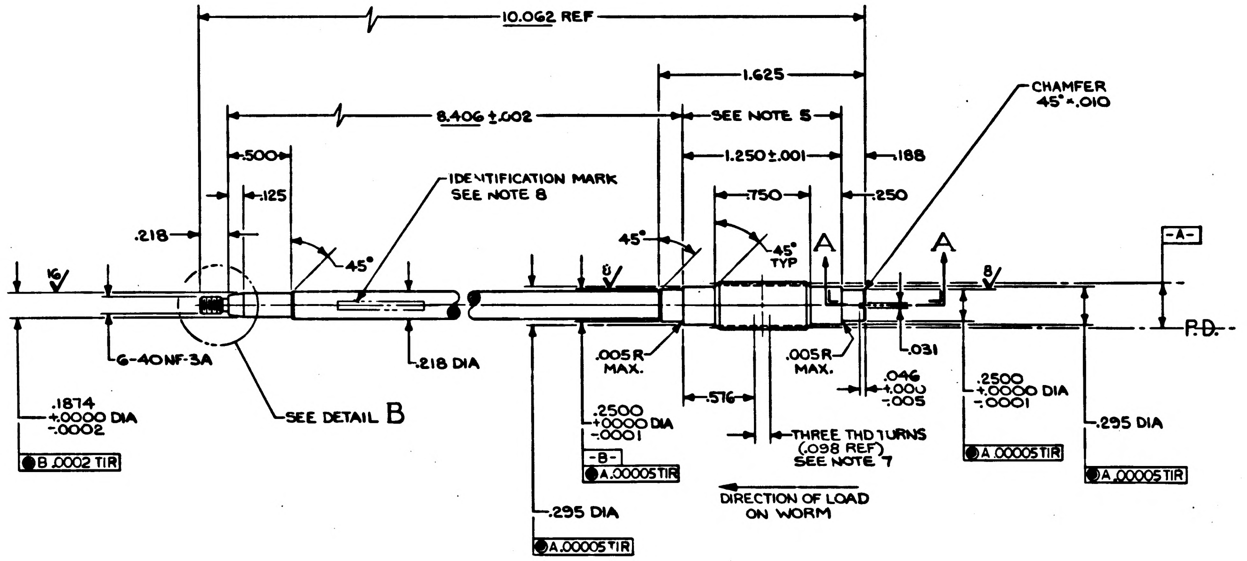
CHANGE GEARS = $\frac{7 \times 11 \times 17}{40,000 \times \text{LEAD OF FEED SCREW}}$

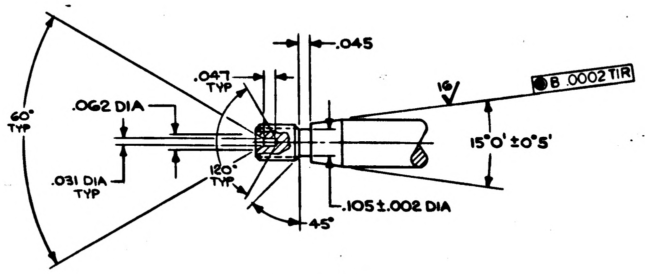
MEASUREMENT OVER .0180 DIA WIRES = $.3635^{+.0000}_{-.0005}$ USING 3 WIRE SYSTEM SEE NOTE 6

CENTER DISTANCE (ACTUAL) ———— 1.1718

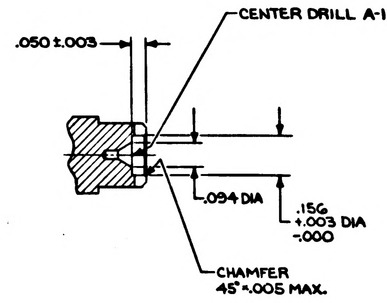
(THEORETICAL) ———— 1.1708

MESHES WITH ———— 2011177


10.062 REF
1.625
8.406 ±.002
SEE NOTE 5
1.250±.001
.188
.250
.750
.500
.125
.218
45°
45° TYP
IDENTIFICATION MARK SEE NOTE 8
CHAMFER 45°×.010
A
A
-A-
P.D.
16
8
8
6-40NF-3A
.218 DIA
.1874 +.0000 -.0002 DIA
B .0002 TIR
SEE DETAIL B
.005R MAX.
.005R MAX.
.576
.031
.046 +.000 -.005
.2500 +.0000 -.0001 DIA
-B-
A .00005 TIR
THREE THD TURNS (.098 REF) SEE NOTE 7
DIRECTION OF LOAD ON WORM
.2500 +.0000 -.0001 DIA
A .00005 TIR
.295 DIA
A .00005 TIR
.295 DIA
A .00005 TIR


.045
.047 TYP
B .0002 TIR
16
.062 DIA
60° TYP
15°0' ±0°5'
.031 DIA TYP
120° TYP
.105±.002 DIA
45°

DETAIL B
SCALE 4/1


CENTER DRILL A-1
.050±.003
.094 DIA
.156 +.003 -.000 DIA
CHAMFER 45°×.005 MAX.

PARTIAL SECTION A-A
SCALE 4/1

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011215	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
8620 STEEL
MIL-S-8690

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910030

DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 6-2-64
APPROVAL 6/2/64
APPROVAL E. 7-27-64
NASA APPROVAL
MIT APPROVAL 25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, WORM

CODE IDENT NO.
SIZE E
NASA NUMBER 2011198

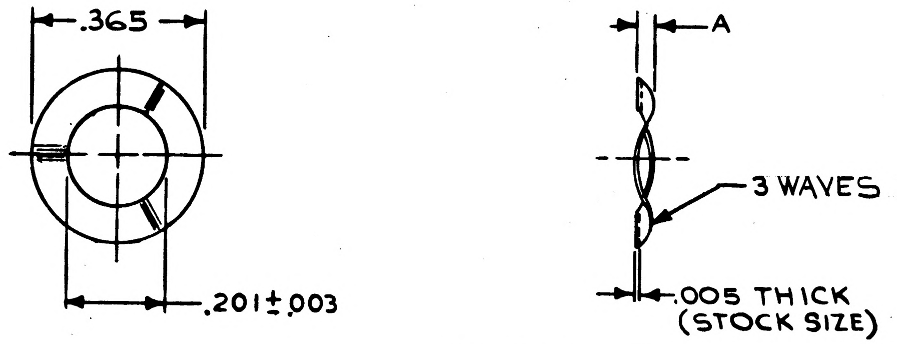
SCALE 2/1 & 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011198

2011213

REVISIONS TORR 09890			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
6. LOAD AT DIMENSION "A" = .010 TO BE 8LB ± 10%
7. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-766, CLASS 302 TEMPER 1/2 HARD

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 59386910010

DRAWN J. Schiller DATE 4-2-64
CHECKED J. SULLIVAN 5-28-64
APPROVAL [illegible] 5-29-64
APPROVAL [illegible] 6/1/64
NASA APPROVAL [illegible] 6/3/64
MIT APPROVAL [illegible] 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE WASHER, WAVE

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011213

SCALE 4/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 22648		

REVISIONS 12217

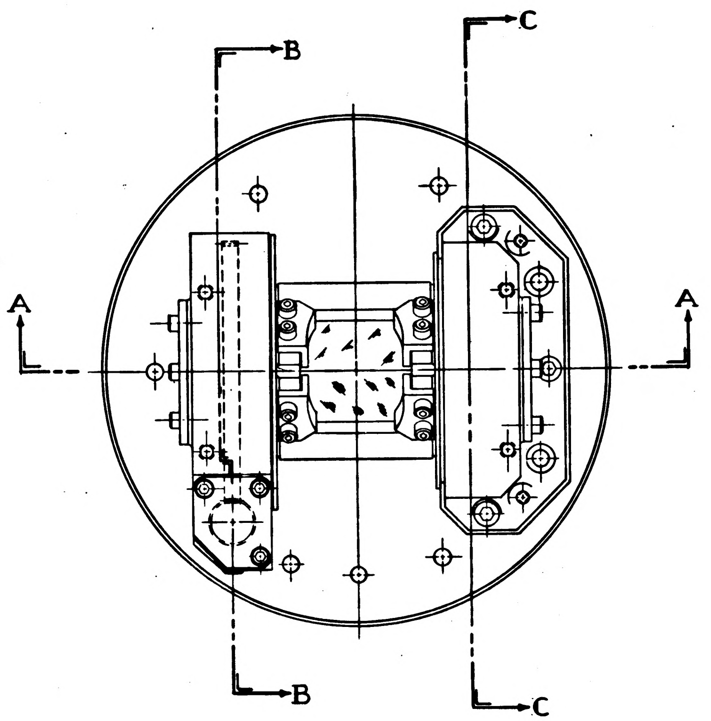
2011215 A

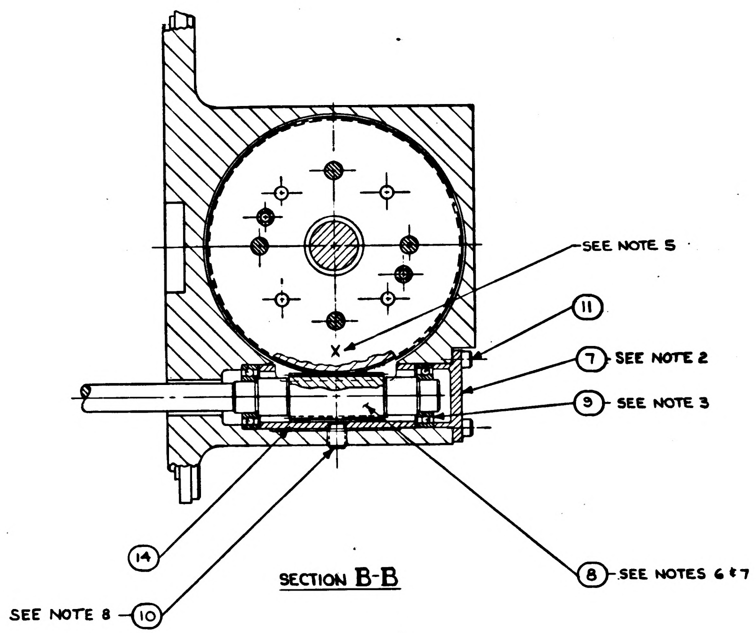
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. a) ITEM 6 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   b) ITEM 7 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   c) ITEMS 6 & 7 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING PER MIL-STD-171. TABLE V-A FINISH NO. 5.4.1 (KPS 10051.200)
3. SELECT ITEM 9, BALL BEARINGS, ON THE FOLLOWING BASIS:
   a) FIT TO SHAFT:
      INBOARD BEARING .0000 TO .0001 LOOSE.
      OUTBOARD BEARING .0000 TO .0001 TIGHT.
   b) FIT TO HOUSING
      INBOARD BEARING .0000 TO .000225 LOOSE
      OUTBOARD BEARING .0001 TO .000325 LOOSE
4. LUBRICATE "SPUR GEAR" ON ITEM 2 BY APPLYING A THIN FILM OF ITEMS 15 & 16 MIXED PER ND 1002077. FILM SHALL BE APPLIED ALL OVER.
5. THE GEAR OF ITEM 2 SHALL BE ORIENTATED, AT ENGAGEMENT WITH ITEM 8 SO THAT "X" MARKED GEAR SECTOR IS CENTERED ABOUT MESH.
6. THE MESH OF ITEM 8 WITH THE GEAR OF ITEM 2 IS DESIGNED TO HAVE BACKLASH WHICH IS TAKEN UP BY ITEM 3 ON THE CAM OF ITEM 2. THIS DEVICE MUST BE EFFECTIVE THROUGH THE RANGE OF 45° CLOCKWISE FROM THE POSITION SHOWN IN SECTION B-B. IT SHALL REQUIRE NO MORE THAN .5 OZ-INCH TORQUE AT ITEM 8 TO ROTATE ITEM 2 THROUGH THIS RANGE.

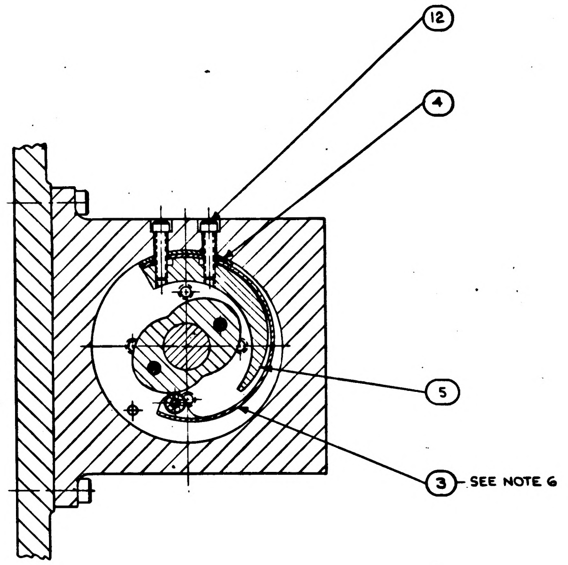
NOTES (CONT'D)

7. THE WORM DRIVE SHALL OPERATE SMOOTHLY WITHOUT ANY SIGNS OF BINDING THROUGH 360° ROTATION OF ITEM 2 IN EITHER DIRECTION.
8. SECURE ITEM 10 WITH LOCKING COMPOUND IN ACCORDANCE WITH ND1002211 USING GRADE "EV" OF MIL-S-22473.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

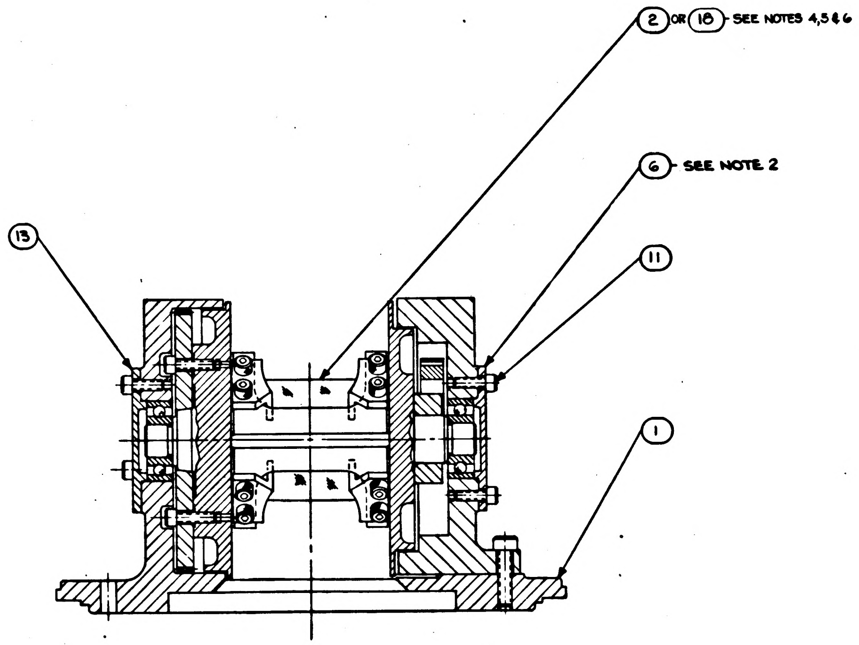




SECTION B-B



SECTION C-C



SECTION A-A

LIST OF PARTS AND MATERIALS

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	18			2011197-011			DOVE PRISM & MOUNT, ASSY OF			
		17									
AR	AR	16		✱	1012050	74471444001		LUBRICATING OIL, SILICONE			
AR	AR	15		✱	1012051	74471445001		GREASE, SILICONE			
1	1	14			2011255	57386910440		SPACER, BEARING			
1	1	13			2011250	57386910430		CAP, RETAINING, TRUNNION (L.H.)			
2	2	12		NAS	1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
10	10	11		NAS	1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
1	1	10			MS51045-29	—		SET SCREW, HEX SOC, HALF DOG POINT			
2	2	9		✱	1011610	30005770161		BEARING, BALL			
1	1	8			2011198	33386910090		SHAFT, WORM			
1	1	7			2011186	57386910420		CAP, RETAINING, WORM SHAFT BRG			
1	1	6			2011181	57386910410		CAP, RETAINING, TRUNNION BRG (R.H)			
1	1	5			2011190	57386910400		BLOCK, SPRING MOUNTING			
1	1	4			2011189	57386910390		SPACER, SPRING			
1	1	3			2011193	85386910360		CAM FOLLOWER AND SPRING, ASSY OF			
0	1	2			2011197	85386910390		DOVE PRISM AND MOUNT, ASSY OF			
1	1	1			2011185	85386910370		SUPPORT, DOVE PRISM MOUNT, ASSY OF (MACHINING			

✱ PURCHASE ITEM — SEE SPEC CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910380

DRAWN DATE 4-7-64
CHECKED J. SULLIVAN 7-27-64
APPROVAL 7/27/64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TRUNNION
AXIS ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011215
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011215 B

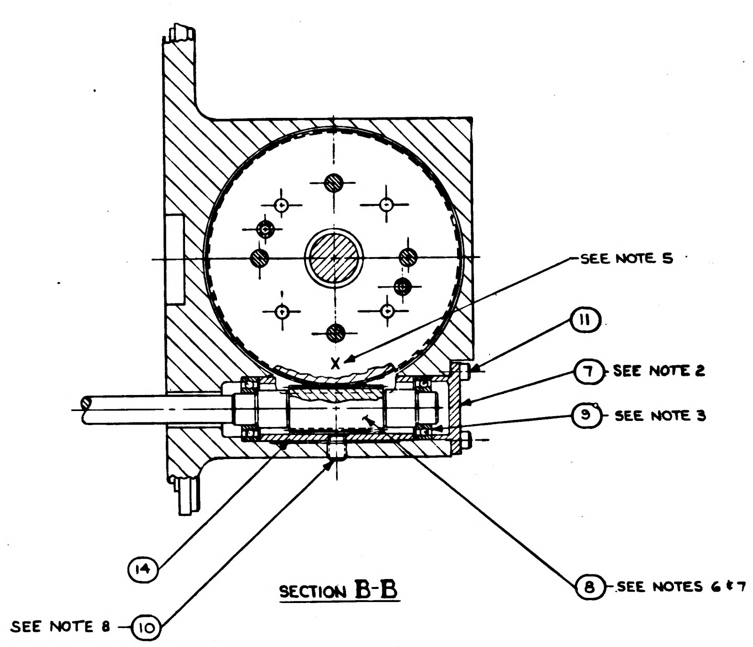
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2 a) ITEM 6 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   b) ITEM 7 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   c) ITEMS 6 & 7 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING PER MIL-STD-171. TABLE V-A FINISH NO. 5.4.1 (KPS 1005I.200)
3. SELECT ITEM 9, BALL BEARINGS, ON THE FOLLOWING BASIS:
   a) FIT TO SHAFT:
      INBOARD BEARING .0000 TO .0001 LOOSE.
      OUTBOARD BEARING .0000 TO .0001 TIGHT.
   b) FIT TO HOUSING
      INBOARD BEARING .0000 TO .000225 LOOSE
      OUTBOARD BEARING .0001 TO .000325 LOOSE
4. LUBRICATE "SPUR GEAR" ON ITEM 2 BY APPLYING A THIN FILM OF ITEMS 15 & 16 MIXED PER ND 1002077. FILM SHALL BE APPLIED ALL OVER.
5. THE GEAR OF ITEM 2 SHALL BE ORIENTATED, AT ENGAGEMENT WITH ITEM 8 SO THAT "X" MARKED GEAR SECTOR IS CENTERED ABOUT MESH.
6. THE MESH OF ITEM 8 WITH THE GEAR OF ITEM 2 IS DESIGNED TO HAVE BACKLASH WHICH IS TAKEN UP BY ITEM 3 ON THE CAM OF ITEM 2. THIS DEVICE MUST BE EFFECTIVE THROUGH THE RANGE OF 45° CLOCKWISE FROM THE POSITION SHOWN IN SECTION B-B. IT SHALL REQUIRE NO MORE THAN .5 OZ-INCH TORQUE AT ITEM 8 TO ROTATE ITEM 2 THROUGH THIS RANGE.

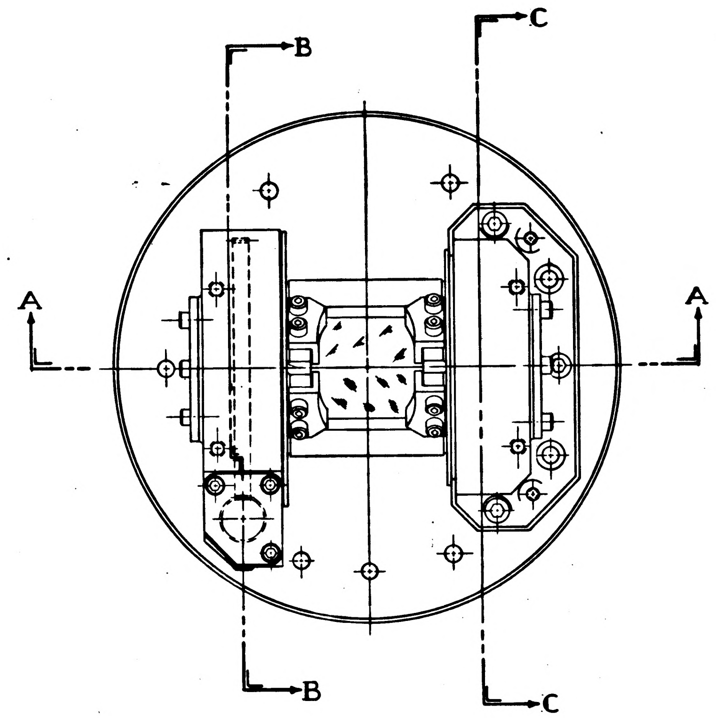
NOTES (CONT'D)

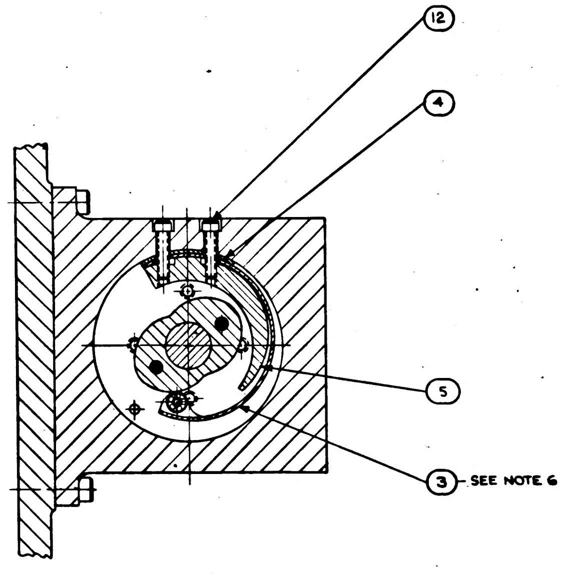
7. THE WORM DRIVE SHALL OPERATE SMOOTHLY WITHOUT ANY SIGNS OF BINDING THROUGH 360° ROTATION OF ITEM 2 IN EITHER DIRECTION.
8. SECURE ITEM 10 WITH LOCKING COMPOUND IN ACCORDANCE WITH ND 1002211 USING GRADE "EV" OF MIL-S-22473.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 22648		
B		REVISED PER TDRR 23545		

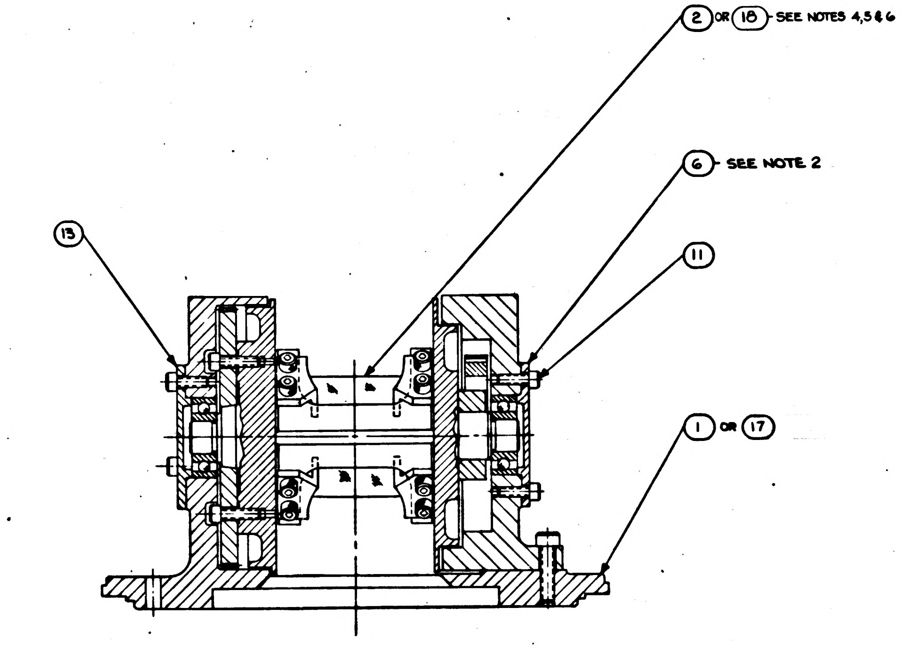


SECTION B-B





SECTION C-C



SECTION A-A

QTY REQD 011	QTY REQD 000	ITEM NO.		SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	18			2011197-011			DOVE PRISM & MOUNT, ASSY OF			
1	0	17			2011185-011	85386910370		SUPPORT DOVE PRISM MOUNT, ASSY OF (MACH)			
AR	AR	16		*	1012050	74471444001		LUBRICATING OIL, SILICONE			
AR	AR	15		*	1012051	74471445001		GREASE, SILICONE			
1	1	14			2011255	57386910440		SPACER, BEARING			
1	1	13			2011250	57386910430		CAP, RETAINING, TRUNNION (L.H.)			
2	2	12			NAS 1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
10	10	11			NAS 1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
1	1	10			MS51045-29	—		SET SCREW, HEX SOC, HALF DOG POINT			
2	2	9		*	1011610	30005770161		BEARING, BALL			
1	1	8			2011198	33386910090		SHAFT, WORM			
1	1	7			2011186	57386910420		CAP, RETAINING, WORM SHAFT BRG			
1	1	6			2011181	57386910410		CAP, RETAINING, TRUNNION BRG (R.H)			
1	1	5			2011190	57386910400		BLOCK, SPRING MOUNTING			
1	1	4			2011189	57386910390		SPACER, SPRING			
1	1	3			2011193	85386910360		CAM FOLLOWER AND SPRING, ASSY OF			
0	1	2			2011197	85386910390		DOVE PRISM AND MOUNT, ASSY OF			
0	1	1			2011185	85386910370		SUPPORT, DOVE PRISM MOUNT, ASSY OF (MACHINING			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM — SEE SPEC CONTROL DWG BEFORE ORDERING

MASTER

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS + - ~ DECIMALS + - ~ ANGLES + - ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910380
DRAWN DATE 4-7-64
CHECKED J. SULLIVAN 7-27-64
APPROVAL 7/27/64
APPROVAL E. Murray 8/3/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TRUNNION
AXIS ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011215
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011215	C

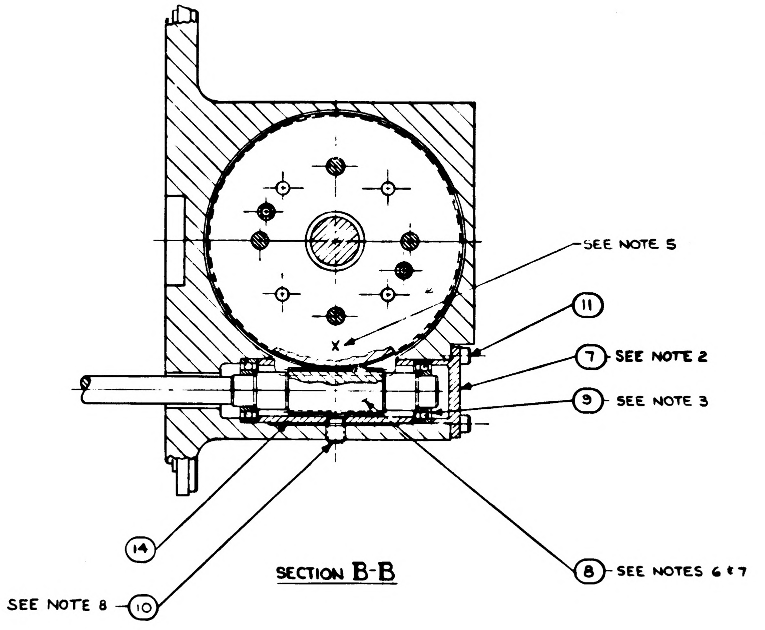
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 22648		
B		REVISED PER TDRR 23545		
C		REVISED PER TDRR 31E35		

NOTES:

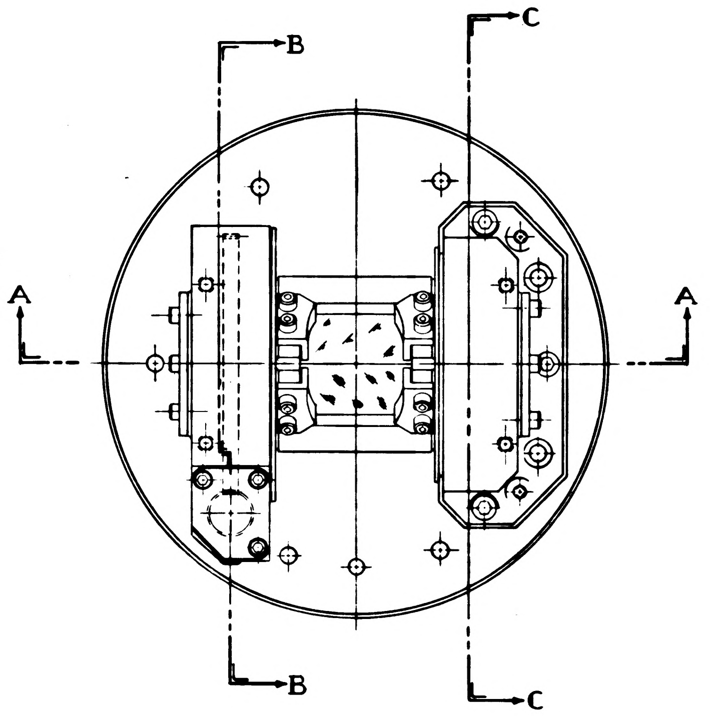
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. a) ITEM 6 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS
   b) ITEM 7 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ±0.2 LBS.
   c) ITEMS 6 & 7 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING PER MIL-STD-171. TABLE V-A FINISH NO. 5.4.1 (KPS 1005I.200)
3. SELECT ITEM 9, BALL BEARINGS, ON THE FOLLOWING BASIS:
   a) FIT TO SHAFT:
      INBOARD BEARING .0000 TO .0001 LOOSE.
      OUTBOARD BEARING .0000 TO .0001 TIGHT.
   b) FIT TO HOUSING
      INBOARD BEARING .0000 TO .000225 LOOSE
      OUTBOARD BEARING .0001 TO .000325 LOOSE
4. LUBRICATE "SPUR GEAR" ON ITEM 2 BY APPLYING A THIN FILM OF ITEMS 15 & 16 MIXED PER ND 1002077. FILM SHALL BE APPLIED ALL OVER.
5. THE GEAR OF ITEM 2 SHALL BE ORIENTATED, AT ENGAGEMENT WITH ITEM 8 SO THAT "X" MARKED GEAR SECTOR IS CENTERED ABOUT MESH.
6. THE MESH OF ITEM 8 WITH THE GEAR OF ITEM 2 IS DESIGNED TO HAVE BACKLASH WHICH IS TAKEN UP BY ITEM 3 ON THE CAM OF ITEM 2. THIS DEVICE MUST BE EFFECTIVE THROUGH THE RANGE OF 45° CLOCKWISE FROM THE POSITION SHOWN IN SECTION B-B. IT SHALL REQUIRE NO MORE THAN .5 OZ-INCH TORQUE AT ITEM 8 TO ROTATE ITEM 2 THROUGH THIS RANGE.

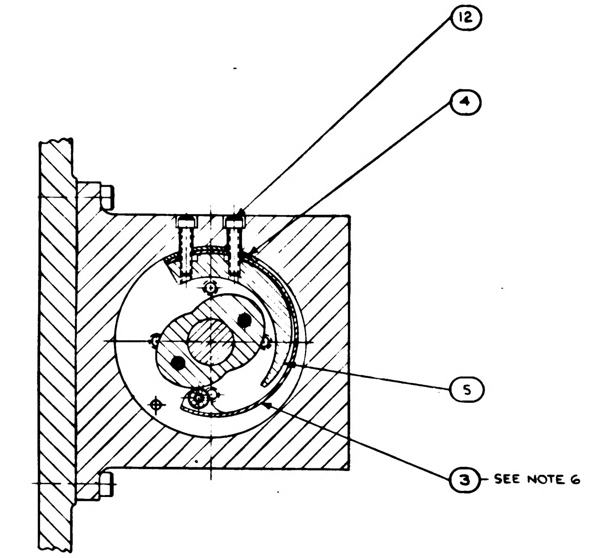
NOTES (CONT'D)

7. THE WORM DRIVE SHALL OPERATE SMOOTHLY WITHOUT ANY SIGNS OF BINDING THROUGH 360° ROTATION OF ITEM 2 IN EITHER DIRECTION.
8. SECURE ITEM 10 WITH LOCKING COMPOUND IN ACCORDANCE WITH ND1002211 USING GRADE "B" OF MIL-S-22473.
9. IDENTIFY USING NASA DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

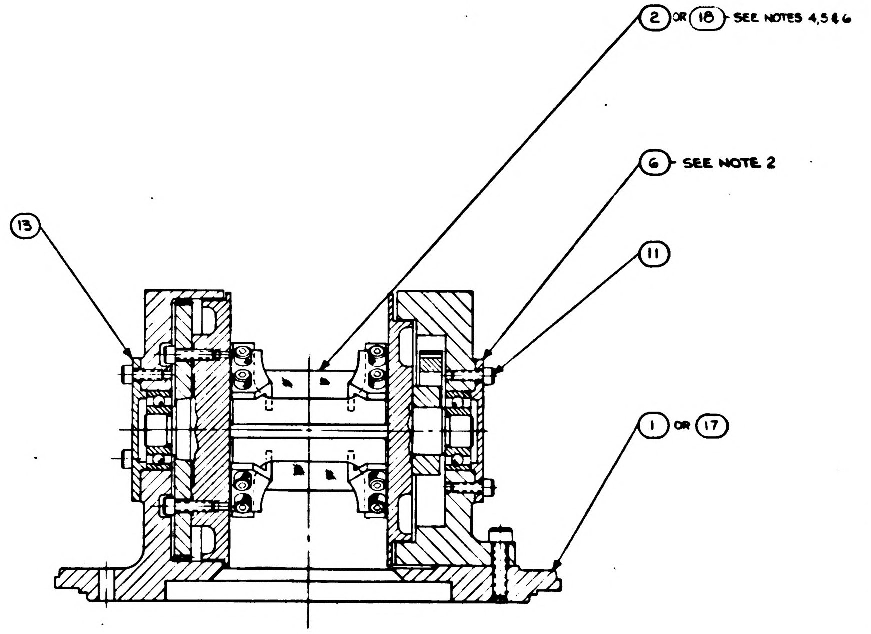


SECTION B-B





SECTION C-C



SECTION A-A

QTY REQD 011	000	ITEM NO.		SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	18			2011197-011			DOVE PRISM & MOUNT, ASSY OF			
1	0	17			2011185-011	85386910370		SUPPORT DOVE PRISM MOUNT, ASSY OF (MACH)			
AR	AR	16		*	1012050	74471444001		LUBRICATING OIL, SILICONE			
AR	AR	15		*	1012051	74471445001		GREASE, SILICONE			
1	1	14			2011255	57386910440		SPACER, BEARING			
1	1	13			2011250	57386910430		CAP, RETAINING, TRUNNION (L.H.)			
2	2	12		NAS	1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
10	10	11		NAS	1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
1	1	10			MS51045-29	—		SET SCREW, HEX SOC HALF DOG POINT			
2	2	9		*	1011610	30005770161		BEARING, BALL			
1	1	8			2011198	33386910090		SHAFT, WORM			
1	1	7			2011186	57386910420		CAP, RETAINING, WORM SHAFT BRG			
1	1	6			2011181	57386910410		CAP, RETAINING, TRUNNION BRG (R.H.)			
1	1	5			2011190	57386910400		BLOCK, SPRING MOUNTING			
1	1	4			2011189	57386910390		SPACER, SPRING			
1	1	3			2011193	85386910360		CAM FOLLOWER AND SPRING, ASSY OF			
0	1	2			2011197	85386910390		DOVE PRISM AND MOUNT, ASSY OF			
0	1	1			2011185	85386910370		SUPPORT, DOVE PRISM MOUNT, ASSY OF (MACHINING			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM — SEE SPEC CONTROL DWG BEFORE ORDERING

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910380
DRAWN DATE 4-1-64
CHECKED J. SULLIVAN 7-27-64
APPROVAL 7/27/64
APPROVAL 7/27/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TRUNNION AXIS ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011215
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011215

2011215

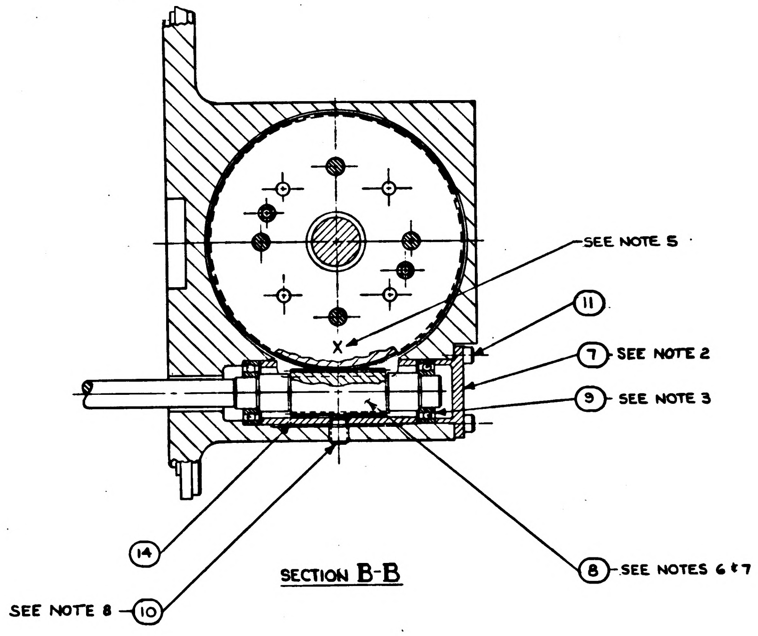
REVISIONS				122.7
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

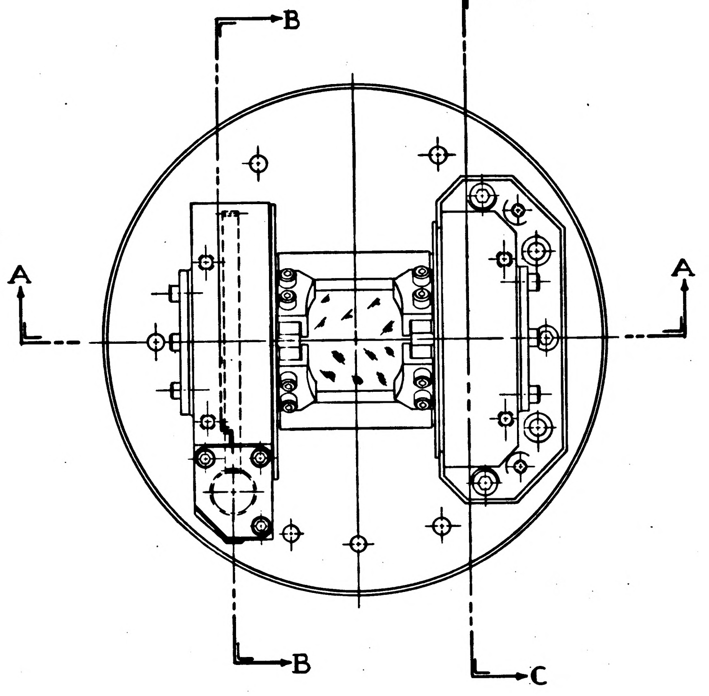
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. a) ITEM 6 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   b) ITEM 7 SHALL BE MACHINED AT ASSEMBLY TO PROVIDE A BEARING PRELOAD OF 2 LBS ± 0.2 LBS.
   c) ITEMS 6 & 7 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING PER MIL-STD-171. TABLE V-A FINISH NO. 5.4.1 (KPS 1005I.200)
3. SELECT ITEM 9, BALL BEARINGS, ON THE FOLLOWING BASIS:
   a) FIT TO SHAFT:
      INBOARD BEARING .0000 TO .0001 LOOSE.
      OUTBOARD BEARING .0000 TO .0001 TIGHT.
   b) FIT TO HOUSING
      INBOARD BEARING .0000 TO .000225 LOOSE
      OUTBOARD BEARING .0001 TO .000325 LOOSE
4. LUBRICATE "SPUR GEAR" ON ITEM 2 BY APPLYING A THIN FILM OF ITEMS 15 & 16 MIXED PER ND 1002077. FILM SHALL BE APPLIED ALL OVER.
5. THE GEAR OF ITEM 2 SHALL BE ORIENTATED, AT ENGAGEMENT WITH ITEM 8 SO THAT "X" MARKED GEAR SECTOR IS CENTERED ABOUT MESH.
6. THE MESH OF ITEM 8 WITH THE GEAR OF ITEM 2 IS DESIGNED TO HAVE BACKLASH WHICH IS TAKEN UP BY ITEM 3 ON THE CAM OF ITEM 2. THIS DEVICE MUST BE EFFECTIVE THROUGH THE RANGE OF 45° CLOCKWISE FROM THE POSITION SHOWN IN SECTION B-B. IT SHALL REQUIRE NO MORE THAN .5 OZ-INCH TORQUE AT ITEM 8 TO ROTATE ITEM 2 THROUGH THIS RANGE.

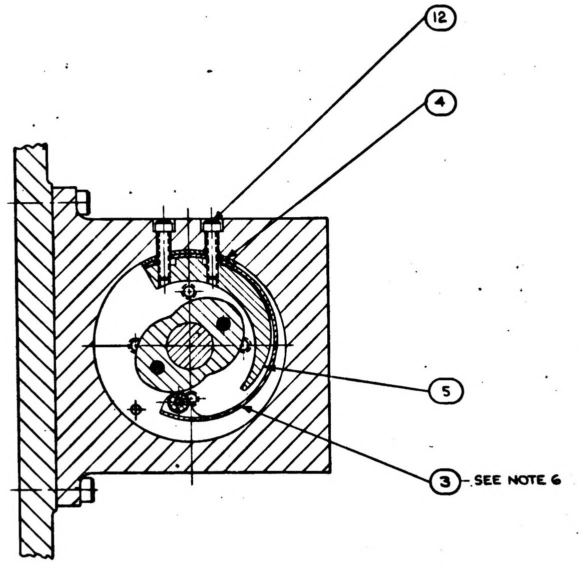
NOTES (CONT'D)

7. THE WORM DRIVE SHALL OPERATE SMOOTHLY WITHOUT ANY SIGNS OF BINDING THROUGH 360° ROTATION OF ITEM 2 IN EITHER DIRECTION.
8. SECURE ITEM 10 WITH LOCKING COMPOUND IN ACCORDANCE WITH ND1002211 USING GRADE "EV" OF MIL-S-22473.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

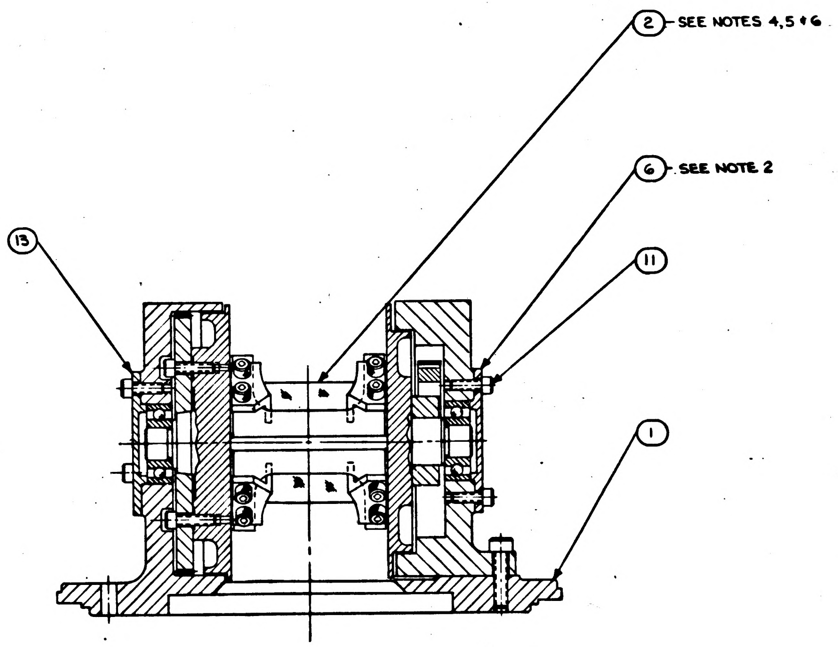


SECTION B-B





SECTION C-C



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
16	AR	*	1012050	74471444001		LUBRICATING OIL, SILICONE			
15	AR	*	1012051	74471445001		GREASE, SILICONE			
14	1		2011255	57386910440		SPACER, BEARING			
13	1		2011250	57386910430		CAP, RETAINING, TRUNNION (L.H.)			
12	2	NAS	1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
11	10	NAS	1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
10	1		MS51045-29	—		SET SCREW, HEX SOC, HALF DOG POINT			
9	2	*	1011610	30005770161		BEARING, BALL			
8	1		2011198	33386910090		SHAFT, WORM			
7	1		2011186	57386910420		CAP, RETAINING, WORM SHAFT BRG			
6	1		2011181	57386910410		CAP, RETAINING, TRUNNION BRG (R.H)			
5	1		2011190	57386910400		BLOCK, SPRING MOUNTING			
4	1		2011189	57386910390		SPACER, SPRING			
3	1		2011193	85386910360		CAM FOLLOWER AND SPRING, ASSY OF			
2	1		2011197	85386910350		DOVE PRISM AND MOUNT, ASSY OF			
1	1		2011185	85386910370		SUPPORT, DOVE PRISM MOUNT, ASSY OF (MACHINING)			

LIST OF PARTS AND MATERIALS

2011215

* PURCHASE ITEM — SEE SPEC CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910380

DRAWN DATE 4-14-
CHECKED J. SULLIVAN 7-27-64
APPROVAL 7/27/64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TRUNNION
AXIS ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 2011215
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

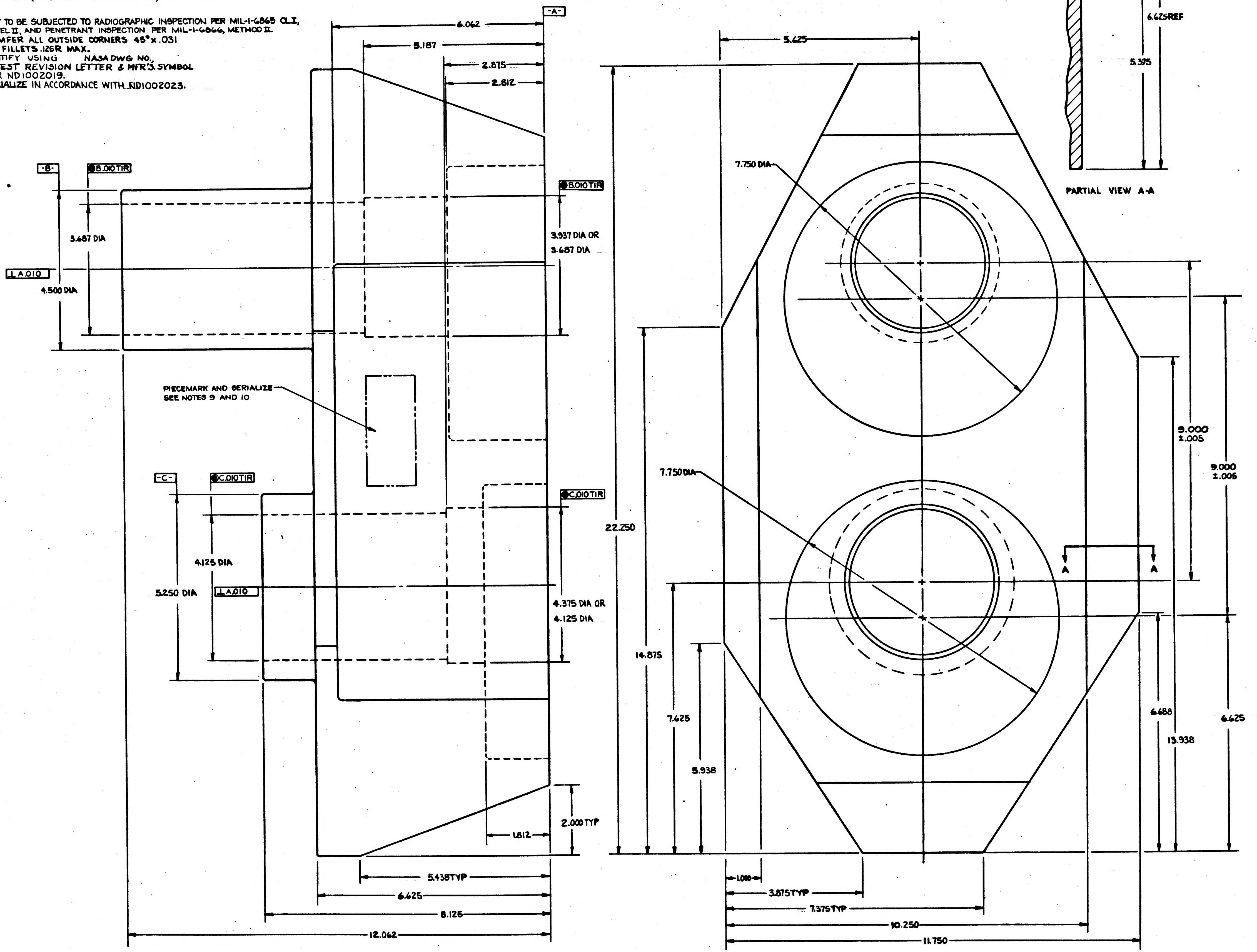
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:

a. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.

6. PART TO BE SUBJECTED TO RADIOGRAPHIC INSPECTION PER MIL-I-6865 CL.I, LEVEL II, AND PENETRANT INSPECTION PER MIL-I-6866, METHOD II.
7. CHAMFER ALL OUTSIDE CORNERS 45° x .031
8. ALL FILLETS .125R MAX.
9. IDENTIFY USING NASA DWG NO., LATEST REVISION LETTER & MFR'S. SYMBOL PER ND1002019.
10. SERIALIZE IN ACCORDANCE WITH ND1002023.

2011228

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


-A-
6.062
5.187
2.875
2.812
-B-
B.010 TIR
B.010 TIR
3.687 DIA
3.937 DIA OR
3.687 DIA
⊥ A.010
4.500 DIA
PIECEMARK AND SERIALIZE
SEE NOTES 9 AND 10
-C-
C.010 TIR
C.010 TIR
4.125 DIA
5.250 DIA
⊥ A.010
4.375 DIA OR
4.125 DIA
2.000 TYP
1.812
5.438 TYP
6.625
8.125
12.062
5.625
7.750 DIA
7.750 DIA
22.250
14.875
7.625
5.938
9.000
±.005
9.000
±.005
6.688
13.938
6.625
A
A
1.000
3.875 TYP
7.375 TYP
10.250
11.750
6.625 REF
5.375
PARTIAL VIEW A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011618	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.015 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 5)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910520
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/16/64
APPROVAL 6/13/64
APPROVAL E. Manny 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE,
ROUGH SHAPE

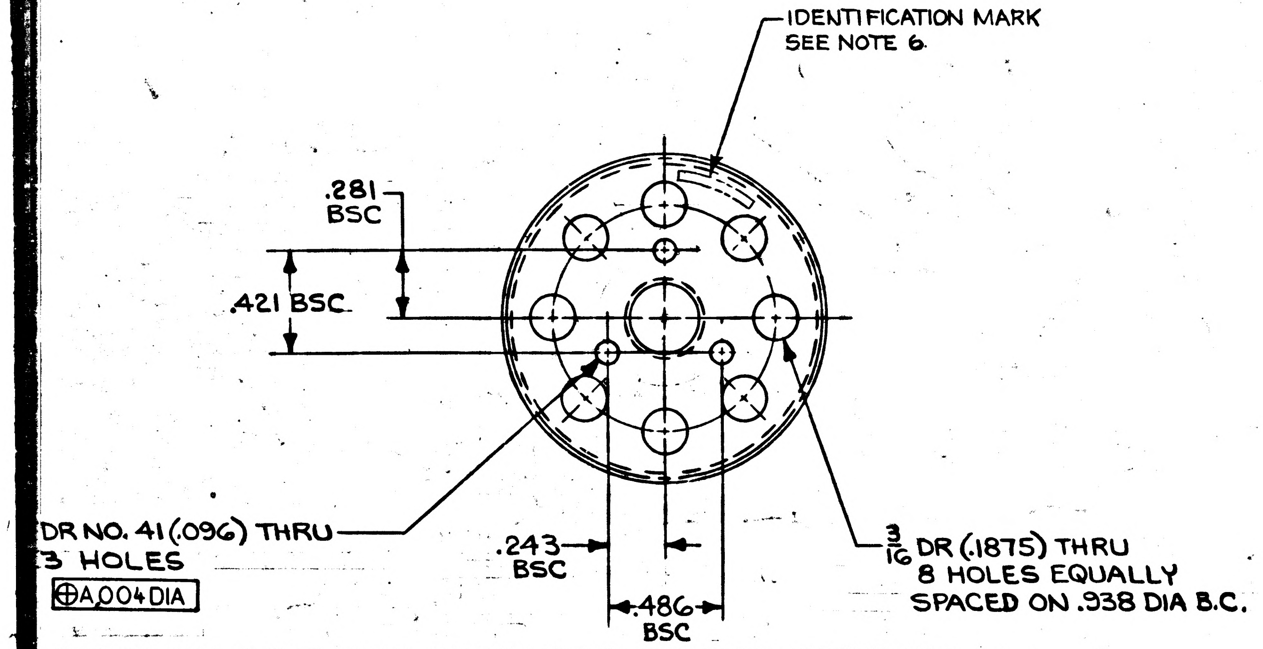
CODE IDENT NO.
SIZE E
NASA NUMBER 2011228
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011233 A

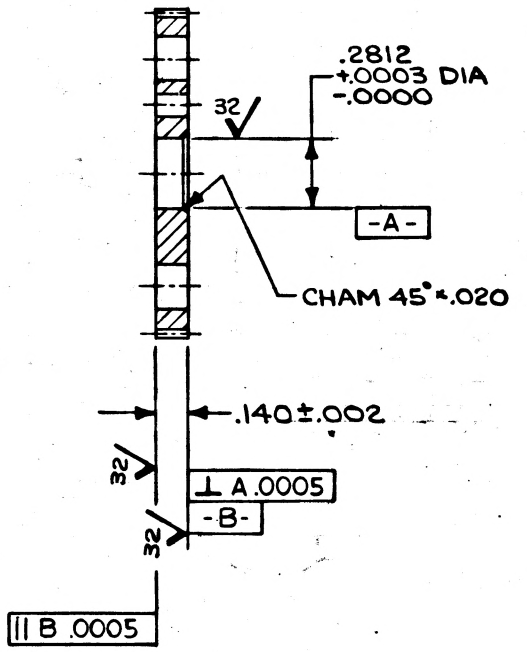
SPUR GEAR DATA	
NO. OF TEETH	128
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	1.33333
OUTSIDE DIAMETER	1.3542 +.0000 -.0020
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32√

REVISIONS 10420

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16175	2/1/65	WH



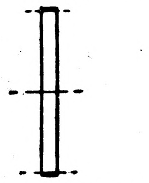
IDENTIFICATION MARK SEE NOTE 6
.281 BSC
.421 BSC
DR NO. 41 (.096) THRU 3 HOLES
⊕A .004 DIA
.243 BSC
.486 BSC
3/16 DR (.1875) THRU 8 HOLES EQUALLY SPACED ON .938 DIA B.C.



.2812 +.0003 -.0000 DIA
32√
-A-
CHAM 45° × .020
.140 ± .002
32√
⊥ A .0005
-B-
32√
∥ B .0005

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT,

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 33386910010

DRAWN J. Schiller DATE 12-17-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL E. Resnikom 6/1/64
APPROVAL E. Thomas 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR
(128T - 96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011233

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

51

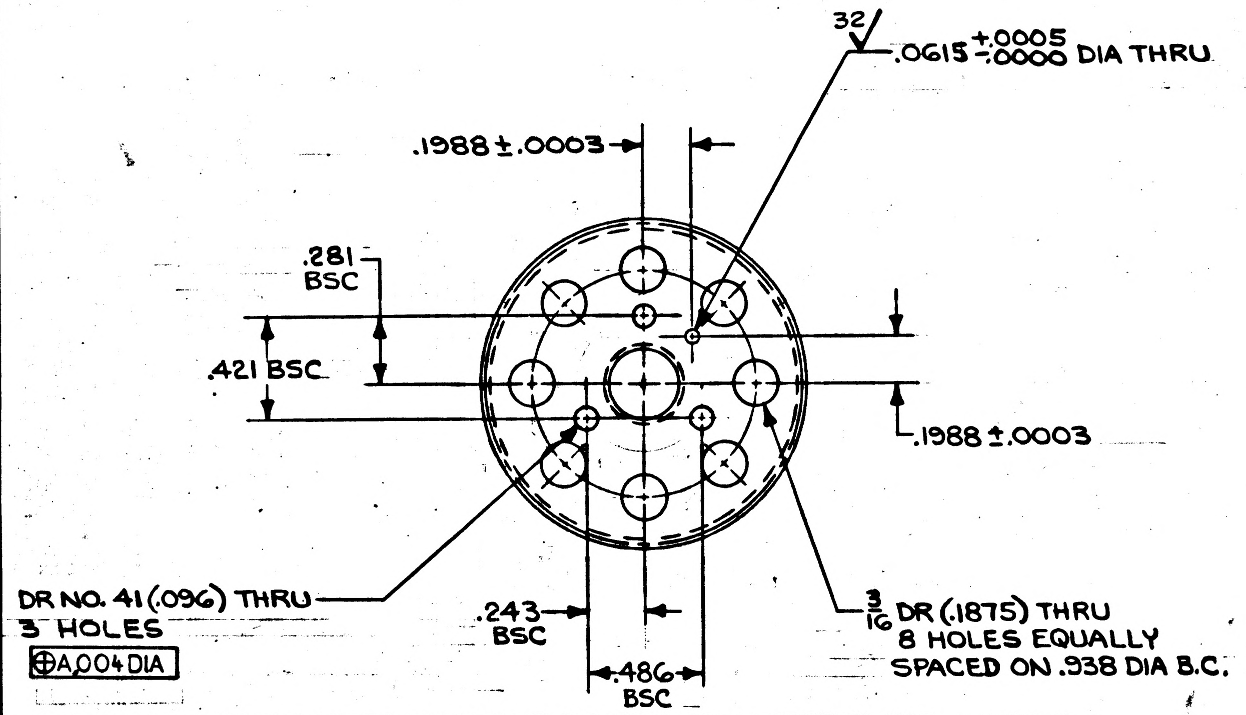
2011233 A

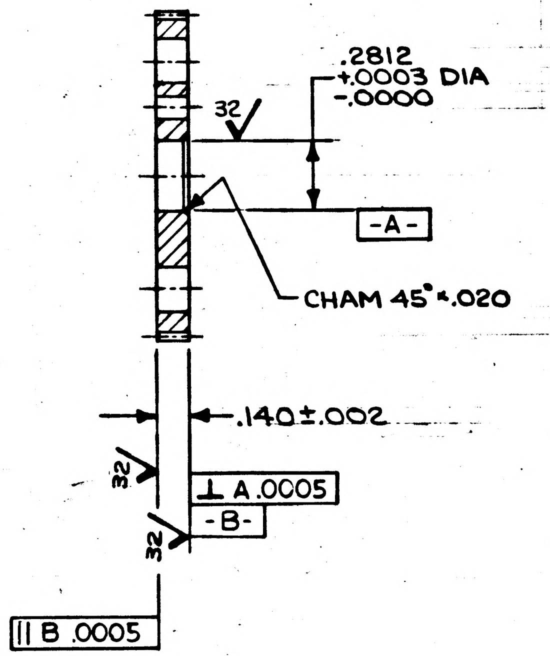
2011233

REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

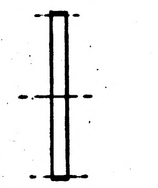
NO. OF TEETH	128
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	1.33333
OUTSIDE DIAMETER	$1.3542^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32√


32√ .0615 $^{+.0005}_{-.0000}$ DIA THRU
.1988 ± .0003
.281 BSC
.421 BSC
.1988 ± .0003
DR NO. 41 (.096) THRU
3 HOLES
⊕A .004 DIA
.243 BSC
.486 BSC
3/16 DR (.1875) THRU
8 HOLES EQUALLY
SPACED ON .938 DIA B.C.


.2812 $^{+.0003}_{-.0000}$ DIA
32√
-A-
CHAM 45° ± .020
.140 ± .002
32√
⊥ A .0005
-B-
32√
∥ B .0005

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011910	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (R_c 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910010

DRAWN J. Schiller DATE 12-17-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR
(128T - 96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011233

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

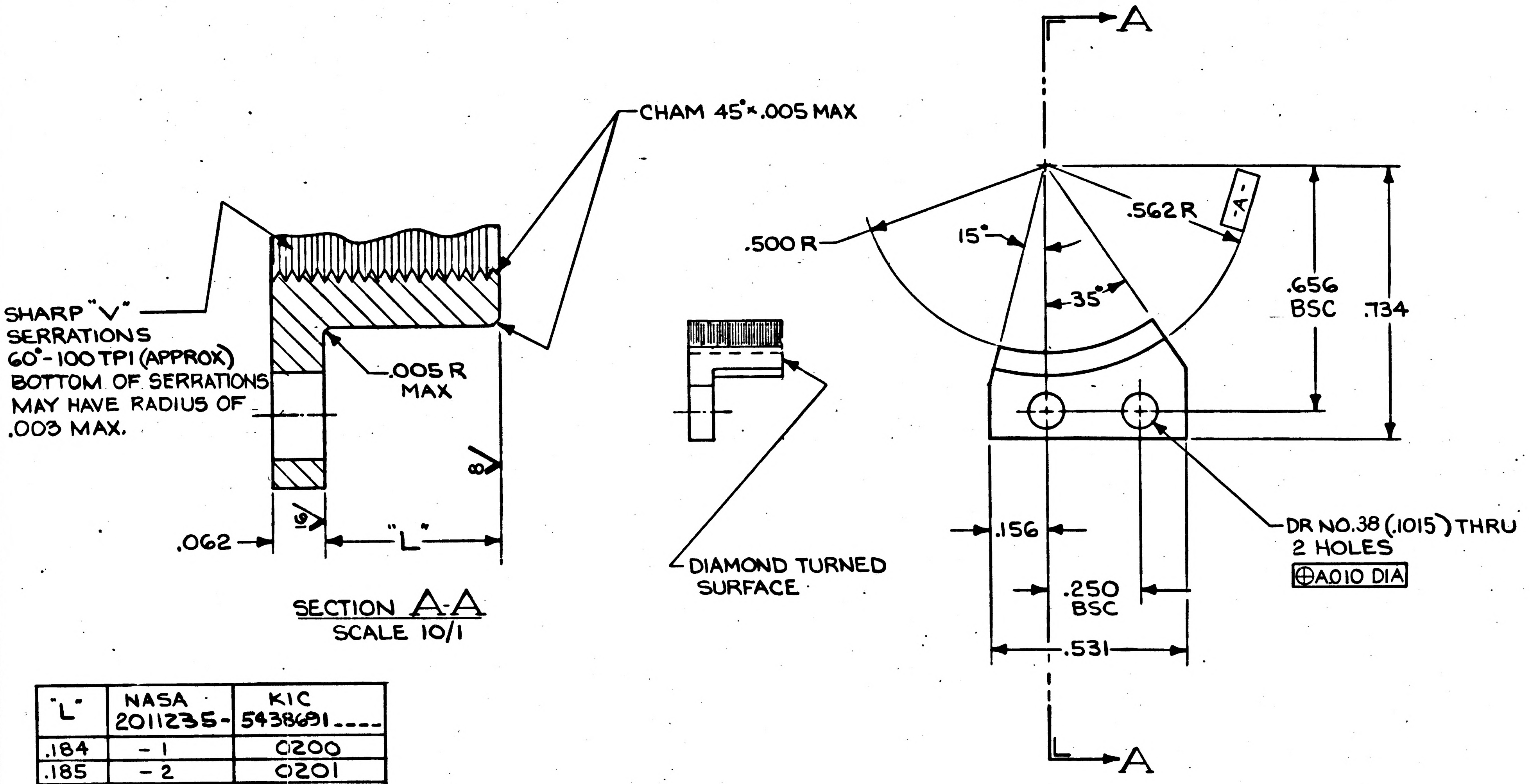
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011235 A

REVISIONS			10049	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 2	REVISED PER TDRR NO 13144	30[illegible]64	WK

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002078.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171. TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



CHAM 45° × .005 MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATIONS MAY HAVE RADIUS OF .003 MAX.
.005 R MAX
8/
16/
.062
"L"
DIAMOND TURNED SURFACE
A
A
.500 R
.562 R
-A-
15°
35°
.656 BSC
.734
.156
.250 BSC
.531
DR NO.38 (.1015) THRU 2 HOLES
⊕A.010 DIA

SECTION A-A
SCALE 10/1

"L"	NASA 2011235-	KIC 5438691----
.184	-1	0200
.185	-2	0201
.186	-3	0202
.187	-4	0203
.188	-5	0204
.189	-6	0205
.190	-7	0206
.191	-8	0207
.192	-9	0208
.193	-10	0209
.194	-11	0210

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL: CORROSION RESISTANT STEEL
FED. SPEC QQ-S-763
CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0200 THRU 0210

DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL [illegible] 5/27/64
APPROVAL [illegible] 6-5-64
NASA APPROVAL
MIT APPROVAL [illegible] 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
RIGHT HAND

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011235

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011235 A

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

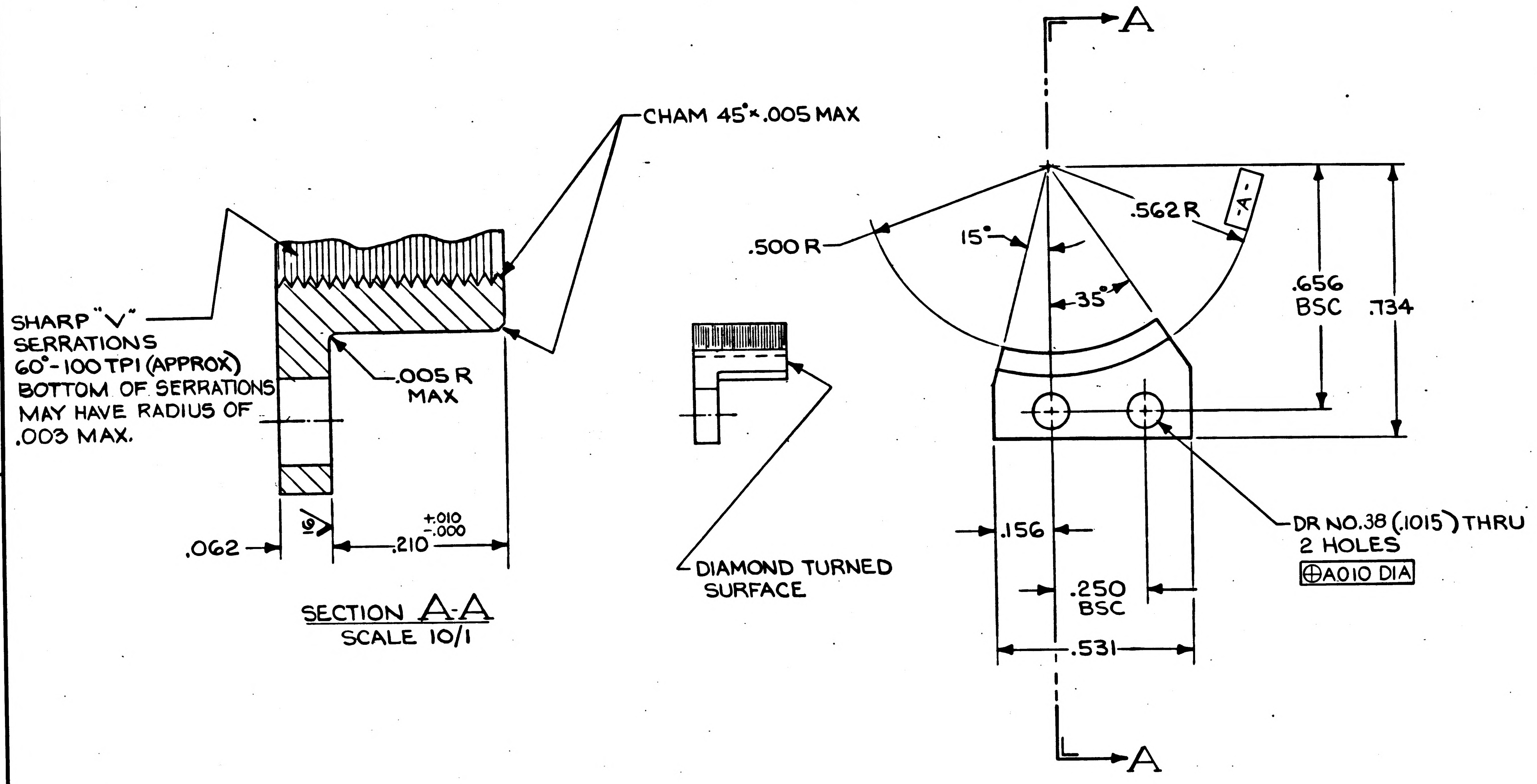
2011235 B

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 2	REVISED PER TDRR NO 13144	30 Apr 64	WK
B		REVISED PER TDRR NO. 15599	1/27/65	WK

REVISIONS 10048

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002078.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171. TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



CHAM 45° × .005 MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATIONS MAY HAVE RADIUS OF .003 MAX.
.005 R MAX
16
.062
+.010 -.000
.210
SECTION A-A
SCALE 10/1
DIAMOND TURNED SURFACE
A
A
.500 R
15°
.562 R
-A-
35°
.656 BSC
.734
.156
.250 BSC
.531
DR NO.38 (.1015) THRU 2 HOLES
⊕A010 DIA

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0200 THRU 0210

DRAWN J. Schilleci DATE 4-6-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL [illegible] 5/29/64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL [illegible]
MIT APPROVAL W Ruyfer 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
RIGHT HAND

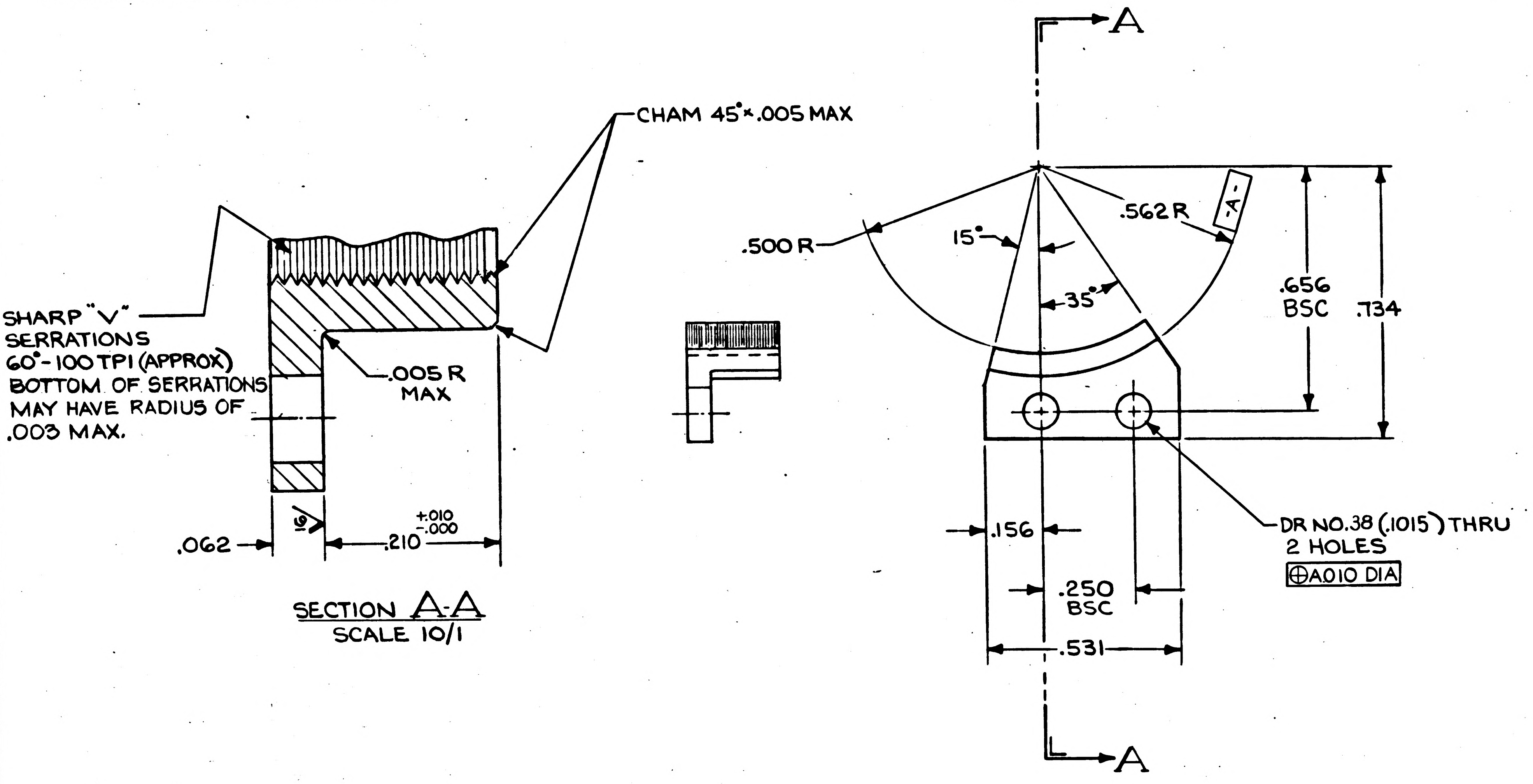
CODE IDENT NO.
SIZE C
NASA NUMBER 2011235
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011235 B

2011235 C

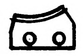
NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002078.
5. FINISH: a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171. TABLE V FINISH NO. 5.4.1 (KPS-10051.200)
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924, CLASS 2.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

REVISIONS				10049
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 2	REVISED PER TDRR NO 13144	30 Apr 64	WK
B		REVISED PER TDRR NO. 15599	1/27/65	WK
C		REVISED PER TDRR NO. 18873	5/11/65	WK



CHAM 45° × .005 MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATIONS MAY HAVE RADIUS OF .003 MAX.
.005 R MAX
.062
16√
.210 +.010 −.000
A
A
.500 R
.562 R
-A-
15°
35°
.656 BSC
.734
.156
.250 BSC
.531
DR NO.38 (.1015) THRU 2 HOLES
⊕ A .010 DIA

SECTION A-A
SCALE 10/1



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0200 THRU 0210

DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL E. Ruelman 5/29/64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL
MIT APPROVAL W Kupfer 6 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
RIGHT HAND

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011235

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011235 C

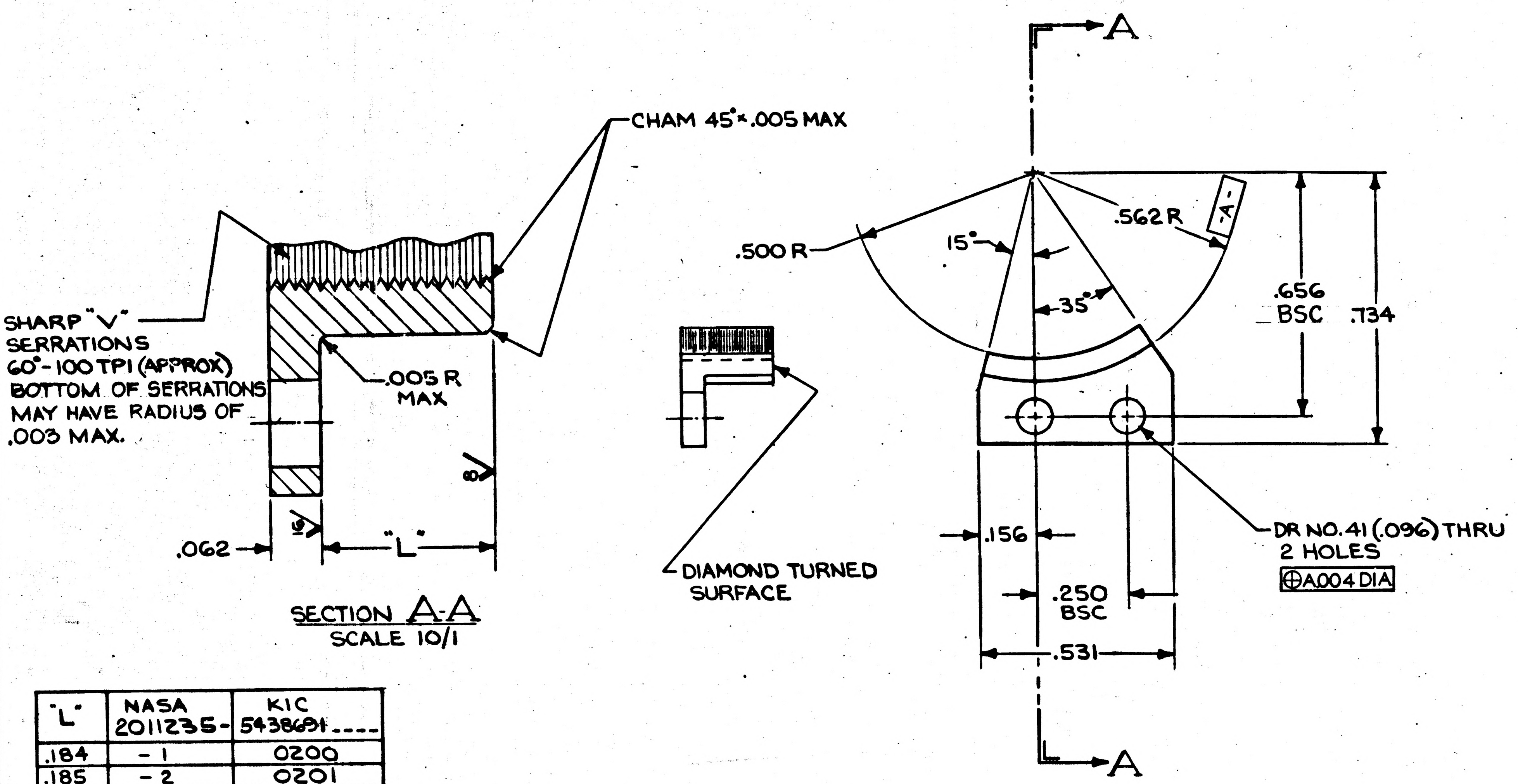
K+E
E-154

2011235

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS 1004

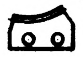
NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078
4. REMOVE BURRS IN ACCORD WITH ND 1002078.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



CHAM 45°×.005 MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATIONS MAY HAVE RADIUS OF .003 MAX.
.005 R MAX
8/
16/
.062
"L"
SECTION A-A
SCALE 10/1
DIAMOND TURNED SURFACE
A
A
.500 R
.562 R
-A-
15°
35°
.656 BSC
.734
.156
.250 BSC
.531
DR NO. 41 (.096) THRU 2 HOLES
⊕A .004 DIA

"L"	NASA 2011235-	KIC 5438691 ----
.184	-1	0200
.185	-2	0201
.186	-3	0202
.187	-4	0203
.188	-5	0204
.189	-6	0205
.190	-7	0206
.191	-8	0207
.192	-9	0208
.193	-10	0209
.194	-11	0210

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011157	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0200 THRU 0210

DRAWN J. Schaller DATE 4-6-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL 5/23/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM, RIGHT HAND

CODE IDENT NO.
SIZE C
NASA NUMBER 2011235

SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011235

K+E
E-194

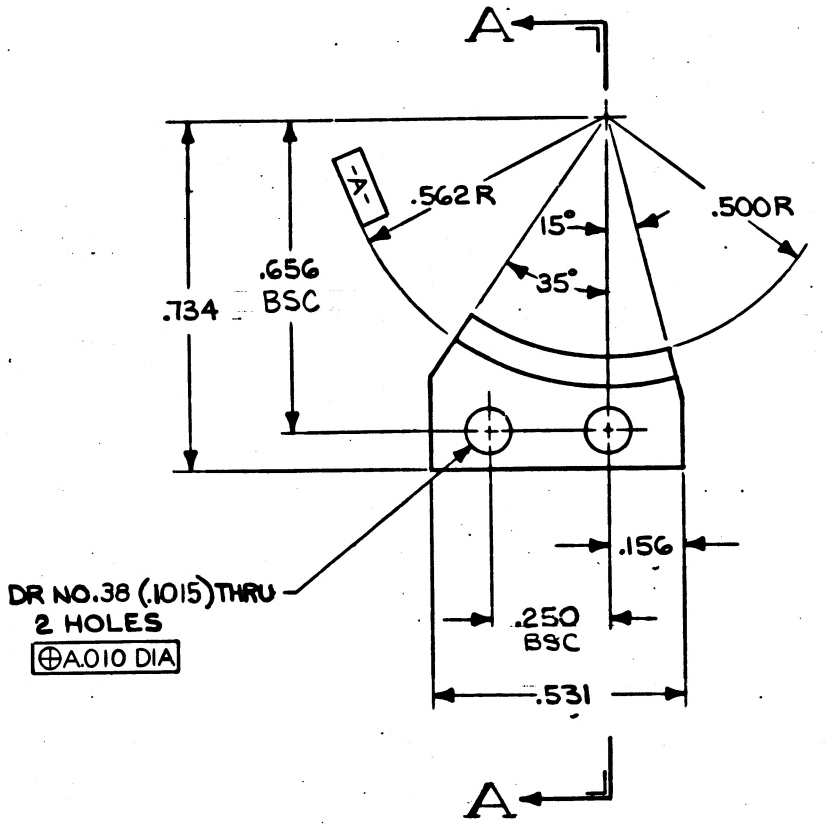
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

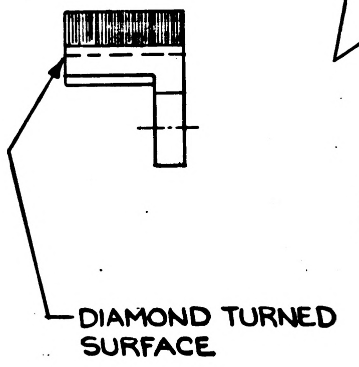
2011236 A

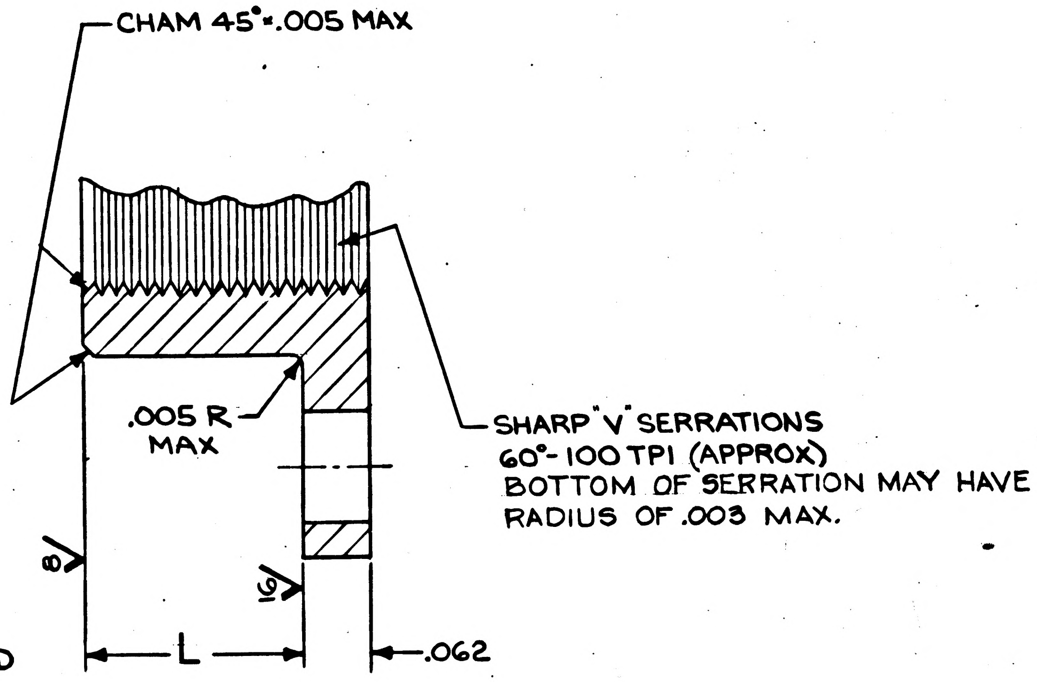
10048

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS		
A	B 6	REVISED PER TDRR NO. 13145	3Jul64	WK

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. .63/ FINISH ALL OVER.
   b. ✓ BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).


A
-A-
.562 R
15°
.500R
35°
.656 BSC
.734
DR NO.38 (.1015) THRU 2 HOLES
⊕A.010 DIA
.156
.250 BSC
.531
A


DIAMOND TURNED SURFACE


CHAM 45° × .005 MAX
.005 R MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATION MAY HAVE RADIUS OF .003 MAX.
8/
16/
L
.062

SECTION A-A
SCALE 10/1

L	NASA 2011236-	KIC 5438691____
.184	-1	0300
.185	-2	0301
.186	-3	0302
.187	-4	0303
.188	-5	0304
.189	-6	0305
.190	-7	0306
.191	-8	0307
.192	-9	0308
.193	-10	0309
.194	-11	0310

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0300 THRU 0310

DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL 5-28-64
APPROVAL E. Moring 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
LEFT HAND

CODE IDENT NO.
SIZE C
NASA NUMBER 2011236
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011236 A

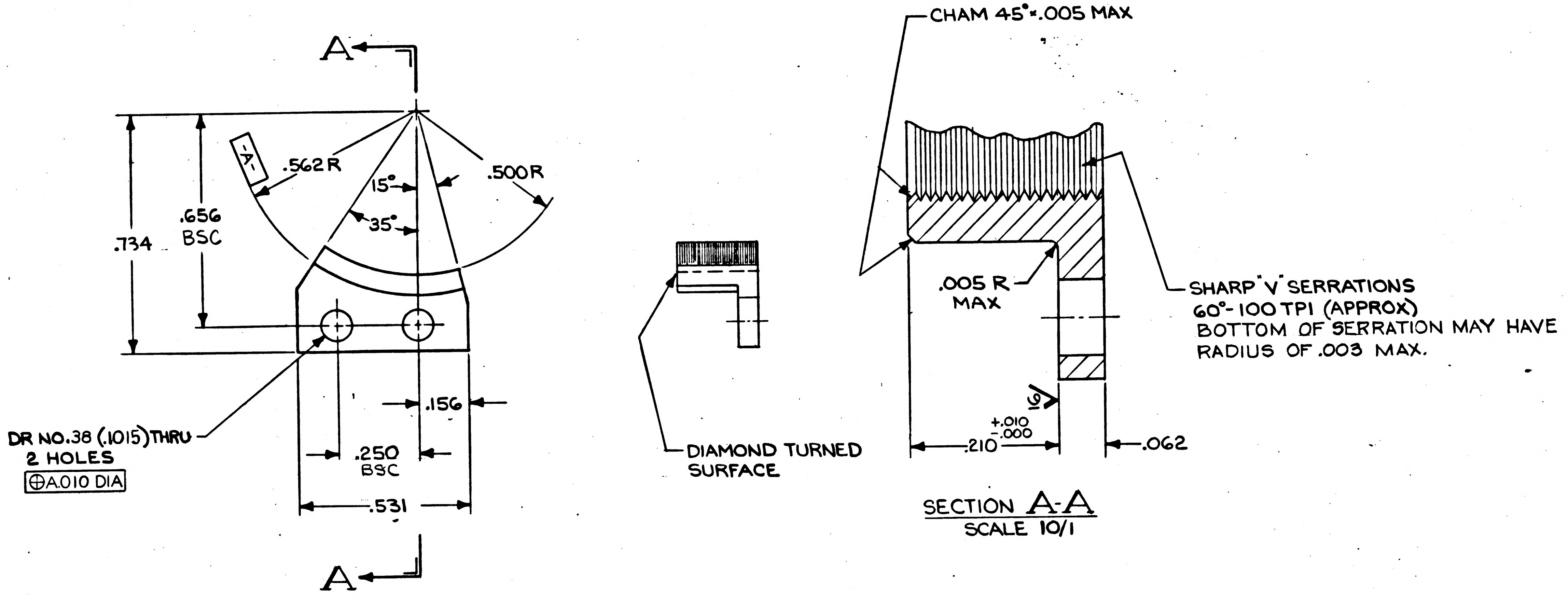
E-194

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011236 B

REVISIONS			10048	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 6	REVISED PER TDRR NO. 13145	30Jul64	WK
B		REVISED PER TDRR NO. 15600	1/27/65	WK

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).


A
A
-A-
.562 R
15°
35°
.500 R
.656 BSC
.734
DR NO. 38 (.1015) THRU 2 HOLES
⊕ A .010 DIA
.156
.250 BSC
.531
DIAMOND TURNED SURFACE
CHAM 45° × .005 MAX
.005 R MAX
SHARP "V" SERRATIONS 60°-100 TPI (APPROX) BOTTOM OF SERRATION MAY HAVE RADIUS OF .003 MAX.
16
+.010 -.000
.210
.062
SECTION A-A
SCALE 10/1

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0300 THRU 0310

DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL J. Rosenbaum 5/28/64
APPROVAL E. Moruzzi 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM, LEFT HAND

CODE IDENT NO.
SIZE C
NASA NUMBER 2011236
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011236 B

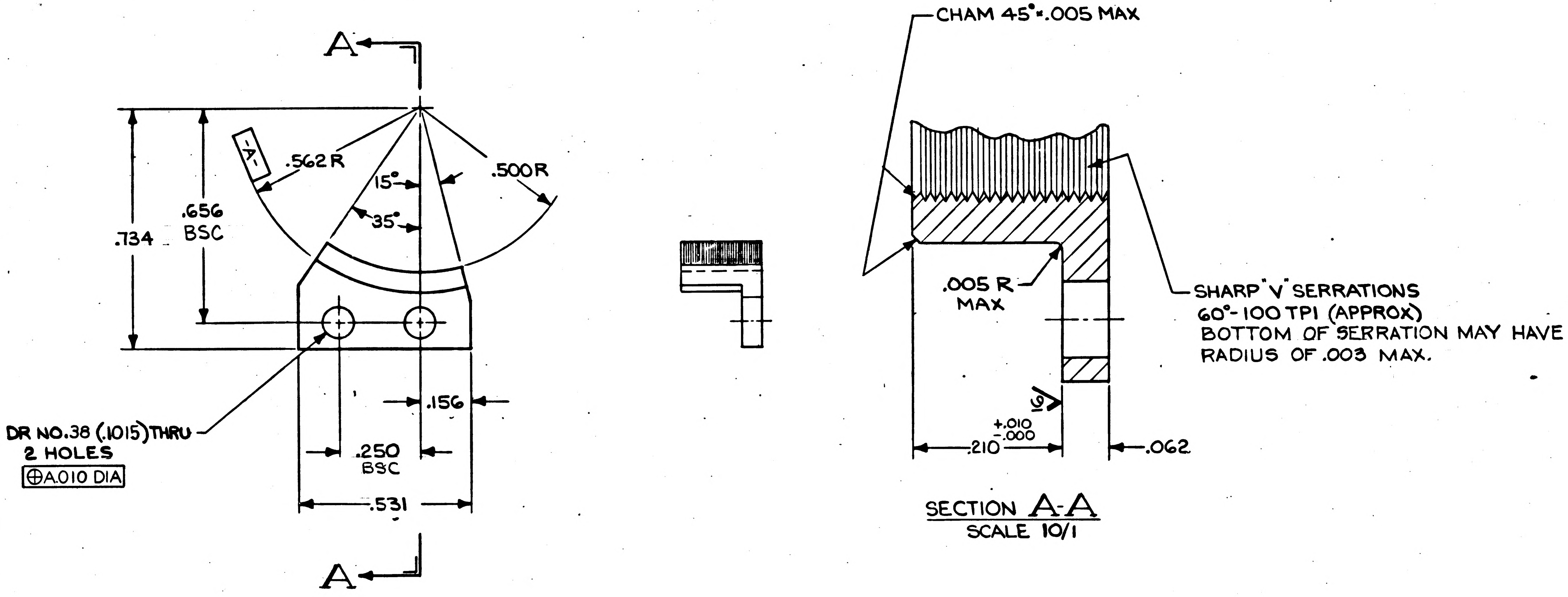
2011236 | C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 6	REVISED PER TDRR NO. 13145	30/6/64	WK.
B		REVISED PER TDRR NO. 15600	1/27/65	WK.
C		REVISED PER TDRR NO. 18872	5/11/65	WK

REVISIONS 10048

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. .63/ FINISH ALL OVER.
   b. ✓ BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V FINISH NO. 5.4.1 (KPS-1005I.200)
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924, CLASS 2.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).


A
A
-A-
.562 R
.500 R
15°
35°
.656 BSC
.734
DR NO. 38 (.1015) THRU 2 HOLES
⊕ A .010 DIA
.156
.250 BSC
.531
CHAM 45° × .005 MAX
.005 R MAX
SHARP "V" SERRATIONS 60° - 100 TPI (APPROX) BOTTOM OF SERRATION MAY HAVE RADIUS OF .003 MAX.
16
+.010
-.000
.210
.062

SECTION A-A
SCALE 10/1

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011197	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0300 THRU 0310

DRAWN F. Scholler DATE 4-6-64
CHECKED T. SULLIVAN 5-27-64
APPROVAL 5/28/64
APPROVAL E. Morup 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
LEFT HAND

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011236
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

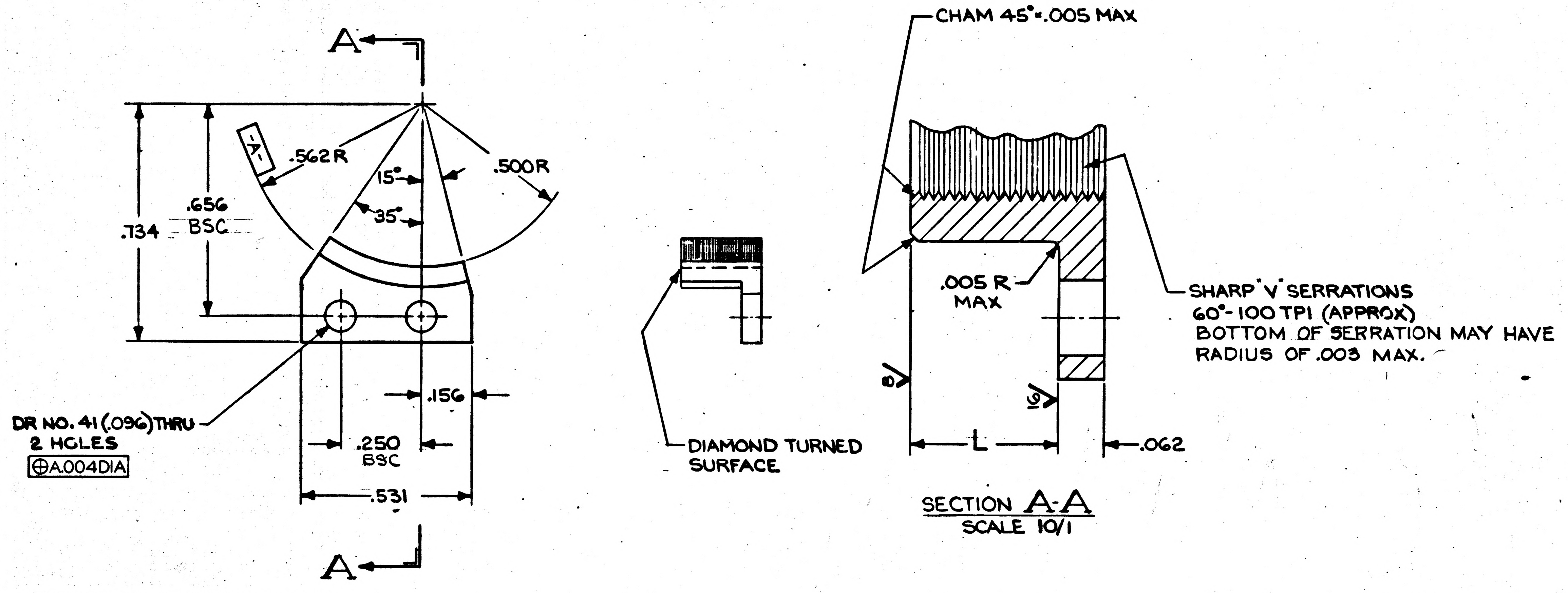
E-154

2011236

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

10048

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 54.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



A
A
-A-
.562 R
15°
35°
.500R
.656 BSC
.734
.156
.250 BSC
.531
DR NO. 41 (.096) THRU
2 HOLES
⊕A.004DIA
DIAMOND TURNED SURFACE
CHAM 45° × .005 MAX
.005 R MAX
SHARP "V" SERRATIONS
60°-100 TPI (APPROX)
BOTTOM OF SERRATION MAY HAVE
RADIUS OF .003 MAX.
8
16
L
.062

SECTION A-A
SCALE 10/1

L	NASA 2011236-	KIC 5438691____
.184	-1	0300
.185	-2	0301
.186	-3	0302
.187	-4	0303
.188	-5	0304
.189	-6	0305
.190	-7	0306
.191	-8	0307
.192	-9	0308
.193	-10	0309
.194	-11	0310

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011197	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ½; DECIMALS ± .005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 303, COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5438691 0300 THRU 0310
DRAWN J. Schiller DATE 4-6-64
CHECKED J. SULLIVAN 5-27-64
APPROVAL J. Rasmussen 5-28-64
APPROVAL E. Moup 6-5-64
NASA APPROVAL
MIT APPROVAL Wingfield

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CLAMP, PRISM,
LEFT HAND

CODE IDENT NO.
SIZE C
NASA NUMBER 2011236
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011236

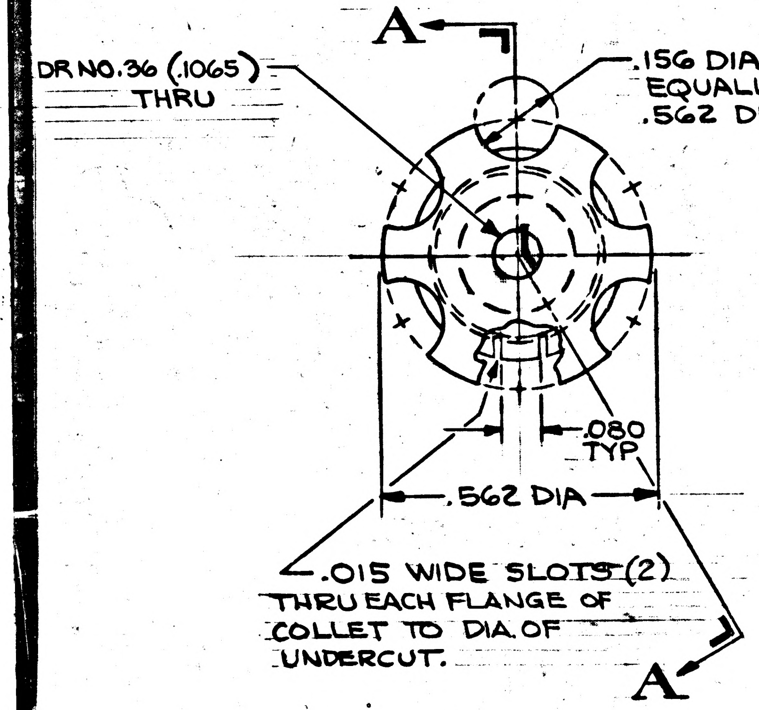
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

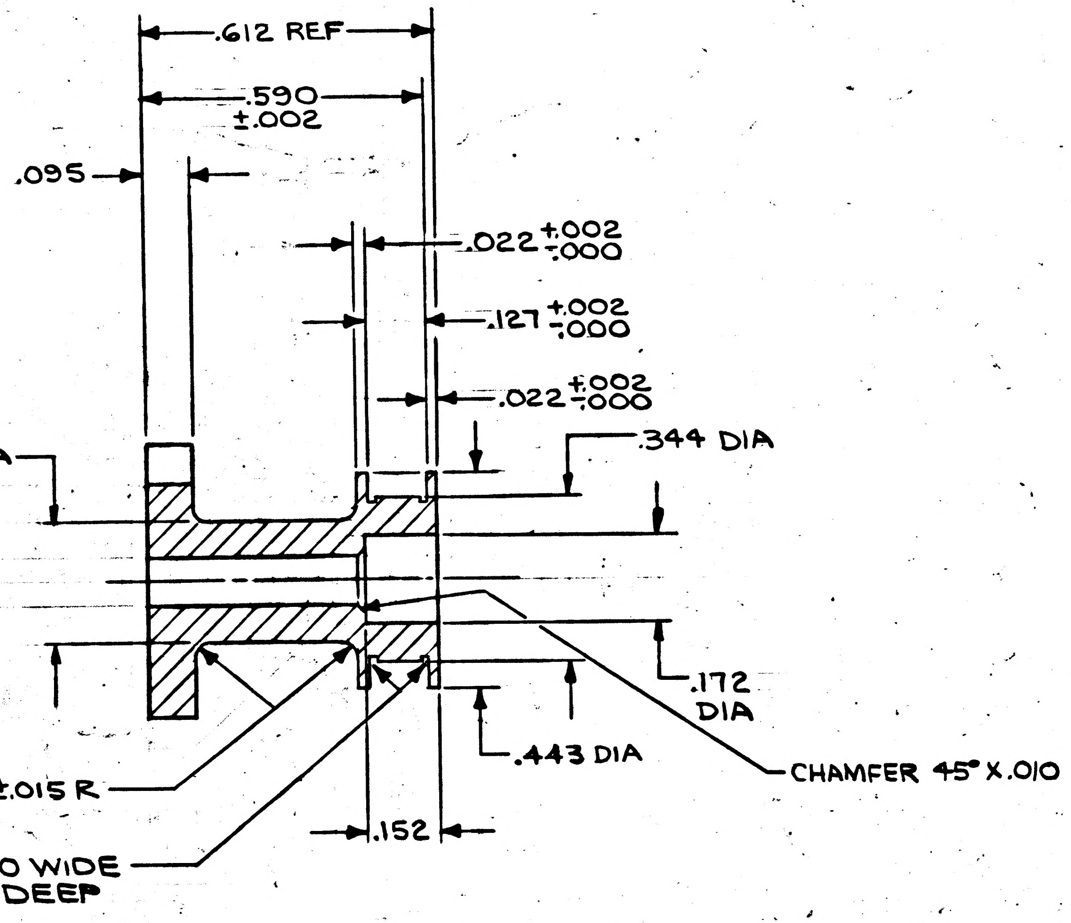
2011238 A

REVISIONS 10420

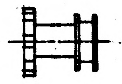
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 17491	4/2/65	WR.

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. MATERIAL: BRASS FED. SPEC QQ-B-626, COMPOSITION 2, TEMPER HALF HARD
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)


A
DR NO.36 (.1065) THRU
.156 DIA 6 PLACES EQUALLY SPACED ON .562 DIA B.C.
.080 TYP
.562 DIA
.015 WIDE SLOTS (2) THRU EACH FLANGE OF COLLET TO DIA OF UNDERCUT.
A


.612 REF
.590 ±.002
.095
.022 +.002 -.000
.127 +.002 -.000
.022 +.002 -.000
.344 DIA
.250 DIA
.172 DIA
.443 DIA
CHAMFER 45° X .010
.031±.015 R
UNDERCUT .010 WIDE X .010 +.005 -.000 DEEP
.152

SECTION A-A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011940	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910150

DRAWN R.BRUNELLE DATE 1-8-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL 6/1/64
APPROVAL E. Thorup 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

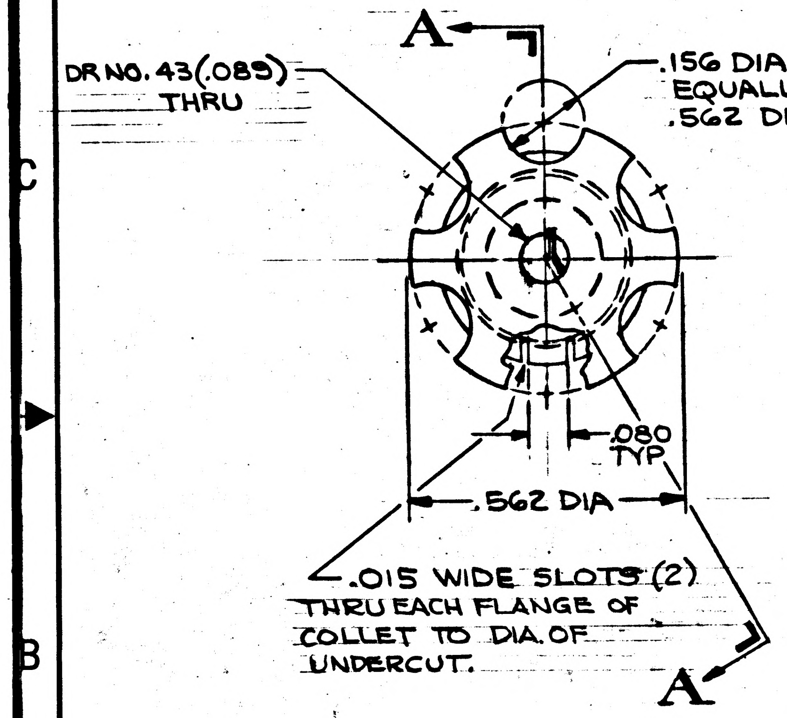
TITLE
COLLET, SPRING

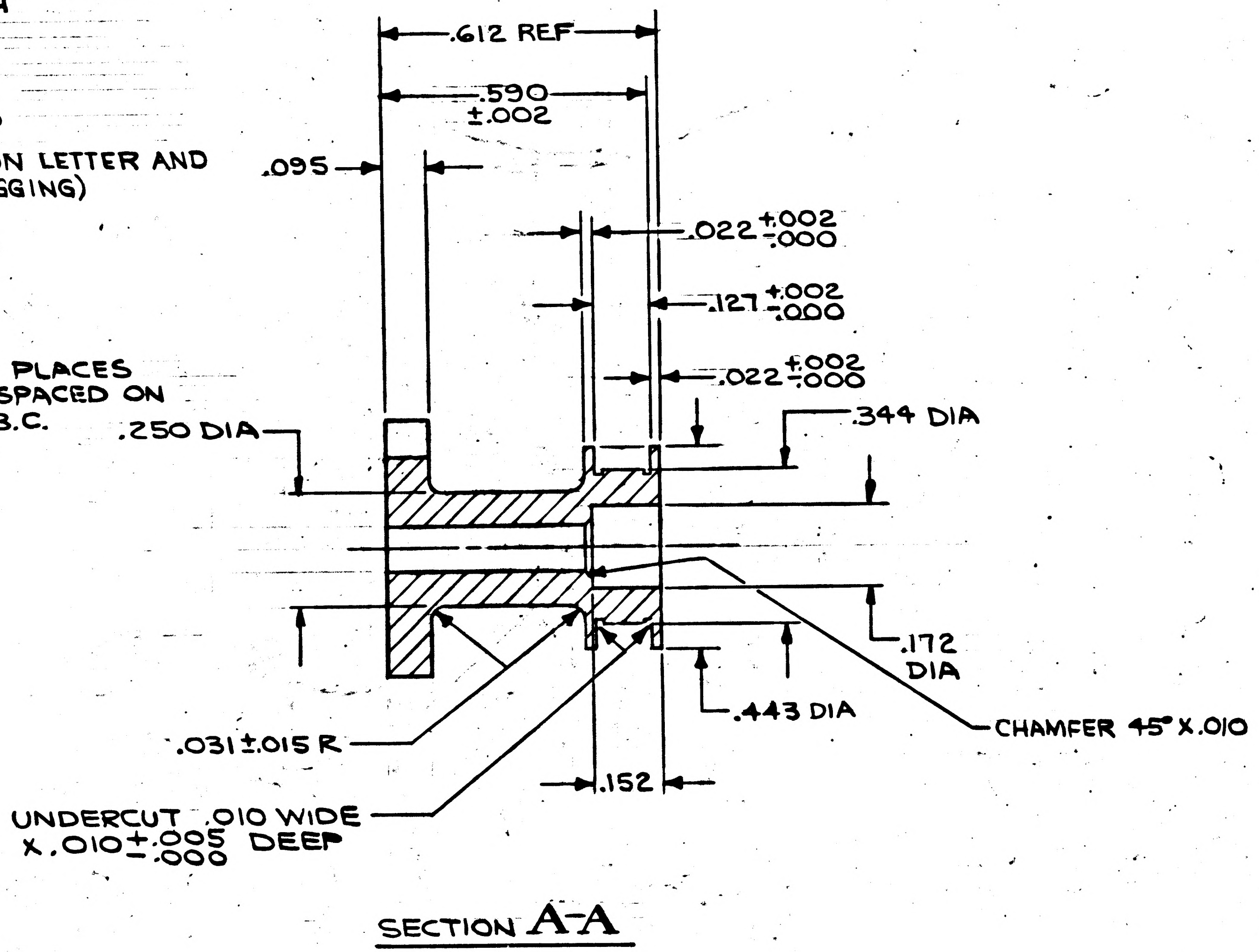
CODE IDENT NO.
SIZE C
NASA NUMBER 2011238
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011238

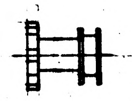
REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED $\sqrt{}^{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. MATERIAL:
   BRASS
   FED. SPEC QQ-B-626, COMPOSITION 22,
   TEMPER HALF HARD
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)


A
A
DR NO. 43 (.089) THRU
.156 DIA 6 PLACES EQUALLY SPACED ON .562 DIA B.C.
.080 TYP
.562 DIA
.015 WIDE SLOTS (2) THRU EACH FLANGE OF COLLET TO DIA. OF UNDERCUT.


.612 REF
.590 ±.002
.095
.022 +.002 -.000
.127 +.002 -.000
.022 +.002 -.000
.344 DIA
.250 DIA
.172 DIA
.443 DIA
CHAMFER 45° X .010
.031 ±.015 R
.152
UNDERCUT .010 WIDE X .010 +.005 -.000 DEEP

SECTION A-A



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011940	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910150

DRAWN R. BRUNELLE DATE 1-8-64
CHECKED J. SULLIVAN 4-27-64
APPROVAL 6/1/64
APPROVAL E. Thorup 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COLLET, SPRING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011238
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011238

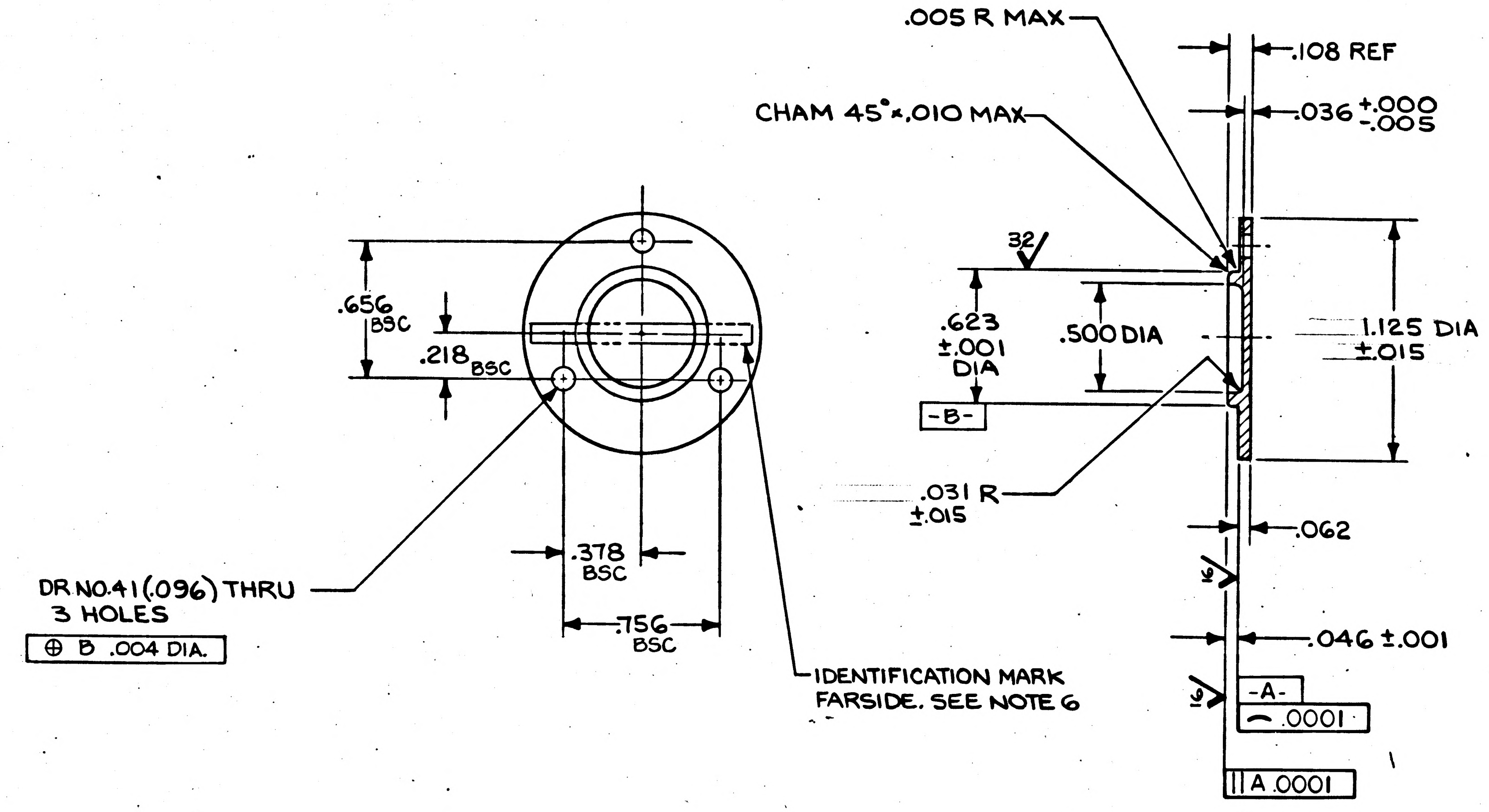
2011250

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

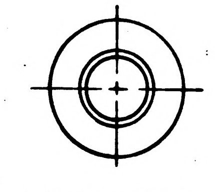
REVISIONS T00R10230

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, MANUFACTURERS SYMBOL PER ND1002019.



.005 R MAX
.108 REF
CHAM 45° × .010 MAX
.036 +.000 -.005
32/
.656 BSC
.218 BSC
.623 ±.001 DIA
.500 DIA
1.125 DIA ±.015
-B-
.031 R ±.015
.062
.378 BSC
.756 BSC
16/
.046 ±.001
-A-
⌒ .0001
// A .0001
DR NO.41 (.096) THRU
3 HOLES
⊕ B .004 DIA.
IDENTIFICATION MARK FARSIDE. SEE NOTE 6



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910430

DRAWN J. D. Oliver DATE 4-6-64
CHECKED T. SULLIVAN 5-29-64
APPROVAL E. Quinlan 5/29/64
APPROVAL E. Thorup 6-5-64
NASA APPROVAL
MIT APPROVAL W Tyler 9 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
CAP, RETAINING,
TRUNNION BEARING (L.H.)

CODE IDENT NO. | SIZE C | NASA NUMBER 2011250

SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011250

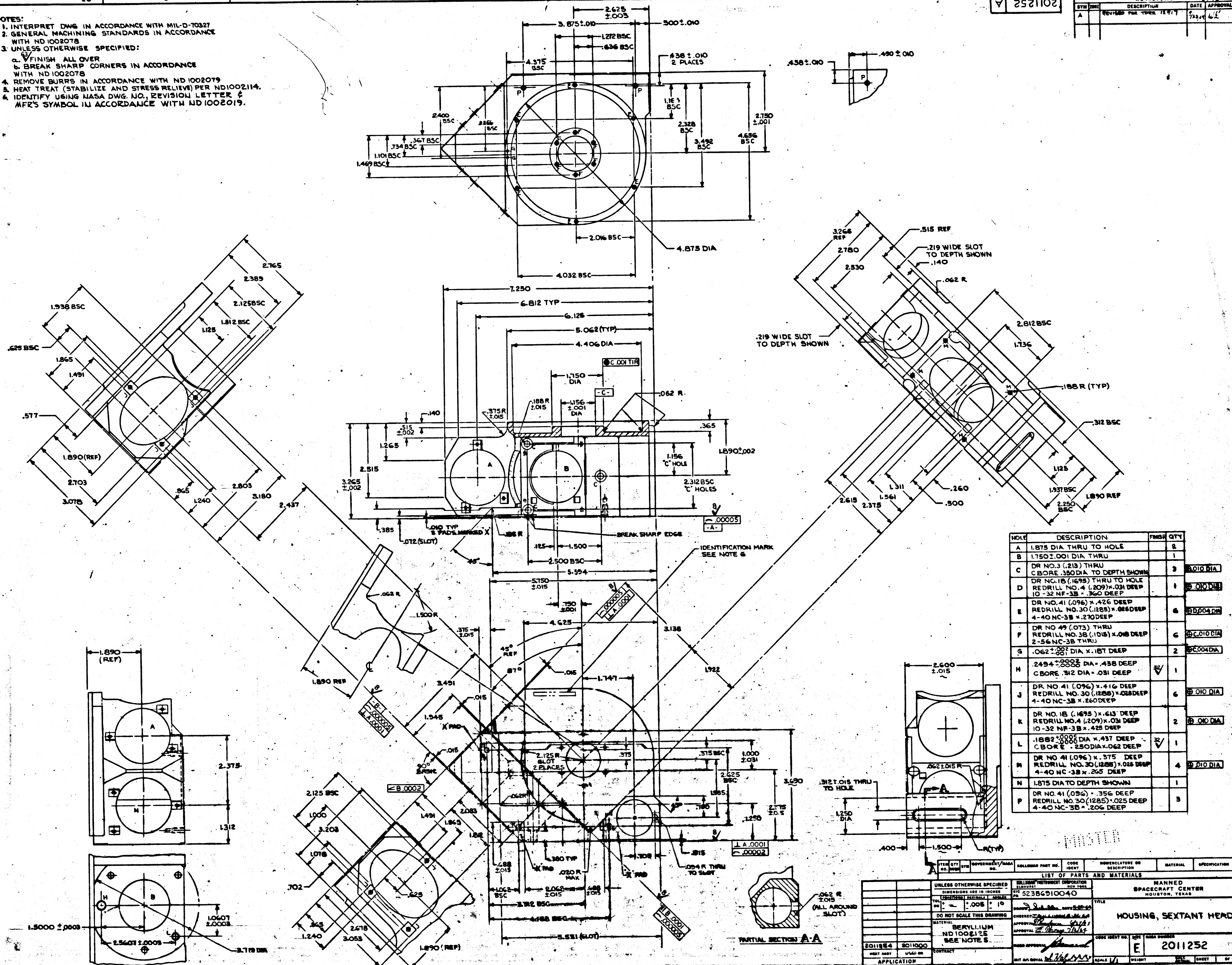
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MFR'S SYMBOL IN ACCORDANCE WITH ND 1002019.

2011252 | A

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12917	9/23/64	



PARTIAL SECTION A-A
IDENTIFICATION MARK SEE NOTE 6
BREAK SHARP EDGE
.219 WIDE SLOT TO DEPTH SHOWN
.312±.015 THRU TO HOLE
.062 R ±.015 (ALL AROUND SLOT)
.094 R THRU TO SLOT
2.125 R SLOT 2 PLACES
.010 TYP 3 PADS MARKED X
4.875 DIA
4.406 DIA
1.750 DIA
.188 R (TYP)
1.890 REF
5.531 (SLOT)
MASTER

HOLE	DESCRIPTION	FINISH	QTY	
A	1.875 DIA THRU TO HOLE		2	
B	1.750±.001 DIA THRU		1	
C	DR NO.3 (.213) THRU CBORE .350 DIA TO DEPTH SHOWN		3	⊕ .010 DIA
D	DR NO.18 (.1695) THRU TO HOLE REDRILL NO.4 (.209)×.031 DEEP 10-32 NF-3B × .360 DEEP		1	⊕ .010 DIA
E	DR NO.41 (.096) × .426 DEEP REDRILL NO.30 (.1285) × .025 DEEP 4-40 NC-3B × .270 DEEP		6	⊕ D .004 DIA
F	DR NO 49 (.073) THRU REDRILL NO.38 (.1015) × .018 DEEP 2-56 NC-3B THRU		6	⊕ C .010 DIA
G	.062 $^{+.002}_{-.001}$ DIA × .187 DEEP		2	⊕ C .004 DIA
H	.2494 $^{+.0002}_{-.0000}$ DIA × .438 DEEP CBORE .312 DIA × .031 DEEP	32√	1	
J	DR NO.41 (.096) × .416 DEEP REDRILL NO. 30 (.1285) × .028 DEEP 4-40 NC-3B × .260 DEEP		6	⊕ .010 DIA
K	DR NO. 18 (.1695) × .613 DEEP REDRILL NO.4 (.209) × .031 DEEP 10-32 NF-3B × .425 DEEP		2	⊕ .010 DIA
L	.1882 $^{+.0005}_{-.0000}$ DIA × .437 DEEP CBORE .250 DIA × .062 DEEP	32√	1	
M	DR NO 41 (.096) × .375 DEEP REDRILL NO. 30 (.1285) × .025 DEEP 4-40 NC-3B × .265 DEEP		4	⊕ .010 DIA
N	1.875 DIA TO DEPTH SHOWN		1	
P	DR NO. 41 (.096) × .356 DEEP REDRILL NO. 30 (.1285) × .025 DEEP 4-40 NC-3B × .206 DEEP		3	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM ND 1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 52386910040
DRAWN DATE 5-20-64
CHECKER
APPROVAL
APPROVAL E. Thomas 7/3/64
NASA APPROVAL
INIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

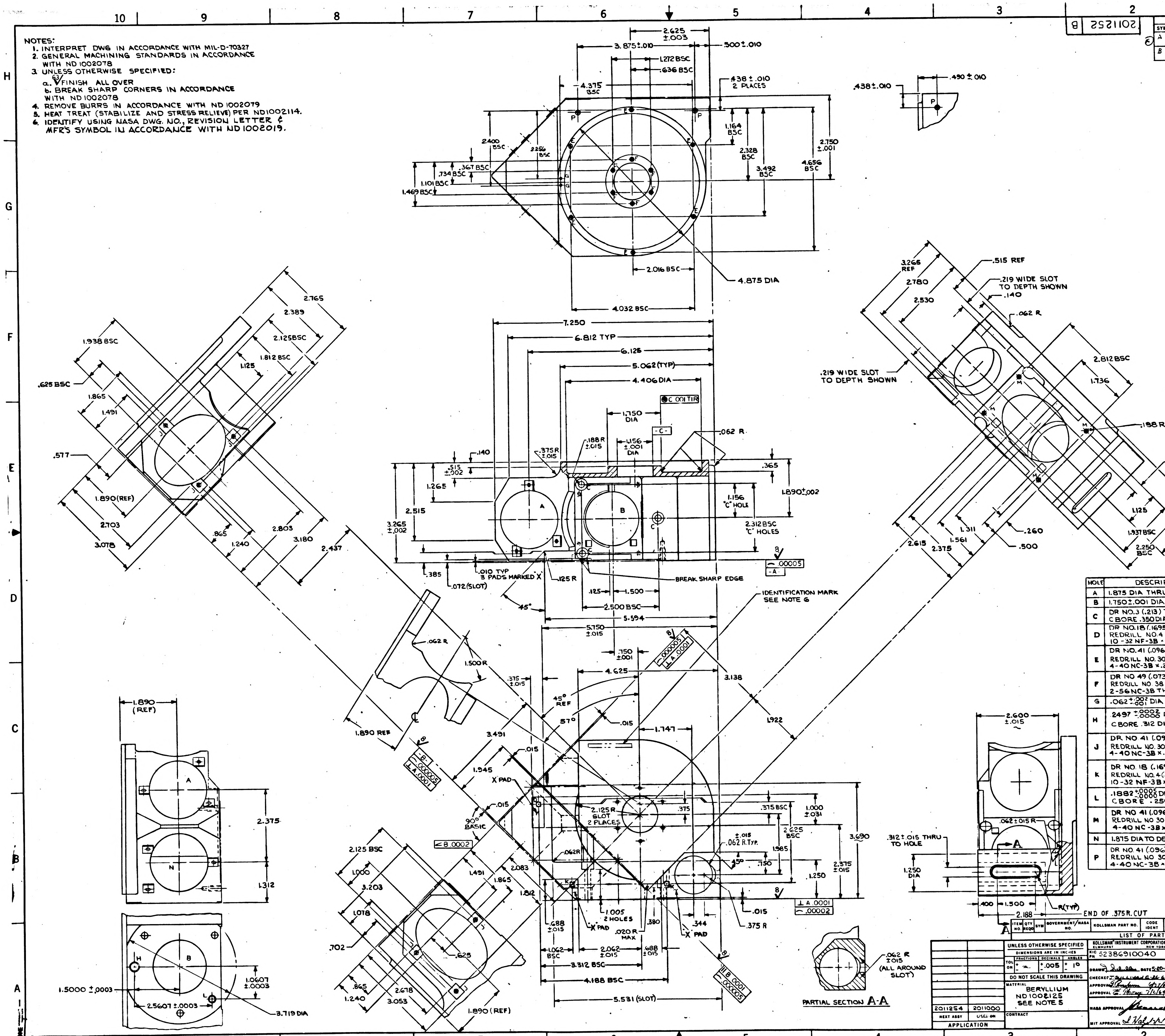
TITLE HOUSING, SEXTANT HEAD

CODE IDENT NO.
SIZE E
NASA NUMBER 2011252
SCALE 1/1
WEIGHT
SHEET OF

B	2011252

REVISIONS RL 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12917	9/23/64	WK
B		REVISED PER TDRR No. 15592	1/19/65	WK.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\checkmark}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MFR'S SYMBOL IN ACCORDANCE WITH ND 1002019.


2.625 ±.003
3.875±.010
.500±.010
1.272 BSC
.636 BSC
4.375 BSC
.438±.010 2 PLACES
.438±.010
.490±.010
1.164 BSC
2.328 BSC
3.492 BSC
4.656 BSC
2.750 ±.001
2.400 BSC
2.256 BSC
.367 BSC
.734 BSC
1.101 BSC
1.469 BSC
2.016 BSC
4.875 DIA
4.032 BSC
7.250
6.812 TYP
6.125
5.062(TYP)
4.406 DIA
C .001 TIR
1.750 DIA
-C-
.062 R
.188 R ±.015
1.156 ±.001 DIA
.375R ±.015
.140
.515 ±.002
.365
1.265
2.515
3.265 ±.002
1.156 "C" HOLE
1.890±.002
2.312 BSC "C" HOLES
.00005
-A-
.385
.010 TYP 3 PADS MARKED X
.125 R
.072 (SLOT)
BREAK SHARP EDGE
.125
1.500
2.500 BSC
5.594
45°
IDENTIFICATION MARK SEE NOTE 6
5.750 ±.015
.750 ±.001
4.625
3.138
1.922
.375 ±.015
1.500 R
.062 R
1.890 REF
45° REF
57°
.015
1.747
3.491
1.945
X PAD
90° BASIC
B .0002
2.125 R SLOT 2 PLACES
.375
.375 BSC
1.000 ±.031
2.625 BSC
3.690
.015
.062 R.Typ.
1.985
.750
45°
2.375 ±.015
1.250
.015
⊥ A .0001
.00002
.375 R
.344
X PAD
1.005 2 HOLES
.020 R MAX
.380
X PAD
.688 ±.015
1.062 BSC
2.062 ±.015
.688 ±.015
3.312 BSC
4.188 BSC
5.531 (SLOT)
2.083
1.812
2.765
2.389
2.125 BSC
1.812 BSC
1.938 BSC
1.125
.625 BSC
1.865
1.491
.577
1.890 (REF)
2.703
3.078
.865
1.240
2.803
3.180
2.437
3.265 REF
2.780
2.530
.515 REF
.219 WIDE SLOT TO DEPTH SHOWN
.140
.062 R
.219 WIDE SLOT TO DEPTH SHOWN
2.812 BSC
1.736
.188 R (TYP)
.312 BSC
1.125
1.937 BSC
2.250 BSC
1.890 REF
.260
.500
1.311
1.561
2.375
2.615
1.890 (REF)
2.375
1.312
1.5000 ±.0003
2.5607 ±.0003
1.0607 ±.0003
3.719 DIA
2.125 BSC
1.000
3.203
1.078
.702
.865
1.240
2.678
3.053
1.491
1.865
.625
1.890 (REF)
2.600 ±.015
.062±.015 R
.312±.015 THRU TO HOLE
1.250 DIA
.400
1.500
2.188
R(TYP)
END OF .375R. CUT
.062 R ±.015 (ALL AROUND SLOT)
PARTIAL SECTION A-A
A
B
C
G
H
J
K
L
M
N
P
E
F

HOLE	DESCRIPTION	FINISH	QTY	
A	1.875 DIA THRU TO HOLE		2	
B	1.750±.001 DIA THRU		1	
C	DR NO.3 (.213) THRU CBORE .350 DIA TO DEPTH SHOWN		3	⊕ .010 DIA
D	DR NO.18 (.1695) THRU TO HOLE REDRILL NO.4 (.209) × .031 DEEP 10-32 NF-3B × .360 DEEP		1	⊕ .010 DIA
E	DR NO.41 (.096) × .426 DEEP REDRILL NO. 30 (.1285) × .025 DEEP 4-40 NC-3B × .270 DEEP		6	⊕ D .004 DIA
F	DR NO 49 (.073) THRU REDRILL NO. 38 (.1015) × .018 DEEP 2-56 NC-3B THRU		6	⊕ C .010 DIA
G	$.062^{+.002}_{-.001}$ DIA × .187 DEEP		2	⊕ C .004 DIA
H	$.2497^{+.0002}_{-.0000}$ DIA × .438 DEEP CBORE .312 DIA × .031 DEEP	$\overset{32}{\checkmark}$	1	
J	DR NO 41 (.096) × .416 DEEP REDRILL NO. 30 (.1285) × .025 DEEP 4-40 NC-3B × .260 DEEP		6	⊕ .010 DIA
K	DR NO. 18 (.1695) × .613 DEEP REDRILL NO. 4 (.209) × .031 DEEP 10-32 NF-3B × .425 DEEP		2	⊕ .010 DIA
L	$.1882^{+.0005}_{-.0000}$ DIA × .437 DEEP CBORE .250 DIA × .062 DEEP	$\overset{32}{\checkmark}$	1	
M	DR NO 41 (.096) × .375 DEEP REDRILL NO 30 (.1285) × .025 DEEP 4-40 NC-3B × .265 DEEP		4	⊕ .010 DIA
N	1.875 DIA TO DEPTH SHOWN		1	
P	DR NO. 41 (.096) × .356 DEEP REDRILL NO 30 (.1285) × .025 DEEP 4-40 NC-3B × .206 DEEP		3	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± —, DECIMALS ±.005, ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910040

DRAWN DATE 5-20-64
CHECKED J. SULLIVAN 6-26-64
APPROVAL 6/27/64
APPROVAL 7/2/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD

CODE IDENT NO.
SIZE E
NASA NUMBER 2011252
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

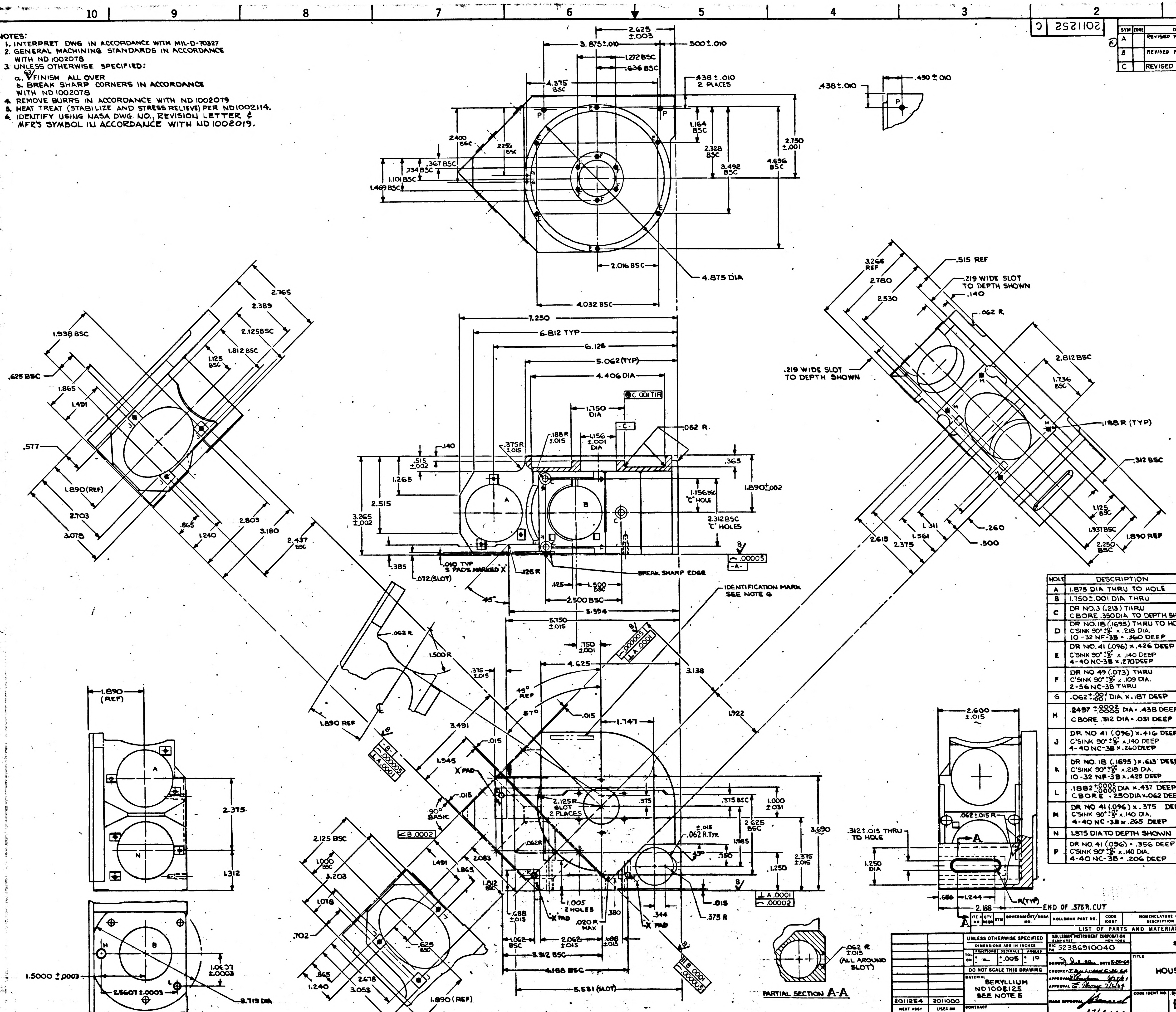
2011252 B

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\checkmark}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MFR'S SYMBOL IN ACCORDANCE WITH ND 1002019.

2011252 C

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12917	9/23/64	WK
B		REVISED PER TDRR No. 15592	1/19/65	WK
C		REVISED PER TDRR 16687	2/26/65	WK



2.625 ±.003
3.875±.010
.500±.010
1.272 BSC
.636 BSC
4.375 BSC
.438±.010 2 PLACES
2.400 BSC
2.256 BSC
.367 BSC
.734 BSC
1.101 BSC
1.469 BSC
1.164 BSC
2.328 BSC
3.492 BSC
2.750 ±.001
4.656 BSC
2.016 BSC
4.875 DIA
4.032 BSC
.438±.010
.450±.010
P
7.250
6.812 TYP
6.125
5.062 (TYP)
4.406 DIA
1.750 DIA
C .001 TIR
-C-
.062 R
.140
.375R ±.015
.188R ±.015
1.156 ±.001 DIA
.515 ±.002
1.265
2.515
3.265 ±.002
.365
1.890±.002
1.156 BSC "C" HOLE
2.312 BSC "C" HOLES
.385
.010 TYP 3 PADS MARKED X
.072 (SLOT)
.126 R
BREAK SHARP EDGE
.00005 -A-
.425
1.500 BSC
2.500 BSC
5.594
IDENTIFICATION MARK SEE NOTE 6
5.750 ±.015
.750 ±.001
4.625
3.138
1.922
45°
45° REF
87°
1.747
3.491
1.945
X PAD
90° BASIC
2.125R SLOT 2 PLACES
.375
.375 BSC
1.000 ±.031
2.625 BSC
3.690
.062 R TYP
.750
1.385
2.375 ±.015
1.250
.015
.375 R
.0002
.0001
1.005 2 HOLES
.020 R MAX
.380
.344
1.062 BSC
2.062 ±.015
.688 ±.015
3.312 BSC
4.188 BSC
5.531 (SLOT)
1.512 BSC
2.083
2.765
2.389
2.125 BSC
1.812 BSC
1.938 BSC
1.125 BSC
.625 BSC
1.865
1.491
.577
1.890 (REF)
2.703
3.078
.865
1.240
2.803
3.180
2.437 BSC
1.500 R
.375 ±.015
1.890 REF
3.265 REF
2.780
2.530
.515 REF
.219 WIDE SLOT TO DEPTH SHOWN
.140
.062 R
2.812 BSC
1.736 BSC
.188 R (TYP)
.312 BSC
1.125 BSC
1.937 BSC
2.250 BSC
1.890 REF
2.615
2.375
1.561
1.311
.260
.500
1.890 (REF)
2.375
1.312
1.5000 ±.0003
2.5607 ±.0003
1.0607 ±.0003
.719 DIA
A
B
C
H
L
N
2.125 BSC
1.000 BSC
3.203
1.018
.702
.865
1.240
2.618
3.053
.625 BSC
1.890 (REF)
2.600 ±.015
.062±.015 R
.312±.015 THRU TO HOLE
1.250 DIA
.656
1.244
2.188
R(TYP)
END OF .375R. CUT
.062 R ±.015 (ALL AROUND SLOT)
PARTIAL SECTION A-A

HOLE	DESCRIPTION	FINISH	QTY	
A	1.875 DIA THRU TO HOLE		2	
B	1.750±.001 DIA THRU		1	
C	DR NO.3 (.213) THRU C BORE .350 DIA TO DEPTH SHOWN		3	⊕.010 DIA
D	DR NO.18 (.1695) THRU TO HOLE C'SINK 90° $^{+0°}_{-5°}$ x .218 DIA. 10-32 NF-3B x .360 DEEP		1	⊕ .010 DIA
E	DR NO.41 (.096) x .426 DEEP C'SINK 90° $^{+0°}_{-5°}$ x .140 DEEP 4-40 NC-3B x .270 DEEP		6	⊕D.004 DIA
F	DR NO 49 (.073) THRU C'SINK 90° $^{+0°}_{-5°}$ x .109 DIA. 2-56 NC-3B THRU		6	⊕C.010 DIA
G	.062 $^{+.002}_{-.001}$ DIA x .187 DEEP		2	⊕C.004 DIA
H	.2497 $^{+.0002}_{-.0000}$ DIA x .438 DEEP C BORE .312 DIA x .031 DEEP	$\overset{32}{\checkmark}$	1	
J	DR NO 41 (.096) x .416 DEEP C'SINK 90° $^{+0°}_{-5°}$ x .140 DEEP 4-40 NC-3B x .260 DEEP		6	⊕ .010 DIA
K	DR NO. 18 (.1695) x .613 DEEP C'SINK 90° $^{+0°}_{-5°}$ x .218 DIA. 10-32 NF-3B x .425 DEEP		2	⊕ .010 DIA
L	.1882 $^{+.0005}_{-.0000}$ DIA x .437 DEEP C BORE .250 DIA x .062 DEEP	$\overset{32}{\checkmark}$	1	
M	DR NO 41 (.096) x .375 DEEP C'SINK 90° $^{+0°}_{-5°}$ x .140 DIA. 4-40 NC-3B x .265 DEEP		4	⊕ .010 DIA
N	1.875 DIA TO DEPTH SHOWN		1	
P	DR NO. 41 (.096) x .356 DEEP C'SINK 90° $^{+0°}_{-5°}$ x .140 DIA. 4-40 NC-3B x .206 DEEP		3	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910040
DRAWN DATE 5-20-64
CHECKED T. Sullivan 6-26-64
APPROVAL
APPROVAL 7/2/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD

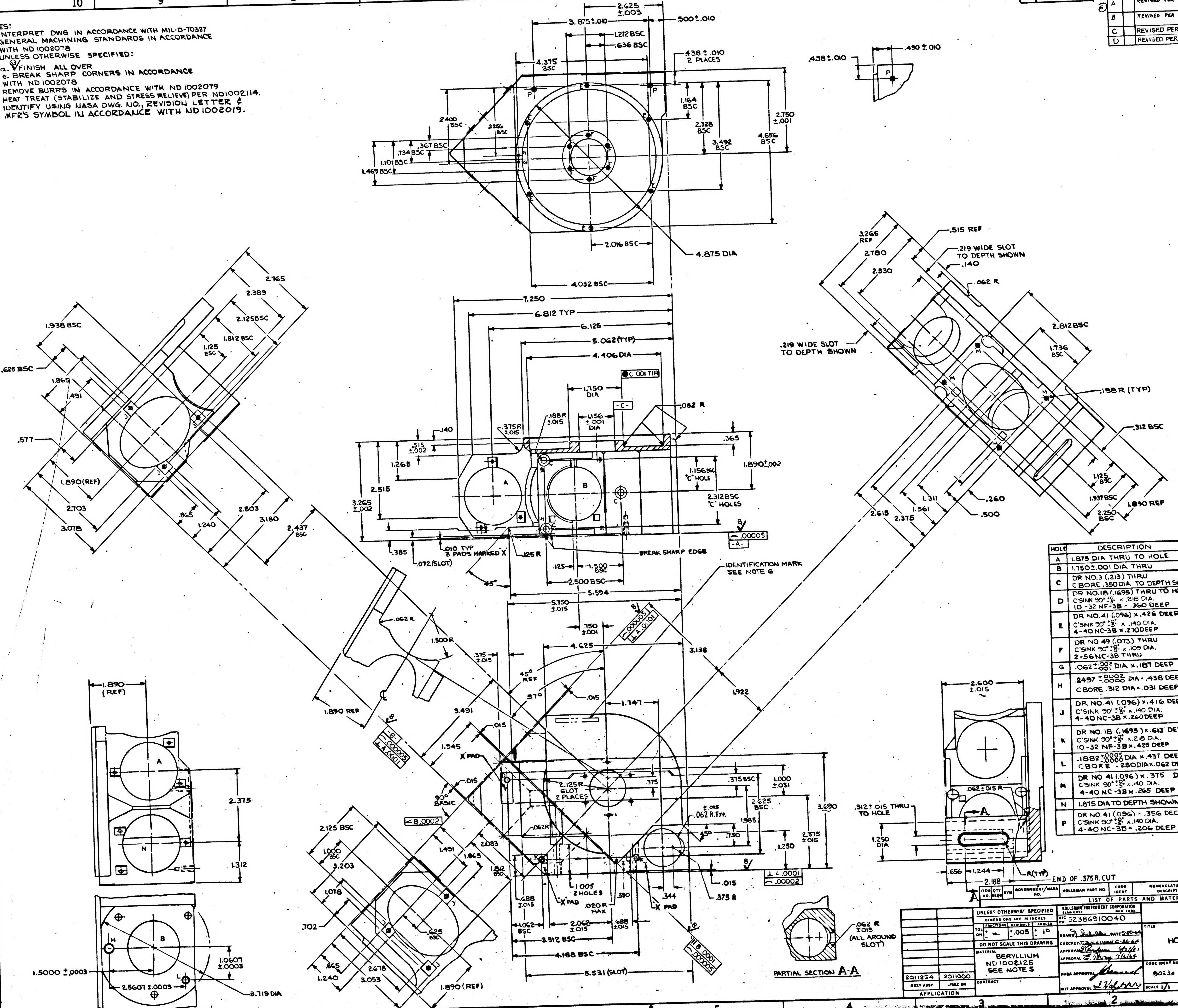
CODE IDENT NO.
SIZE E
NASA NUMBER 2011252
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MFR'S SYMBOL IN ACCORDANCE WITH ND 1002019.

2011252 D

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12917	9/23/64	LK
B		REVISED PER TDRR No. 15592	1/19/65	LK
C		REVISED PER TDRR 16687	2/26/65	LK
D		REVISED PER TDRR 20352	6/5/65	LK



2.625 ±.003
3.875±.010
.500±.010
1.272 BSC
.636 BSC
.438±.010 2 PLACES
4.375 BSC
.438±.010
.490±.010
1.164 BSC
2.328 BSC
3.492 BSC
2.750 ±.001
4.656 BSC
2.400 BSC
2.256 BSC
.367 BSC
.734 BSC
1.101 BSC
1.469 BSC
2.016 BSC
4.875 DIA
4.032 BSC
7.250
6.812 TYP
6.126
5.062 (TYP)
4.406 DIA
C .001 TIR
1.750 DIA
-C-
.062 R
.375 R ±.015
.188 R ±.015
1.156 ±.001 DIA
.140
.515 ±.002
.365
1.265
2.515
3.265 ±.002
1.890±.002
1.156 BSC "C" HOLE
2.312 BSC "C" HOLES
.00005
-A-
.385
.010 TYP 3 PADS MARKED X
.072 (SLOT)
.125 R
.125
1.500 BSC
2.500 BSC
5.594
BREAK SHARP EDGE
IDENTIFICATION MARK SEE NOTE 6
45°
5.750 ±.015
.150 ±.001
4.625
3.138
1.922
1.747
45° REF
57°
3.491
1.945
X PAD
90° BASIC
.015
2.125 R SLOT 2 PLACES
.062 R Typ.
.315 BSC
1.000 ±.031
2.625 BSC
1.585
3.690
2.375 ±.015
1.250
.750
1.005 2 HOLES
.020 R MAX
.380
.344
.375 R
1.062 BSC
2.062 ±.015
.688 ±.015
3.312 BSC
4.188 BSC
5.531 (SLOT)
.00002
2.765
2.389
2.125 BSC
1.938 BSC
1.812 BSC
1.125 BSC
.625 BSC
1.865
1.491
.577
1.890 (REF)
2.703
3.078
.865
1.240
2.803
3.180
2.437 BSC
.062 R
1.500 R
1.890 REF
3.265 REF
2.780
2.530
.515 REF
.219 WIDE SLOT TO DEPTH SHOWN
.140
.062 R
.219 WIDE SLOT TO DEPTH SHOWN
2.812 BSC
1.736 BSC
.198 R (TYP)
.312 BSC
1.125 BSC
1.937 BSC
1.890 REF
2.250 BSC
2.615
2.375
1.561
1.311
.260
.500
1.890 (REF)
2.375
1.312
1.5000 ±.0003
2.5607 ±.0003
1.0607 ±.0003
3.719 DIA
2.125 BSC
1.000 BSC
3.203
1.078
.702
.865
1.240
2.618
3.053
1.845
2.083
1.812 BSC
.625 BSC
1.890 (REF)
2.600 ±.015
.062 ±.015 R
.312 ±.015 THRU TO HOLE
1.250 DIA
.656
1.244
2.188
R(TYP)
END OF .375 R. CUT
.062 R ±.015 (ALL AROUND SLOT)
PARTIAL SECTION A-A
A
B
C
D
E
F
G
H
J
K
L
M
N
P

HOLE	DESCRIPTION	FINISH	QTY	
A	1.875 DIA THRU TO HOLE		2	
B	1.750±.001 DIA THRU		1	
C	DR NO.3 (.213) THRU C BORE .350 DIA TO DEPTH SHOWN		3	⊕.010 DIA
D	DR NO.18 (.1695) THRU TO HOLE C'SINK 90° $^{+0°}_{-5°}$ × .218 DIA. 10-32 NF-3B × .360 DEEP		1	⊕ .010 DIA
E	DR NO.41 (.096) × .426 DEEP C'SINK 90° $^{+0°}_{-5°}$ × .140 DIA. 4-40 NC-3B × .270 DEEP		6	⊕D.004 DIA
F	DR NO 49 (.073) THRU C'SINK 90° $^{+0°}_{-5°}$ × .109 DIA. 2-56 NC-3B THRU		6	⊕C.010 DIA
G	.062 $^{+.002}_{-.001}$ DIA × .187 DEEP		2	⊕C.004 DIA
H	.2497 $^{+.0002}_{-.0000}$ DIA × .438 DEEP C BORE .312 DIA × .031 DEEP	32√	1	
J	DR NO 41 (.096) × .416 DEEP C'SINK 90° $^{+0°}_{-5°}$ × .140 DIA. 4-40 NC-3B × .260 DEEP		6	⊕ .010 DIA
K	DR NO. 18 (.1695) × .613 DEEP C'SINK 90° $^{+0°}_{-5°}$ × .218 DIA. 10-32 NF-3B × .425 DEEP		2	⊕ .010 DIA
L	.1882 $^{+.0005}_{-.0000}$ DIA × .437 DEEP C BORE .250 DIA × .062 DEEP	32√	1	
M	DR NO 41 (.096) × .375 DEEP C'SINK 90° $^{+0°}_{-5°}$ × .140 DIA. 4-40 NC-3B × .265 DEEP		4	⊕ .010 DIA
N	1.875 DIA TO DEPTH SHOWN		1	
P	DR NO. 41 (.096) × .356 DEEP C'SINK 90° $^{+0°}_{-5°}$ × .140 DIA. 4-40 NC-3B × .206 DEEP		3	

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910040

DRAWN J. Schiller DATE 5-20-64
CHECKED T. SULLIVAN 6-26-64
APPROVAL 6/29/64
APPROVAL E. Thomas 7/2/64
NASA APPROVAL
MIT APPROVAL

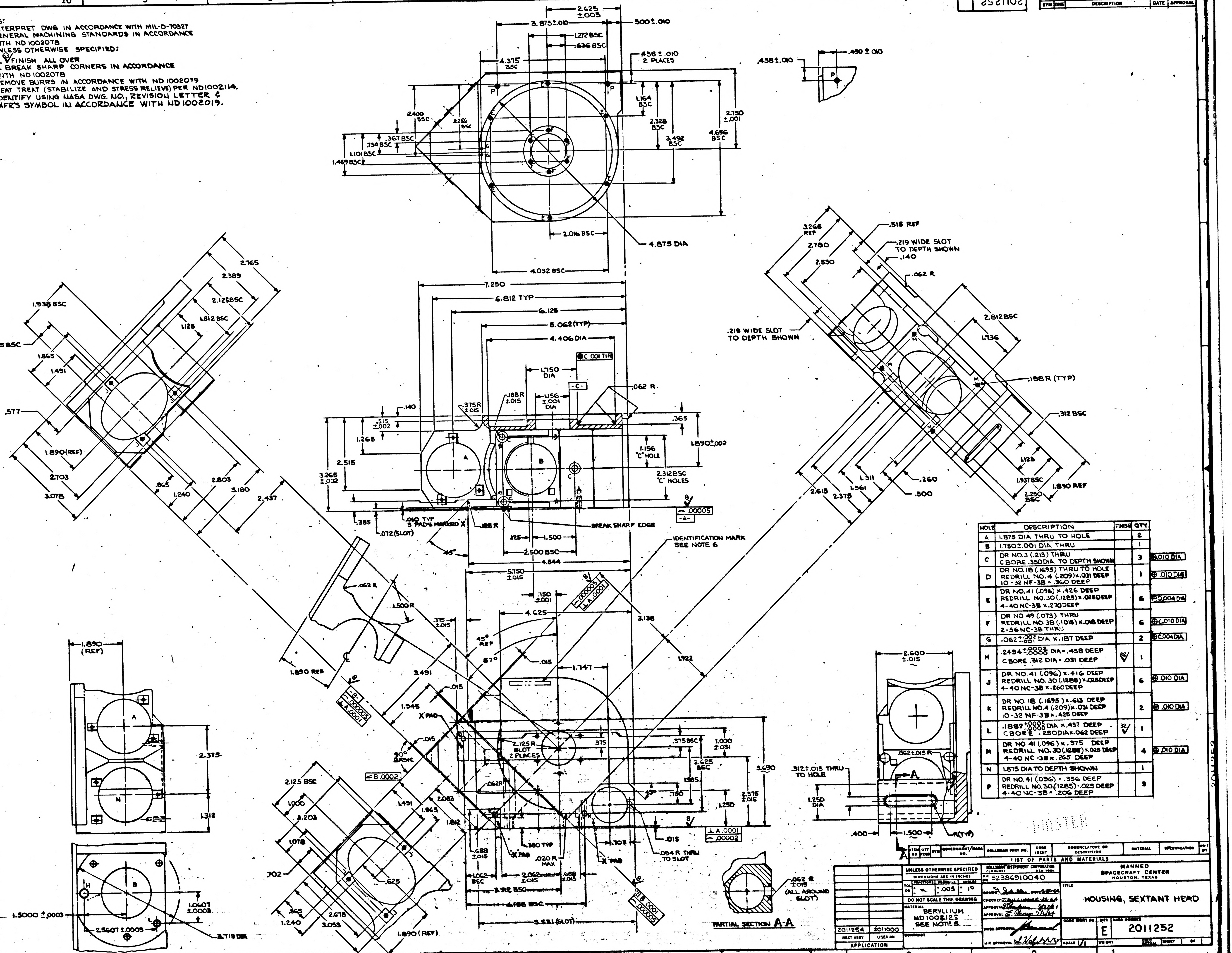
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011252
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\surd}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MFR'S SYMBOL IN ACCORDANCE WITH ND 1002019.

SYM	ZONE	REVISIONS 7024 10793 DESCRIPTION	DATE	APPROVAL



2011252
4.875 DIA
4.032 BSC
2.016 BSC
7.250
6.812 TYP
6.125
5.062 (TYP)
4.406 DIA
1.750 DIA
1.156 ±.001 DIA
.001 TIR
.062 R
1.890 ±.002
1.156 "C" HOLE
2.312 BSC "C" HOLES
.00005
BREAK SHARP EDGE
.010 TYP 3 PADS MARKED X
.072 (SLOT)
2.500 BSC
4.844
IDENTIFICATION MARK SEE NOTE 6
.219 WIDE SLOT TO DEPTH SHOWN
.188 R (TYP)
.312 BSC
1.890 REF
1.890 (REF)
2.125 R SLOT 2 PLACES
.312 ±.015 THRU TO HOLE
1.250 DIA
2.600 ±.015
.062 ±.015 R
.094 R THRU TO SLOT
.062 R ±.015 (ALL AROUND SLOT)
PARTIAL SECTION A-A
1.5000 ±.0003
2.5607 ±.0003
1.0607 ±.0003
2.719 DIA
5.531 (SLOT)
4.188 BSC
3.312 BSC
A
B
C
N
H
L
X PAD
MASTER

HOLE	DESCRIPTION	FINISH	QTY	
A	1.875 DIA THRU TO HOLE		2	
B	1.750 ±.001 DIA THRU		1	
C	DR NO.3 (.213) THRU CBORE .350 DIA TO DEPTH SHOWN		3	⊕ .010 DIA
D	DR NO.18 (.1695) THRU TO HOLE REDRILL NO.4 (.209) × .031 DEEP 10-32 NF-3B × .360 DEEP		1	⊕ .010 DIA
E	DR NO.41 (.096) × .426 DEEP REDRILL NO.30 (.1285) × .025 DEEP 4-40 NC-3B × .270 DEEP		6	⊕ .004 DIA
F	DR NO 49 (.073) THRU REDRILL NO.38 (.1015) × .018 DEEP 2-56 NC-3B THRU		6	⊕ C .010 DIA
G	$.062^{+.002}_{-.001}$ DIA × .187 DEEP		2	⊕ C .004 DIA
H	$.2494^{+.0002}_{-.0000}$ DIA × .438 DEEP CBORE .312 DIA × .031 DEEP	$\overset{32}{\surd}$	1	
J	DR NO.41 (.096) × .416 DEEP REDRILL NO. 30 (.1285) × .025 DEEP 4-40 NC-3B × .260 DEEP		6	⊕ .010 DIA
K	DR NO. 18 (.1695) × .613 DEEP REDRILL NO.4 (.209) × .031 DEEP 10-32 NF-3B × .425 DEEP		2	⊕ .010 DIA
L	$.1882^{+.0005}_{-.0000}$ DIA × .437 DEEP CBORE .250 DIA × .062 DEEP	$\overset{32}{\surd}$	1	
M	DR NO 41 (.096) × .375 DEEP REDRILL NO.30 (.1285) × .025 DEEP 4-40 NC-3B × .265 DEEP		4	⊕ .010 DIA
N	1.875 DIA TO DEPTH SHOWN		1	
P	DR NO.41 (.096) × .356 DEEP REDRILL NO.30 (.1285) × .025 DEEP 4-40 NC-3B × .206 DEEP		3	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND 1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910040
DRAWN J. Schiller DATE 5-20-64
CHECKED T. Sullivan 6-26-64
APPROVAL [illegible] 6-29-64
APPROVAL E. Thomas 7/2/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD

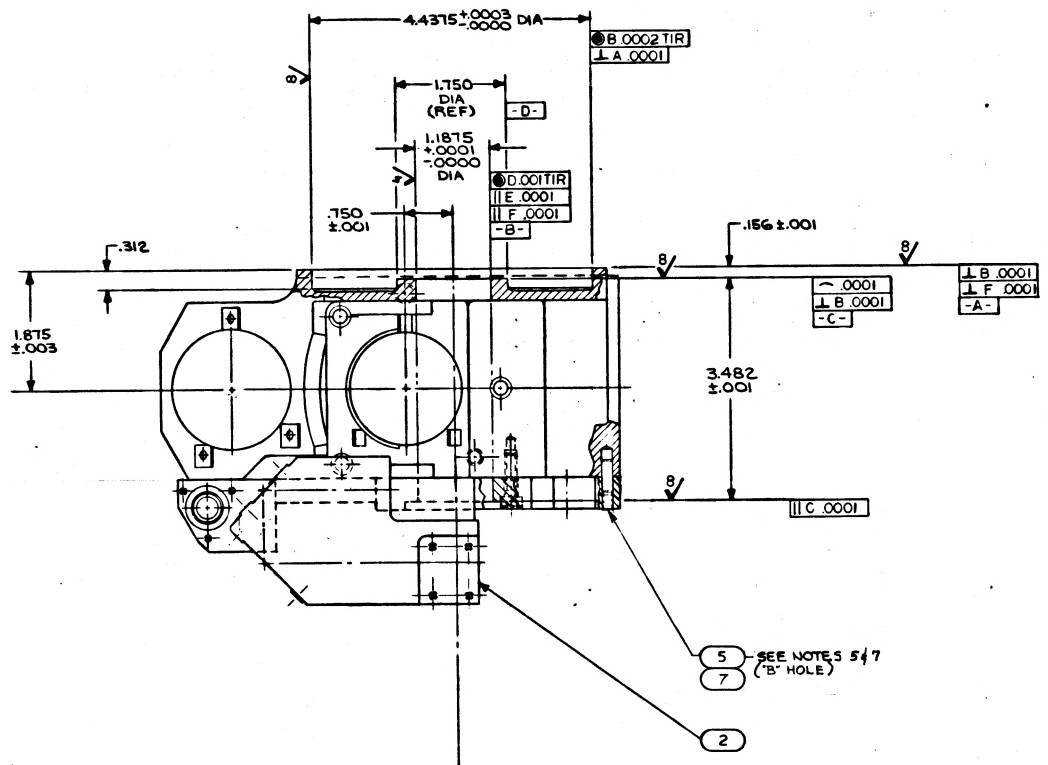
CODE IDENT NO.
SIZE E
NASA NUMBER 2011252
SCALE 1/1
WEIGHT
CALC
ACTUAL
SHEET OF

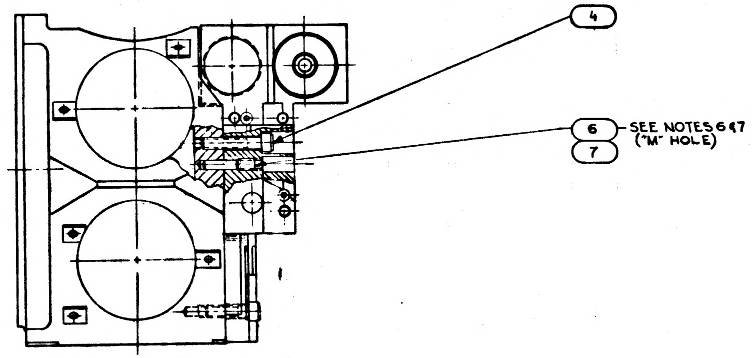
2011254 A

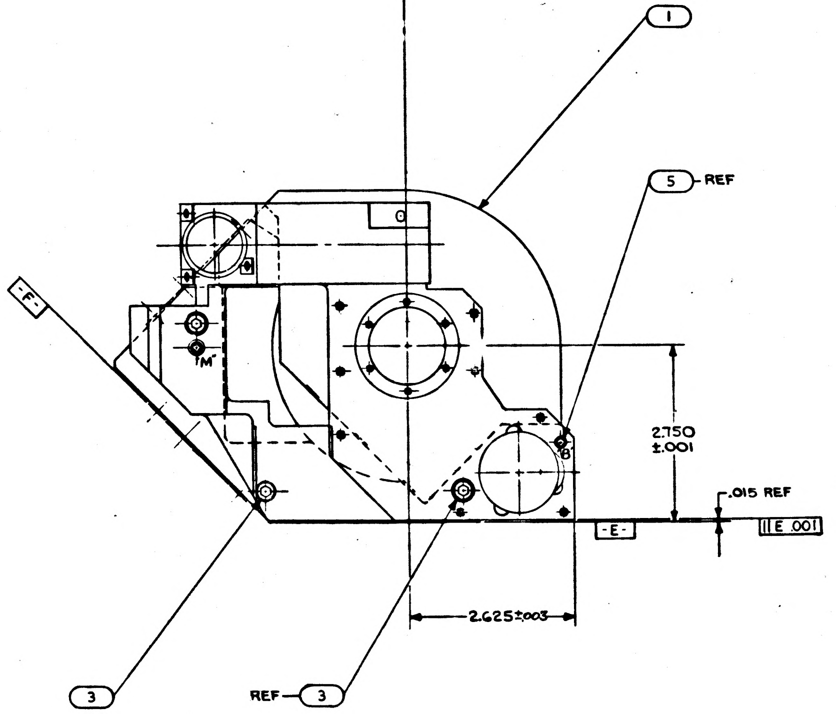
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		SED PER R NO. 16179	1/3/65	W.K.

REVISIONS 10952

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) $\sqrt{}^{63}$ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. "B" HOLE - REDRILL NO.28 (.1405) × .890 DEEP.
   BORE $.1500^{+.0002}_{-.0000}$ DIA × .797 DEEP.
6. "M" HOLE - REDRILL NO.24 (.152) × 1.468 DEEP
   BORE $.1600^{+.0002}_{-.0000}$ DIA × 1.375 DEEP.
7. MACHINE O.D OF PINS (ITEM 5&6) TO OBTAIN DIAMETRAL CLEARANCE FROM .000000 TO .000050
8. IDENTIFY USING NASA DWG NO REVISION LETTER AND MANUFACTURE SYMBOL PER ND 1002019, (TAGGING).


4.4375 +.0003 -.0000 DIA
B .0002 TIR
⊥ A .0001
8
1.750 DIA (REF)
-D-
1.1875 +.0001 -.0000 DIA
D .001 TIR
∥ E .0001
∥ F .0001
-B-
.750 ±.001
.312
.156 ±.001
8
⌒ .0001
⊥ B .0001
-C-
⊥ B .0001
⊥ F .0001
-A-
1.875 ±.003
3.482 ±.001
∥ C .0001
5
7
SEE NOTES 5&7 ("B" HOLE)
2


4
6
7
SEE NOTES 6&7 ("M" HOLE)


1
5
REF
-F-
M
B
2.750 ±.001
.015 REF
-E-
∥ E .001
2.625 ±.003
3
REF
3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	2	NAS1081C3A4L				SETSCREW; SELF LOCKING			
6	1		2012409	39386910030		PIN, DOWEL,			
5	1		2012408	39386910020		PIN, DOWEL			
4	1	*	1011625-76	74455151077		SCREW, CAP, HEX SOC HD SELF LOCKING			
3	2	*	1011625-72	74455151073		SCREW, CAP, HEX SOC HD SELF LOCKINK			
2	1		2012446	52386910800		HOUSING, STAR TRACKER & HORIZON SENSOR			
1	1		2011252	52386910040		HOUSING, SXT HEAD			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM : SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910040
DRAWN S. Jolidas DATE 5-26-64
CHECKED T. SULLIVAN 6-26-64
APPROVAL 6/26/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD,
ASSEMBLY OF (MACHINING)

CODE IDENT NO. SIZE E NASA NUMBER 2011254
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

2011254

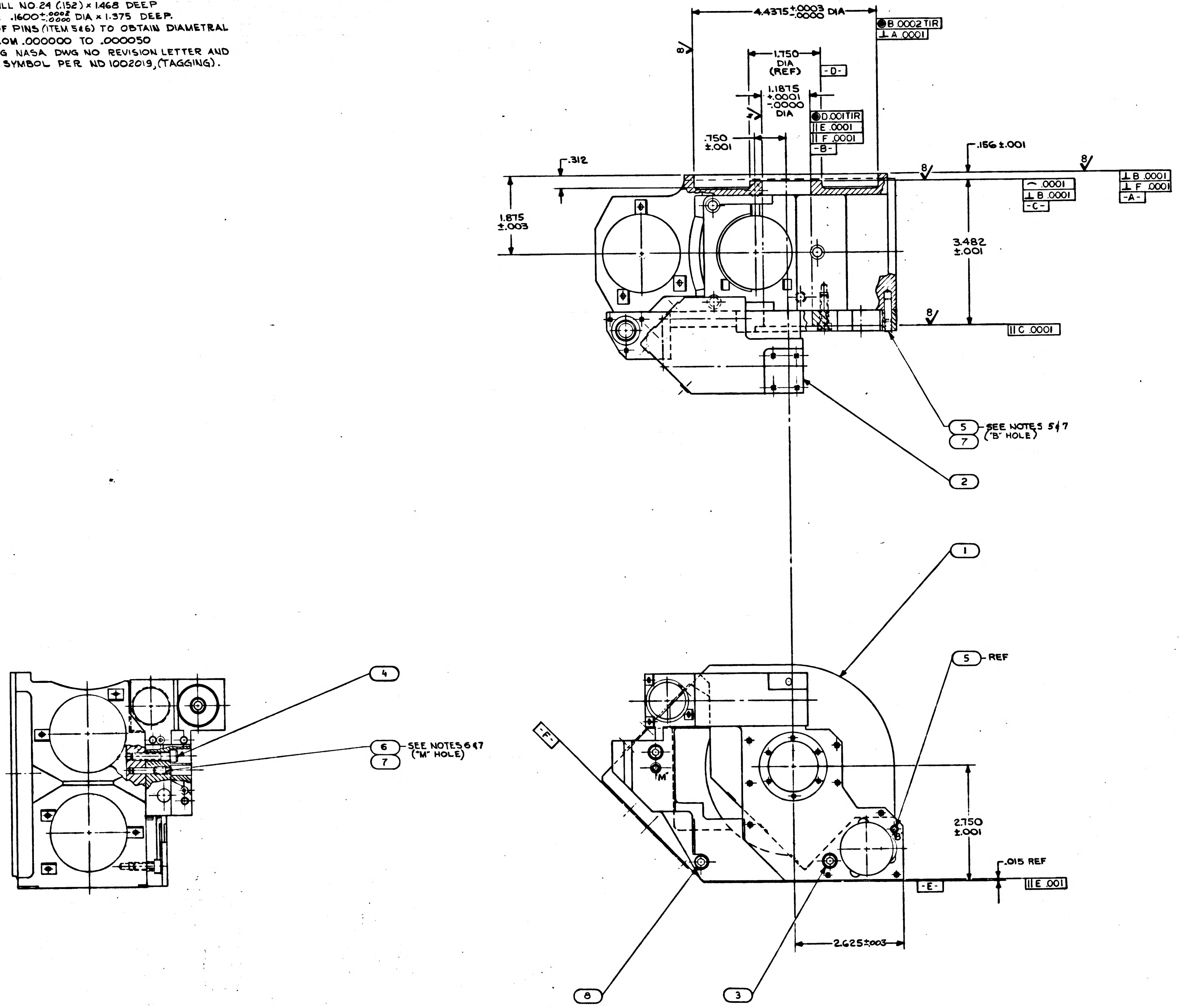
2011254 B

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16179	2/3/65	WK
B		REVISED PER TDRR 19065		WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) $\overset{63}{\checkmark}$ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. "B" HOLE - REDRILL NO.28 (.1405) × .890 DEEP. BORE $.1500^{+.0002}_{-.0000}$ DIA × .797 DEEP.
6. "M" HOLE - REDRILL NO.24 (.152) × 1.468 DEEP BORE $.1600^{+.0002}_{-.0000}$ DIA × 1.375 DEEP.
7. MACHINE O.D OF PINS (ITEM 5&6) TO OBTAIN DIAMETRAL CLEARANCE FROM .000000 TO .000050
8. IDENTIFY USING NASA DWG NO REVISION LETTER AND MANUFACTURE SYMBOL PER ND 1002019, (TAGGING).


4.4375 +.0003 -.0000 DIA
B .0002 TIR
⊥ A .0001
8
1.750 DIA (REF)
-D-
1.1875 +.0001 -.0000 DIA
D .001 TIR
∥ E .0001
∥ F .0001
-B-
.750 ±.001
.312
1.875 ±.003
.156 ±.001
8
8
⌒ .0001
⊥ B .0001
-C-
⊥ B .0001
⊥ F .0001
-A-
3.482 ±.001
8
∥ C .0001
5 SEE NOTES 5 & 7
7 ("B" HOLE)
2
1
4
6 SEE NOTES 6 & 7
7 ("M" HOLE)
5 REF
-F-
M
B
2.750 ±.001
.015 REF
-E-
∥ E .001
2.625 ±.003
8
3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1		NAS1351C3LL8	74455156039		SCREW, CAP, HEX SOC HD SELF LOCKING			
7	2		NAS1081C3A4L			SETSCREW, SELF LOCKING			
6	1		2012409	39386910030		PIN, DOWEL,			
5	1		2012408	39386910020		PIN, DOWEL			
4	1	*	1011625-76	74455151077		SCREW, CAP, HEX SOC HD SELF LOCKING			
3	1	*	1011625-72	74455151073		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	1		2012446	52386910800		HOUSING, STAR TRACKER & HORIZON SENSOR			
1	1		2011252	52386910040		HOUSING, SXT HEAD			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM : SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 85386910040
DRAWN [illegible] DATE 5-26-64
CHECKED J. SULLIVAN 5-26-64
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible] 7-x-64
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD, ASSEMBLY OF (MACHINING)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011254
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

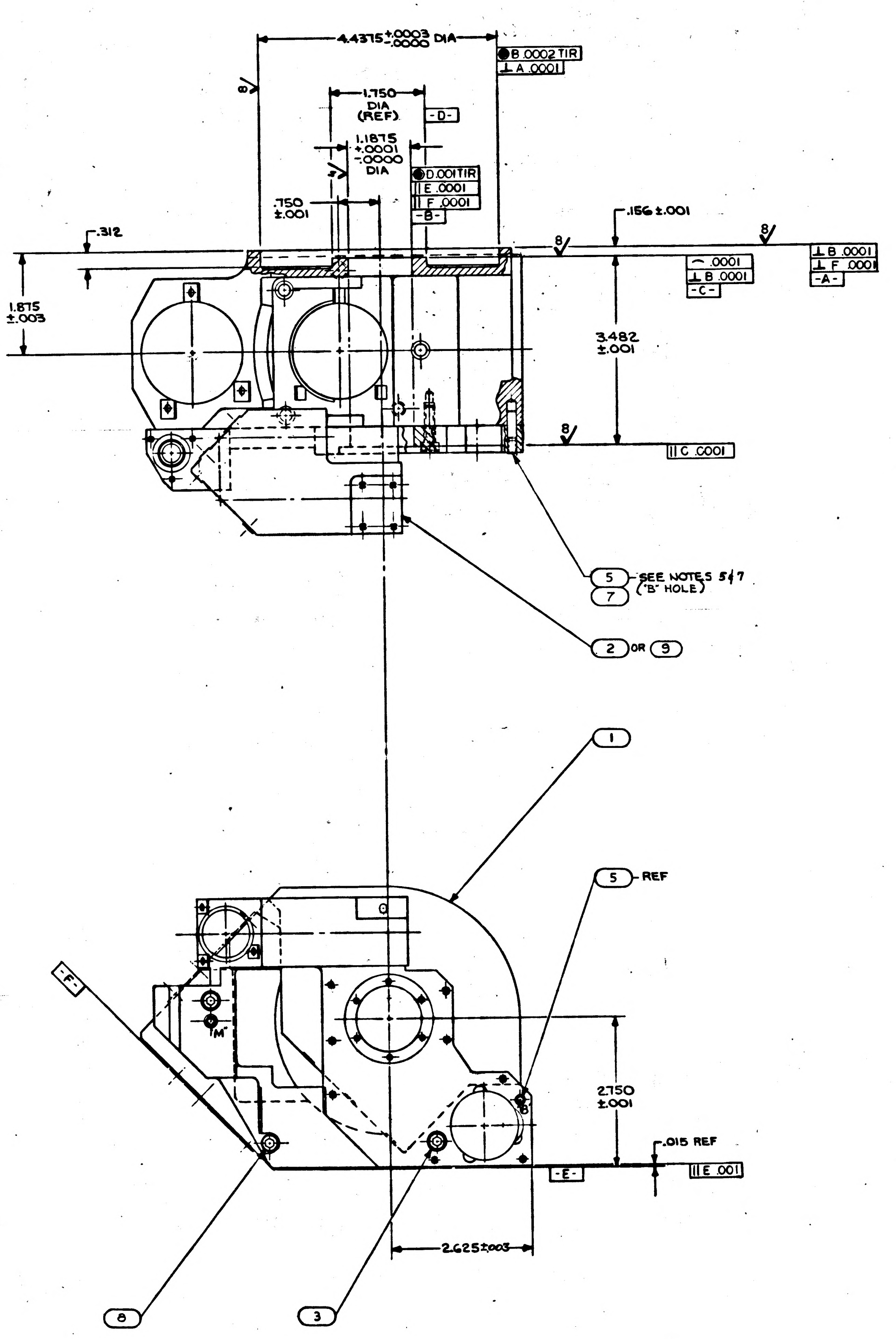
MASTER

E-186

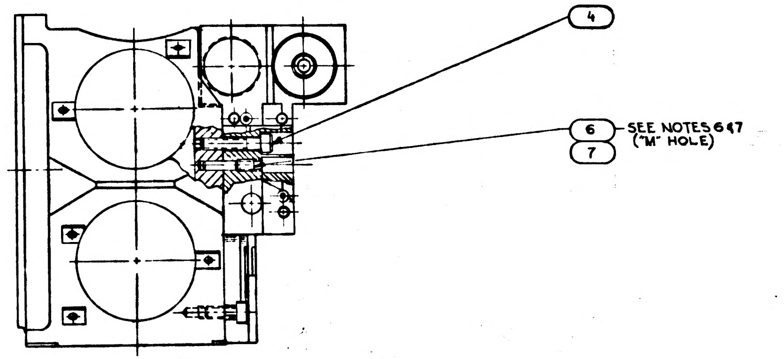
2011254 C

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) $\overset{63}{\surd}$ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. "B" HOLE - REDRILL NO. 28 (.1405) × .890 DEEP.
   BORE .1500$^{+.0002}_{-.0000}$ DIA × .797 DEEP.
6. "M" HOLE - REDRILL NO. 24 (.152) × 1.468 DEEP
   BORE .1600$^{+.0002}_{-.0000}$ DIA × 1.375 DEEP.
7. MACHINE O.D OF PINS (ITEM 5&6) TO OBTAIN DIAMETRAL CLEARANCE FROM .000000 TO .000050
8. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURE SYMBOL PER ND1002019, (TAGGING).

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16179	4/3/65	wK
B		REVISED PER TDRR 19035	6/1/65	wK
C		REVISED PER TDRR 22647	[illegible]	wK



4.4375 +.0003 -.0000 DIA
● B .0002 TIR
⊥ A .0001
8
1.750 DIA (REF)
-D-
1.1875 +.0001 -.0000 DIA
● D .001 TIR
∥ E .0001
∥ F .0001
-B-
.750 ±.001
.312
.156 ±.001
8
8
⌒ .0001
⊥ B .0001
-C-
⊥ B .0001
⊥ F .0001
-A-
1.875 ±.003
3.482 ±.001
8
∥ C .0001
5 SEE NOTES 5&7 ("B" HOLE)
7
2 OR 9
1
5 REF
-F-
"M"
2.750 ±.001
.015 REF
-E-
∥ E .001
2.625 ±.003
8
3



4
6 SEE NOTES 6&7 ("M" HOLE)
7

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	9			2012638	52386910990		HOUSING STAR TRACKER & HORIZON SENSOR			
1	1	8	1		NAS1351C3LL8	74455156039		SCREW, CAP HEX SOC HD SELF LOCKING			
2	2	7	2		NAS1081C3A4L	-		SETSCREW, SELF LOCKING			
1	1	6	1		2012409	39386910030		PIN, DOWEL,			
1	1	5	1		2012408	39386910020		PIN, DOWEL			
1	1	4	1	*	1011625-76	74455151077		SCREW, CAP, HEX SOC HD SELF LOCKING			
1	1	3	1	*	1011625-72	74455151073		SCREW, CAP, HEX SOC HD SELF LOCKING			
0	1	2	1		2012446	52386910800		HOUSING, STAR TRACKER & HORIZON SENSOR			
1	1	1	1		2011252	52386910040		HOUSING, SXT HEAD			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± - ; DECIMALS ± .005 ; ANGLES ± -
DO NOT SCALE THIS DRAWING
MATERIAL -
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910040
DRAWN [illegible] DATE 5-26-64
CHECKED T. SULLIVAN 6-26-64
APPROVAL [illegible] 6/26/64
APPROVAL E. [illegible] 7/9/64
NASA APPROVAL [illegible] 7-14-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD,
ASSEMBLY OF (MACHINING)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011254
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

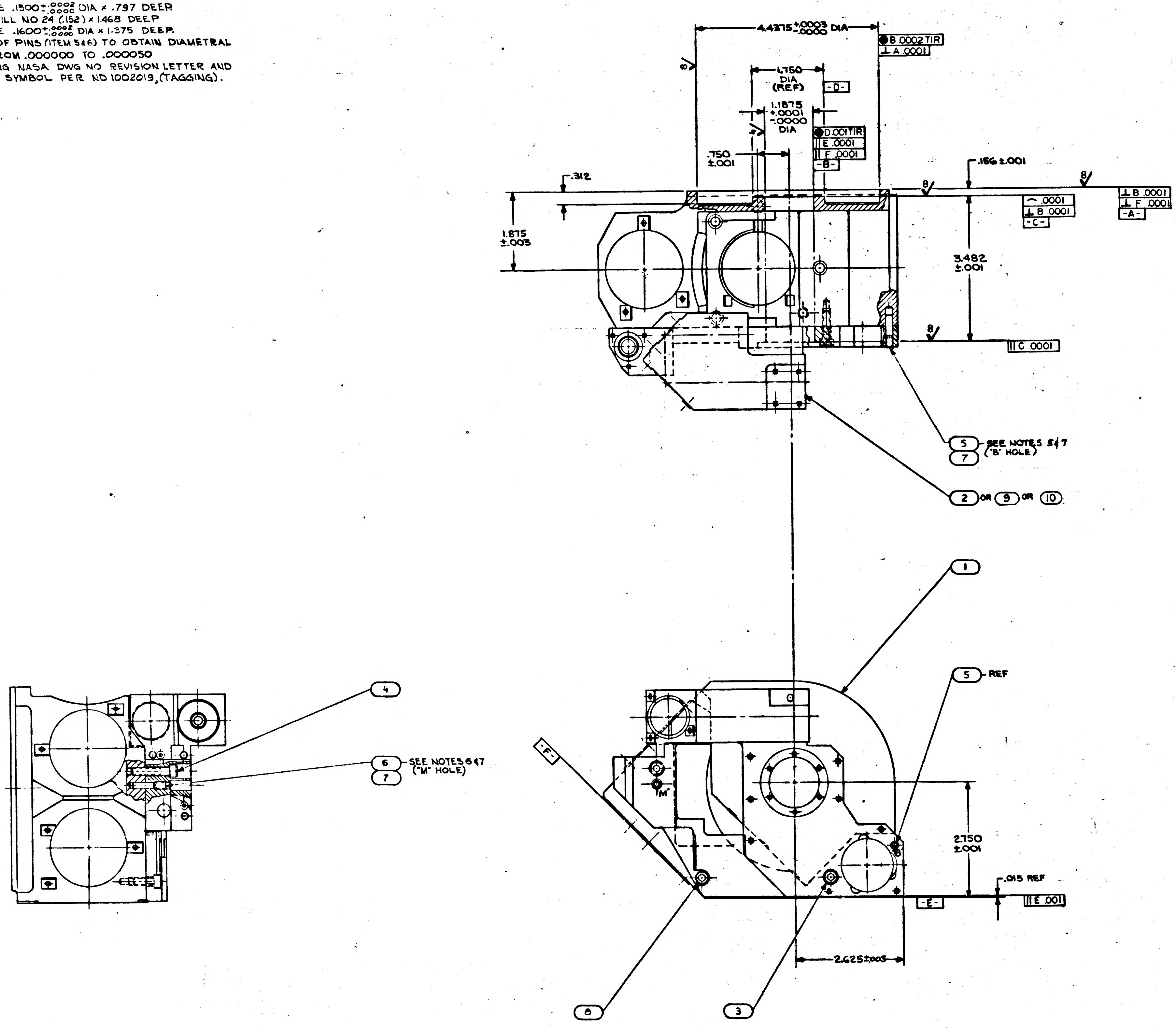
MASTER

2011254 D

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16179	1/13/65	WK
B		REVISED PER TDRR 19035		WK
C		REVISED PER TDRR 22647		WK
D		REVISED PER TDRR 25242		WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) $\sqrt{}^{63}$ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. "B" HOLE - REDRILL NO. 28 (.1405) × .890 DEEP.
   BORE .1500 $^{+.0002}_{-.0000}$ DIA × .797 DEEP.
6. "M" HOLE - REDRILL NO. 24 (.152) × 1.468 DEEP
   BORE .1600 $^{+.0002}_{-.0000}$ DIA × 1.375 DEEP.
7. MACHINE O.D OF PINS (ITEM 5&6) TO OBTAIN DIAMETRAL CLEARANCE FROM .000000 TO .000050
8. IDENTIFY USING NASA DWG NO REVISION LETTER AND MANUFACTURE SYMBOL PER ND 1002019, (TAGGING).


4.4375 +.0003 -.0000 DIA
B .0002 TIR
⊥ A .0001
8
1.750 DIA (REF)
-D-
1.1875 +.0001 -.0000 DIA
D .001 TIR
E .0001
F .0001
-B-
.750 ±.001
.312
1.875 ±.003
.156 ±.001
⊥ B .0001
⊥ F .0001
-A-
⌒ .0001
⊥ B .0001
-C-
3.482 ±.001
C .0001
5
7
SEE NOTES 5 & 7 ("B" HOLE)
2 OR 9 OR 10
1
4
6
7
SEE NOTES 6 & 7 ("M" HOLE)
5 - REF
-F-
"M"
"B"
2.750 ±.001
.015 REF
-E-
E .001
2.625 ±.003
8
3

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

1	0	0	10			2012738	52386911070		HOUSING STAR TRACKER & HORIZON SENSOR			
0	1	0	9			2012638	52386910990		HOUSING STAR TRACKER & HORIZON SENSOR			
1	1	1	8			NAS1351C3LL8	74455156089		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	2	2	7			NAS1081C3A4L			SET SCREW, SELF LOCKING			
1	1	1	6			2012409	39386910030		PIN, DOWEL,			
1	1	1	5			2012408	39386910020		PIN, DOWEL,			
1	1	1	4		*	1011625-76	74455151077		SCREW, CAP, HEX SOC HD SELF LOCKING			
1	1	1	3		*	1011625-72	74455151073		SCREW, CAP, HEX SOC HD SELF LOCKING			
0	0	1	2			2012446	52386910800		HOUSING, STAR TRACKER & HORIZON SENSOR			
1	1	1	1			2011252	52386910040		HOUSING, SXT HEAD			
021	011	000	ITEM NO.		SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012722	
2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	± .005	± -

DO NOT SCALE THIS DRAWING
MATERIAL -
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910040
DRAWN J. Jobbins DATE 5-26-64
CHECKED T. SULLIVAN 5-26-64
APPROVAL 6/26/64
APPROVAL E. Morey 7/9/64
NASA APPROVAL 7-2-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD, ASSEMBLY OF (MACHINING)

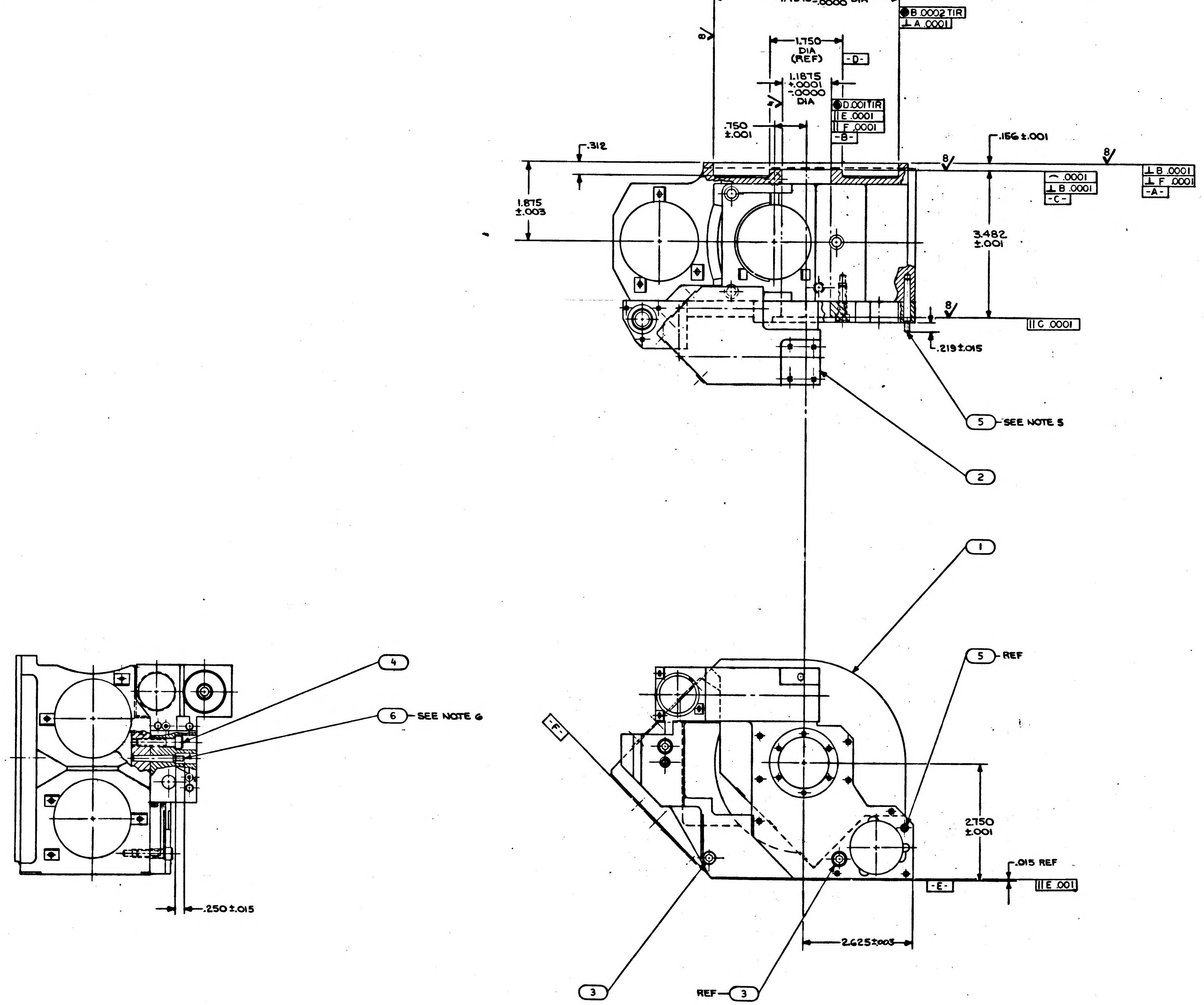
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011254
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

2011254

SYM	ZONE	REVISIONS 1C952 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. DRILL AND REAM FOR NO. 1/0 TAPER PIN, ITEM 5, TO DEPTH SHOWN.
6. DRILL AND REAM FOR NO. 1 TAPER PIN, ITEM 6, TO DEPTH SHOWN.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002015, (TAGGING).


4.4375 +.0003 -.0000 DIA
B .0002 TIR
⊥ A .0001
8
1.750 DIA (REF)
-D-
1.1875 +.0001 -.0000 DIA
D .001 TIR
∥ E .0001
∥ F .0001
-B-
.750 ±.001
.312
1.875 ±.003
.156 ±.001
⌒ .0001
⊥ B .0001
-C-
⊥ B .0001
⊥ F .0001
-A-
3.482 ±.001
∥ C .0001
.219 ±.015
5 SEE NOTE 5
2
1
4
6 SEE NOTE 6
5 REF
-F-
2.750 ±.001
.015 REF
-E-
∥ E .001
.250 ±.015
2.625 ±.003
3
REF 3

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1		2011196-29	39386910129		PIN, TAPER, THREADED			
5	1		2011196-28	39386910128		PIN, TAPER, THREADED			
4	1	*	1011625-76	74455151077		SCREW, CAP, HEX SOC HD SELF LOCKING			
3	2	*	1011625-72	74455151073		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	1		2012446	52386910800		HOUSING, STAR TRACKER & HORIZON SENSOR			
1	1		2011252	52386910040		HOUSING, SXT HEAD			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM : SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910040

DRAWN DATE
CHECKED T. SULLIVAN 6-26-64
APPROVAL 6/26/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SEXTANT HEAD, ASSEMBLY OF (MACHINING)

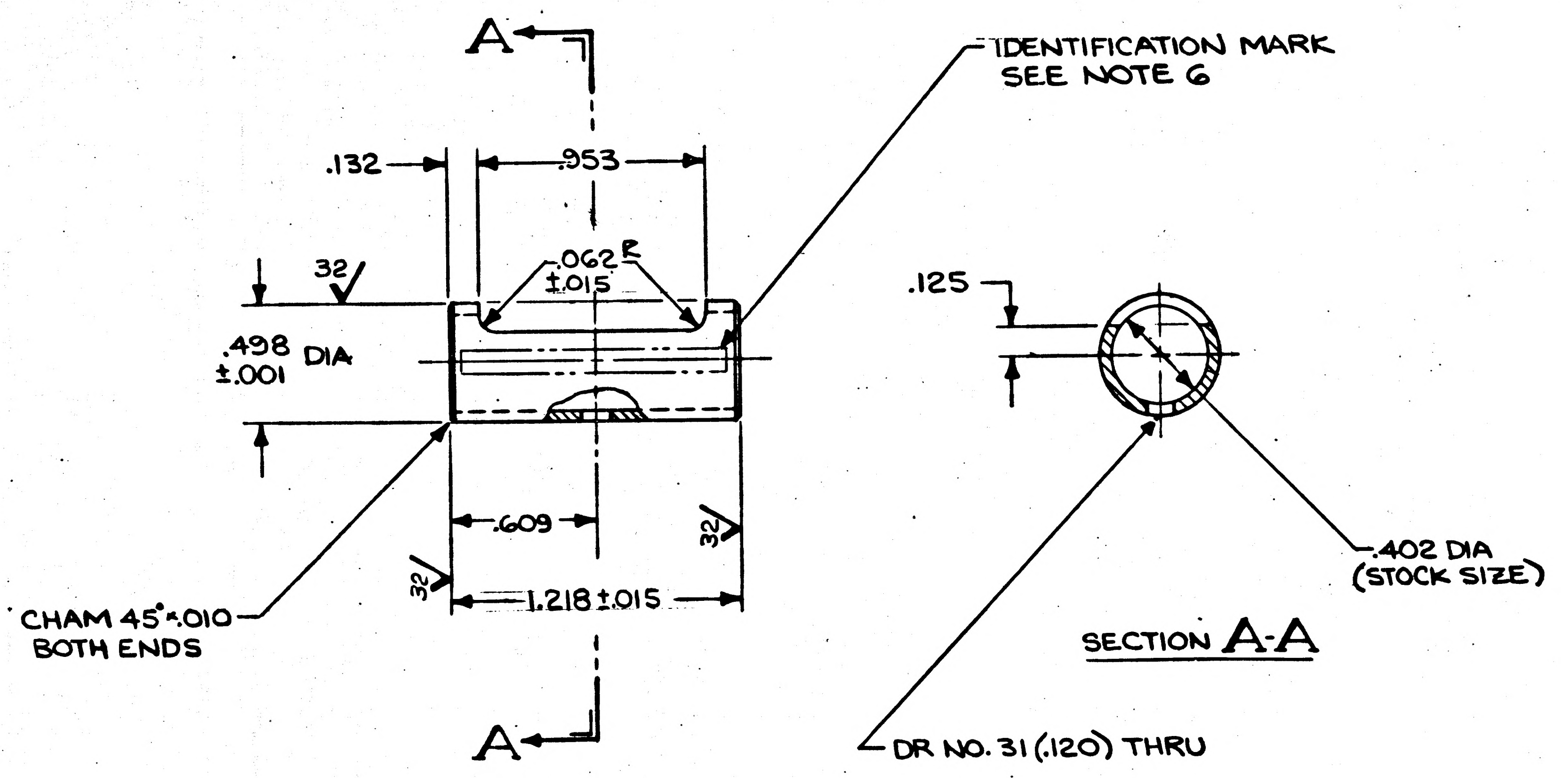
CODE IDENT NO.
SIZE E
NASA NUMBER 2011254

SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

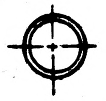
MASTER

	2011255			REVISIONS	0048	
		SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. ~~BREAK SHARP CORNERS~~ IN ACCORD WITH ND1002078.
4. ~~REMOVE BURRS IN ACCORD WITH ND1002079.~~
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171, TABLE V-A
   FINISH NO. 5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER &
   MANUFACTURERS SYMBOL PER ND1002019.



A
A
.132
.953
IDENTIFICATION MARK
SEE NOTE 6
32/
.062 R
±.015
.498 DIA
±.001
.609
32/
32/
1.218±.015
CHAM 45°×.010
BOTH ENDS
.125
.402 DIA
(STOCK SIZE)
SECTION A-A
DR NO. 31 (.120) THRU


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011215	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED. SPEC MIL-T-8506
TYPE 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910440

DRAWN DATE 4-6-64
CHECKED J. SULLIVAN 5-29-64
APPROVAL 5/29/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 9 June 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER, BEARING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011255

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

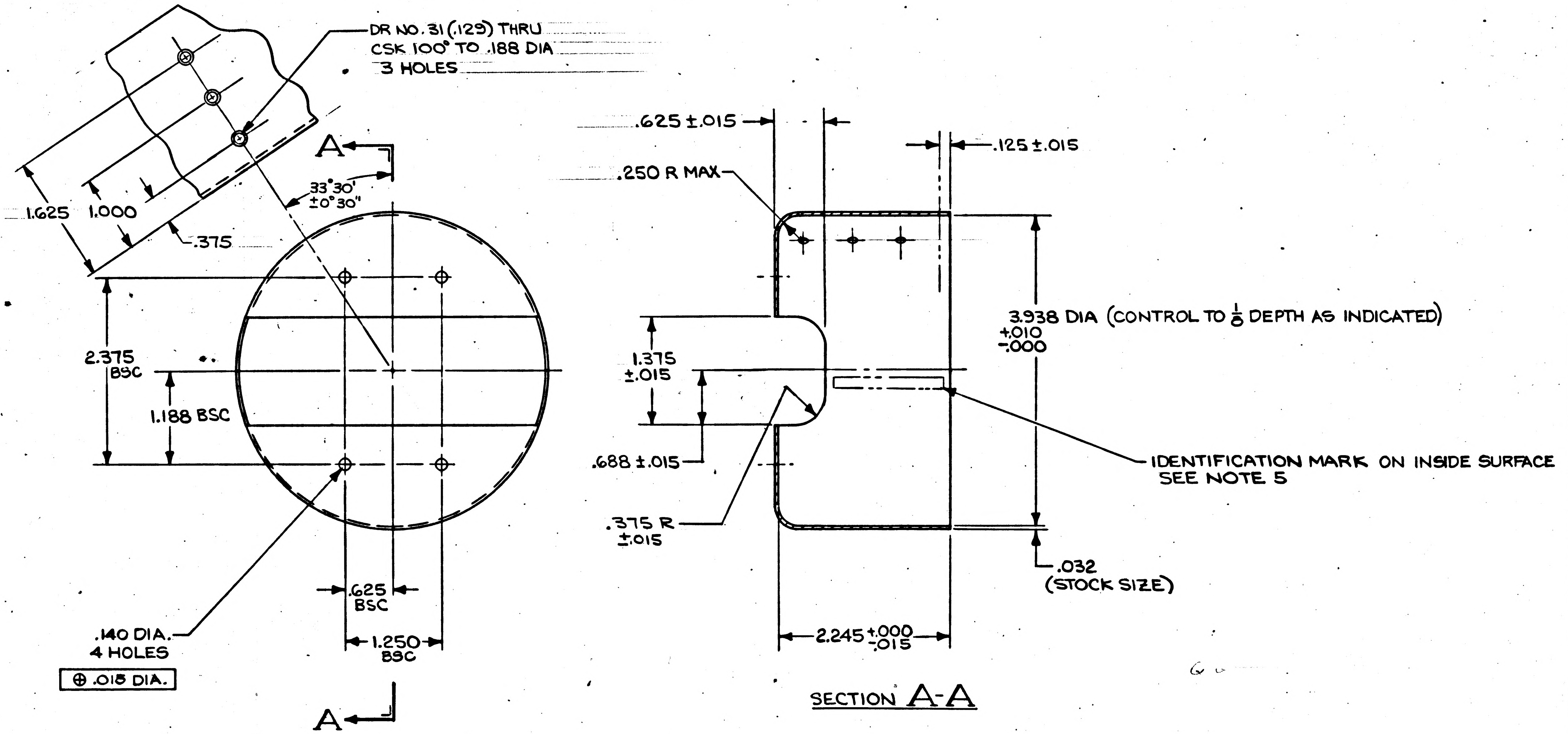
2011255

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011256

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078. (KES 1002A.2)
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019.



DR NO. 31 (.120) THRU
CSK 100° TO .188 DIA
3 HOLES
A
33°30' ±0°30"
1.625
1.000
.375
2.375 BSC
1.188 BSC
.140 DIA.
4 HOLES
⊕ .015 DIA.
.625 BSC
1.250 BSC
A
.625 ±.015
.125 ±.015
.250 R MAX
3.938 DIA (CONTROL TO 1/8 DEPTH AS INDICATED) +.010 -.000
1.375 ±.015
.688 ±.015
.375 R ±.015
IDENTIFICATION MARK ON INSIDE SURFACE SEE NOTE 5
.032 (STOCK SIZE)
2.245 +.000 -.015
SECTION A-A

2011256

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012138	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± ½

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED. SPEC QQ-A-250/8
TEMPER O

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910040

DRAWN J. Schiller DATE 4-10-64
CHECKED 6/1/64
APPROVAL 6/3/64
APPROVAL E. 6/12/64
NASA APPROVAL
MIT APPROVAL J. Wilson 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER,
TELESCOPE HEAD

CODE IDENT NO.
SIZE C
NASA NUMBER 2011256
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011257

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

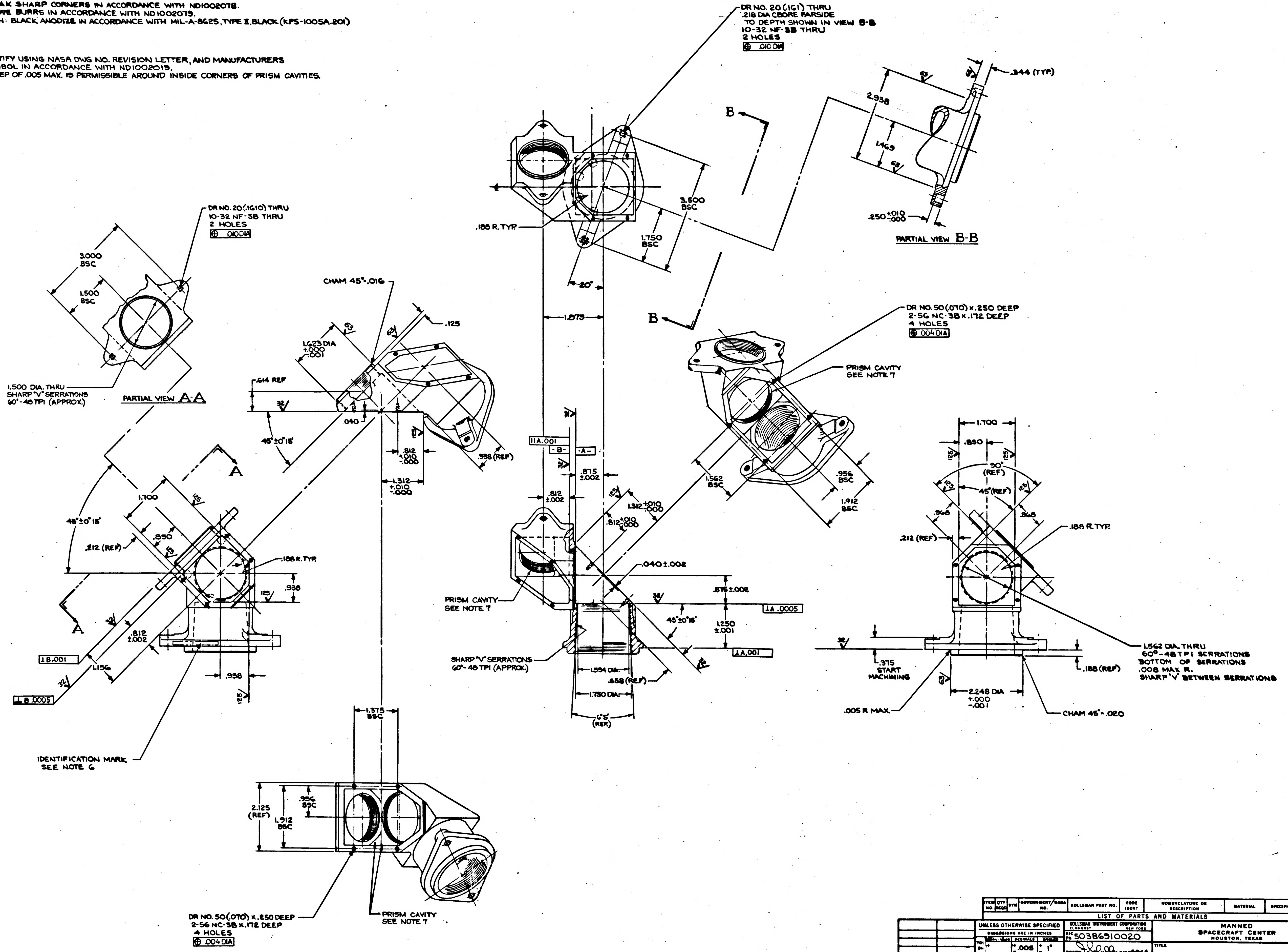
10432

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.

3. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625, TYPE II, BLACK (KPS-1005A.201)

6. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
7. A STEP OF .005 MAX. IS PERMISSIBLE AROUND INSIDE CORNERS OF PRISM CAVITIES.


DR NO. 20 (.161) THRU
.218 DIA CBORE FARSIDE
TO DEPTH SHOWN IN VIEW B-B
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
.188 R. TYP.
3.500 BSC
1.750 BSC
20°
1.875
B
B
2.938
1.469
63
.344 (TYP)
.250 +.010 -.000
PARTIAL VIEW B-B
DR NO. 20 (.1610) THRU
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
3.000 BSC
1.500 BSC
1.500 DIA. THRU
SHARP "V" SERRATIONS
60°-48 TPI (APPROX.)
PARTIAL VIEW A-A
CHAM 45° × .016
.125
1.623 DIA +.000 -.001
.614 REF
32
.040
45° ±0° 15'
.812 +.010 -.000
1.312 +.010 -.000
.938 (REF)
A
A
1.700
.850
.212 (REF)
125
.188 R. TYP.
.938
.812 ±.002
1.156
⊥ B .001
⊥ B .0005
IDENTIFICATION MARK
SEE NOTE 6
// A .001
-B-
-A-
.875 ±.002
.812 ±.002
1.312 +.010 -.000
.812 +.010 -.000
.040 ±.002
.875 ±.002
45° ±0° 15'
1.250 ±.001
⊥ A .0005
⊥ A .001
PRISM CAVITY
SEE NOTE 7
SHARP "V" SERRATIONS
60°-48 TPI (APPROX.)
1.594 DIA.
.658 (REF)
1.750 DIA.
6° 5' (REF)
DR NO. 50 (.070) × .250 DEEP
2-56 NC-3B × .172 DEEP
4 HOLES
⊕ .004 DIA
PRISM CAVITY
SEE NOTE 7
1.562 BSC
.956 BSC
1.912 BSC
1.700
.850
90° (REF)
45° (REF)
.968
.968
.212 (REF)
.188 R. TYP.
.375 START MACHINING
.188 (REF)
2.248 DIA +.000 -.001
.005 R MAX.
CHAM 45° × .020
1.562 DIA. THRU
60°-48 TPI SERRATIONS
BOTTOM OF SERRATIONS
.008 MAX R.
SHARP 'V' BETWEEN SERRATIONS
1.375 BSC
2.125 (REF)
1.912 BSC
.956 BSC
DR NO. 50 (.070) × .250 DEEP
2-56 NC-3B × .172 DEEP
4 HOLES
⊕ .004 DIA
PRISM CAVITY
SEE NOTE 7

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011734	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 — ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL 2011875
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910020
DRAWN [illegible] DATE 4-3-64
CHECKED [illegible]
APPROVAL [illegible] 4/13/64
APPROVAL E. [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
SCT PRISM

CODE IDENT NO. — SIZE E — NASA NUMBER 2011257
SCALE 1/1 — WEIGHT — SHEET 1 OF 1

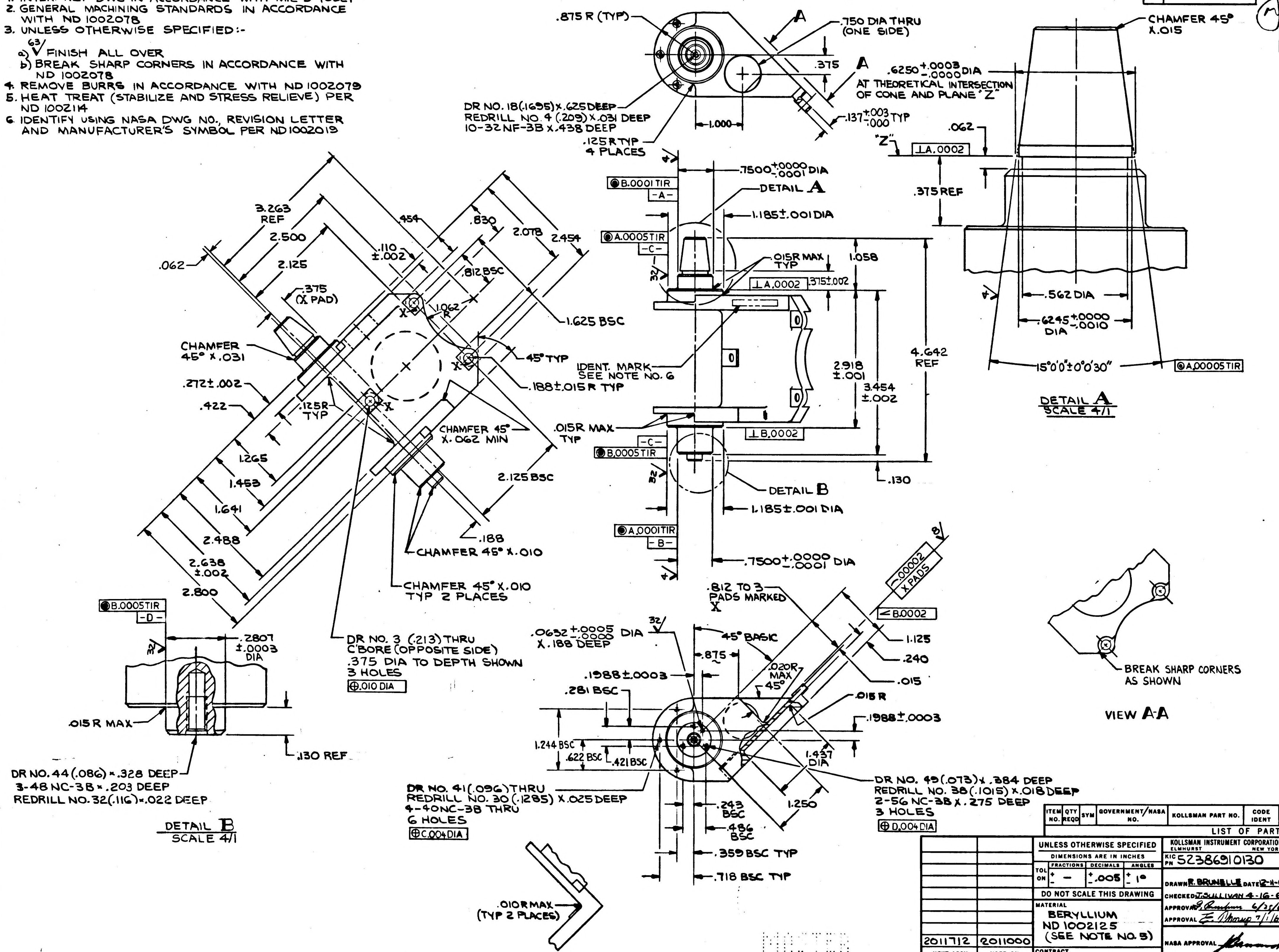
2011257

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND 1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019

2011258 A

REVISIONS TDRR 15793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 14293	11/13/64	WK



.875 R (TYP)
A
.750 DIA THRU (ONE SIDE)
.375
A
.6250 +.0003 -.0000 DIA AT THEORETICAL INTERSECTION OF CONE AND PLANE "Z"
DR NO. 18 (.1695) X .625 DEEP REDRILL NO. 4 (.209) X .031 DEEP 10-32 NF-3B X .438 DEEP
1.000
.137 +.003 -.000 TYP
.125 R TYP 4 PLACES
.062
"Z"
⊥ A .0002
CHAMFER 45° X.015
.375 REF
.7500 +.0000 -.0001 DIA
B .0001 TIR
-A-
DETAIL A
1.185 ± .001 DIA
A .0005 TIR
-C-
.015R MAX TYP
1.058
⊥ A .0002
.375 ± .002
IDENT. MARK SEE NOTE NO. 6
2.918 ±.001
3.454 ±.002
4.642 REF
.015R MAX TYP
⊥ B .0002
-C-
B .0005 TIR
.130
DETAIL B
1.185 ± .001 DIA
A .0001 TIR
-B-
.7500 +.0000 -.0001 DIA
.562 DIA
.6245 +.0000 -.0010 DIA
15°0'0" ± 0°0'30"
A .00005 TIR
DETAIL A
SCALE 4/1
3.263 REF
2.500
2.125
.062
.375 (X PAD)
.454
.110 ±.002
.830
.812 BSC
2.078
2.454
1.062 R
1.625 BSC
CHAMFER 45° X .031
45° TYP
.188 ± .015 R TYP
.272 ± .002
.422
.125R TYP
X
CHAMFER 45° X .062 MIN
1.265
1.453
1.641
2.488
2.638 ±.002
2.800
2.125 BSC
.188
CHAMFER 45° X .010
CHAMFER 45° X .010 TYP 2 PLACES
DR NO. 3 (.213) THRU C'BORE (OPPOSITE SIDE) .375 DIA TO DEPTH SHOWN 3 HOLES
⊕ .010 DIA
B .0005 TIR
-D-
.2807 ±.0003 DIA
.015 R MAX
.130 REF
DR NO. 44 (.086) × .328 DEEP 3-48 NC-3B × .203 DEEP REDRILL NO. 32 (.116) × .022 DEEP
DETAIL B
SCALE 4/1
.812 TO 3 PADS MARKED X
.0002 X PADS
∠ B .0002
.0632 +.0005 -.0000 DIA X .188 DEEP
45° BASIC
.875
.020R MAX
45°
1.125
.240
.015
.015 R
.1988 ± .0003
.281 BSC
.1988 ± .0003
1.244 BSC
.622 BSC
.421 BSC
1.437 DIA
1.250
DR NO. 49 (.073) X .384 DEEP REDRILL NO. 38 (.1015) X .018 DEEP 2-56 NC-3B X .275 DEEP 3 HOLES
⊕ 0.004 DIA
DR NO. 41 (.096) THRU REDRILL NO. 30 (.1285) X .025 DEEP 4-40 NC-3B THRU 6 HOLES
⊕ C .004 DIA
.243 BSC
.486 BSC
.359 BSC TYP
.718 BSC TYP
.010 R MAX (TYP 2 PLACES)
BREAK SHARP CORNERS AS SHOWN
VIEW A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE NO. 5)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910130

DRAWN R. BRUNELLE DATE 12-11-63
CHECKED J. SULLIVAN 4-16-64
APPROVAL 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

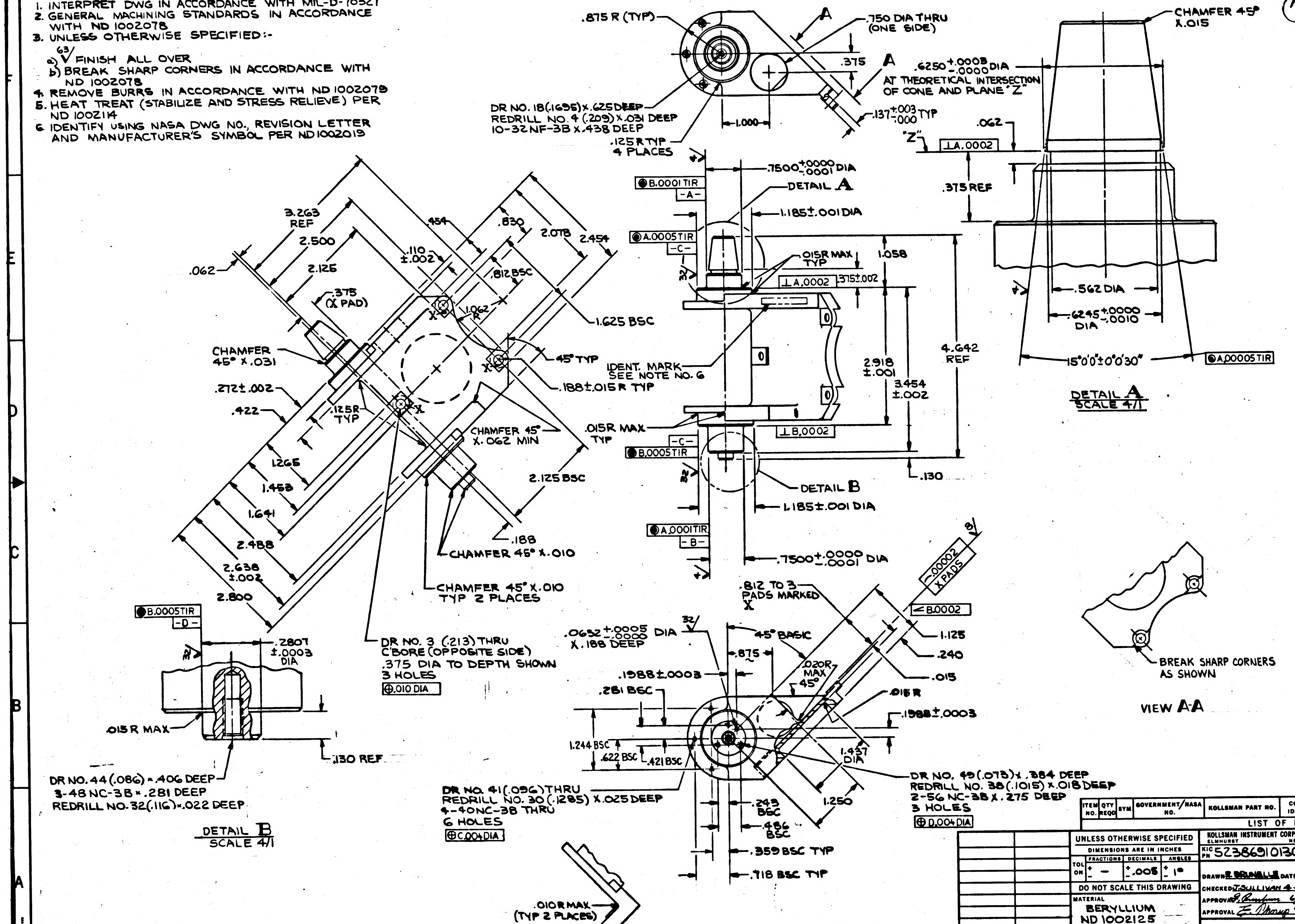
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, INDEX MIRROR, SEXTANT HEAD

CODE IDENT NO.
SIZE D
NASA NUMBER 2011258
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

REVISIONS TDRR 15793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND 1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019


2011258
.875 R (TYP)
A
.750 DIA THRU (ONE SIDE)
.375
A
DR NO. 18 (.1695) X .625 DEEP
REDRILL NO. 4 (.209) X .031 DEEP
10-32 NF-3B X .438 DEEP
1.000
.137 +.003 -.000 TYP
.125 R TYP 4 PLACES
CHAMFER 45° X .015
.6250 +.0003 -.0000 DIA
AT THEORETICAL INTERSECTION OF CONE AND PLANE "Z"
"Z"
.062
⊥ A .0002
.375 REF
.562 DIA
.6245 +.0000 -.0010 DIA
15°0'0"±0°0'30"
◎ A .00005 TIR
DETAIL A SCALE 4/1
.7500 +.0000 -.0001 DIA
◎ B .0001 TIR
-A-
DETAIL A
1.185±.001 DIA
◎ A .0005 TIR
-C-
.015R MAX TYP
1.058
⊥ A .0002
.375±.002
32
IDENT. MARK SEE NOTE NO. 6
2.918 ±.001
3.454 ±.002
4.642 REF
.015R MAX TYP
⊥ B .0002
-C-
◎ B .0005 TIR
DETAIL B
.130
1.185±.001 DIA
◎ A .0001 TIR
-B-
.7500 +.0000 -.0001 DIA
3.263 REF
2.500
2.125
.062
.375 (X PAD)
.110 ±.002
.454
.830
2.078
2.454
.812 BSC
1.062 R
1.625 BSC
CHAMFER 45° X .031
45° TYP
.188±.015R TYP
.272±.002
.422
.125R TYP
CHAMFER 45° X .062 MIN
1.265
1.453
2.125 BSC
1.641
2.488
.188
CHAMFER 45° X .010
2.638 ±.002
2.800
CHAMFER 45° X .010 TYP 2 PLACES
DR NO. 3 (.213) THRU C'BORE (OPPOSITE SIDE) .375 DIA TO DEPTH SHOWN 3 HOLES
⊕ .010 DIA
◎ B .0005 TIR
-D-
.2807 ±.0003 DIA
32
.015 R MAX
.130 REF
DR NO. 44 (.086) X .406 DEEP
3-48 NC-3B X .281 DEEP
REDRILL NO. 32 (.116) X .022 DEEP
DETAIL B SCALE 4/1
.0652 +.0005 -.0000 DIA X .188 DEEP
32
.812 TO 3 PADS MARKED X
.0002 X PADS
45° BASIC
.875
.020R MAX
45°
.1988±.0003
.281 BSC
1.244 BSC
.622 BSC
.421 BSC
B .0002
1.125
.240
.015
.015 R
.1988±.0003
1.437 DIA
1.250
.243 BSC
.486 BSC
.359 BSC TYP
.718 BSC TYP
DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) X .025 DEEP
4-40 NC-3B THRU
6 HOLES
⊕ C .004 DIA
DR NO. 49 (.073) X .384 DEEP
REDRILL NO. 38 (.1015) X .018 DEEP
2-56 NC-3B X .275 DEEP
3 HOLES
⊕ D .004 DIA
.010 R MAX (TYP 2 PLACES)
BREAK SHARP CORNERS AS SHOWN
VIEW A-A
MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE NO. 5)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910130

DRAWN R. BRUNELLE DATE 12-11-63
CHECKED J. SULLIVAN 4-16-64
APPROVAL 6/25/64
APPROVAL E. Nhmup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, INDEX MIRROR, SEXTANT HEAD

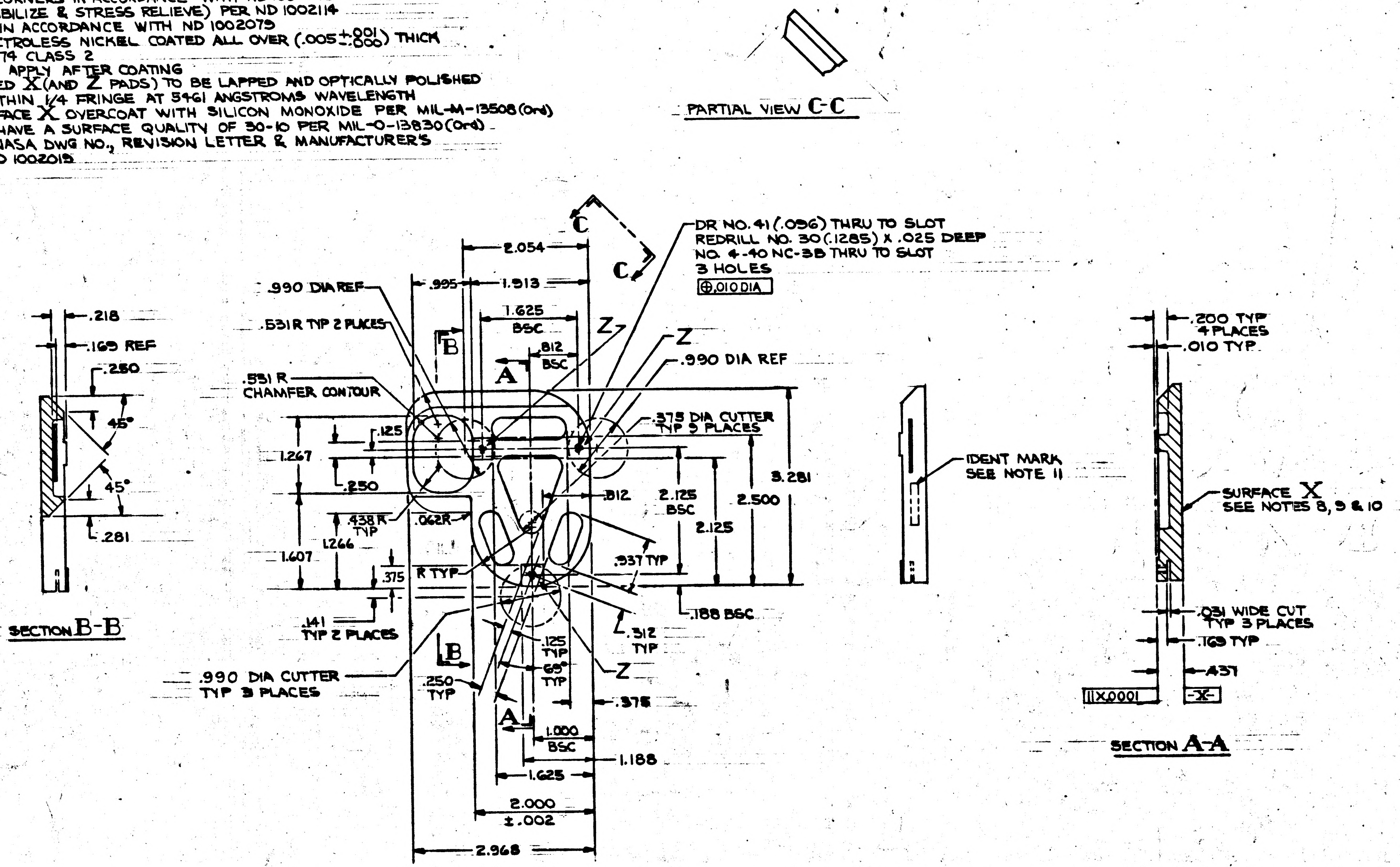
CODE IDENT NO. SIZE D NASA NUMBER 2011258
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

A | 2011259

REVISIONS TORR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TORR 12839	8-17-64	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   - a) 63/ FINISH ALL OVER
   - b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE MARKED X (AND Z PADS) TO BE LAPPED AND OPTICALLY POLISHED TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord)
11. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002015



PARTIAL VIEW C-C
C
C
2.054
.995
1.913
1.625
BSC
.812
BSC
.990 DIA REF
.531R TYP 2 PLACES
B
A
Z
Z
.531 R
CHAMFER CONTOUR
.125
1.267
.250
.438R
TYP
.062R
1.266
1.607
.375
R TYP
.141
TYP 2 PLACES
.990 DIA CUTTER
TYP 3 PLACES
B
.250
TYP
A
DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
.990 DIA REF
.375 DIA CUTTER
TYP 3 PLACES
.812
2.125
BSC
2.125
2.500
3.281
.337 TYP
.188 BSC
.312
TYP
.125
TYP
65°
TYP
Z
.375
1.000
BSC
1.188
1.625
2.000
±.002
2.968
.218
.169 REF
.250
45°
45°
.281
SECTION B-B
IDENT MARK
SEE NOTE 11
.200 TYP
4 PLACES
.010 TYP
SURFACE X
SEE NOTES 8, 9 & 10
.031 WIDE CUT
TYP 3 PLACES
.169 TYP
.437
∥ X .0001
-X-
SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140

DRAWN E. BRUNELLE DATE 5-13-64
CHECKED C. Lamp 6-26-64
APPROVAL 6/26/64
APPROVAL L. Monroy 7/1/64

NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, INDEX,
SEXTANT HEAD

CODE IDENT NO. | SIZE D | NASA NUMBER 2011259

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET | OF

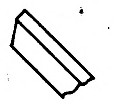
2011259 A

B 2011259

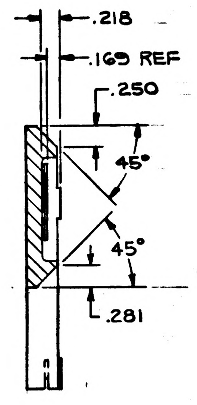
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12839	8-19-64	GK
B		REVISED PER TDRR 15039	22 ... 64	GK

REVISIONS TDRR 10793

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\sqrt{}^{63}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE MARKED X (AND Z PADS) TO BE LAPPED AND OPTICALLY POLISHED TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord).
10. SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-0-13830 (Ord).
11. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.

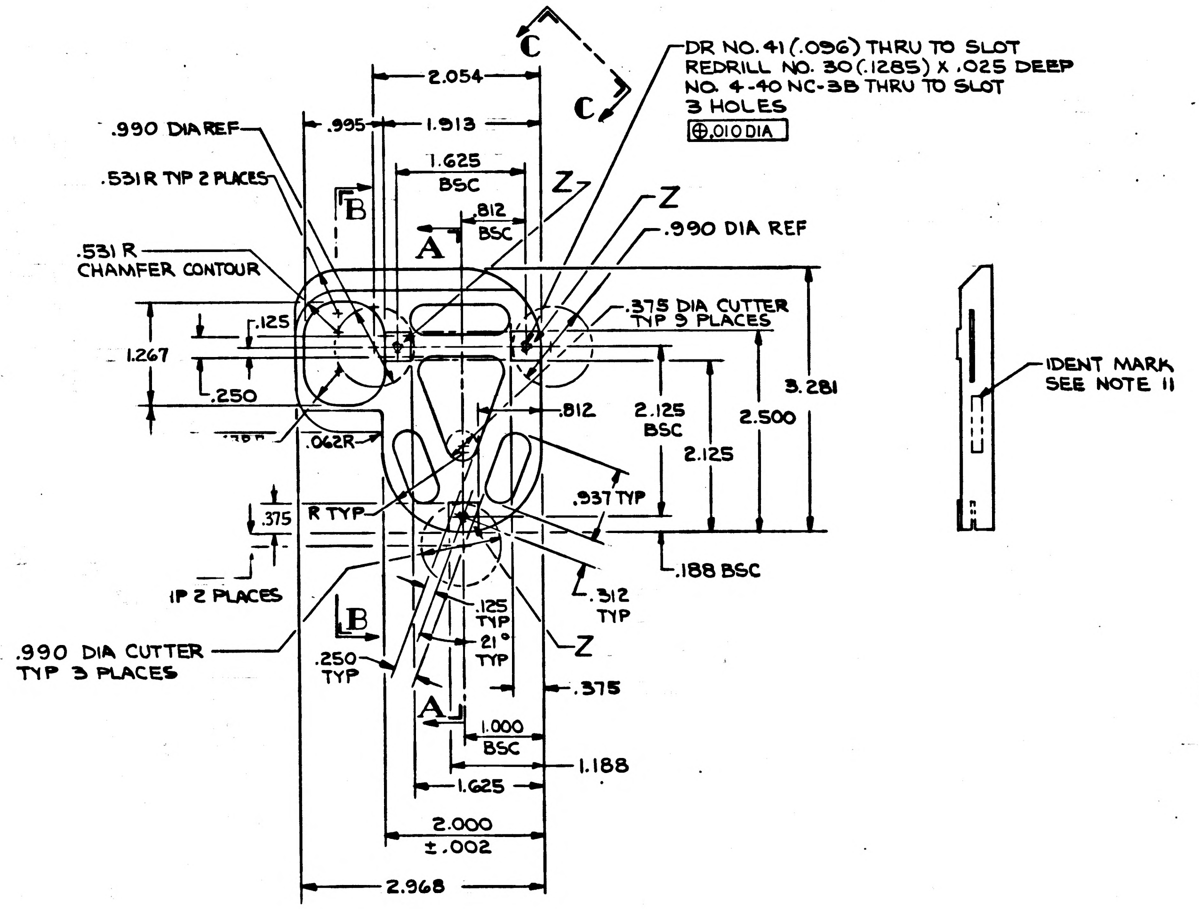


PARTIAL VIEW C-C

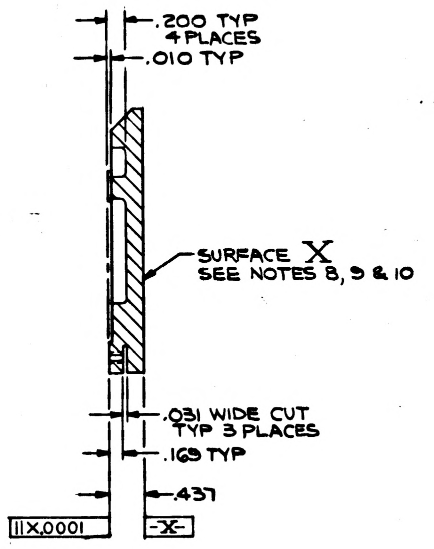


.218
.165 REF
.250
45°
45°
.281

SECTION B-B



C
C
2.054
DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
.990 DIA REF
.995
1.913
.531 R TYP 2 PLACES
1.625 BSC
B
.812 BSC
A
Z
Z
.990 DIA REF
.531 R CHAMFER CONTOUR
.375 DIA CUTTER TYP 3 PLACES
.125
1.267
.250
3.281
.812
2.125 BSC
2.500
2.125
.062R
.937 TYP
.375
R TYP
.188 BSC
1P 2 PLACES
.312 TYP
.125 TYP
B
21° TYP
Z
.990 DIA CUTTER TYP 3 PLACES
.250 TYP
.375
A
1.000 BSC
1.188
1.625
2.000 ±.002
2.968
IDENT MARK SEE NOTE 11



.200 TYP 4 PLACES
.010 TYP
SURFACE X SEE NOTES 8, 9 & 10
.031 WIDE CUT TYP 3 PLACES
.169 TYP
.437
‖ X .0001
-X-

SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM ND 1002125 (SEE NOTE 4)
CONTRACT

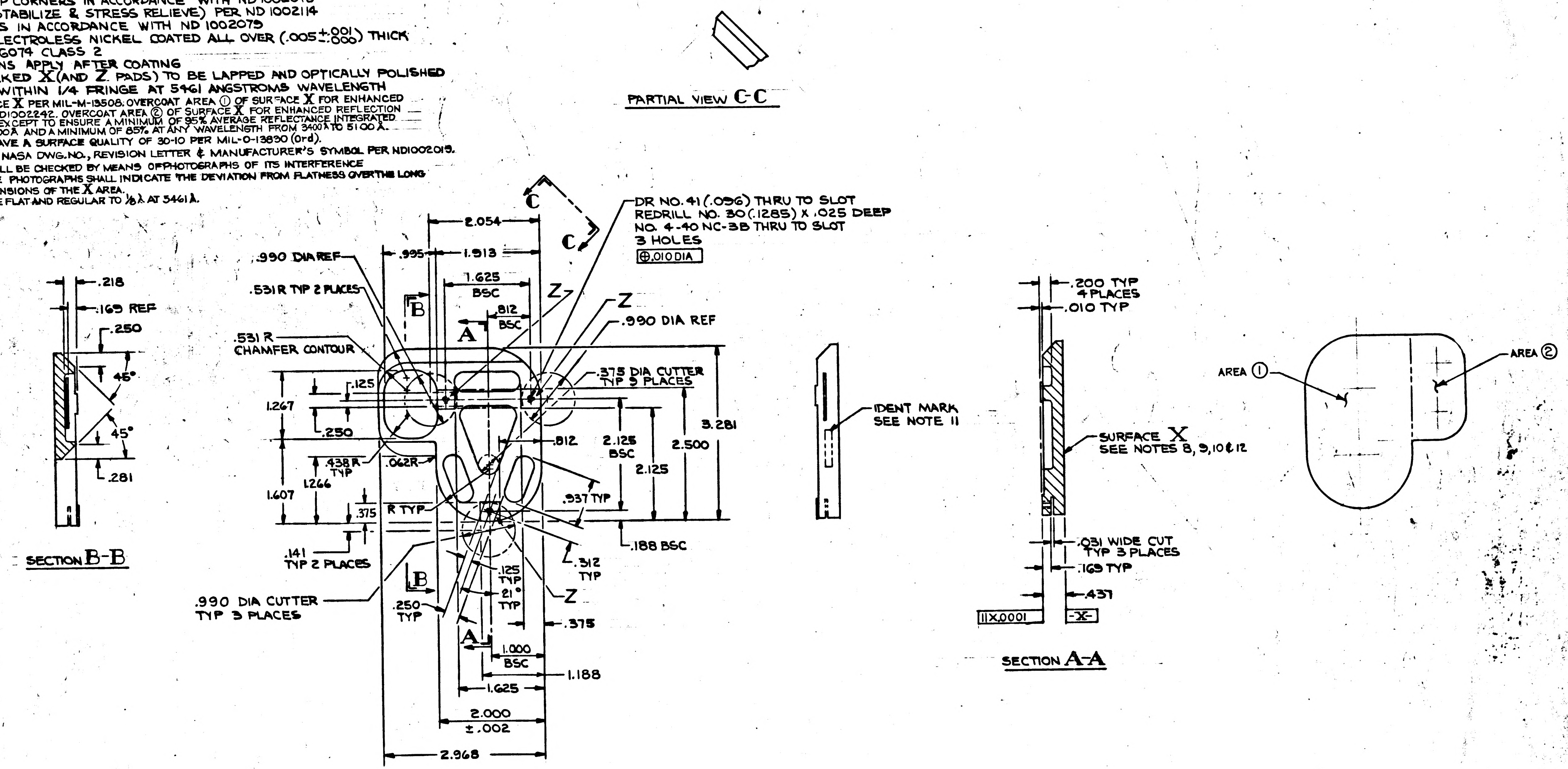
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140
DRAWN R. BRUNELLE DATE 5-15-64
CHECKED C. Langstaff 6-26-64
APPROVAL 6/26/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE MIRROR, INDEX, SEXTANT HEAD
CODE IDENT NO. SIZE D NASA NUMBER 2011259
SCALE 1/1 WEIGHT CALC ACTUAL SHEET OF

C	2011259

REVISIONS TDRR 079				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12839	8-19-64	wk
B		REVISED PER TDRR 15039	2-2-64	wk
C		REVISED PER TDRR 16659	11 Feb 65	wk

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002075
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE MARKED X (AND Z PADS) TO BE LAPPED AND OPTICALLY POLISHED TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X PER MIL-M-13508. OVERCOAT AREA ① OF SURFACE X FOR ENHANCED REFLECTION PER ND1002242. OVERCOAT AREA ② OF SURFACE X FOR ENHANCED REFLECTION PER ND1002242 EXCEPT TO ENSURE A MINIMUM OF 95% AVERAGE REFLECTANCE INTEGRATED FROM 3500 TO 4800Å AND A MINIMUM OF 85% AT ANY WAVELENGTH FROM 3400Å TO 5100Å.
10. SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord).
11. IDENITFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.
12. EACH MIRROR SHALL BE CHECKED BY MEANS OF PHOTOGRAPHS OF ITS INTERFERENCE PATTERN. THESE PHOTOGRAPHS SHALL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG AND SHORT DIMENSIONS OF THE X AREA.
    a) SURFACE TO BE FLAT AND REGULAR TO 1/8λ AT 5461Å.



PARTIAL VIEW C-C
C
C
DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
2.054
.995
1.913
1.625 BSC
.812 BSC
.990 DIA REF
.531R TYP 2 PLACES
.531R CHAMFER CONTOUR
B
A
Z
Z
.990 DIA REF
.375 DIA CUTTER TYP 3 PLACES
.125
1.267
.250
.438R TYP
1.266
.062R
1.607
.375
R TYP
.141 TYP 2 PLACES
.812
2.125 BSC
2.125
2.500
3.281
.937 TYP
.188 BSC
.312 TYP
.125 TYP
21° TYP
Z
.375
.250 TYP
.990 DIA CUTTER TYP 3 PLACES
B
A
1.000 BSC
1.625
1.188
2.000 ±.002
2.968
.218
.169 REF
.250
45°
45°
.281
SECTION B-B
IDENT MARK SEE NOTE 11
.200 TYP 4 PLACES
.010 TYP
SURFACE X SEE NOTES 8, 9, 10 & 12
.031 WIDE CUT TYP 3 PLACES
.169 TYP
.437
// X .0001
-X-
SECTION A-A
AREA ①
AREA ②

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011712	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140

DRAWN R. BRUNELLE DATE 5-15-64
CHECKED C. Langstaff 6-26-64
APPROVAL 6/26/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, INDEX,
SEXTANT HEAD

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011259

SCALE 1/1 WEIGHT CALC ACTUAL SHEET OF

MASTER

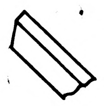
D 2011259

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12839	8-19-64	[illegible]
B		REVISED PER TDRR 15039	22Oct64	wh
C		REVISED PER TDRR 16659	11Feb65	wh
D		REVISED PER TDRR 21528	6/24/65	wh

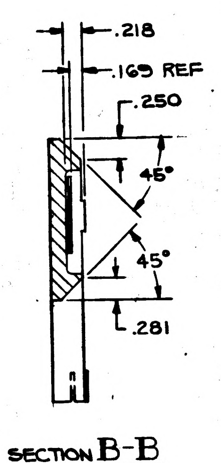
REVISIONS TDRR 10793

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   - a) 63√ FINISH ALL OVER
   - b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE "X" TO BE OPTICALLY POLISHED AREA "1" TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS, AREA "2" TO BE FLAT WITHIN 1 FRINGE AT 5461 ANGSTROMS.
9. HEAT TREAT (STABILIZE & STRESS RELIEVE) PRIOR TO NOTE 10, TO MEET FLATNESS TOLERENCE PER NOTE 8 AS FOLLOWS
   - a) HEAT MIRROR FROM ROOM TEMPERATURE TO $600°F^{+0°}_{-20°}F$ AT THE RATE OF 100°F ±10°F PER HOUR.
   - b) HOLD TEMPERATURE OF $600°F^{+0°}_{-20°}F$ FOR 1½ HOURS.
   - c) COOL AT THE RATE OF 100°F ±10°F PER HOUR TO ROOM TEMPERATURE.
   - d) RE-CHECK FOR COMPLIANCE TO NOTE 8 AT 70°F ±5°F.
   - e) REPOLISH AS REQUIRED TO COMPLY TO NOTE 8.
   - f) REPEAT HEAT CYCLE IF REWORK IN STEP "e" EXCEEDED ½ FRINGE.



PARTIAL VIEW C-C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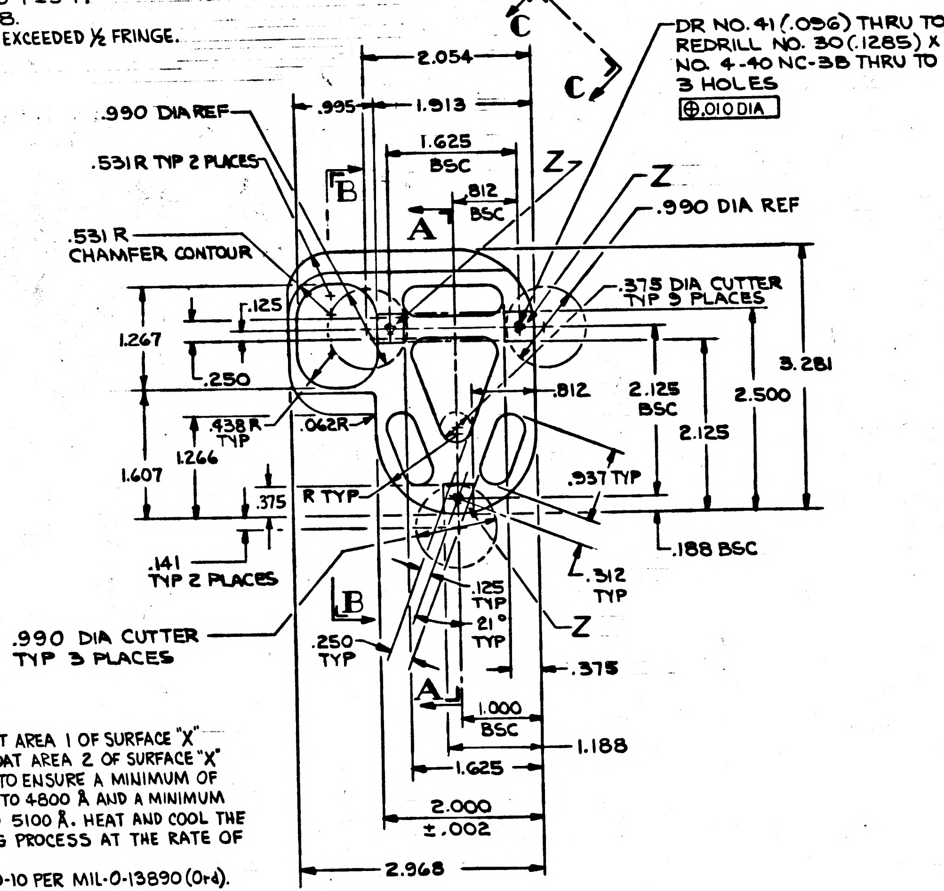
SECTION B-B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DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
2.054
.995
1.913
.990 DIA REF
.531R TYP 2 PLACES
1.625 BSC
.812 BSC
B
A
Z
Z
.990 DIA REF
.531 R CHAMFER CONTOUR
.125
.375 DIA CUTTER TYP 3 PLACES
1.267
.250
3.281
.438R TYP
2.125 BSC
2.500
.062R
.812
2.125
1.266
1.607
.375
R TYP
.937 TYP
.141 TYP 2 PLACES
.188 BSC
.312 TYP
B
.125 TYP
21° TYP
Z
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.375
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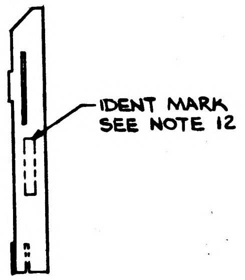
1.000 BSC
1.188
1.625
2.000 ±.002
2.968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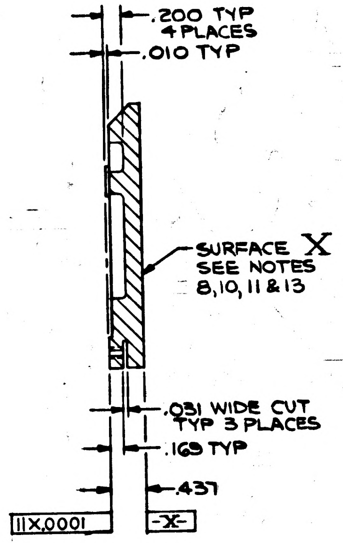
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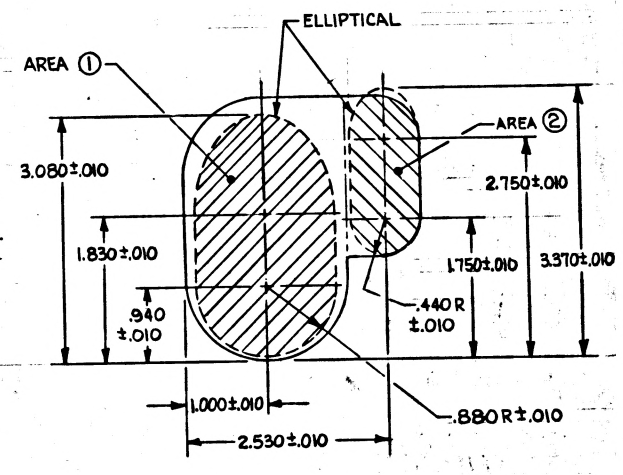
.010 TYP
SURFACE X SEE NOTES 8,10,11 & 13
.031 WIDE CUT TYP 3 PLACES
.165 TYP
.437
11 X .0001
-X-

SECTION A-A


ELLIPTICAL
AREA ①
AREA ②
3.080 ±.010
2.750 ±.010
1.830 ±.010
1.750 ±.010
3.370 ±.010
.940 ±.010
.440 R ±.010
1.000 ±.010
.880 R ±.010
2.530 ±.010

10. ALUMINIZE SURFACE "X" PER MIL-M-13508. OVERCOAT AREA 1 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242. OVERCOAT AREA 2 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242 EXCEPT TO ENSURE A MINIMUM OF 95% AVERAGE REFLECTANCE INTEGRATED FROM 3500 TO 4800 Å AND A MINIMUM OF 85% AT ANY WAVELENGTH FROM 3400 Å TO 5100 Å. HEAT AND COOL THE MIRROR DURING THE ALUMINIZING AND COATING PROCESS AT THE RATE OF 100°F MAX PER HOUR.
11. SURFACE "X" TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord).
12. IDENTIFY USING NASA DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
13. EACH MIRROR SHALL BE CHECKED BY MEANS OF PHOTOGRAPHS OF ITS INTERFERENCE PATTERN. THESE PHOTOGRAPHS SHALL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG AND SHORT DIMENSIONS OF THE "X" AREA
    - a) SURFACE TO BE FLAT AND REGULAR TO 1/8 λ AT 5461 Å.
    - b) MEASUREMENT TO BE MADE AT 70° ±10°F.
14. "Z" PADS TO BE FLAT AND IN SAME PLANE WITHIN ½ FRINGE AT 5461 ANGSTROMS (NOTE - THIS MUST BE CHECKED USING A FLAT IN CONTACT WITH THE 3 PADS).

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140

DRAWN R BRUNELLE DATE 5-15-64
CHECKED C. Langstaff 6-26-64
APPROVAL [illegible] 6/26/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 7/2/64

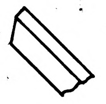
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

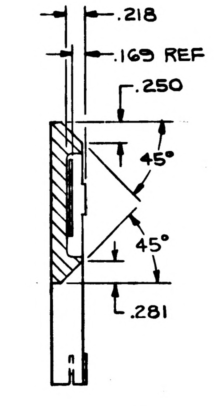
TITLE
MIRROR, INDEX,
SEXTANT HEAD

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011259
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET
OF

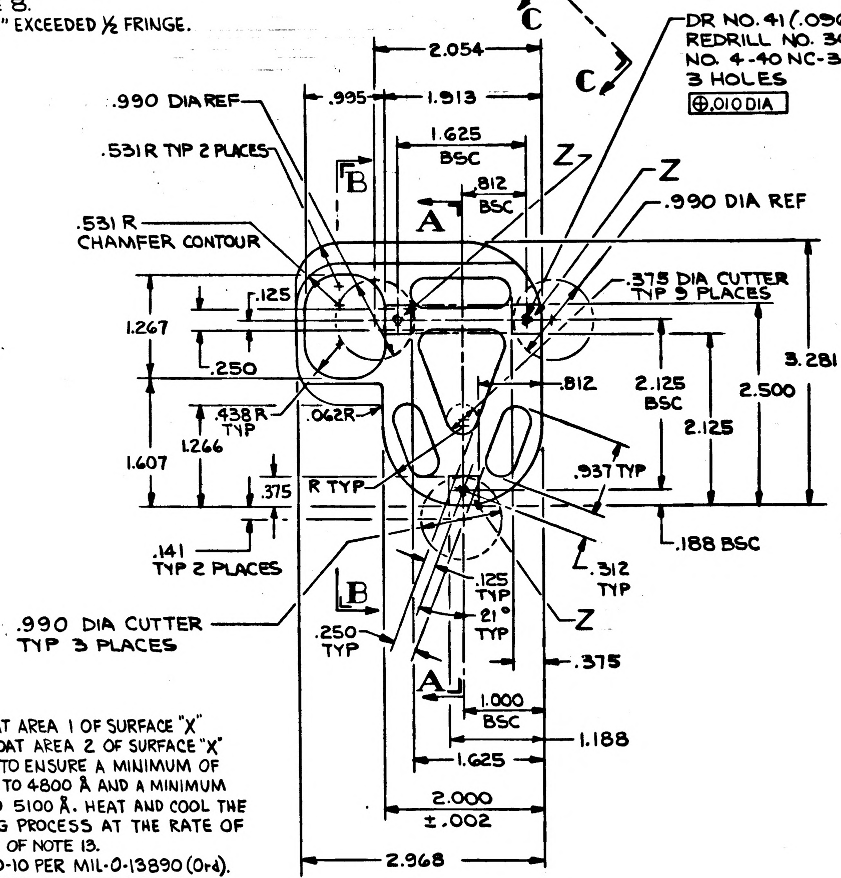
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
  a) 63/√ FINISH ALL OVER
  b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE "X" TO BE OPTICALLY POLISHED AREA "1" TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS, AREA "2" TO BE FLAT WITHIN 1 FRINGE AT 5461 ANGSTROMS.
9. HEAT TREAT (STABILIZE & STRESS RELIEVE) PRIOR TO NOTE 10, TO MEET FLATNESS TOLERANCE PER NOTE 8 AS FOLLOWS
  a) HEAT MIRROR FROM ROOM TEMPERATURE TO $600°F^{+0°}_{-20°}$F AT THE RATE OF 100°F ±10°F PER HOUR.
  b) HOLD TEMPERATURE OF $600°F^{+0°}_{-20°}$F FOR 1½ HOURS.
  c) COOL AT THE RATE OF 100°F ±10°F PER HOUR TO ROOM TEMPERATURE.
  d) RE-CHECK FOR COMPLIANCE TO NOTE 8 AT 70°F ±5°F.
  e) REPOLISH AS REQUIRED TO COMPLY TO NOTE 8.
  f) REPEAT HEAT CYCLE IF REWORK IN STEP "e" EXCEEDED ½ FRINGE.

PARTIAL VIEW C-C




.218
.169 REF
.250
45°
45°
.281

SECTION B-B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2.054
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BSC
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BSC
B
A
Z
Z
.990 DIA REF
.531R
CHAMFER CONTOUR
.125
.375 DIA CUTTER
TYP 3 PLACES
1.267
.250
.812
2.125
BSC
2.500
3.281
2.125
.438R
TYP
.062R
1.266
1.607
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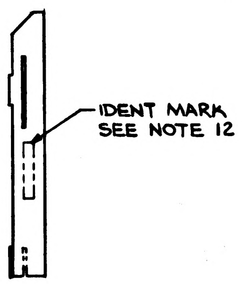
R TYP
.937 TYP
.188 BSC
.141
TYP 2 PLACES
.312
TYP
.125
TYP
21°
TYP
.250
TYP
B
Z
.375
A
1.000
BSC
1.188
1.625
2.000
±.002
2.968

DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA

.990 DIA CUTTER
TYP 3 PLACES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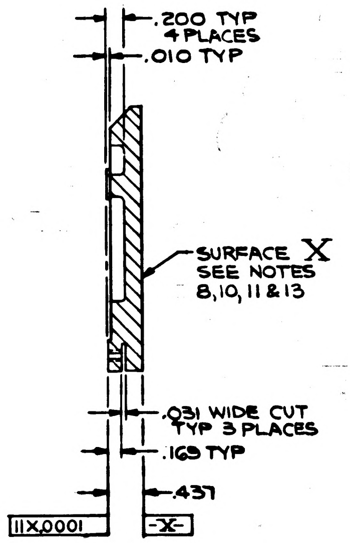
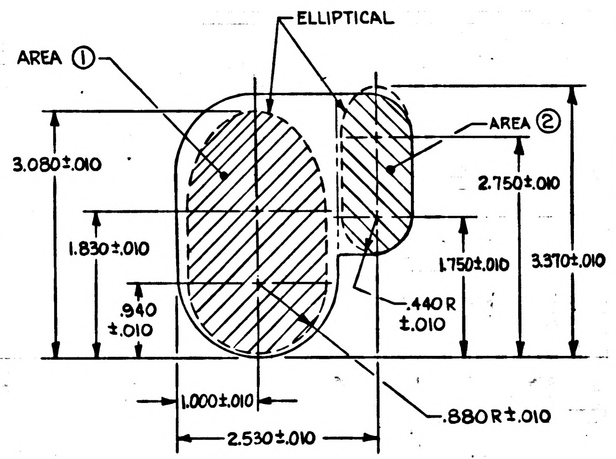
SEE NOTE 12


.200 TYP
4 PLACES
.010 TYP
SURFACE X
SEE NOTES
8, 10, 11 & 13
.031 WIDE CUT
TYP 3 PLACES
.169 TYP
.437
11 X .0001
-X-

SECTION A-A


ELLIPTICAL
AREA ①
AREA ②
3.080±.010
2.750±.010
1.830±.010
1.750±.010
3.370±.010
.940
±.010
.440R
±.010
1.000±.010
.880R±.010
2.530±.010

10. ALUMINIZE SURFACE "X" PER MIL-M-13508. OVERCOAT AREA 1 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242. OVERCOAT AREA 2 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242 EXCEPT TO ENSURE A MINIMUM OF 95% AVERAGE REFLECTANCE INTEGRATED FROM 3500 TO 4800 Å AND A MINIMUM OF 85% AT ANY WAVELENGTH FROM 3400 Å TO 5100 Å. HEAT AND COOL THE MIRROR DURING THE ALUMINIZING AND COATING PROCESS AT THE RATE OF 100°F MAX PER HOUR TO MEET THE TOLERANCE OF NOTE 13.
11. SURFACE "X" TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-0-13890 (Ord).
12. IDENTIFY USING NASA DWG NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
13. EACH MIRROR SHALL BE CHECKED BY MEANS OF PHOTOGRAPHS OF ITS INTERFERENCE PATTERN. THESE PHOTOGRAPHS SHALL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG AND SHORT DIMENSIONS OF THE "X" AREA
  a) SURFACE AREA #1 TO BE FLAT & REGULAR TO $\frac{1}{8}\lambda$ & AREA #2 TO BE FLAT & REGULAR TO $\frac{1}{2}\lambda$ AT 5461 Å.
  b) MEASUREMENT TO BE MADE AT 70° ± 10°F.
14. "[illegible]" PADS TO BE FLAT AND IN SAME PLANE WITHIN ½ FRINGE AT 5461 ANGSTROMS (NOTE- THIS MUST BE CHECKED USING A FLAT IN CONTACT WITH THE 3 PADS).

E 2011259

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12899	8-19-64	[illegible]
B		REVISED PER TDRR 15039	[illegible] 64	WK
C		REVISED PER TDRR 16659	18 Feb 65	WK
D		REVISED PER TDRR 21528	8/24/65	WK
E		REVISED PER TDRR 24893	1/4/66	WK

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND 1002125 (SEE NOTE 4)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140
DRAWN R BRUNELLE DATE 5-15-64
CHECKED C. [illegible] 6-26-64
APPROVAL [illegible] 6/26/64
APPROVAL E. [illegible] 7/1/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: MIRROR, INDEX, SEXTANT HEAD

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011259
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET
OF

MASTER

E-158

2011259 F

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\sqrt[63]{}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
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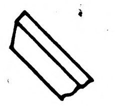
   b) HOLD TEMPERATURE OF $600°F^{+0°}_{-20°}F$ FOR 1½ HOURS.
   c) COOL AT THE RATE OF 100°F ±10°F PER HOUR TO ROOM TEMPERATURE.
   d) RE-CHECK FOR COMPLIANCE TO NOTE 8 AT 70°F ±5°F.
   e) REPOLISH AS REQUIRED TO COMPLY TO NOTE 8.
   f) REPEAT HEAT CYCLE IF REWORK IN STEP "e" EXCEEDED ½ FRINGE.



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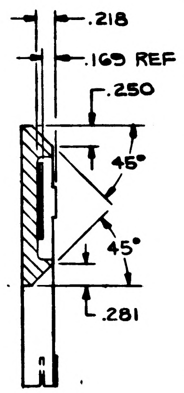
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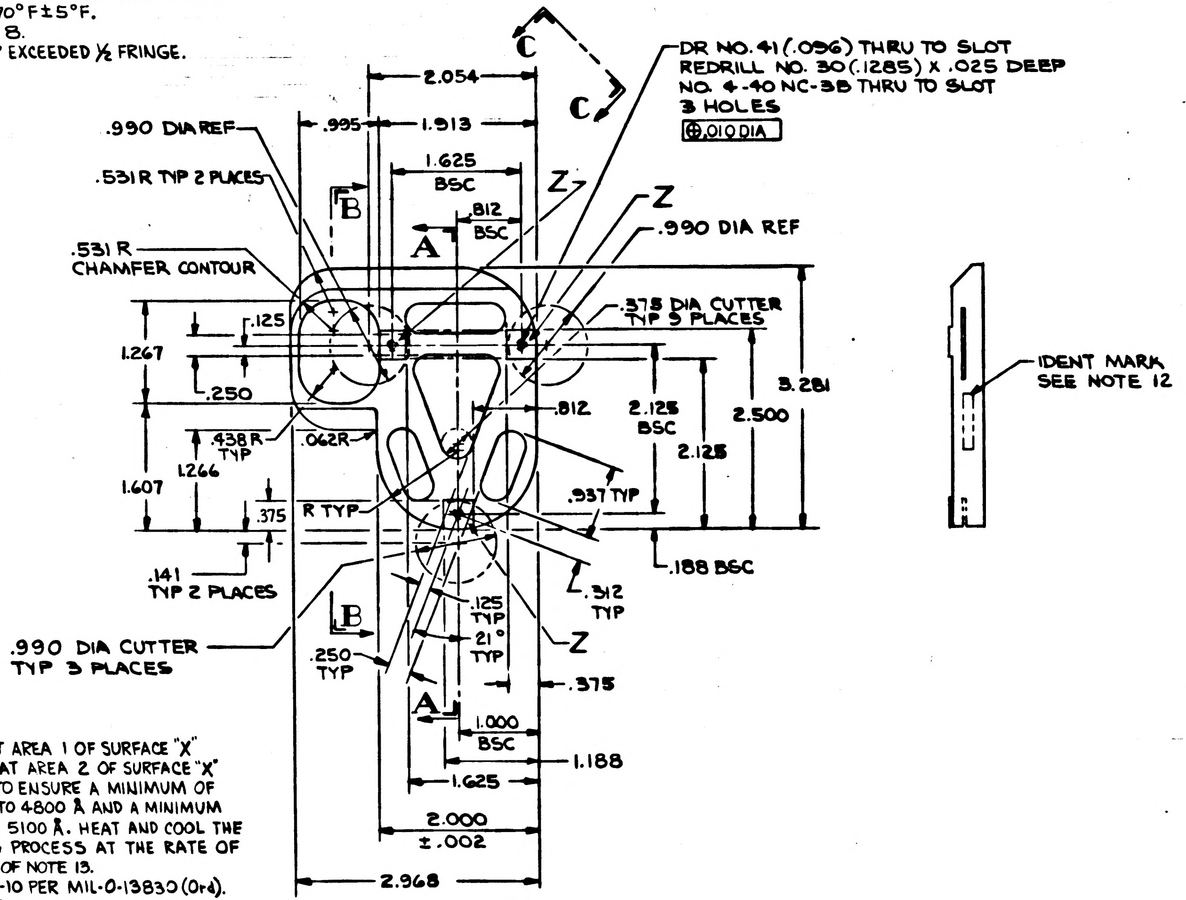
SECTION B-B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.995
1.913
.531R TYP 2 PLACES
1.625 BSC
.812 BSC
B
A
Z
Z
.990 DIA REF
DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
.531 R
CHAMFER CONTOUR
.375 DIA CUTTER TYP 9 PLACES
.125
1.267
.250
.812
2.125 BSC
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.438R TYP
.062R
1.266
1.607
.375
R TYP
.937 TYP
.141 TYP 2 PLACES
.188 BSC
.312 TYP
.990 DIA CUTTER TYP 3 PLACES
B
.125 TYP
21° TYP
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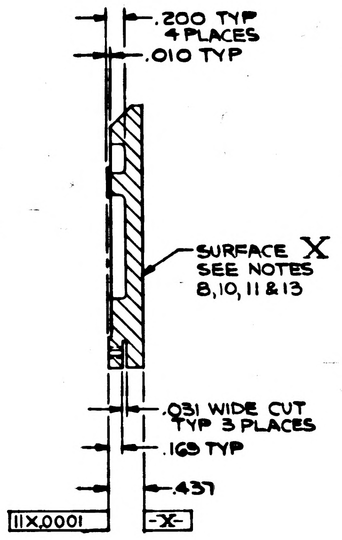
A
1.000 BSC
1.188
1.625
2.000 ±.002
2.968
IDENT MARK
SEE NOTE 12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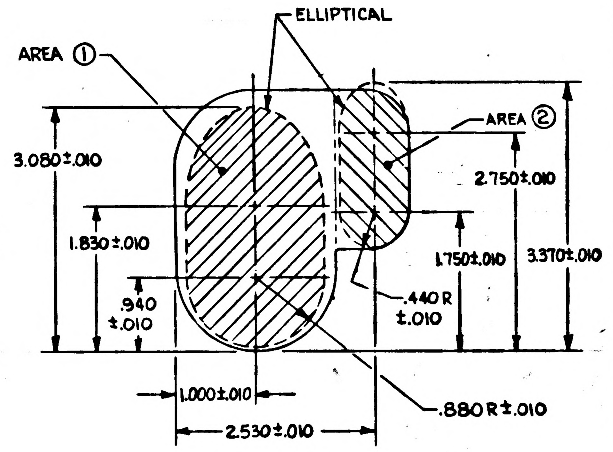
SURFACE X
SEE NOTES 8, 10, 11 & 13
.031 WIDE CUT TYP 3 PLACES
.169 TYP
.437
11 X .0001
-X-

SECTION A-A


ELLIPTICAL
AREA ①
AREA ②
3.080±.010
1.830±.010
.940 ±.010
2.750±.010
1.750±.010
3.370±.010
.440 R ±.010
1.000±.010
2.530±.010
.880R±.010

10. ALUMINIZE SURFACE "X" PER MIL-M-13508. OVERCOAT AREA 1 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242. OVERCOAT AREA 2 OF SURFACE "X" FOR ENHANCED REFLECTION PER ND1002242 EXCEPT TO ENSURE A MINIMUM OF 95% AVERAGE REFLECTANCE INTEGRATED FROM 3500 TO 4800 Å AND A MINIMUM OF 85% AT ANY WAVELENGTH FROM 3400 Å TO 5100 Å. HEAT AND COOL THE MIRROR DURING THE ALUMINIZING AND COATING PROCESS AT THE RATE OF 100°F MAX PER HOUR TO MEET THE TOLERANCE OF NOTE 13.
11. SURFACE "X" TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord).
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
13. EACH MIRROR SHALL BE CHECKED BY MEANS OF PHOTOGRAPHS OF ITS INTERFERENCE PATTERN. THESE PHOTOGRAPHS SHALL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG AND SHORT DIMENSIONS OF THE "X" AREA
    a) SURFACE AREA #1 TO BE FLAT & REGULAR TO $\frac{1}{8}\lambda$ & AREA #2 TO BE FLAT & REGULAR TO $\frac{1}{2}\lambda$ AT 5461 Å.
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14. "Z" PADS TO BE FLAT AND IN SAME PLANE WITHIN ½ FRINGE AT 5461 ANGSTROMS (NOTE - THIS MUST BE CHECKED USING A FLAT IN CONTACT WITH THE 3 PADS).

REVISIONS TDRR 10193

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12839	8-19-64	WK
B		REVISED PER TDRR 15039	12/2/64	WK
C		REVISED PER TDRR 16659	11 Feb 65	WK
D		REVISED PER TDRR 21528	6/24/65	WK
E		REVISED PER TDRR 24893	1/4/66	WK
F		REVISED PER TDRR 30828	8/29/66	[illegible]

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910140

DRAWN R. BRUNELLE DATE 5-15-64
CHECKED C. Langstaff 6-26-64
APPROVAL [illegible] 6/26/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, INDEX,
SEXTANT HEAD

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011259
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF

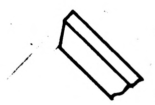
MASTE

2011259 E

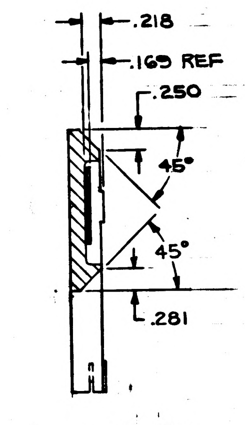
2011259

SYM	ZONE	REVISIONS TOPP 10/93 DESCRIPTION	DATE	APPROVAL

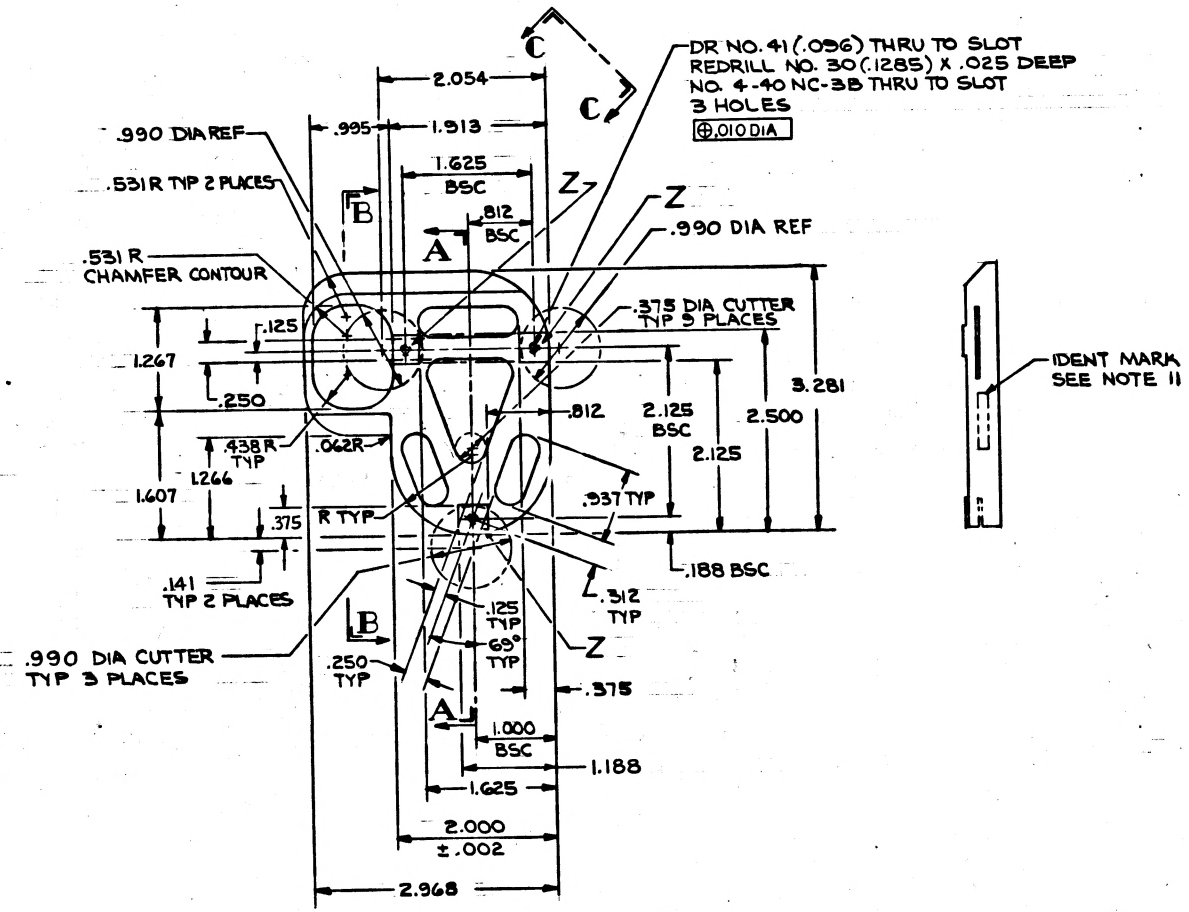
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\overset{63}{\surd}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$) THICK PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING
8. SURFACE MARKED X (AND Z PADS) TO BE LAPPED AND OPTICALLY POLISHED TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508(Ord)
10. SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830(Ord)
11. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

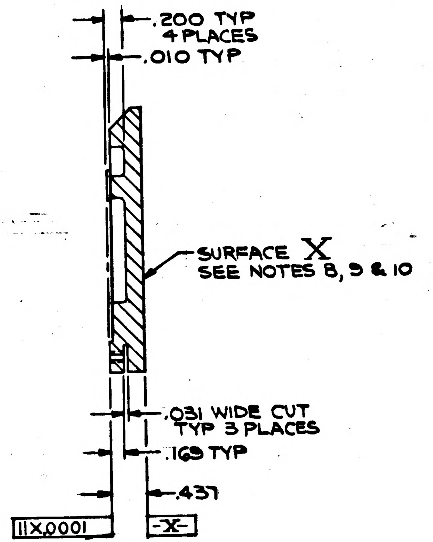


PARTIAL VIEW C-C


.218
.169 REF
.250
45°
45°
.281

SECTION B-B


C
C
2.054
.995
1.913
.990 DIA REF
.531R TYP 2 PLACES
1.625 BSC
.812 BSC
B
A
Z
Z
.990 DIA REF
DR NO. 41 (.096) THRU TO SLOT
REDRILL NO. 30 (.1285) X .025 DEEP
NO. 4-40 NC-3B THRU TO SLOT
3 HOLES
⊕ .010 DIA
.531 R CHAMFER CONTOUR
.375 DIA CUTTER TYP 9 PLACES
.125
1.267
.250
.812
2.125 BSC
2.125
2.500
3.281
.438R TYP
.062R
1.266
1.607
.375
R TYP
.937 TYP
.188 BSC
.141 TYP 2 PLACES
.312 TYP
B
.125 TYP
69° TYP
Z
.990 DIA CUTTER TYP 3 PLACES
.250 TYP
.375
A
1.000 BSC
1.188
1.625
2.000 ±.002
2.968
IDENT MARK SEE NOTE 11


.200 TYP 4 PLACES
.010 TYP
SURFACE X SEE NOTES 8, 9 & 10
.031 WIDE CUT TYP 3 PLACES
.169 TYP
.437
∥ X .0001
-X-

SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011712 NEXT ASSY	2011000 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± 1° DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 5238691O140	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL BERYLLIUM ND 1002125 (SEE NOTE 4)	DRAWN R. BRUNELLE DATE 5-19-64 CHECKED C. Lang 6-26-64 APPROVAL 6/24/64 APPROVAL 7/1/64	TITLE MIRROR, INDEX, SEXTANT HEAD
		CONTRACT	NASA APPROVAL	CODE IDENT NO. — SIZE D — NASA NUMBER 2011259
			MIT APPROVAL 7/2/64	SCALE 1/1 — WEIGHT — CALC ACTUAL — SHEET — OF

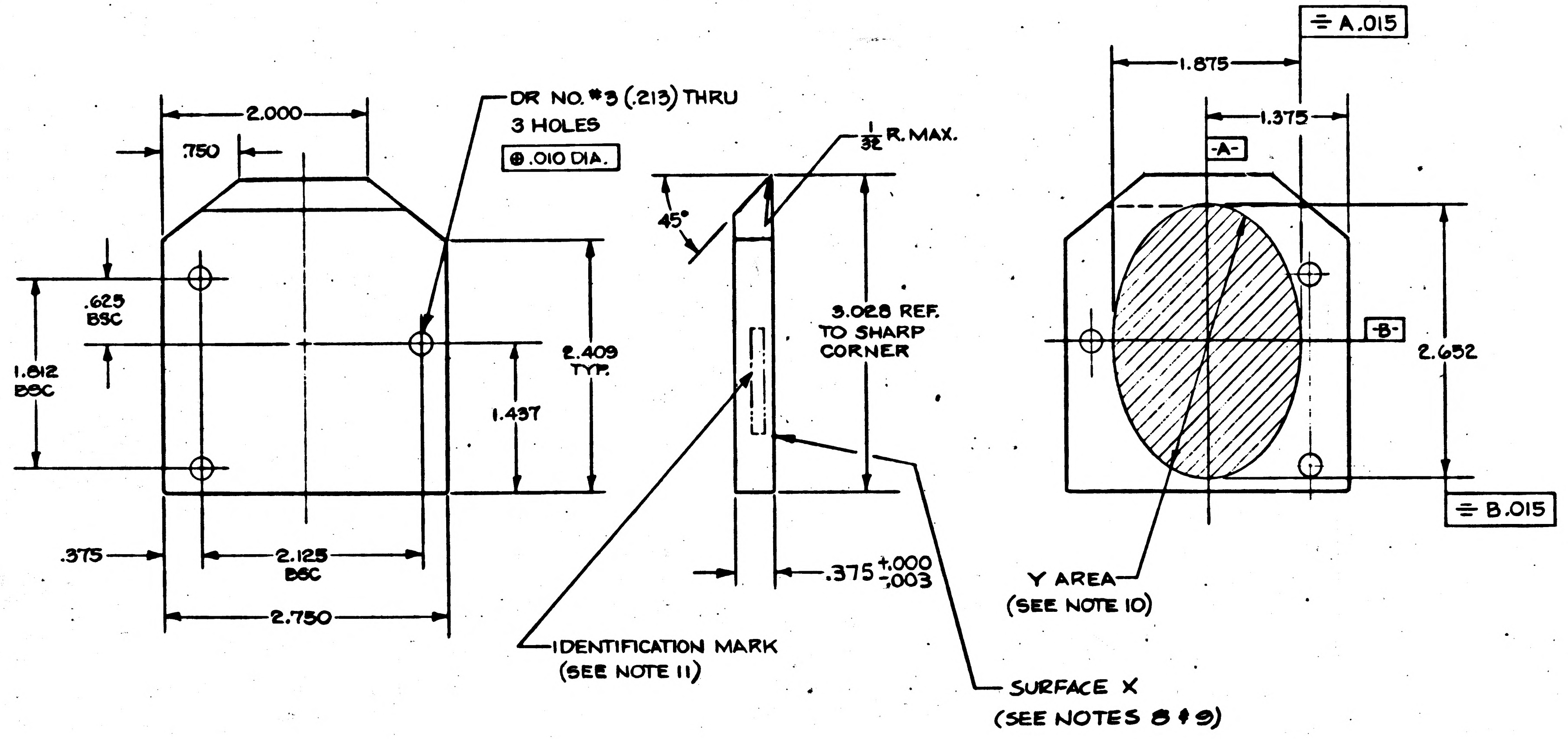
INCHES
0 1 2
PHOTOGRAPHIC SCALE CHECK

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12837	8-19-64	WK 9/23/64

2011260 A

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
    a. ▽ FINISH ALL OVER.
    b. ROUND OFF EDGES .015 R. MIN.
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING.
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH.
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord).
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-0-13830 (Ord). TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019



2.000
.750
DR NO. #3 (.213) THRU
3 HOLES
⊕ .010 DIA.
.625 BSC
1.812 BSC
2.409 TYP.
1.437
.375
2.125 BSC
2.750
45°
1/32 R. MAX.
3.028 REF. TO SHARP CORNER
.375 +.000 -.003
IDENTIFICATION MARK
(SEE NOTE 11)
SURFACE X
(SEE NOTES 8 & 9)
= A .015
1.875
1.375
-A-
-B-
2.652
= B .015
Y AREA
(SEE NOTE 10)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED	DIMENSIONS ARE IN INCHES
TOL ON	FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING	
MATERIAL	BERYLLIUM ND1002125 (SEE NOTE 4)
CONTRACT	
KOLLSMAN INSTRUMENT CORPORATION	ELMHURST NEW YORK
KIC PN	52386910380
DRAWN	J. Schiller DATE 4-2-64
CHECKED	T. Sullivan 6-25-64
APPROVAL	6/23/64
APPROVAL	E. Thomp 7/1/64
NASA APPROVAL	
MIT APPROVAL	7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE

MIRROR, SEXTANT HEAD

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011260
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

E-184

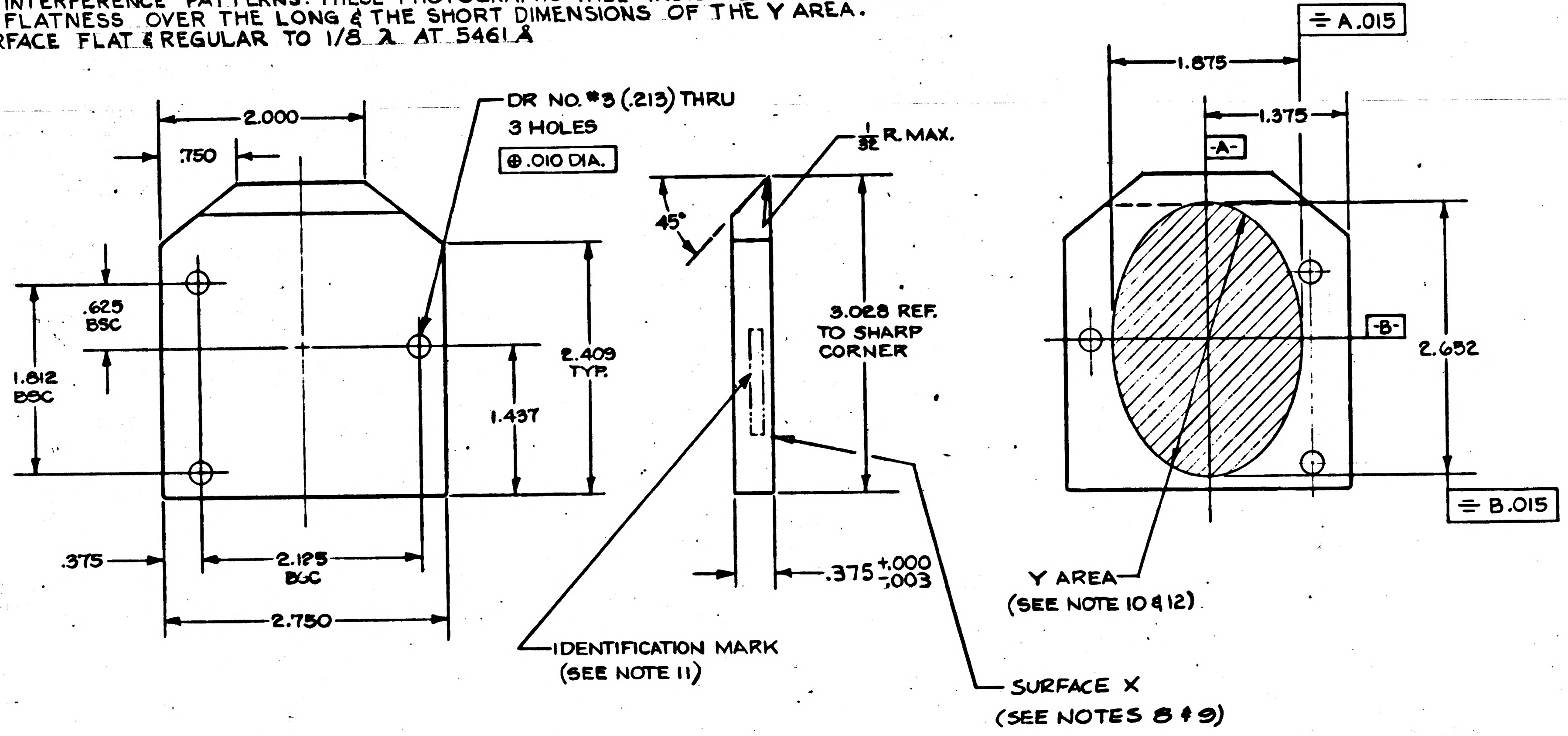
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011260 B

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12837	8-19-64	WK 9/23/64
B		REVISED PER TDRR NO. 16666	2/18/65	WK.

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. ▽ FINISH ALL OVER.
   b. ROUND OFF EDGES .015 R. MIN.
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER (.005 $^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING.
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH.
9. ALUMINIZE SURFACE X PER MIL-M-13508, OVERCOAT FOR ENHANCED REFLECTION PER ND1002242.
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord).
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURES SYMBOL PER ND1002019.
12. EACH LOT OF MIRRORS WILL BE CHECKED BY MEANS OF PHOTOGRAPHS OF THEIR INTERFERENCE PATTERNS. THESE PHOTOGRAPHS WILL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG & THE SHORT DIMENSIONS OF THE Y AREA.
    a) SURFACE FLAT & REGULAR TO 1/8 λ AT 5461 Å



2.000
.750
DR NO. #3 (.213) THRU
3 HOLES
⊕ .010 DIA.
.625 BSC
1.812 BSC
2.409 TYP.
1.437
.375
2.125 BSC
2.750
1/32 R. MAX.
45°
3.028 REF. TO SHARP CORNER
.375 +.000 -.003
IDENTIFICATION MARK (SEE NOTE 11)
SURFACE X (SEE NOTES 8 & 9)
1.875
1.375
⌯ A.015
-A-
-B-
2.652
⌯ B.015
Y AREA (SEE NOTE 10 & 12)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910380

DRAWN J. Schilling DATE 4-2-64
CHECKED J. Sullivan 6-25-64
APPROVAL 6/23/64
APPROVAL E. Thoma 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

CODE IDENT NO. | SIZE C | NASA NUMBER 2011260

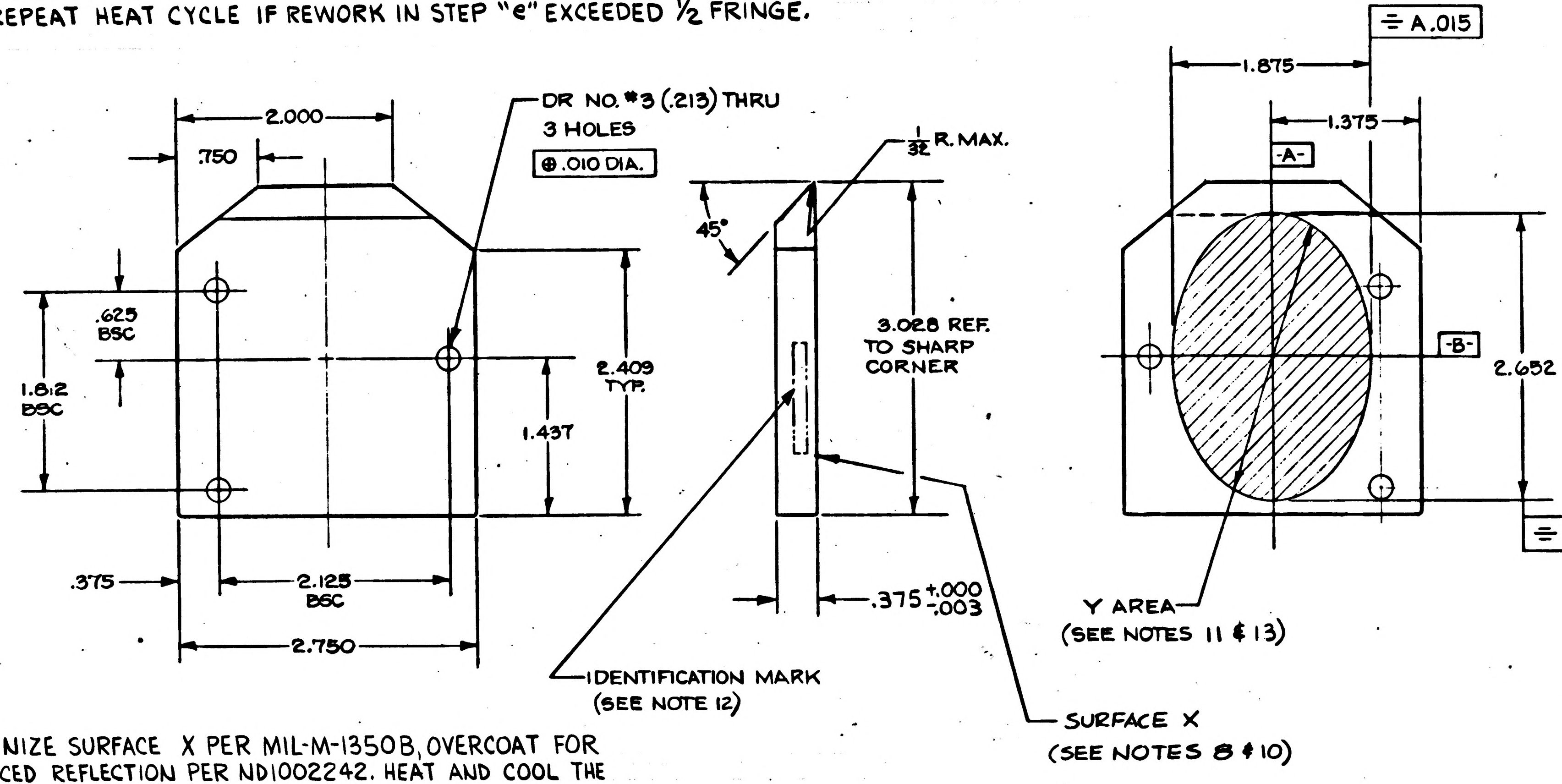
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

E-154

2011260 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 10793				
A		REVISED PER TDRR 12837	8-19-64	WK 9/23/64
B		REVISED PER TDRR NO. 16666	7/18/65	WK.
C		REVISED PER TDRR NO. 21529	8/24/65	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\nabla}$ FINISH ALL OVER.
   b. ROUND OFF EDGES .015 R. MIN.
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING.
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH.
9. HEAT TREAT (STABILIZE & STRESS RELIEVE) PRIOR TO NOTE 10, TO MEET FLATNESS TOLERANCE PER NOTE 8 AS FOLLOWS
   a) HEAT MIRROR FROM ROOM TEMPERATURE TO $600°F^{+0°}_{-20°}F$ AT THE RATE OF 100°F ± 10°F PER HOUR.
   b) HOLD TEMPERATURE OF $600°F^{+0°}_{-20°}F$ FOR 1½ HOURS.
   c) COOL AT THE RATE OF 100°F ± 10°F PER HOUR TO ROOM TEMPERATURE.
   d) RE-CHECK FOR COMPLIANCE TO NOTE 8 AT 70°F ± 5°F.
   e) REPOLISH AS REQUIRED TO COMPLY TO NOTE 8.
   f) REPEAT HEAT CYCLE IF REWORK IN STEP "e" EXCEEDED ½ FRINGE.



10. ALUMINIZE SURFACE X PER MIL-M-13508, OVERCOAT FOR ENHANCED REFLECTION PER ND1002242. HEAT AND COOL THE MIRROR DURING THE ALUMINIZING AND COATING PROCESS AT THE RATE OF 100°F MAX PER HOUR.
11. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord).
12. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
13. EACH LOT OF MIRRORS WILL BE CHECKED BY MEANS OF PHOTOGRAPHS OF THEIR INTERFERENCE PATTERNS. THESE PHOTOGRAPHS WILL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG & THE SHORT DIMENSIONS OF THE Y AREA.
   a) SURFACE FLAT & REGULAR TO 1/8 λ AT 5461 Å.
   b) MEASUREMENT TO BE MADE AT 70° ± 10°F.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910380

DRAWN J. Schiller DATE 4-2-64
CHECKED J. SULLIVAN 6-25-64
APPROVAL 6/23/64
APPROVAL E. Thoup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

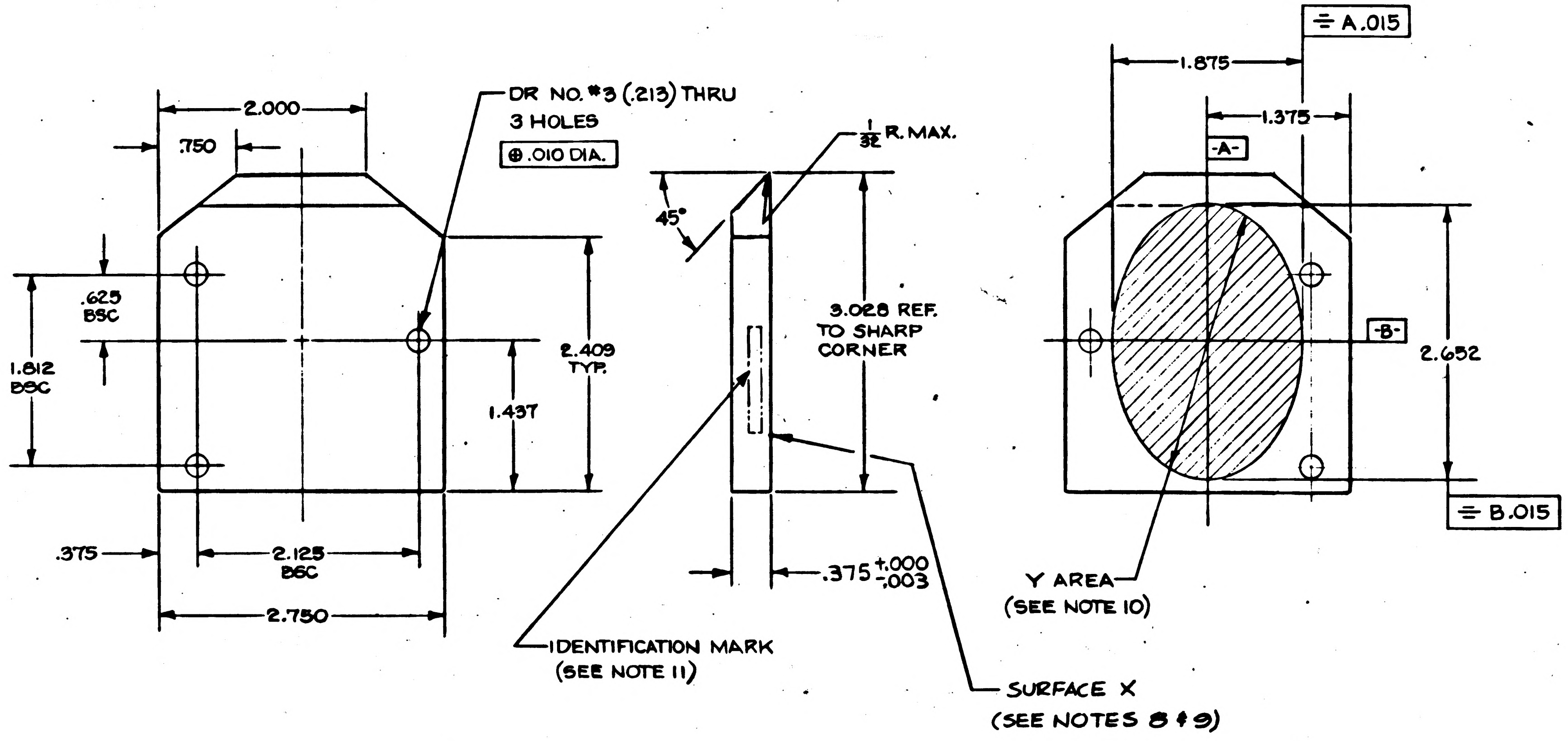
CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011260
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

SYM	ZONE	REVISIONS TDRR 10793 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\nabla}$ FINISH ALL OVER.
   b. ROUND OFF EDGES .015 R. MIN.
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER COATING.
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN ½ FRINGE AT 5461 ANGSTROMS WAVELENGTH.
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord).
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord). TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019


2.000
.750
DR NO. #3 (.213) THRU
3 HOLES
⊕ .010 DIA.
.625 BSC
1.812 BSC
2.409 TYP.
1.437
.375
2.125 BSC
2.750
45°
1/32 R. MAX.
3.028 REF. TO SHARP CORNER
.375 +.000 -.003
IDENTIFICATION MARK (SEE NOTE 11)
SURFACE X (SEE NOTES 8 & 9)
= A .015
1.875
1.375
-A-
-B-
2.652
= B .015
Y AREA (SEE NOTE 10)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910380

DRAWN J. Schiller DATE 4-2-64
CHECKED J. Sullivan 6-25-64
APPROVAL E. [illegible] 6/23/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL [illegible] 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

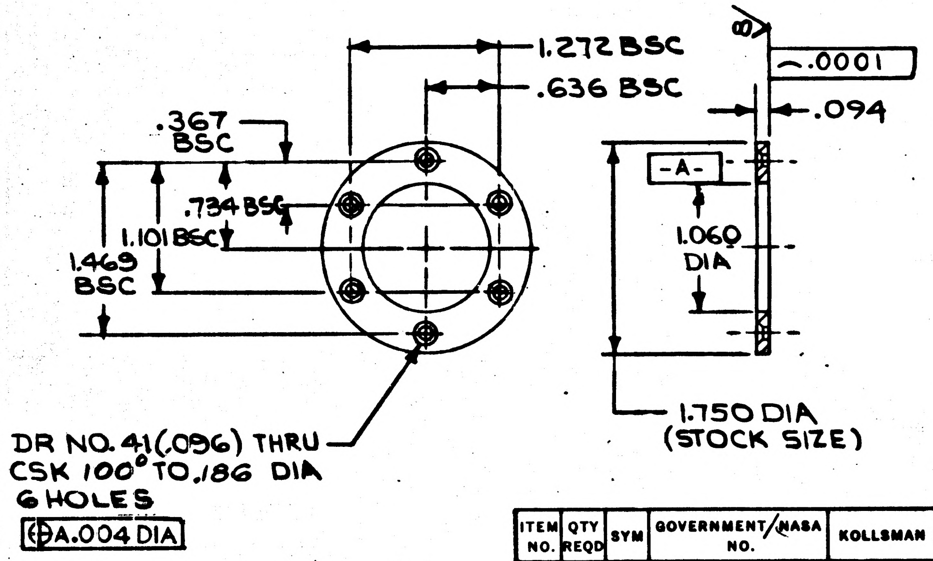
CODE IDENT NO.
SIZE C
NASA NUMBER 2011260
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011266

SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS 100-18			

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARD IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 100278
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. ANODIZE (SURFURIC) PER MIL-A-8625, TYPE II (KPS-1003P.200)



1.272 BSC
.636 BSC
.367 BSC
.734 BSC
1.101 BSC
1.469 BSC
.0001
.094
-A-
1.060 DIA
1.750 DIA (STOCK SIZE)
DR NO. 41 (.096) THRU
CSK 100° TO .186 DIA
6 HOLES
⌖ A .004 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910230

DRAWN F. Schiller DATE 4-2-64
CHECKED [illegible] 4/2/64
APPROVAL F. Rulschmann (ECT)
APPROVAL E. [illegible] 6-5-64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, BEARING

CODE IDENT NO.
SIZE B
NASA NUMBER 2011266
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF 1

INCHES
0 1 2

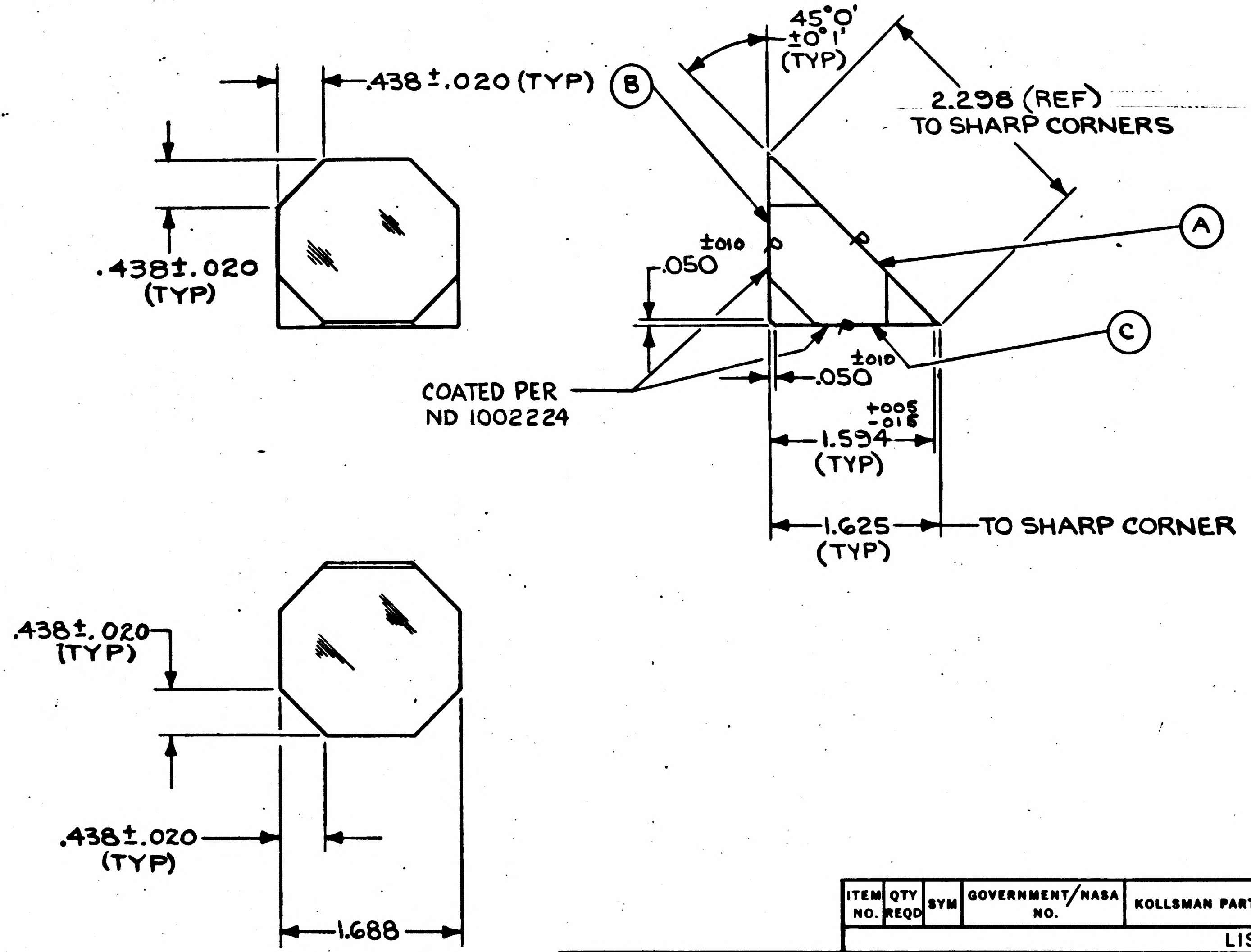
2011269

REVISIONS TARR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. ELEMENT IN ACCORD WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B, FINE ANNEALED
   TYPE 573-574.
4. SURFACE QUALITY: 60-40.
5. ERROR DUE TO PYRAMID, 2 MINUTES MAX.
6. CHAM 45°×.010 ALL EDGES, UNLESS OTHERWISE SPECIFIED.
7. SURFACES MARKED "P" POL, ALL OTHERS GRD.
8. SURFACES Ⓐ-1 FRNG TO TEST PLATE (½ FRNG IRREG)
   Ⓑ-2 FRNGS TO TEST PLATE (1 FRNG IRREG)
   Ⓒ-2 FRNGS TO TEST PLATE (1 FRNG IRREG)
9. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)



.438±.020 (TYP)
.438±.020 (TYP)
Ⓑ
45°0' ±0°1' (TYP)
2.298 (REF) TO SHARP CORNERS
Ⓐ
Ⓒ
P
P
P
.050 ±.010
.050 ±.010
COATED PER ND 1002224
1.594 +.005 -.015 (TYP)
1.625 (TYP) TO SHARP CORNER
.438±.020 (TYP)
.438±.020 (TYP)
1.688

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

2011734	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910260

DRAWN F. Schuller DATE 4-9-64
CHECKER 5/27/64
APPROVAL 5/28/64
APPROVAL 6-12-64
NASA APPROVAL
MIT APPROVAL 6/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, SMALL
SCT EYEPIECE

CODE IDENT NO. | SIZE C | NASA NUMBER 2011269
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

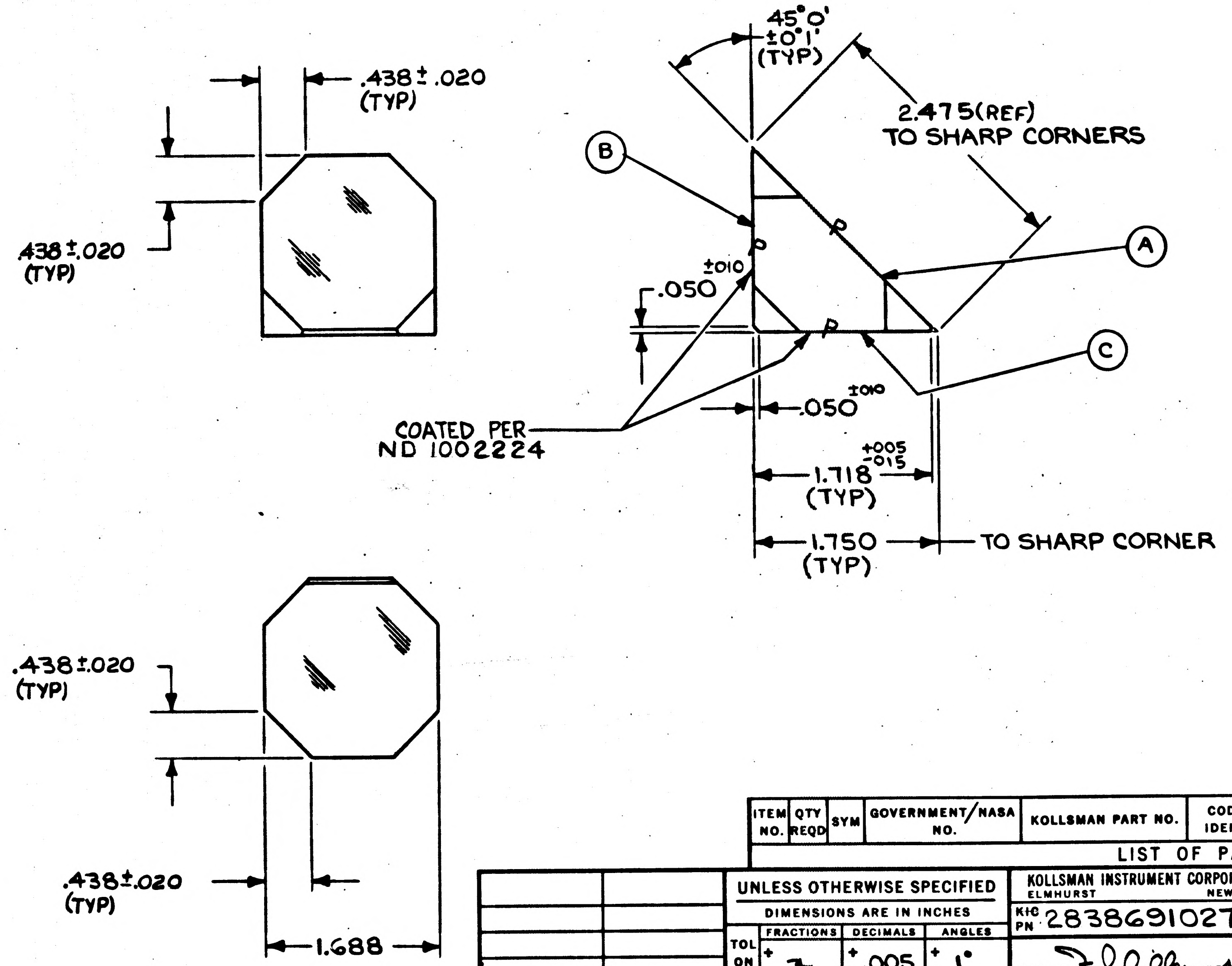
E-194

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011270

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. ELEMENT IN ACCORD WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B, FINE ANNEALED.
   TYPE 573,574.
4. SURFACE QUALITY: 60-40.
5. ERROR DUE TO PYRAMID, 2 MINUTES MAX.
6. CHAM 45°×.010 ALL EDGES, UNLESS OTHERWISE SPECIFIED.
7. SURFACES MARKED "P" POL, ALL OTHERS GRD.
8. SURFACES: Ⓐ - 1 FRNG TO TEST PLATE (½ FRNG IRREG.)
   Ⓑ - 2 FRNGS TO TEST PLATE (1 FRNG IRREG)
   Ⓒ - 2 FRNGS TO TEST PLATE (1 FRNG IRREG)
9. IDENTIFY USING NASA DWG. NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING)



.438±.020 (TYP)
.438±.020 (TYP)
45°0' ±0°1' (TYP)
2.475 (REF) TO SHARP CORNERS
Ⓑ
Ⓐ
Ⓒ
P
P
P
.050 ±.010
.050 ±.010
COATED PER ND 1002224
1.718 +.005 −.015 (TYP)
1.750 (TYP) TO SHARP CORNER
.438±.020 (TYP)
.438±.020 (TYP)
1.688

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011734	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910270
DRAWN DATE 4-9-64
CHECKED 6/1/64
APPROVAL 6/17/64
APPROVAL 6/16/64
NASA APPROVAL
MIT APPROVAL 6/10/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PRISM, LARGE
SCT EYEPIECE

CODE IDENT NO.
SIZE C
NASA NUMBER 2011270
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

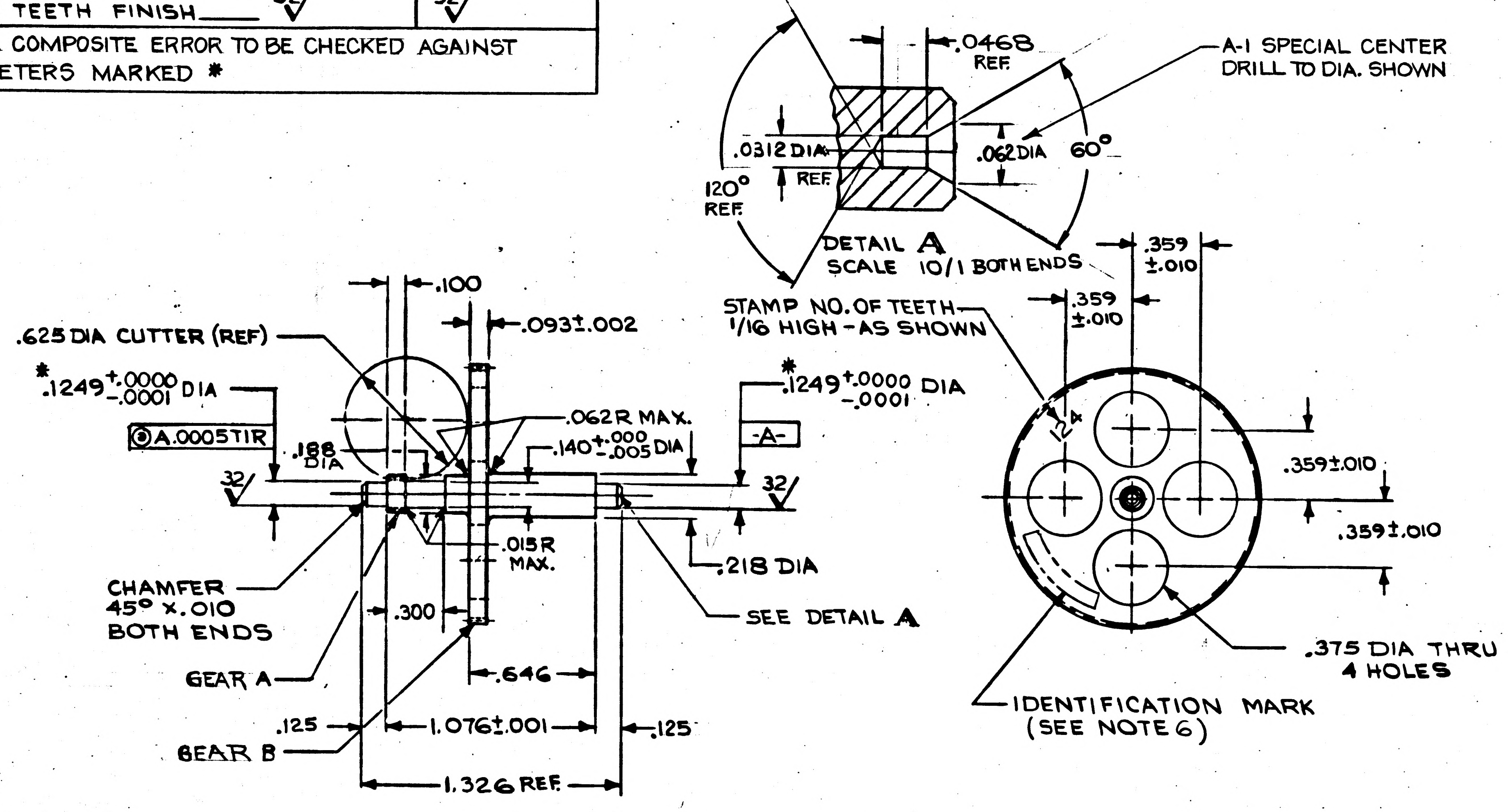
2011270

2011276

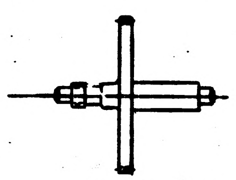
REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA	A	B
NO. OF TEETH	20	124
DIAMETRAL PITCH	120	96
PRESSURE ANGLE	20°	20°
PITCH DIA (STD)	.16667	1.29166
OUTSIDE DIA	$.1833^{+.0000}_{-.0015}$	$1.3125^{+.0000}_{-.0020}$
AGMA CLASS	PREC. 3D	PREC. 3D
GEAR TEETH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


.0468
REF.
A-1 SPECIAL CENTER DRILL TO DIA. SHOWN
.0312 DIA
REF.
.062 DIA
60°
120° REF.
DETAIL A
SCALE 10/1 BOTH ENDS
.359 ±.010
.359 ±.010
STAMP NO. OF TEETH 1/16 HIGH - AS SHOWN
124
.359±.010
.359±.010
.375 DIA THRU 4 HOLES
IDENTIFICATION MARK (SEE NOTE 6)
.100
.093±.002
.625 DIA CUTTER (REF)
*.1249 +.0000 -.0001 DIA
*.1249 +.0000 -.0001 DIA
A .0005 TIR
-A-
.188 DIA
.062R MAX.
.140 +.000 -.005 DIA
32
32
.015R MAX.
.218 DIA
CHAMFER 45° X .010 BOTH ENDS
.300
SEE DETAIL A
GEAR A
.646
.125
1.076±.001
.125
GEAR B
1.326 REF.

6 IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
5 PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO.5.4.1 (KPS 10051.200)
4 REMOVE BURRS IN ACCORDANCE WITH ND 1002079
3. UNLESS OTHERWISE SPECIFIED:
  a. 63√ FINISH ALL OVER
  b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
NOTES:



ACTUAL SIZE

MASTER

2011702	2011000
NEXT ASSY	USED ON
APPLICATION	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 - CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910270

DRAWN E. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL 6/5/64
APPROVAL E. Mmy 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
20T/120P — 124T/96P

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011276

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011276

S-8

E-184

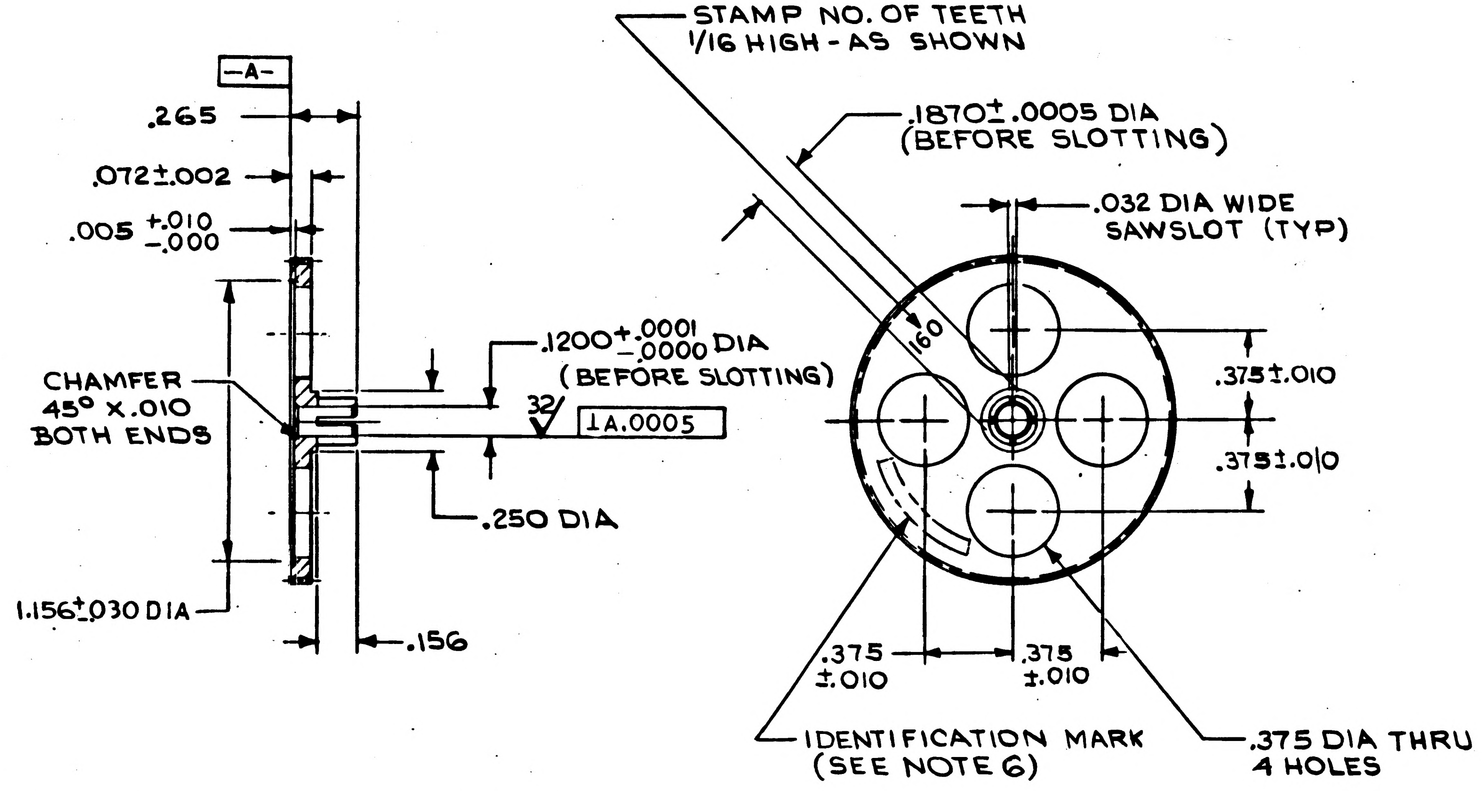
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011277

REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

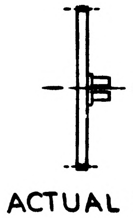
NO. OF TEETH	160
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIA	1.33333
OUSIDE DIA	1.3500 +.0000 −.0015
AGMA CLASS	PREC. 3D
GEAR TEETH FINISH	32√



STAMP NO. OF TEETH 1/16 HIGH - AS SHOWN
-A-
.265
.072±.002
.005 +.010 −.000
.1870±.0005 DIA (BEFORE SLOTTING)
.032 DIA WIDE SAWSLOT (TYP)
CHAMFER 45° X .010 BOTH ENDS
.1200 +.0001 −.0000 DIA (BEFORE SLOTTING)
32√ ⊥A.0005
160
.375±.010
.375±.010
.250 DIA
1.156±.030 DIA
.156
.375 ±.010
.375 ±.010
IDENTIFICATION MARK (SEE NOTE 6)
.375 DIA THRU 4 HOLES

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1 (KPS 10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 33386910280

DRAWN E. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 6-25-64
APPROVAL
APPROVAL E. Thorup 7-7-64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR SPUR
160T/120P

CODE IDENT NO.
SIZE C
NASA NUMBER 2011277

SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

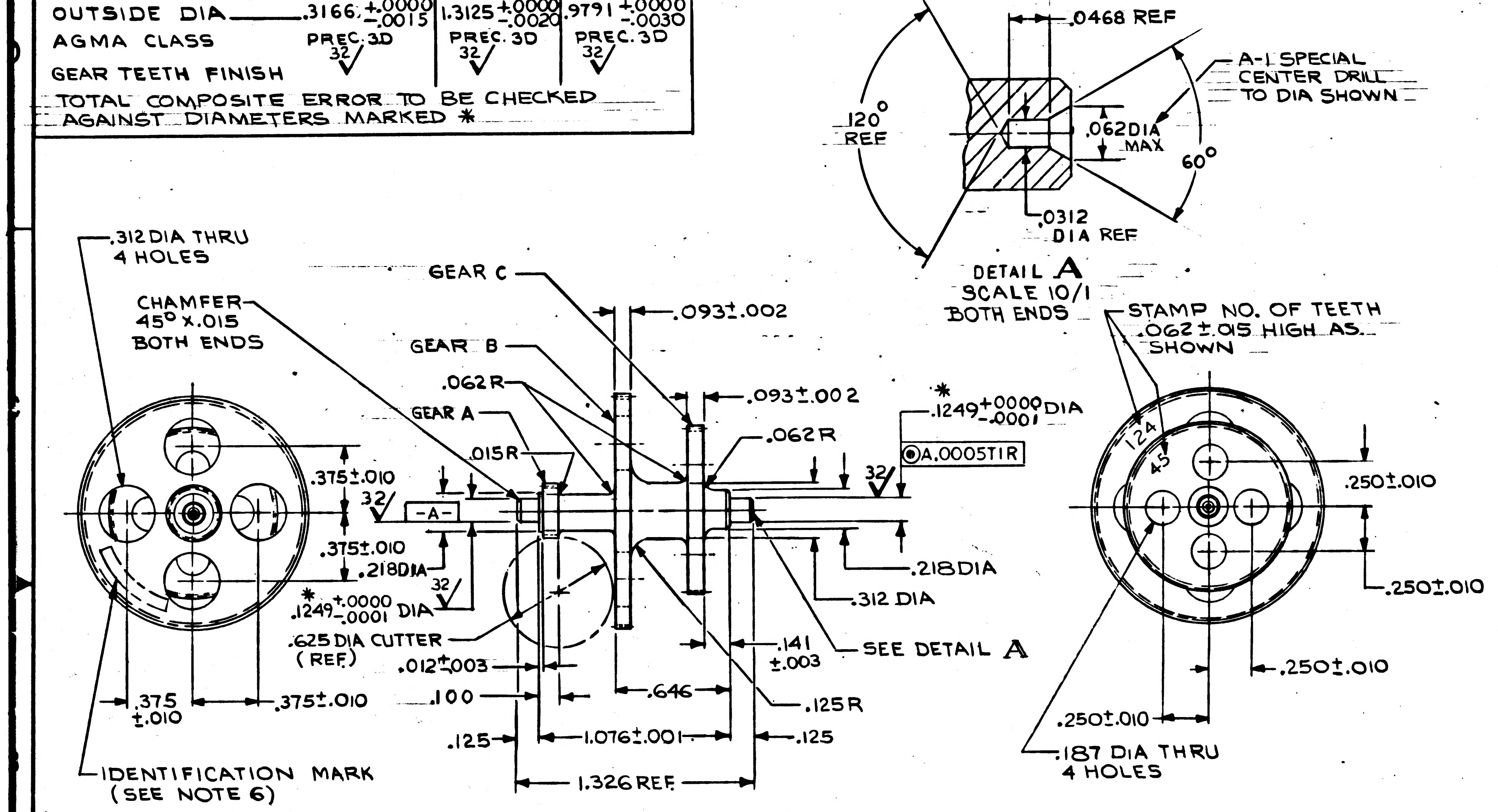
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011278

SPUR GEAR DATA	A	B	C
NO. OF TEETH	36	124	45
DIAMETRAL PITCH	120	96	48
PRESSURE ANGLE	20°	20°	20°
PITCH DIA (STD)	.30000	1.29166	.93750
OUTSIDE DIA	.3166 +.0000 −.0015	1.3125 +.0000 −.0020	.9791 +.0000 −.0030
AGMA CLASS	PREC. 3D	PREC. 3D	PREC. 3D
GEAR TEETH FINISH	32√	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *

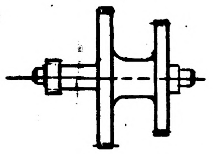
REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



.0468 REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
120° REF
.062 DIA MAX
60°
.0312 DIA REF
DETAIL A
SCALE 10/1
BOTH ENDS
.312 DIA THRU 4 HOLES
CHAMFER 45° X .015 BOTH ENDS
GEAR C
.093±.002
GEAR B
.062R
GEAR A
.093±.002
.062R
*.1249 +.0000 −.0001 DIA
A .0005 TIR
.015R
.375±.010
32
-A-
.375±.010
.218DIA
32
*.1249 +.0000 −.0001 DIA
32
.625 DIA CUTTER (REF)
.012±.003
.100
.125
.646
1.076±.001
.141 ±.003
.125R
.125
1.326 REF
.218 DIA
.312 DIA
SEE DETAIL A
.375 ±.010
.375±.010
IDENTIFICATION MARK (SEE NOTE 6)
STAMP NO. OF TEETH .062±.015 HIGH AS SHOWN
124
45
.250±.010
.250±.010
.250±.010
.250±.010
.187 DIA THRU 4 HOLES

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS 10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910080

DRAWN E. DRAPALA DATE 4-6-64
CHECKED J. SULLIVAN 4-17-64
APPROVAL 6/25/64
APPROVAL E. Moung 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
36T/120P —124T/96P— 45T/48P

CODE IDENT NO.
SIZE C
NASA NUMBER 2011278
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

2011278

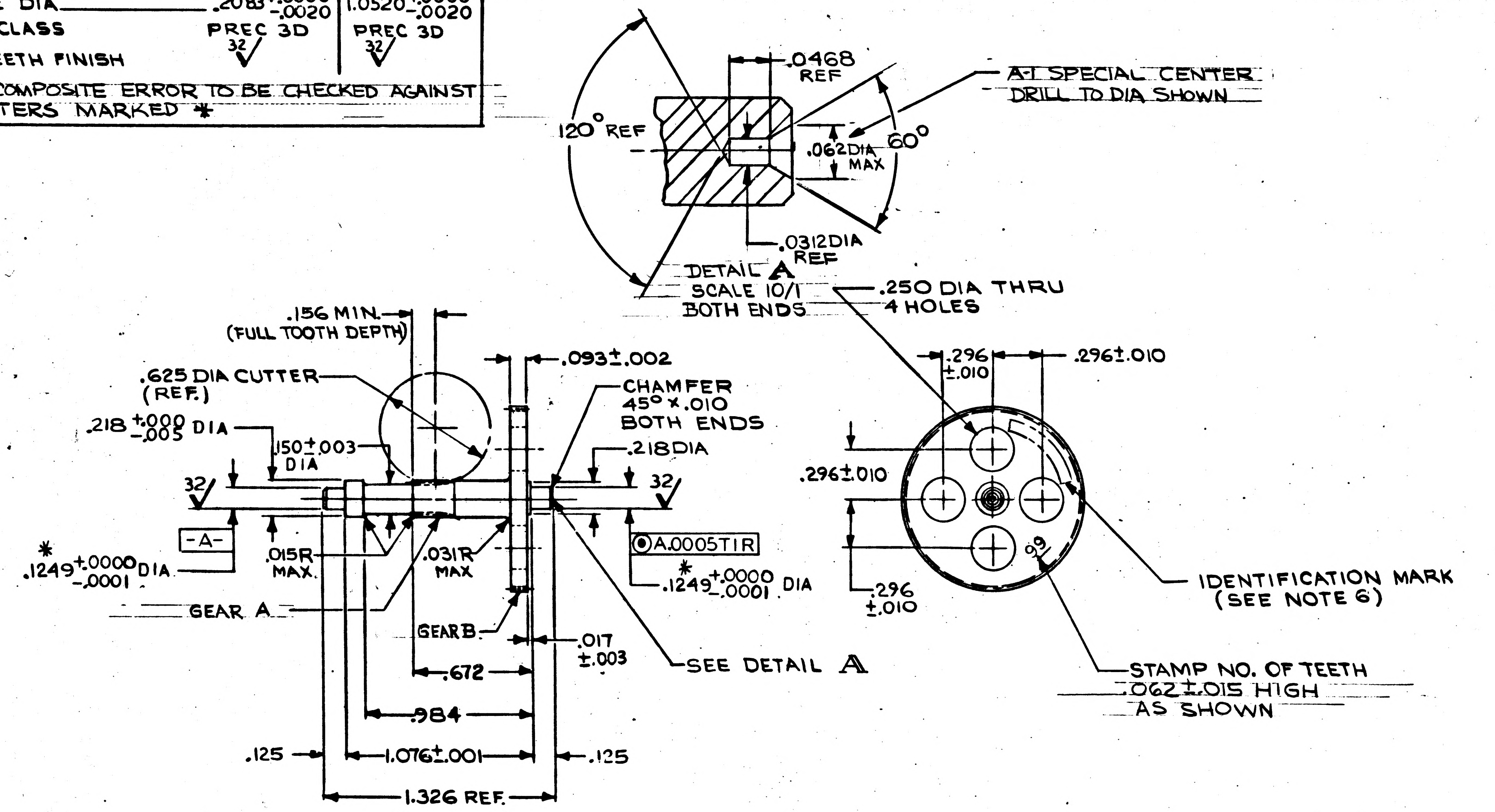
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011279

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA	A	B
NO. OF TEETH	18	99
DIAMETRAL PITCH	96	96
PRESSURE ANGLE	20°	20°
PITCH DIA (STD)	.18750	1.03125
OUTSIDE DIA	.2083 +.0000 −.0020	1.0520 +.0000 −.0020
AGMA CLASS	PREC 3D	PREC 3D
GEAR TEETH FINISH	32 √	32 √

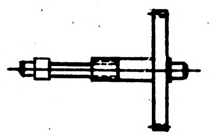
TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *



120° REF
.0468 REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.062 DIA MAX
60°
.0312 DIA REF
DETAIL A
SCALE 10/1
BOTH ENDS
.250 DIA THRU 4 HOLES
.156 MIN. (FULL TOOTH DEPTH)
.625 DIA CUTTER (REF.)
.093±.002
CHAMFER 45° × .010 BOTH ENDS
.218 +.000 −.005 DIA
.150±.003 DIA
.218 DIA
32
32
-A-
*
.1249 +.0000 −.0001 DIA
.015R MAX.
.031R MAX
◉ A .0005 TIR
*
.1249 +.0000 −.0001 DIA
GEAR A
GEAR B
.017 ±.003
SEE DETAIL A
.672
.984
.125
1.076±.001
.125
1.326 REF.
.296 ±.010
.296±.010
.296±.010
.296 ±.010
99
IDENTIFICATION MARK (SEE NOTE 6)
STAMP NO. OF TEETH .062±.015 HIGH AS SHOWN

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
    a. 63√ FINISH ALL OVER
    b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.

NOTES:-


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910130

DRAWN E. DRAPALA DATE 4-2-64
CHECKED J. SULLIVAN 4-20-64
APPROVAL 6/5/64
APPROVAL 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
18T/96P — 99T/96P

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011279
SCALE 2:1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

2011279

E-154

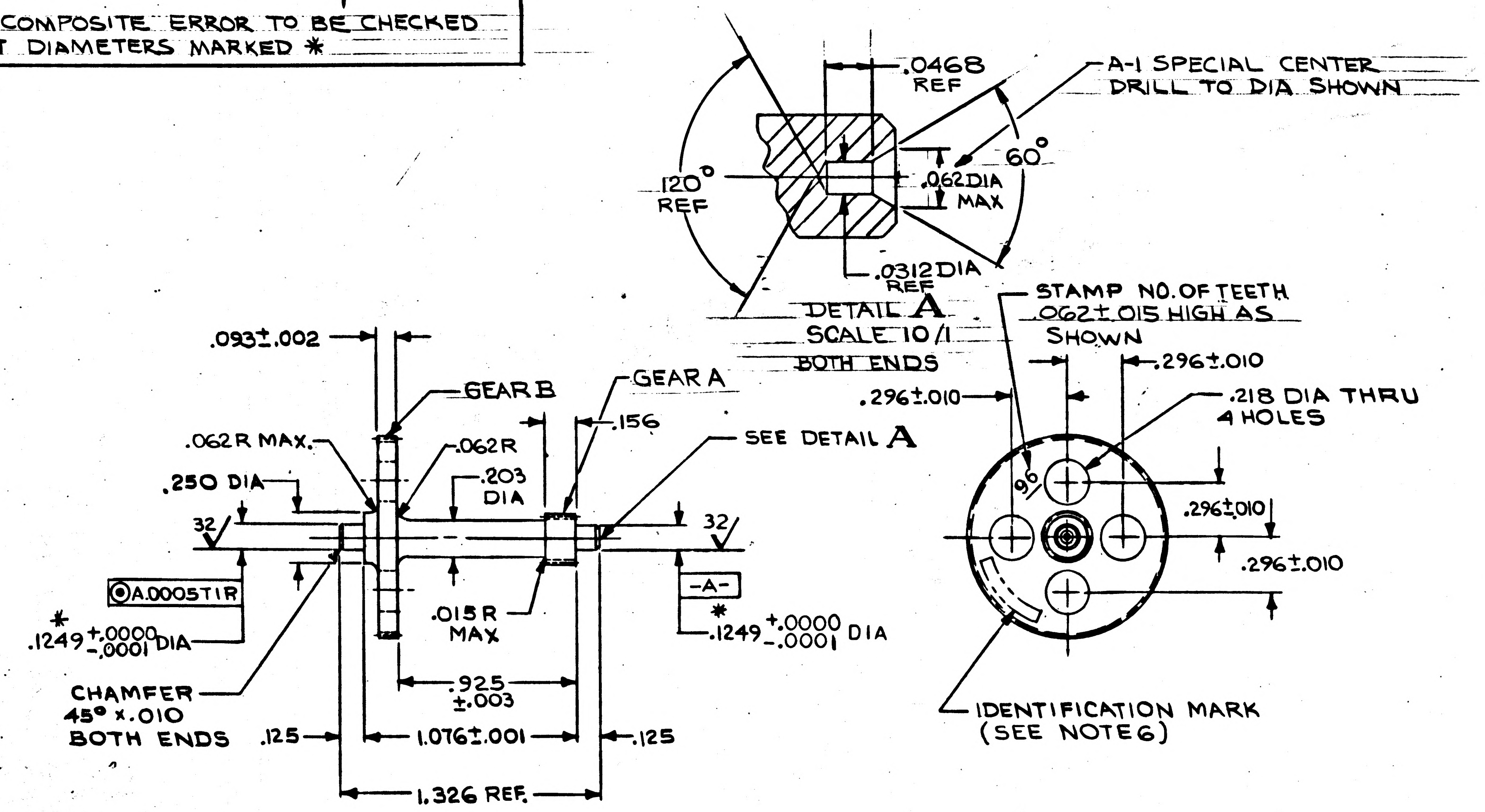
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011280

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA	A	B
NO. OF TEETH	22	96
DIAMETRAL PITCH	96	96
PRESSURE ANGLE	20°	20°
PITCH DIA (STD)	.22916	1.0000
OUTSIDE DIA	.2500 +.0000 −.0020	1.0208 +.0000 −.0020
AGMA CLASS	PREC 3D	PREC 3D
GEAR TEETH FINISH	32√	32√

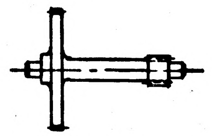
TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *



.0468 REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
60°
120° REF
.062 DIA MAX
.0312 DIA REF
DETAIL A
SCALE 10/1
BOTH ENDS
STAMP NO. OF TEETH .062±.015 HIGH AS SHOWN
.296±.010
.296±.010
.218 DIA THRU 4 HOLES
96
.296±.010
.296±.010
IDENTIFICATION MARK (SEE NOTE 6)
.093±.002
GEAR B
GEAR A
.156
SEE DETAIL A
.062 R MAX.
.062R
.203 DIA
.250 DIA
32
32
A .0005 TIR
-A-
.015 R MAX
* .1249 +.0000 −.0001 DIA
* .1249 +.0000 −.0001 DIA
CHAMFER 45° x .010 BOTH ENDS
.925 ±.003
.125
1.076±.001
.125
1.326 REF.

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910120

DRAWN E. DRAPALA DATE 4-2-64
CHECKED J. SULLIVAN 4-20-64
APPROVAL 6/1/64
APPROVAL 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
22T/96P — 96T/96P

CODE IDENT NO.
SIZE C
NASA NUMBER 2011280
SCALE 2:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

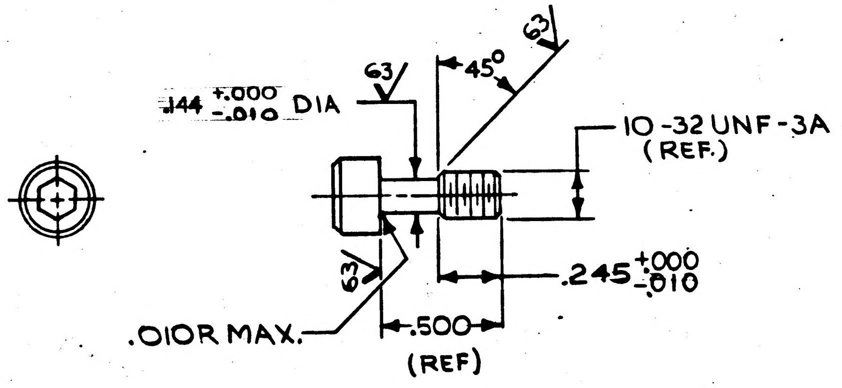
2011280

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

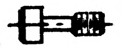
2011282 A

REVISIONS 10048			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO 14526	11/25/64	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. REMOVE BURRS IN ACCORDANCE WITH ND1002079
4. THIS PART IS TO BE PRODUCED BY REWORKING MS 16996-10 (# 10-32 × 1/2 LG. SCREW)
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO 5.4.2 (KPS-10051.200)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019. (BAGGING)



MASTER


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000
2011787	2011000
2011734	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
REF- CORROSION RESISTING STEEL (SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 48386910040

DRAWN J. Schiller DATE 4-9-64
CHECKED 4-27-64
APPROVAL 5-29-64
APPROVAL E. Thorup 6-5-69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCREW, CAPTIVE
HEX SOCKET HEAD

CODE IDENT NO.
SIZE B
NASA NUMBER 2011282
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

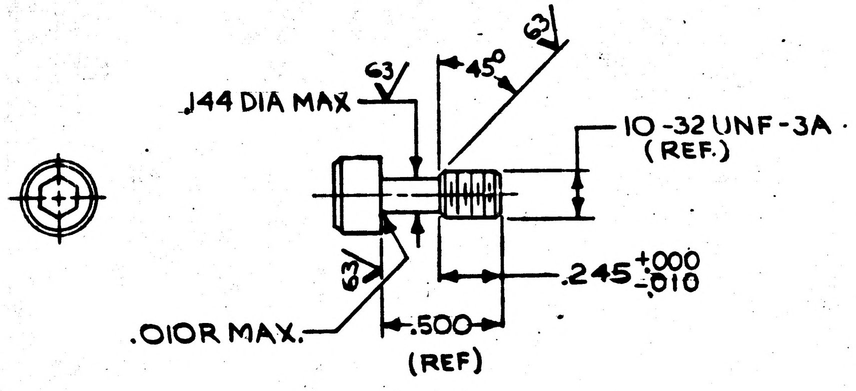
E-153

2011282

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 10048

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. REMOVE BURRS IN ACCORDANCE WITH ND1002079
4. THIS PART IS TO BE PRODUCED BY REWORKING MS 16996-10 (# 10-32 × 1/2 LG. SCREW)
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO 5.4.2 (KPS-10051.200)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019. (BAGGING)



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000
2011787	2011000
2011734	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
REF- CORROSION RESISTING STEEL (SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 48386910040

DRAWN J. Schiller DATE 4-3-64
CHECKED 4-27-64
APPROVAL 5-29-64
APPROVAL E. Murray 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCREW, CAPTIVE
HEX SOCKET HEAD

CODE IDENT NO.
SIZE B
NASA NUMBER 2011282

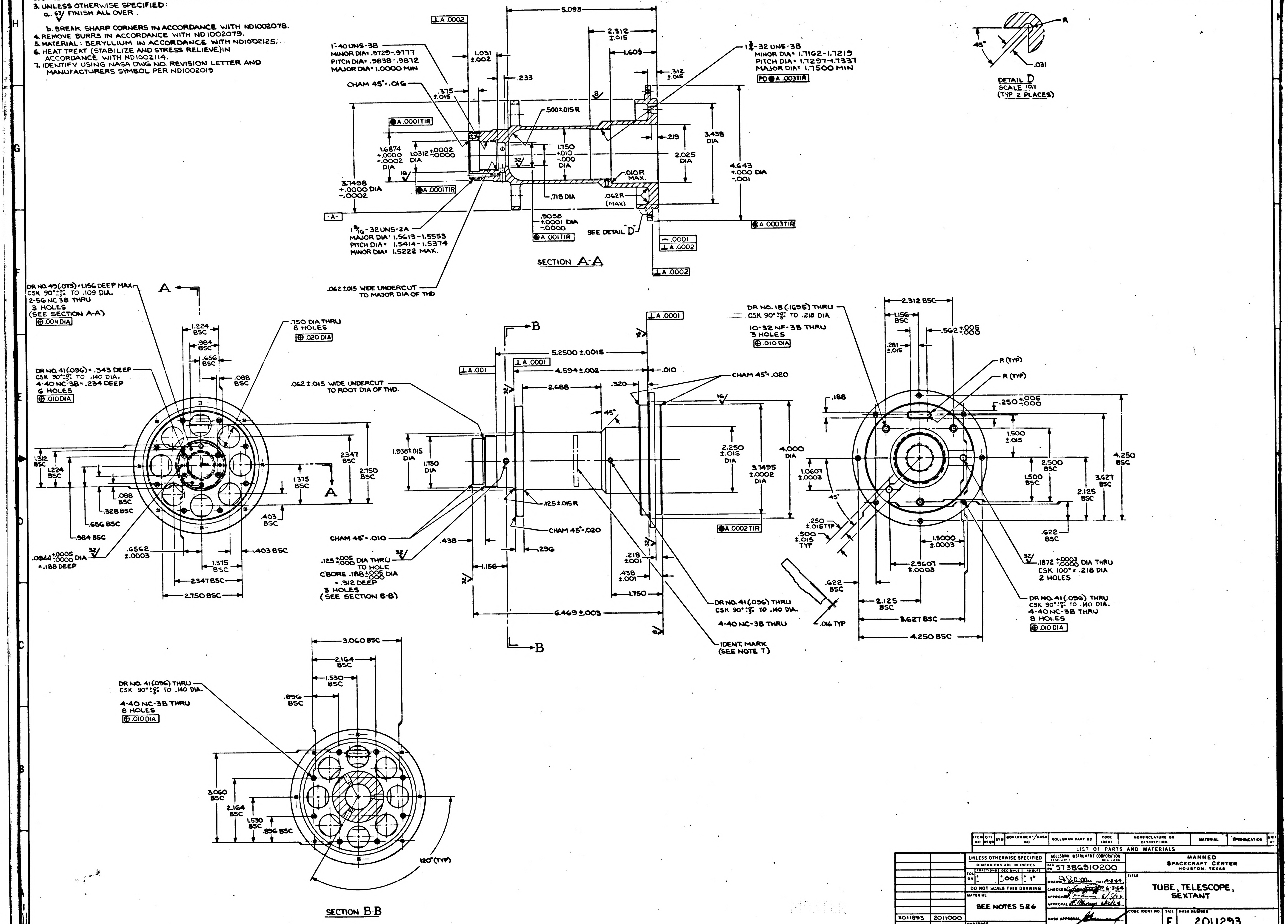
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-153

INCHES
0 1 2

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


SECTION A-A
5.093
2.312 ±.015
1.609
1.031 ±.002
.233
.375 ±.015
.312 ±.015
⊥ A .0002
1"-40 UNS-3B
MINOR DIA = .9729-.9777
PITCH DIA = .9838-.9872
MAJOR DIA = 1.0000 MIN
CHAM 45° × .016
1 3/4-32 UNS-3B
MINOR DIA = 1.7162-1.7219
PITCH DIA = 1.7297-1.7337
MAJOR DIA = 1.7500 MIN
PD ● A .003TIR
.500±.015 R
● A .0001TIR
1.6874 +.0000 -.0002 DIA
1.0312 +.0002 -.0000 DIA
1.750 +.010 -.000 DIA
.219
2.025 DIA
3.438 DIA
4.643 +.000 -.001 DIA
3.7498 +.0000 -.0002 DIA
.010R MAX.
.062R (MAX)
.718 DIA
-A-
1 9/16-32 UNS-2A
MAJOR DIA = 1.5613-1.5553
PITCH DIA = 1.5414-1.5374
MINOR DIA = 1.5222 MAX.
.9058 +.0001 -.0000 DIA
● A .001TIR
SEE DETAIL "D"
⌒ .0001
⊥ A .0002
● A .0003TIR
.062±.015 WIDE UNDERCUT TO MAJOR DIA OF THD
DETAIL D
SCALE 10/1
(TYP 2 PLACES)
45°
.031
R
DR NO.49(.073) × 1.156 DEEP MAX.
CSK 90° +0° -5° TO .109 DIA.
2-56 NC-3B THRU
3 HOLES
(SEE SECTION A-A)
⊕ .004 DIA
A
A
1.224 BSC
.984 BSC
.656 BSC
.088 BSC
.750 DIA THRU
8 HOLES
⊕ .020 DIA
DR NO.41(.096) × .343 DEEP
CSK 90° +0° -5° TO .140 DIA.
4-40 NC-3B × .234 DEEP
6 HOLES
⊕ .010 DIA
1.312 BSC
1.224 BSC
.088 BSC
.328 BSC
.656 BSC
.984 BSC
2.347 BSC
2.750 BSC
1.375 BSC
.403 BSC
.0944 +.0005 -.0000 DIA × .188 DEEP
.6562 ±.0003
.403 BSC
1.375 BSC
2.347 BSC
2.750 BSC
B
B
⊥ A .0001
5.2500 ±.0015
⊥ A .0001
⊥ A .001
4.594 ±.002
.010
2.688
.320
CHAM 45° × .020
.062±.015 WIDE UNDERCUT TO ROOT DIA OF THD.
45°
1.938±.015 DIA
1.750 DIA
2.250 ±.015 DIA
3.7495 ±.0002 DIA
4.000 DIA
.125±.015R
CHAM 45° × .020
● A .0002 TIR
CHAM 45° × .010
.438
.296
.125 +.005 -.000 DIA THRU TO HOLE
C'BORE .188 +.005 -.000 DIA × .312 DEEP
3 HOLES
(SEE SECTION B-B)
1.156
.218 ±.001
.438 ±.001
1.750
6.469 ±.003
DR NO.41(.096) THRU
CSK 90° +0° -5° TO .140 DIA.
4-40 NC-3B THRU
IDENT. MARK
(SEE NOTE 7)
DR NO.18 (.1695) THRU
CSK 90° +0° -5° TO .218 DIA
10-32 NF-3B THRU
3 HOLES
⊕ .010 DIA
2.312 BSC
1.156 BSC
.562 +.005 -.000
.281 ±.015
R (TYP)
R (TYP)
.188
.250 +.005 -.000
1.500 ±.015
2.500 BSC
1.500 BSC
4.250 BSC
3.627 BSC
2.125 BSC
.622 BSC
1.0607 ±.0003
45°
.250 ±.015 TYP
.500 ±.015 TYP
1.5000 ±.0003
2.5607 ±.0003
.1872 +.0003 -.0000 DIA THRU
CSK 100° × .218 DIA
2 HOLES
.622 BSC
.016 TYP
2.125 BSC
3.627 BSC
4.250 BSC
DR NO.41(.096) THRU
CSK 90° +0° -5° TO .140 DIA.
4-40 NC-3B THRU
8 HOLES
⊕ .010 DIA
SECTION B-B
3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
DR NO.41(.096) THRU
CSK 90° +0° -5° TO .140 DIA.
4-40 NC-3B THRU
8 HOLES
⊕ .010 DIA
3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
120° (TYP)

2011293 A

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13310	10/4/64	WK

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011893	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTES 5 & 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910200

DRAWN J. Schiller DATE 4-2-64
CHECKED Langstaff 6-3-64
APPROVAL 6/3/64
APPROVAL E. Mayo 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: TUBE, TELESCOPE, SEXTANT

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011293

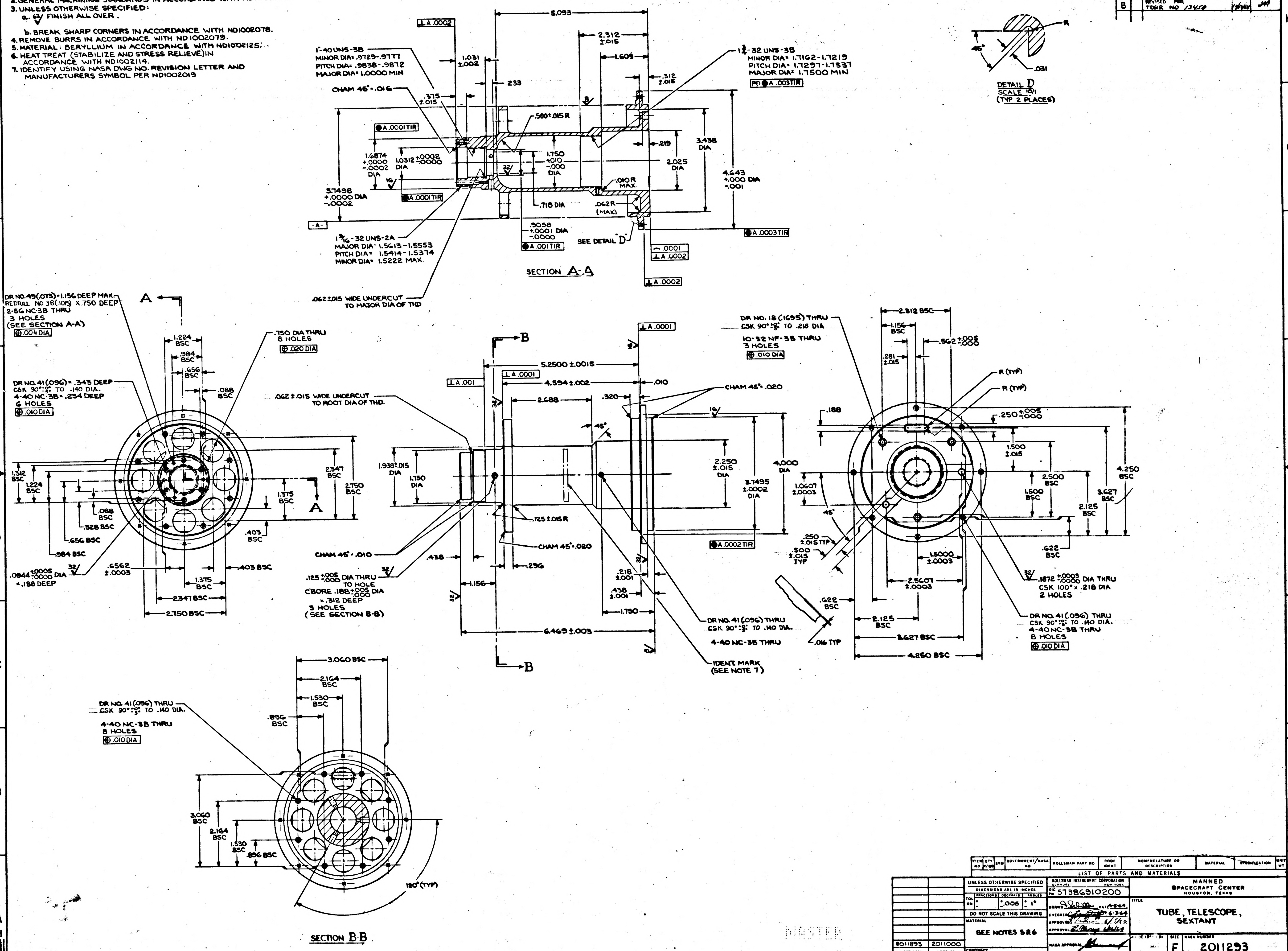
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

2011293 B

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13310		
B		REVISED PER TDRR NO 13450		



SECTION A-A
1"-40 UNS-3B
MINOR DIA= .9729-.9777
PITCH DIA= .9838-.9872
MAJOR DIA= 1.0000 MIN
CHAM 45° × .016
1 3/4-32 UNS-3B
MINOR DIA= 1.7162-1.7219
PITCH DIA= 1.7297-1.7337
MAJOR DIA= 1.7500 MIN
1 9/16-32 UNS-2A
MAJOR DIA= 1.5613-1.5553
PITCH DIA= 1.5414-1.5374
MINOR DIA= 1.5222 MAX.
.062±.015 WIDE UNDERCUT TO MAJOR DIA OF THD
5.093
2.312 ±.015
1.609
1.031 ±.002
.233
.375 ±.015
.500±.015 R
1.750 +.010 -.000 DIA
2.025 DIA
3.438 DIA
4.643 +.000 -.001 DIA
3.7498 +.0000 -.0002 DIA
1.6874 +.0000 -.0002 DIA
1.0312 +.0002 -.0000 DIA
.718 DIA
.9058 +.0001 -.0000 DIA
.010R MAX.
.062R (MAX)
.219
.312 ±.015
SEE DETAIL "D"
-A-
DETAIL D
SCALE 10/1
(TYP 2 PLACES)
45°
R
.031
A
B
B
DR NO. 49 (.073) × 1.156 DEEP MAX.
REDRILL NO 38 (.1015) × .750 DEEP
2-56 NC-3B THRU
3 HOLES
(SEE SECTION A-A)
.750 DIA THRU
8 HOLES
DR NO. 41 (.096) × .343 DEEP
CSK 90° TO .140 DIA.
4-40 NC-3B × .234 DEEP
6 HOLES
.0944 +.0005 -.0000 DIA × .188 DEEP
.6562 ±.0003
2.347 BSC
2.750 BSC
.062 ±.015 WIDE UNDERCUT TO ROOT DIA OF THD.
5.2500 ±.0015
4.594 ±.002
2.688
.320
CHAM 45° × .020
CHAM 45° × .010
.125 ±.015 R
.125 +.005 -.000 DIA THRU TO HOLE
C'BORE .188 +.005 -.000 DIA × .312 DEEP
3 HOLES
(SEE SECTION B-B)
1.156
6.469 ±.003
1.750
DR NO. 41 (.096) THRU
CSK 90° TO .140 DIA.
4-40 NC-3B THRU
IDENT. MARK
(SEE NOTE 7)
DR NO. 18 (.1695) THRU
CSK 90° TO .218 DIA
10-32 NF-3B THRU
3 HOLES
2.312 BSC
4.250 BSC
3.627 BSC
2.125 BSC
.1872 +.0003 -.0000 DIA THRU
CSK 100° × .218 DIA
2 HOLES
DR NO. 41 (.096) THRU
CSK 90° TO .140 DIA.
4-40 NC-3B THRU
8 HOLES
.016 TYP
SECTION B-B
3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
120° (TYP)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011893	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTES 5&6
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910200
DRAWN J. Schiller DATE 4-2-64
CHECKED 6-3-64
APPROVAL 6/5/64
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TUBE, TELESCOPE, SEXTANT

SIZE E
NASA NUMBER 2011293
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

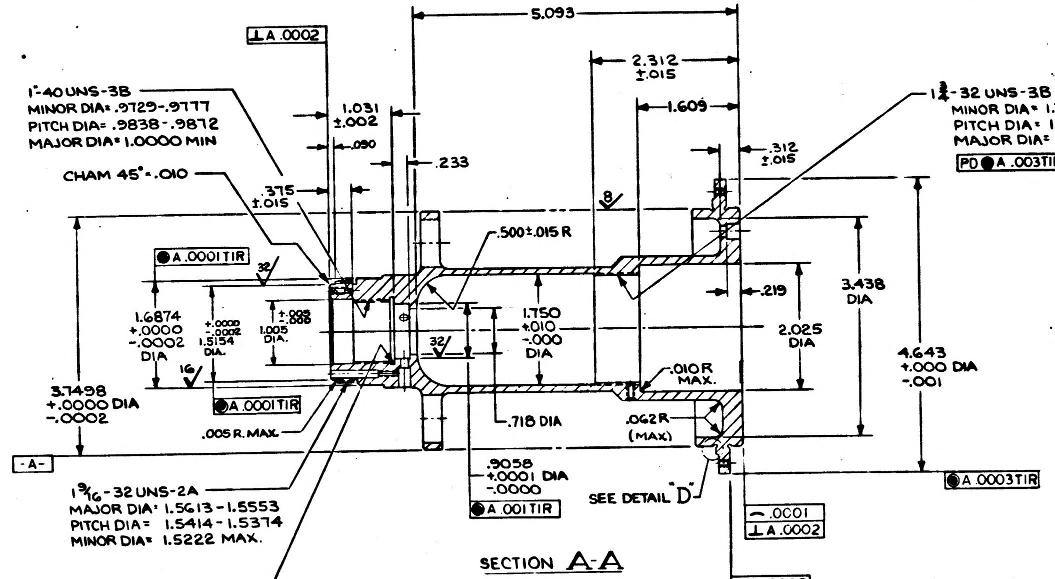
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

2011293 C

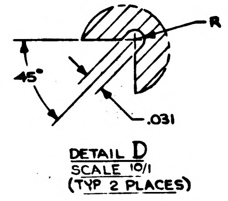
REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13310	10/4/64	WK
B		REVISED PER TDRR NO. 13458	1/4/64	
C		REVISED PER TDRR NO. 15359	1/4/65	WK.

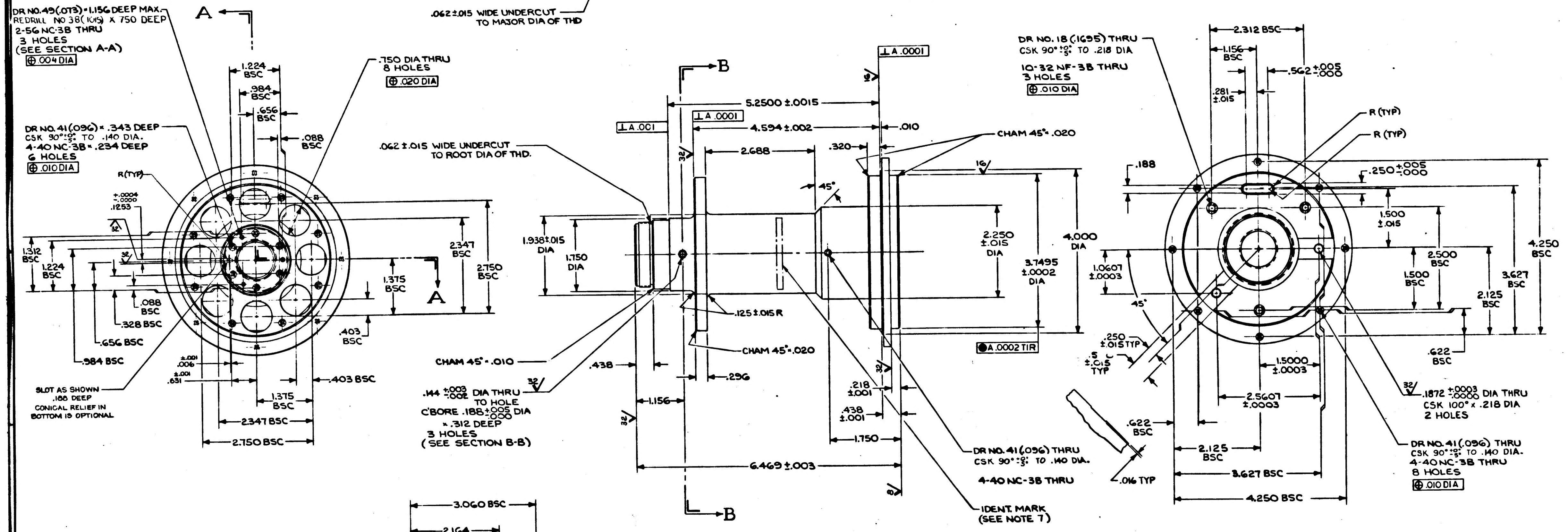


5.093
2.312 ±.015
1.609
.312 ±.015
1.031 ±.002
.090
.233
.375 ±.015
⊥ A .0002
1"-40 UNS-3B
MINOR DIA= .9729-.9777
PITCH DIA= .9838-.9872
MAJOR DIA= 1.0000 MIN
CHAM 45°×.010
1 3/4-32 UNS-3B
MINOR DIA= 1.7162-1.7219
PITCH DIA= 1.7297-1.7337
MAJOR DIA= 1.7500 MIN
PD ◎ A .003TIR
.500±.015 R
◎ A .0001TIR
1.6874 +.0000 -.0002 DIA
1.5154 DIA
1.003 DIA
1.750 +.010 -.000 DIA
.219
2.025 DIA
3.438 DIA
4.643 +.000 -.001 DIA
3.7498 +.0000 -.0002 DIA
.010R MAX.
.062R (MAX)
.718 DIA
.005 R. MAX.
-A-
.9058 +.0001 -.0000 DIA
◎ A .001TIR
SEE DETAIL D
◎ A .0003TIR
⌒ .0001
⊥ A .0002
1 3/16-32 UNS-2A
MAJOR DIA= 1.5613-1.5553
PITCH DIA= 1.5414-1.5374
MINOR DIA= 1.5222 MAX.
.062±.015 WIDE UNDERCUT TO MAJOR DIA OF THD

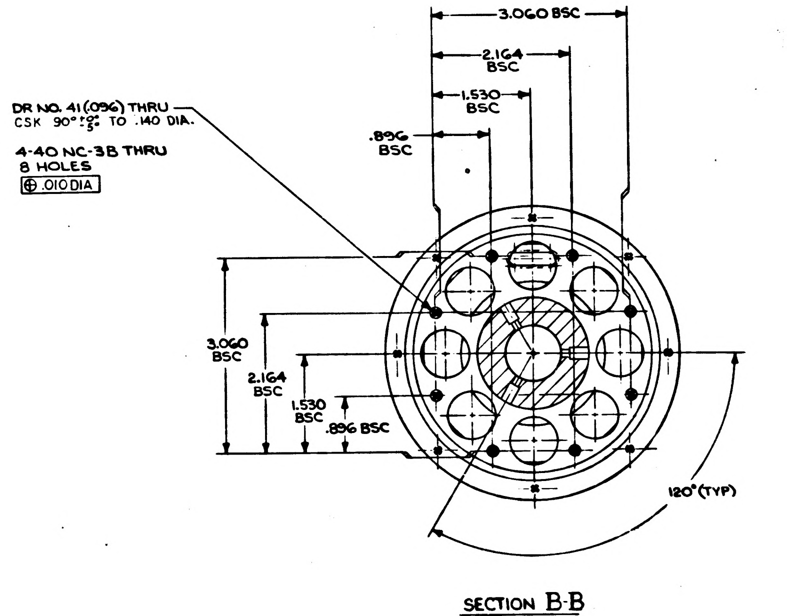
SECTION A-A



DETAIL D
SCALE 10/1
(TYP 2 PLACES)



A
DR NO.49 (.073) ×1.156 DEEP MAX.
REDRILL NO 38 (.1015) × .750 DEEP
2-56 NC-3B THRU
3 HOLES
(SEE SECTION A-A)
⊕ .004 DIA
1.224 BSC
.984 BSC
.656 BSC
.088 BSC
.750 DIA THRU
8 HOLES
⊕ .020 DIA
DR NO.41 (.096) × .343 DEEP
CSK 90° TO .140 DIA.
4-40 NC-3B × .234 DEEP
6 HOLES
⊕ .010 DIA
R (TYP)
.1253 +.0004 -.0000
1.312 BSC
1.224 BSC
2.347 BSC
2.750 BSC
1.375 BSC
.088 BSC
.328 BSC
.656 BSC
.984 BSC
.403 BSC
SLOT AS SHOWN .180 DEEP
CONICAL RELIEF IN BOTTOM IS OPTIONAL
.006 +.001
.631 ±.001
1.375 BSC
2.347 BSC
2.750 BSC
.403 BSC
B
⊥ A .0001
5.2500 ±.0015
⊥ A .001
⊥ A .0001
4.594 ±.002
.010
2.688
.320
CHAM 45°×.020
.062 ±.015 WIDE UNDERCUT TO ROOT DIA OF THD.
45°
1.938 ±.015 DIA
1.750 DIA
2.250 ±.015 DIA
3.7495 ±.0002 DIA
4.000 DIA
.125 ±.015 R
CHAM 45°×.020
◎ A .0002 TIR
CHAM 45°×.010
.438
.296
.144 +.003 -.002 DIA THRU TO HOLE
C'BORE .188 +.005 -.000 DIA × .312 DEEP
3 HOLES
(SEE SECTION B-B)
1.156
.218 ±.001
.438 ±.001
1.750
6.469 ±.003
DR NO. 41 (.096) THRU
CSK 90° TO .140 DIA.
4-40 NC-3B THRU
IDENT. MARK
(SEE NOTE 7)
DR NO. 18 (.1695) THRU
CSK 90° TO .218 DIA
10-32 NF-3B THRU
3 HOLES
⊕ .010 DIA
2.312 BSC
1.156 BSC
.281 ±.015
.562 +.005 -.000
R (TYP)
R (TYP)
.188
.250 +.005 -.000
1.500 ±.015
2.500 BSC
1.500 BSC
2.125 BSC
3.627 BSC
4.250 BSC
1.0607 ±.0003
45°
.250 ±.015 TYP
.5 ±.015 TYP
.622 BSC
1.5000 ±.0003
2.5607 ±.0003
.1872 +.0003 -.0000 DIA THRU
CSK 100° × .218 DIA
2 HOLES
.622 BSC
2.125 BSC
3.627 BSC
4.250 BSC
.016 TYP
DR NO. 41 (.096) THRU
CSK 90° TO .140 DIA.
4-40 NC-3B THRU
8 HOLES
⊕ .010 DIA



3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
DR NO. 41 (.096) THRU
CSK 90° TO .140 DIA.
4-40 NC-3B THRU
8 HOLES
⊕ .010 DIA
3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
120° (TYP)

SECTION B-B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011893	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES 5&6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910200

DRAWN J. Schiller DATE 4-2-64
CHECKED C. Langstaff 6-3-64
APPROVAL 6/ /64
APPROVAL E. Mary 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TUBE, TELESCOPE,
SEXTANT

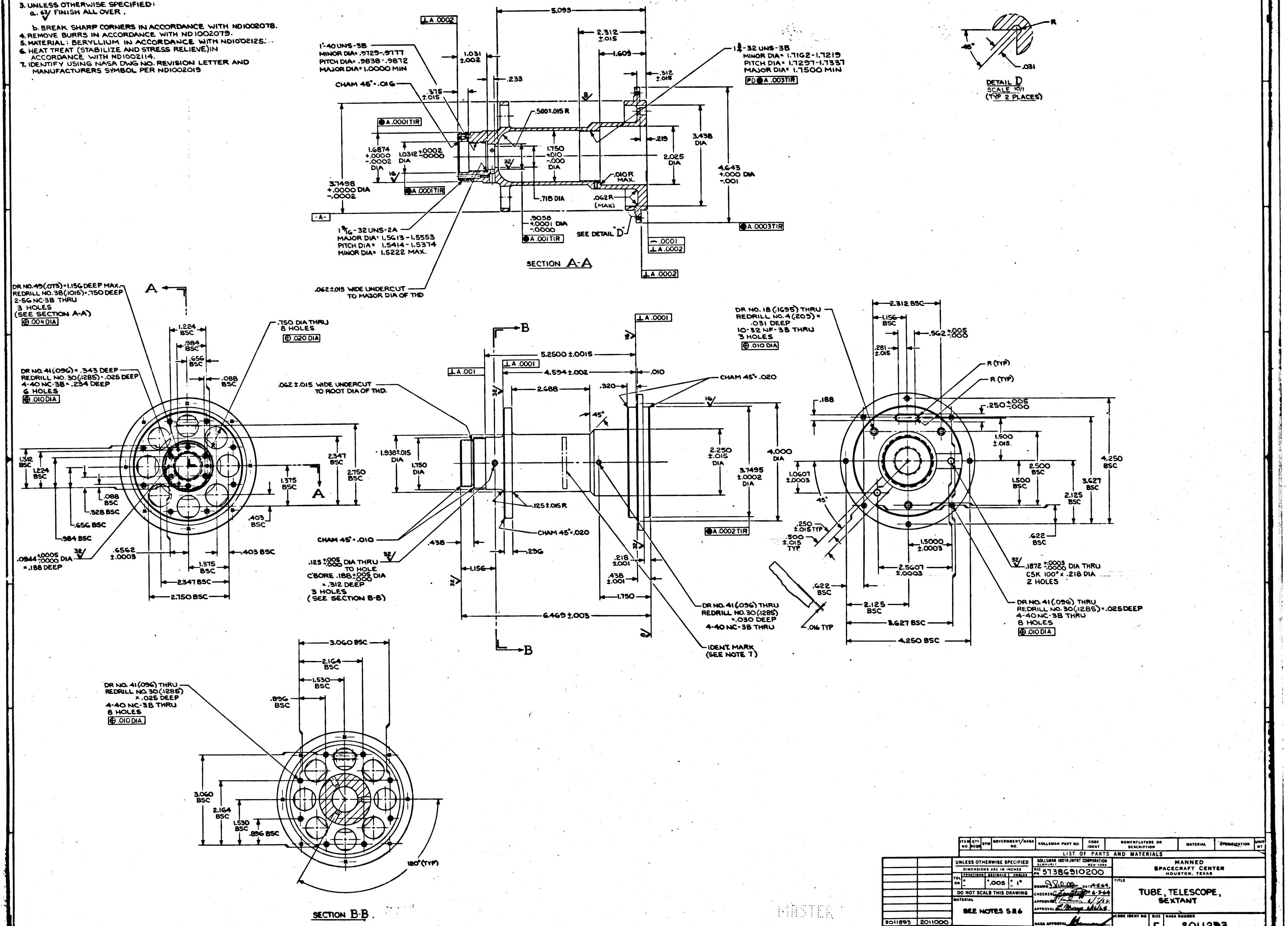
CODE IDENT NO | SIZE E | NASA NUMBER 2011293

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

2011293

REVISIONS TORL 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



SECTION A-A
DETAIL D
SCALE 10/1
(TYP 2 PLACES)
SECTION B-B
1"-40 UNS-3B
MINOR DIA= .9729-.9777
PITCH DIA= .9838-.9872
MAJOR DIA= 1.0000 MIN
1 3/4-32 UNS-3B
MINOR DIA= 1.7162-1.7219
PITCH DIA= 1.7297-1.7337
MAJOR DIA= 1.7500 MIN
1 9/16-32 UNS-2A
MAJOR DIA= 1.5613-1.5553
PITCH DIA= 1.5414-1.5374
MINOR DIA= 1.5222 MAX.
.062±.015 WIDE UNDERCUT TO MAJOR DIA OF THD
SEE DETAIL "D"
5.093
2.312 ±.015
1.609
1.031 ±.002
.233
CHAM 45° × .016
.375 ±.015
.500±.015 R
.312 ±.015
.219
3.438 DIA
2.025 DIA
4.643 +.000 -.001 DIA
1.6874 +.0000 -.0002 DIA
1.0312 ±.0002 -.0000 DIA
1.750 ±.010 -.000 DIA
3.7498 +.0000 -.0002 DIA
.718 DIA
.010R MAX.
.062R (MAX)
.9058 +.0001 -.0000 DIA
DR NO. 49 (.073) × 1.156 DEEP MAX.
REDRILL NO. 38 (.1015) × .750 DEEP
2-56 NC-3B THRU
3 HOLES
(SEE SECTION A-A)
.004 DIA
.750 DIA THRU
8 HOLES
.020 DIA
DR NO. 41 (.096) × .343 DEEP
REDRILL NO. 30 (.1285) × .025 DEEP
4-40 NC-3B × .234 DEEP
6 HOLES
.010 DIA
.0944 +.0005 -.0000 DIA × .188 DEEP
.6562 ±.0003
1.375 BSC
2.347 BSC
2.750 BSC
.403 BSC
.062±.015 WIDE UNDERCUT TO ROOT DIA OF THD.
5.2500±.0015
4.594±.002
2.688
.320
.010
CHAM 45° × .020
1.938±.015 DIA
1.750 DIA
2.250 ±.015 DIA
3.7495 ±.0002 DIA
4.000 DIA
.125±.015 R
CHAM 45° × .010
.125 +.005 -.000 DIA THRU TO HOLE
C'BORE .188 ±.005 -.000 DIA × .312 DEEP
3 HOLES
(SEE SECTION B-B)
1.156
.296
.438
.218 ±.001
.438 ±.001
1.750
6.469±.003
DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) × .030 DEEP
4-40 NC-3B THRU
IDENT. MARK (SEE NOTE 7)
DR NO. 18 (.1695) THRU
REDRILL NO. 4 (.205) × .031 DEEP
10-32 NF-3B THRU
3 HOLES
.010 DIA
2.312 BSC
1.156 BSC
.281 ±.015
.562 +.005 -.000
R (TYP)
.250 +.005 -.000
1.500 ±.015
2.500 BSC
1.500 BSC
2.125 BSC
3.627 BSC
4.250 BSC
1.0607 ±.0003
.622 BSC
1.5000 ±.0003
2.5607 ±.0003
.1872 +.0003 -.0000 DIA THRU
CSK 100° × .218 DIA
2 HOLES
DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) × .025 DEEP
4-40 NC-3B THRU
8 HOLES
.010 DIA
.016 TYP
3.060 BSC
2.164 BSC
1.530 BSC
.896 BSC
120° (TYP)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011893	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES 5&6
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910200
DRAWN DATE 4-2-64
CHECKED C. Longstaff 6-3-64
APPROVAL 6/5/64
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TUBE, TELESCOPE,
SEXTANT

CODE IDENT NO.
SIZE E
NASA NUMBER 2011293
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

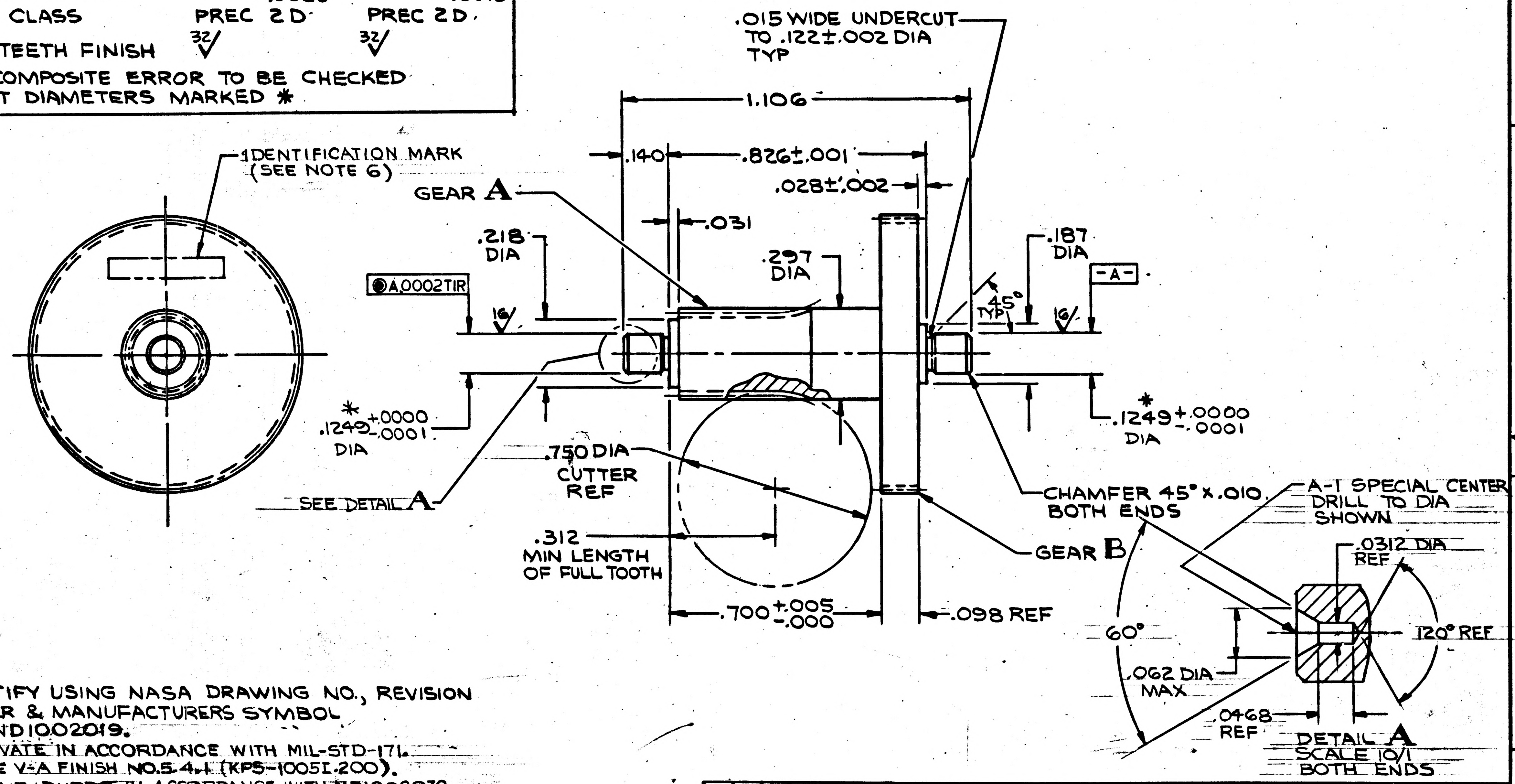
2011295

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

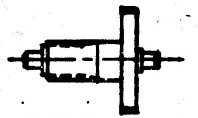
	GEAR A	GEAR B
NO. OF TEETH	19	104
DIAMETRAL PITCH	72	120
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.26389	.86667
OUTSIDE DIAMETER	$.2916^{+.0000}_{-.0020}$	$.8833^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D	PREC 2D
GEAR TEETH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


IDENTIFICATION MARK (SEE NOTE 6)
GEAR A
.218 DIA
◉A .0002TIR
16√
*.1249 +.0000 -.0001 DIA
SEE DETAIL A
.015 WIDE UNDERCUT TO .122±.002 DIA TYP
1.106
.140
.826±.001
.028±.002
.031
.297 DIA
.187 DIA
-A-
45° TYP
16√
*.1249 +.0000 -.0001 DIA
.750 DIA CUTTER REF
.312 MIN LENGTH OF FULL TOOTH
.700 +.005 -.000
.098 REF
CHAMFER 45° x .010 BOTH ENDS
GEAR B
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF
DETAIL A
SCALE 10/1
BOTH ENDS

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171. (TABLE V-A FINISH NO.5.4.1 (KPS-10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:- 63√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND1002078.
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011705	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 CLASS 416 (Rc-28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910180

DRAWN E. DRAPALA DATE 4-8-64
CHECKED T. SULLIVAN 5-6-64
APPROVAL 6/5/64
APPROVAL E. 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(19T-72P.) (104T-120P)

CODE IDENT NO. | SIZE C | NASA NUMBER 2011295
SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011295

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

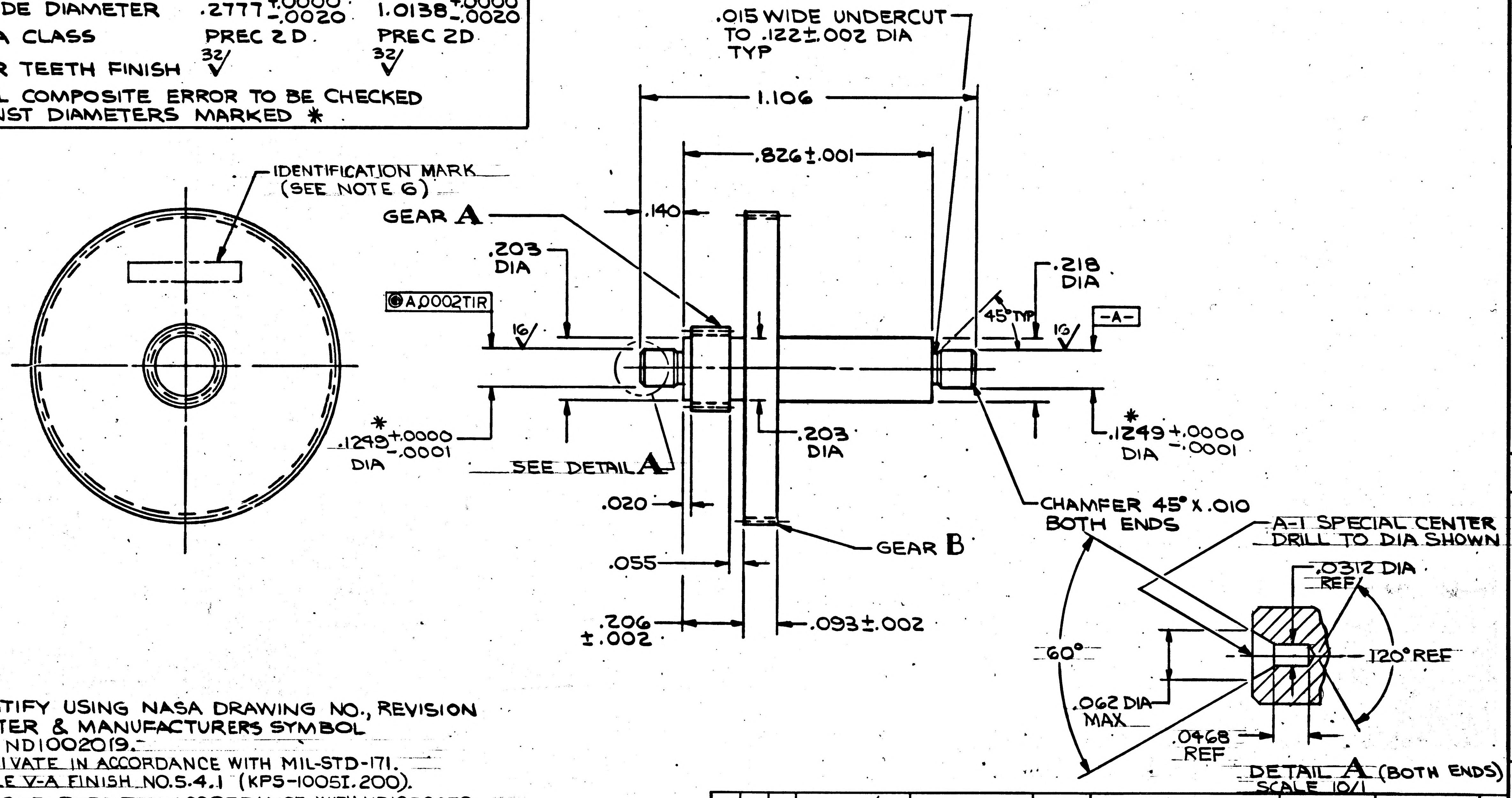
2011296

SYM	ZONE	REVISIONS TDRR 10230 DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

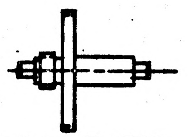
	GEAR A	GEAR B
NO. OF TEETH	18	71
DIAMETRAL PITCH	72	72
PRESSURE ANGLE	20	20
PITCH DIAMETER	.25000	.98611
OUTSIDE DIAMETER	$.2777^{+.0000}_{-.0020}$	$1.0138^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D	PREC 2D
GEAR TEETH FINISH	32/√	32/√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


IDENTIFICATION MARK (SEE NOTE 6)
GEAR A
.015 WIDE UNDERCUT TO .122±.002 DIA TYP
1.106
.826±.001
.140
.203 DIA
⊚ A .0002 TIR
16/
.218 DIA
45° TYP
16/
-A-
* .1249 +.0000 -.0001 DIA
SEE DETAIL A
.203 DIA
* .1249 +.0000 -.0001 DIA
CHAMFER 45° X .010 BOTH ENDS
.020
GEAR B
.055
.206 ±.002
.093±.002
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF
DETAIL A (BOTH ENDS) SCALE 10/1

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171. (TABLE V-A FINISH NO.5.4.1 (KPS-10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
   63/√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910190

DRAWN E. DRAPALA DATE 4-8-64
CHECKED J. SULLIVAN 5-6-64
APPROVAL 6/5/64
APPROVAL 6/12/64
NASA APPROVAL
MIT APPROVAL G. Nilson 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(18T-72P)(71T-72P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011296

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011296

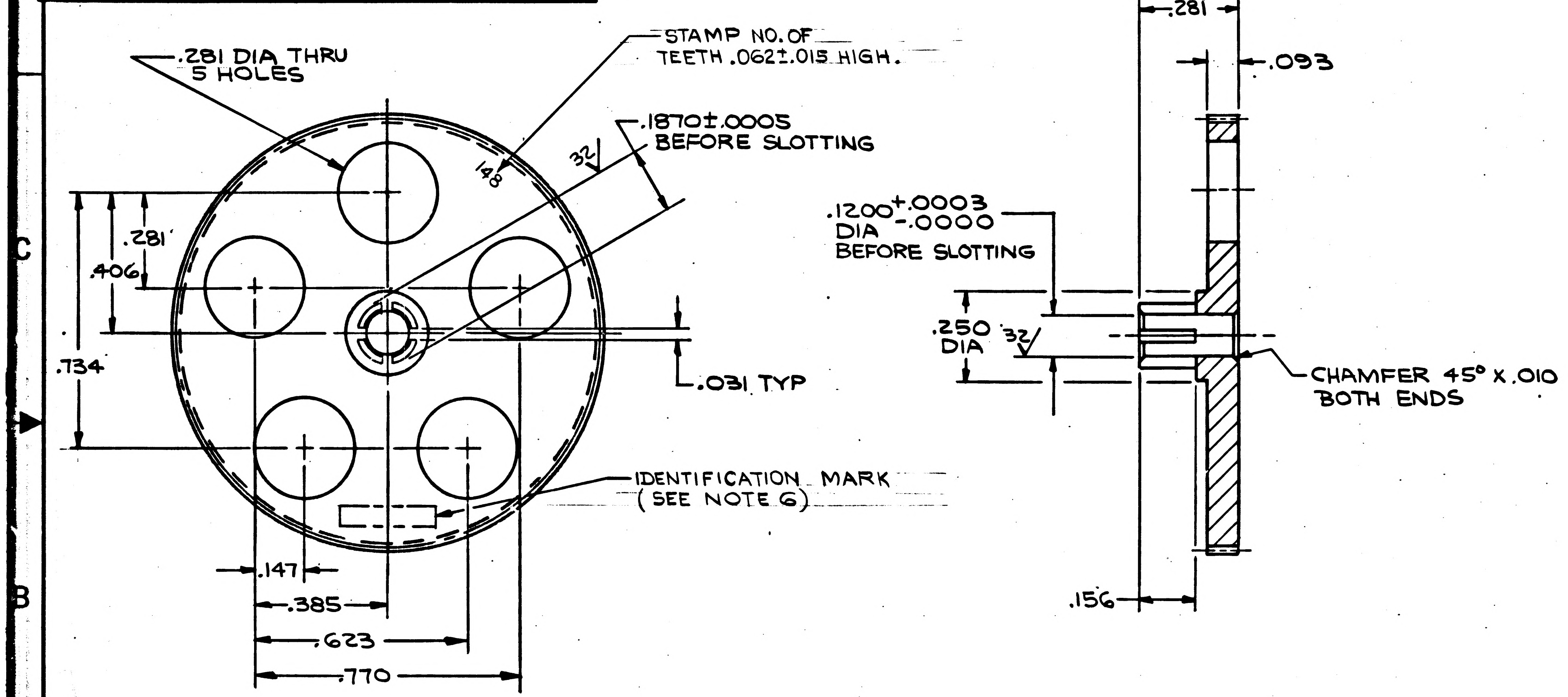
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011297 A

REVISIONS			10048	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12222	9/1/64	WK

SPUR GEAR DATA

NO. OF TEETH	148
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIAMETER	1.23333
OUTSIDE DIAMETER	$1.2500^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\sqrt{}$ 32


.281 DIA THRU
5 HOLES
STAMP NO. OF TEETH .062±.015 HIGH.
148
.1870±.0005
BEFORE SLOTTING
32
.281
.406
.734
.031 TYP
IDENTIFICATION MARK
(SEE NOTE 6)
.147
.385
.623
.770
.281
.093
.1200 +.0003 -.0000
DIA
BEFORE SLOTTING
.250
DIA
32
CHAMFER 45° X .010
BOTH ENDS
.156

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171, (TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
$\sqrt{}$ 63 FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327.

NOTES:-

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910200

DRAWN E. DRAPALA DATE 4-8-64
CHECKED T. SULLIVAN 5-26-64
APPROVAL 5/29/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 9/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR
(148T-120P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011297

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011297 A

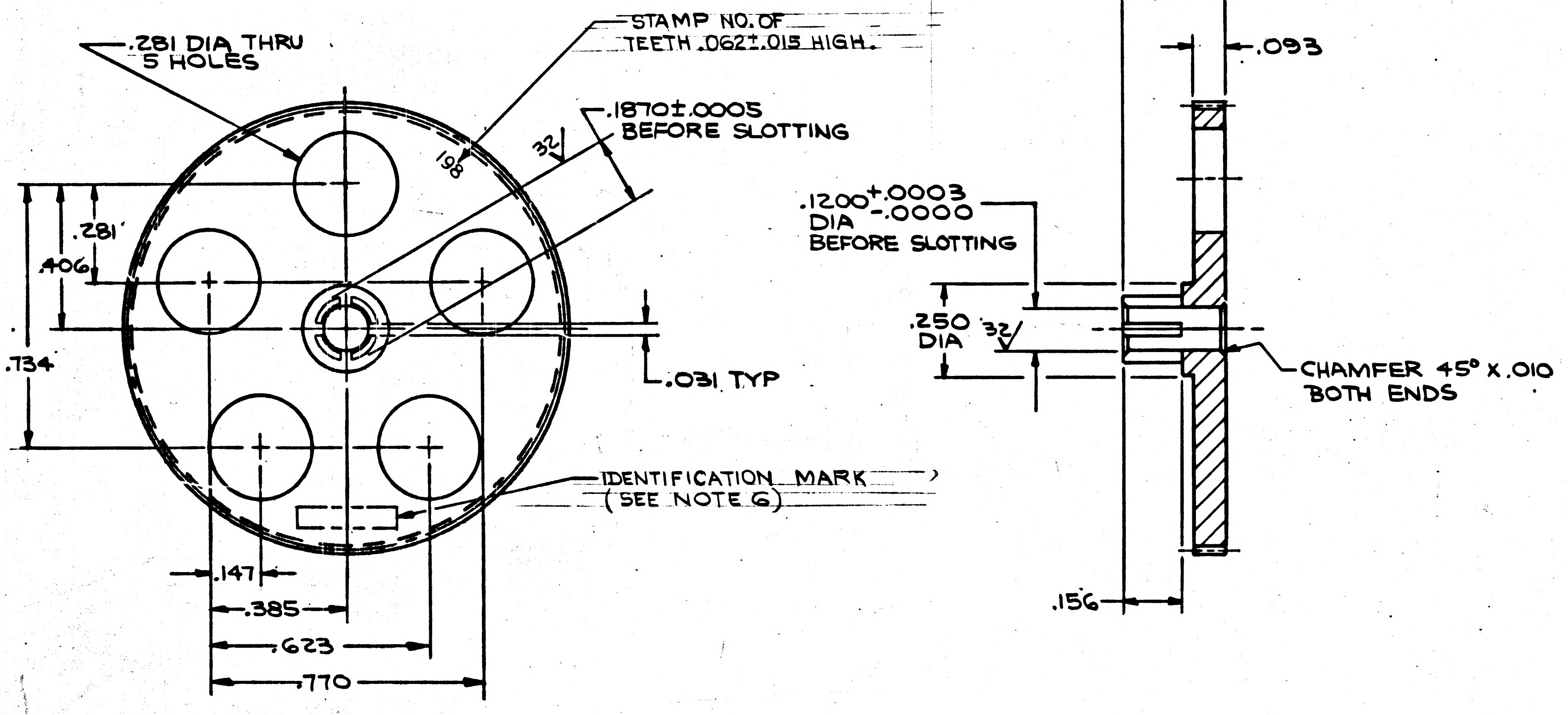
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011297

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

NO. OF TEETH	148
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIAMETER	1.23333
OUTSIDE DIAMETER	$1.2500^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\sqrt{}$ 32


.281 DIA THRU
5 HOLES
STAMP NO. OF TEETH .062±.015 HIGH.
198
.1870±.0005
BEFORE SLOTTING
32
.281
.406
.734
.031 TYP
IDENTIFICATION MARK
(SEE NOTE 6)
.147
.385
.623
.770
.281
.093
$.1200^{+.0003}_{-.0000}$
DIA
BEFORE SLOTTING
.250
DIA
32
CHAMFER 45° X .010
BOTH ENDS
.156

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171, (TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:- $\sqrt{}$ 63 FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910200

DRAWN E. DRAPALA DATE 4-3-64
CHECKED T. SULLIVAN 5-26-64
APPROVAL 6/2/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR
(148T-120P)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011297
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

57

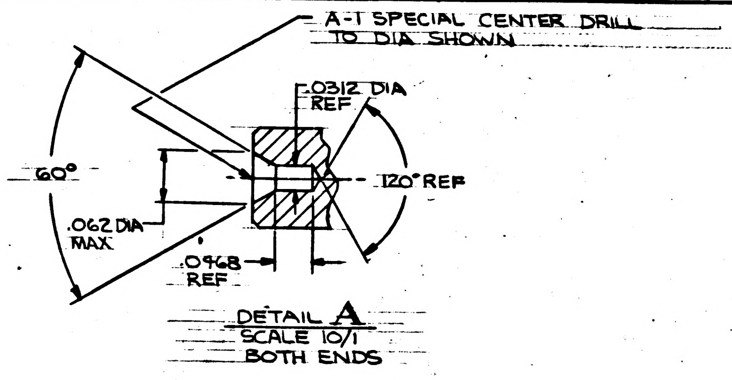
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

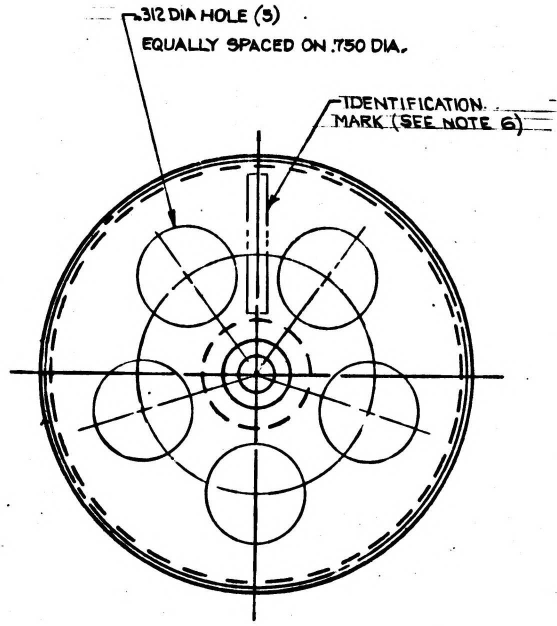
2011298

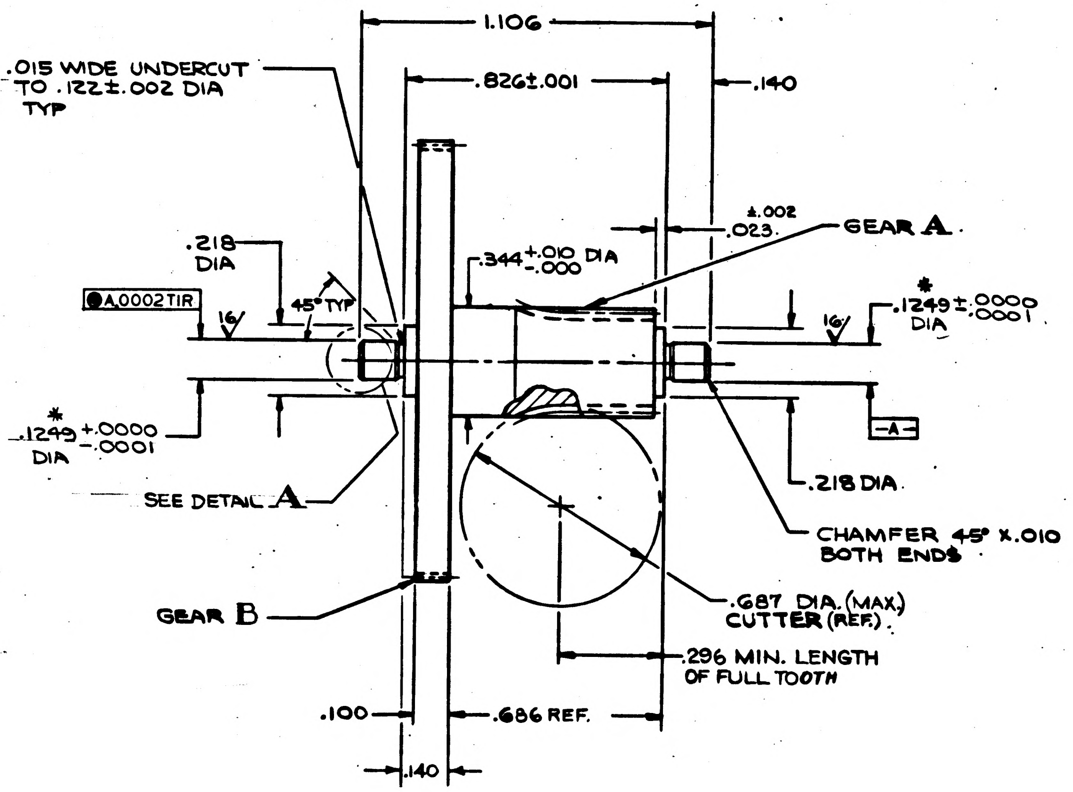
SPUR GEAR DATA	GEAR A	GEAR B
NO. OF TEETH	20	98
DIAMETRAL PITCH	64	72
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.31250	1.36111
OUTSIDE DIAMETER	.3437 +.0000 -.0030	1.3888 +.0000 -.0020
AGMA CLASS	PREC 2D	PREC 2D
GEAR TEETH FINISH	32/√	32/√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0968 REF

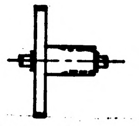
DETAIL A
SCALE 10/1
BOTH ENDS


.312 DIA HOLE (5) EQUALLY SPACED ON .750 DIA.
IDENTIFICATION MARK (SEE NOTE 6)


.015 WIDE UNDERCUT TO .122±.002 DIA TYP
1.106
.826±.001
.140
±.002 .023
GEAR A
.218 DIA
.344 +.010 -.000 DIA
A .0002 TIR
16/
45° TYP
.1249 +.0000 -.0001 DIA
-A-
.218 DIA
CHAMFER 45° X .010 BOTH ENDS
SEE DETAIL A
GEAR B
.687 DIA. (MAX) CUTTER (REF.)
.296 MIN. LENGTH OF FULL TOOTH
.100
.686 REF.
.140

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 (TABLE V-A FINISH NO. 5.4.1.) (KPS-10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
63/√ FINISH ALL OVER

2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327
NOTES:-



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910230
DRAWN E. DRAPALA DATE 4-8-64
CHECKED J. SULLIVAN 5-6-64
APPROVAL 6/3/64
APPROVAL 6/12/64
NASA APPROVAL
MIT APPROVAL 6/10/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(20T-64P)(98T-72P)

CODE IDENT NO. SIZE D NASA NUMBER 2011298
SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011298

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011299

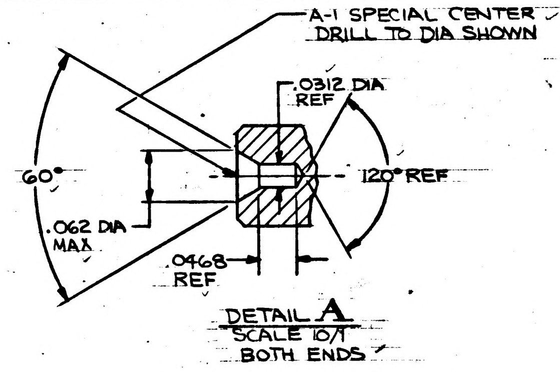
REVISIONS TORR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

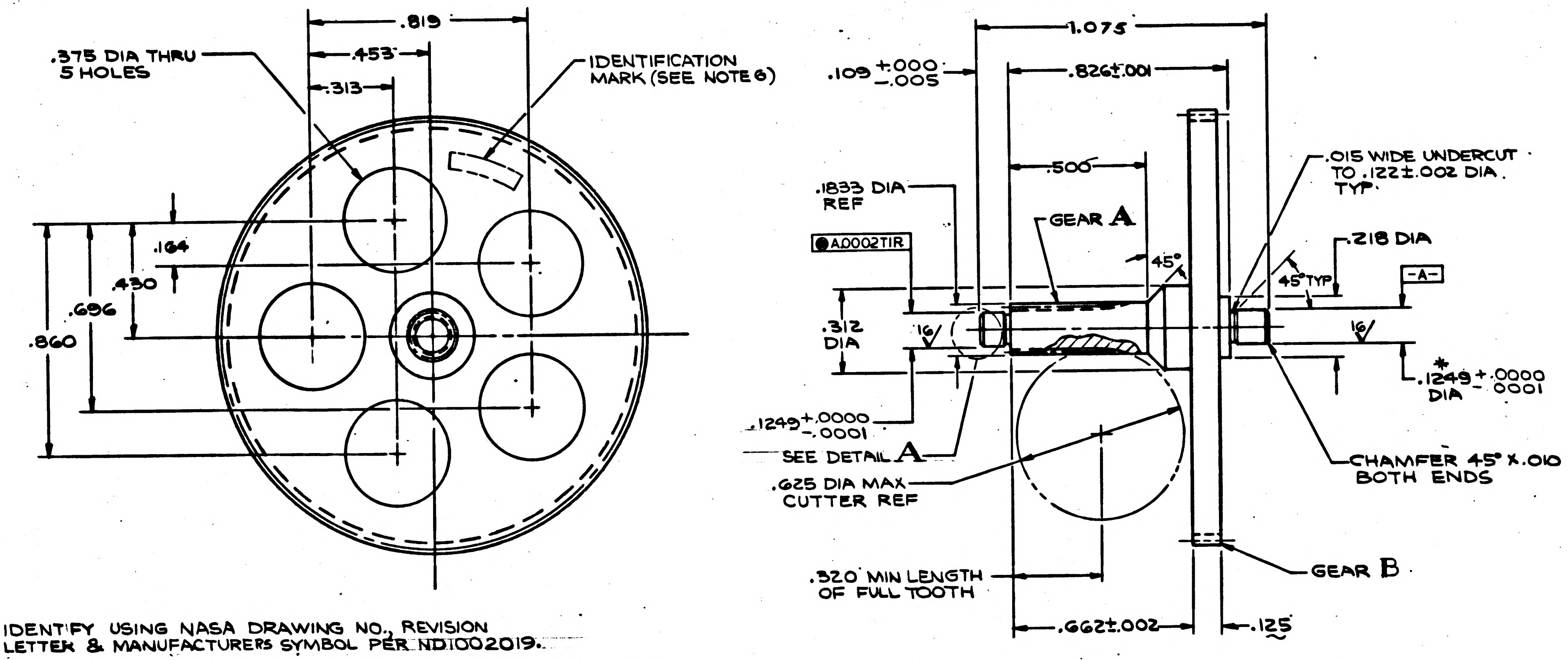
SPUR GEAR DATA

	GEAR A	GEAR B
NO. OF TEETH	20	100
DIAMETRAL PITCH	120	64
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.16667	1.56250
OUTSIDE DIAMETER	$.1833^{+.0000}_{-.0015}$	$1.5937^{+.0000}_{-.0030}$
AGMA CLASS	PREC 2D	PREC 2D
GEAR TEETH FINISH	$\overset{32}{\checkmark}$	$\overset{32}{\checkmark}$

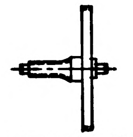
TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF

DETAIL A
SCALE 10/1
BOTH ENDS


.819
.453
.313
.375 DIA THRU 5 HOLES
IDENTIFICATION MARK (SEE NOTE 6)
.164
.430
.696
.860
1.075
.109 +.000 −.005
.826±.001
.500
.1833 DIA REF
GEAR A
A.0002TIR
45°
.015 WIDE UNDERCUT TO .122±.002 DIA TYP
.218 DIA
45° TYP
-A-
.312 DIA
16
16
* .1249 +.0000 −.0001 DIA
.1249 +.0000 −.0001
SEE DETAIL A
.625 DIA MAX CUTTER REF
CHAMFER 45° X .010 BOTH ENDS
.320 MIN LENGTH OF FULL TOOTH
GEAR B
.662±.002
.125

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171. (TABLE V-A FINISH NO.5.4.1 (KPS-10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
$\overset{63}{\checkmark}$ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327
NOTES:-



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910220

DRAWN E. DRAGALA DATE 4-8-64
CHECKED T. SULLIVAN 5-6-64
APPROVAL F. Ruhlman 6/1/64
APPROVAL E. Thorup 4/12/64
NASA APPROVAL
MIT APPROVAL E J Nelson 4/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(20T-120P)(100T-64P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011299
SCALE 4/1
WEIGHT
CALC ACTUAL
SHEET OF

2011299

MASTER

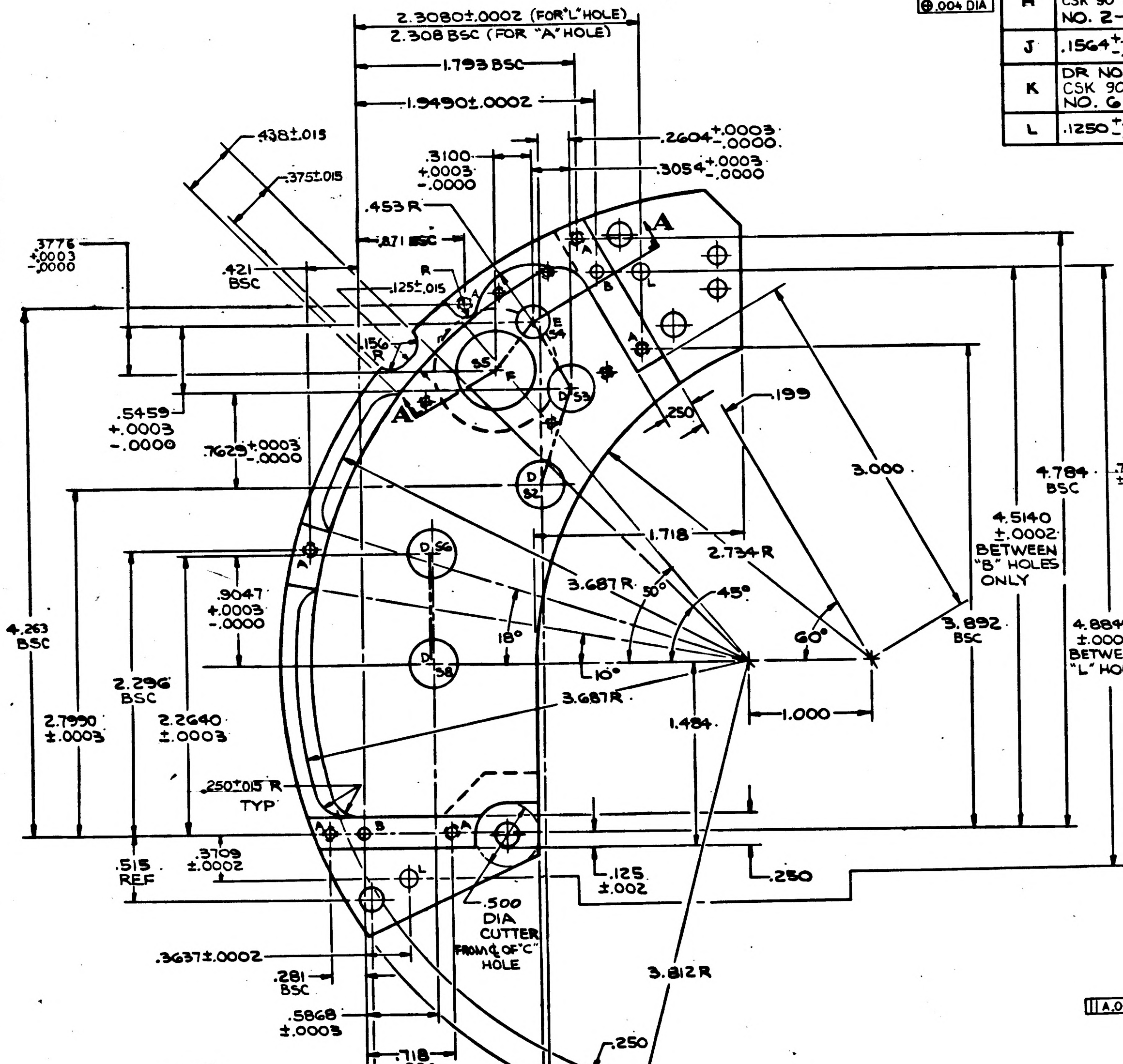
NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE ND1002078.
3. UNLESS OTHERWISE SPECIFIED:-
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. THIS PART TO BE MATED WITH PART NO. 2011301.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (TAGGING)

	HOLE	DESCRIPTION	QUANTITY
⊕ .010 DIA.	A	DR NO. 41 (.096) X .380 DEEP CSK 90° $^{+0°}_{-5°}$ TO .140 DIA. NO. 4-40 NC-3B X .281 DEEP	6
	B	.0944 $^{+.0005}_{-.0000}$ DIA X .187 DEEP 32√	2
⊕ .010 DIA	C	DR NO. 15 (.1800) THRU	4
	D	.3751 $^{+.0002}_{-.0000}$ DIA THRU 32√	4
	E	.2501 $^{+.0002}_{-.0000}$ DIA THRU 32√	1
	F	.628 $^{+.005}_{-.000}$ DIA THRU 1.0003 $^{+.0005}_{-.0000}$ DIA X DEPTH SHOWN 32√ IN SECTION A-A (FROM OPP. SIDE)	1
⊕ .010 DIA	G	DR NO. 44 (.086) THRU CSK 90° $^{+0°}_{-5°}$ TO .120 DIA NO. 3-48 NC-3 THRU	3
⊕ .004 DIA	H	DR NO. 49 (.073) THRU CSK 90° $^{+0°}_{-5°}$ TO .109 DIA NO. 2-56 NC-3 THRU	2
	J	.1564 $^{+.0003}_{-.0000}$ DIA THRU	2
	K	DR NO. 32 (.116) THRU CSK 90° $^{+0°}_{-5°}$ TO .156 DIA. NO. 6-32 NC-3B THRU	1
	L	.1250 $^{+.0005}_{-.0000}$ DIA THRU 32√	2

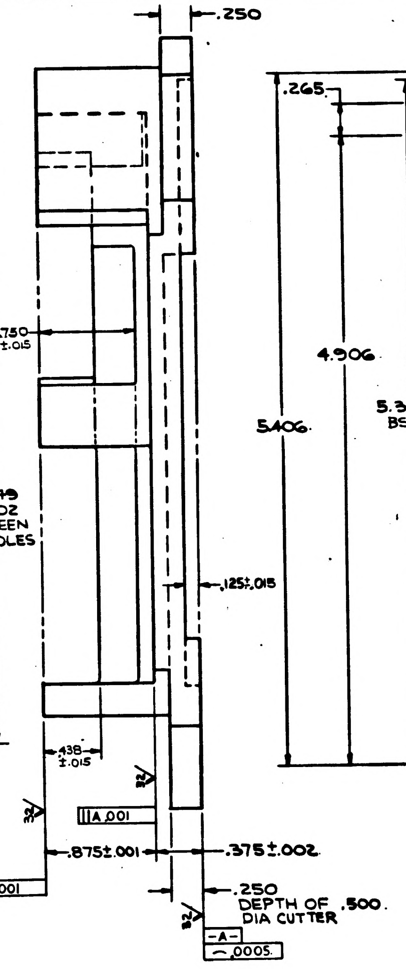
(n) A 2011300

REVISIONS TDCR 10793

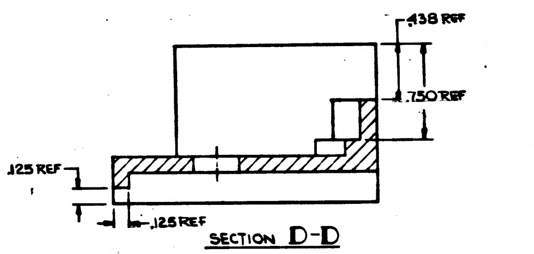
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13311	10/6/[illegible]	WK



2.3080±.0002 (FOR "L" HOLE)
2.308 BSC (FOR "A" HOLE)
1.793 BSC
1.9490±.0002
.2604 +.0003 -.0000
.3054 +.0003 -.0000
.3100 +.0003 -.0000
.438±.015
.375±.015
.453 R
.3776 +.0003 -.0000
.421 BSC
.125±.015
.5459 +.0003 -.0000
.7629 +.0003 -.0000
3.000
4.784 BSC
4.5140 ±.0002 BETWEEN "B" HOLES ONLY
4.8849 ±.0002 BETWEEN "L" HOLES
3.892 BSC
3.687 R
2.734 R
1.718
.199
.250
45°
60°
30°
18°
10°
1.000
1.484
4.263 BSC
2.296 BSC
2.7990 ±.0003
2.2640 ±.0003
.9047 +.0003 -.0000
.250±.015 R TYP
.515 REF
.3709 ±.0002
.125 ±.002
.250
.500 DIA CUTTER FROM OF "C" HOLE
.3637±.0002
.281 BSC
.5868 ±.0003
3.812 R
A
A

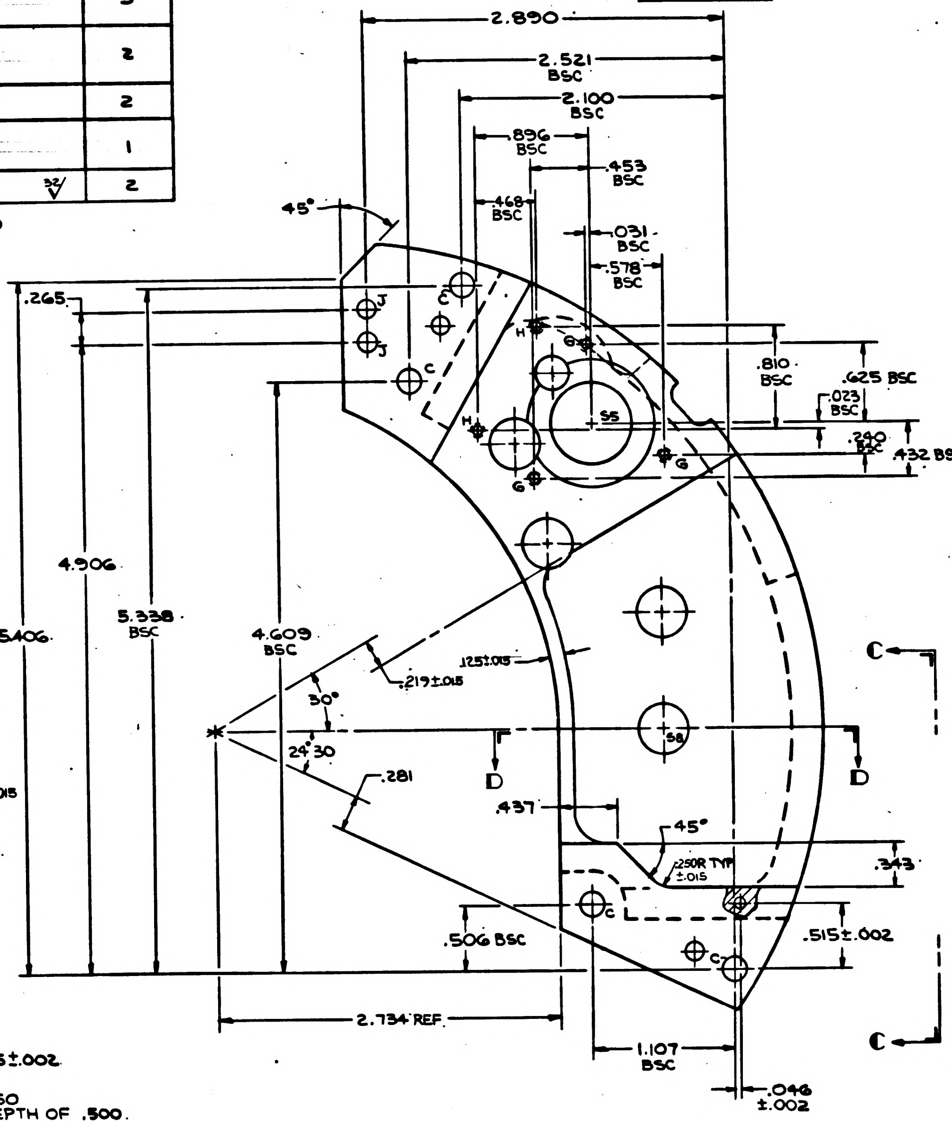


.250
.750 ±.015
.125±.015
.438 ±.015
A .001
.875±.001
.375±.002
.250 DEPTH OF .500 DIA CUTTER
-A-
.0005

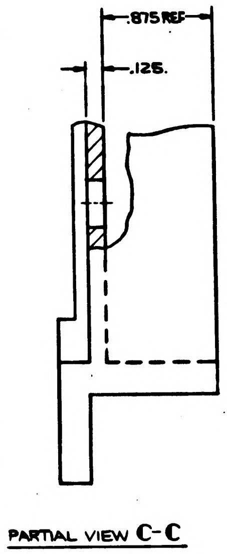


.438 REF
.750 REF
.125 REF
.125 REF

SECTION D-D

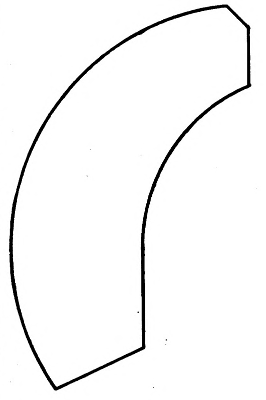


2.890
2.521 BSC
2.100 BSC
.896 BSC
.468 BSC
.453 BSC
.031 BSC
.578 BSC
45°
.265
.810 BSC
.625 BSC
.023 BSC
.240 BSC
.432 BSC
5.406
5.338 BSC
4.906
4.609 BSC
.125±.015
.219±.015
30°
24°30'
.281
.437
45°
.250R TYP ±.015
.343
.515±.002
.506 BSC
2.734 REF
1.107 BSC
.046 ±.002
C
C
D
D

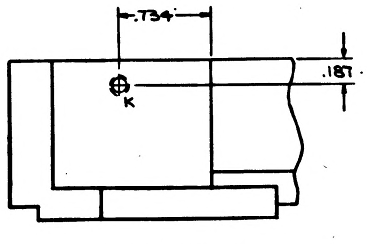


PARTIAL VIEW C-C

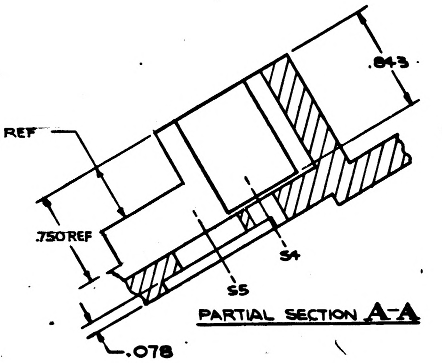
CENTERS	C.D. CHECKING DIM
S2-S3	.8061 $^{+.0004}_{-.0000}$
S3-S4	.6255 $^{+.0004}_{-.0000}$
S4-S5	.4885 $^{+.0005}_{-.0000}$
S6-S8	.9047 $^{+.0004}_{-.0000}$



ACTUAL SIZE



PARTIAL VIEW B-B



.843
.438 REF
.750 REF
S5
S4
.078

PARTIAL SECTION A-A

NOTE:-
GEAR TRAINS ARE INDICATED AS SHOWN ----

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011897	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910230
DRAWN E. DRAPALA DATE 4-7-64
CHECKED T. SULLIVAN 6-1-64
APPROVAL 6/25/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
(SEXTANT SHAFT DRIVE)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011300.
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

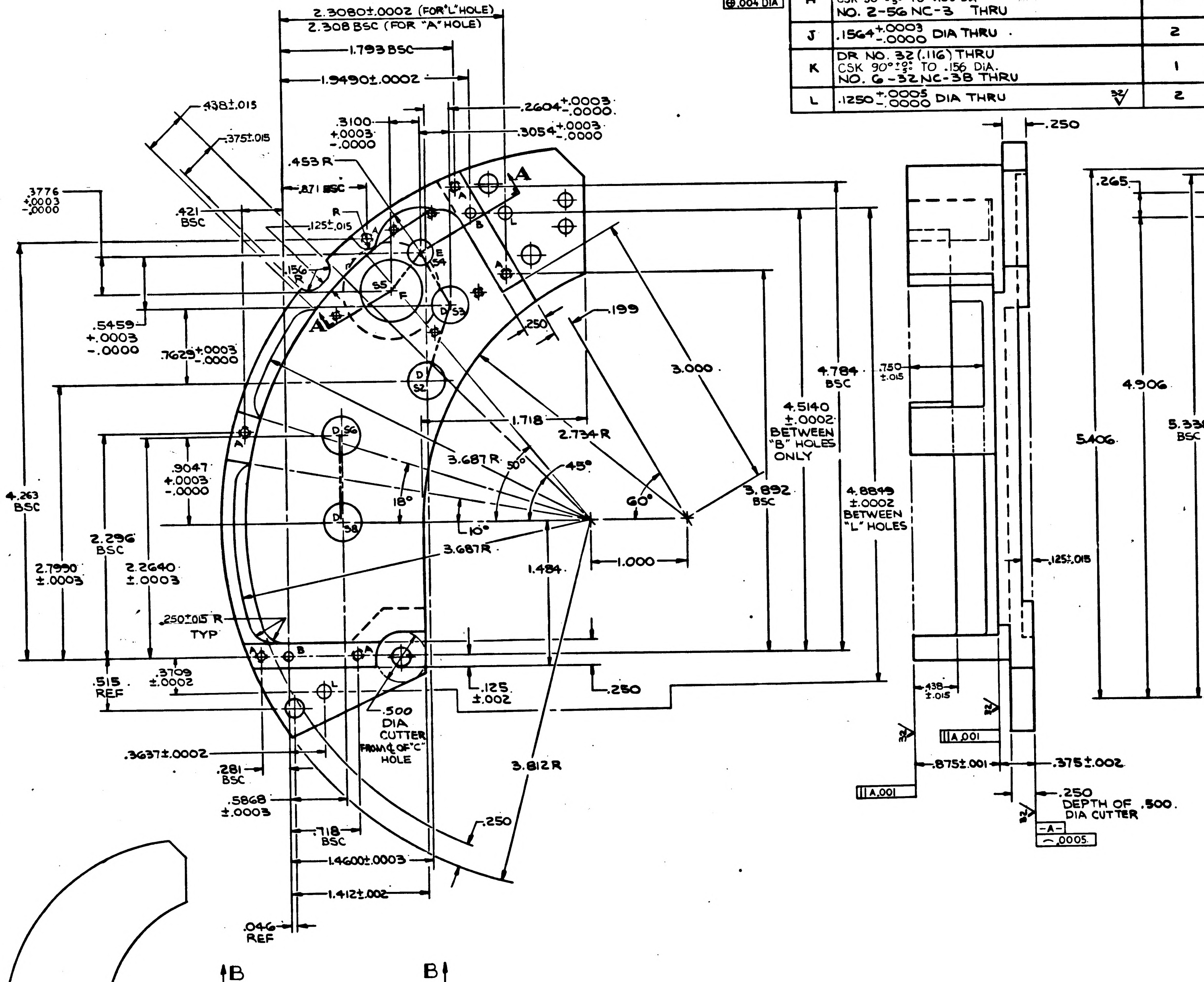
NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:-
   a. 63/√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. THIS PART TO BE MATED WITH PART NO. 2011301.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (TAGGING)

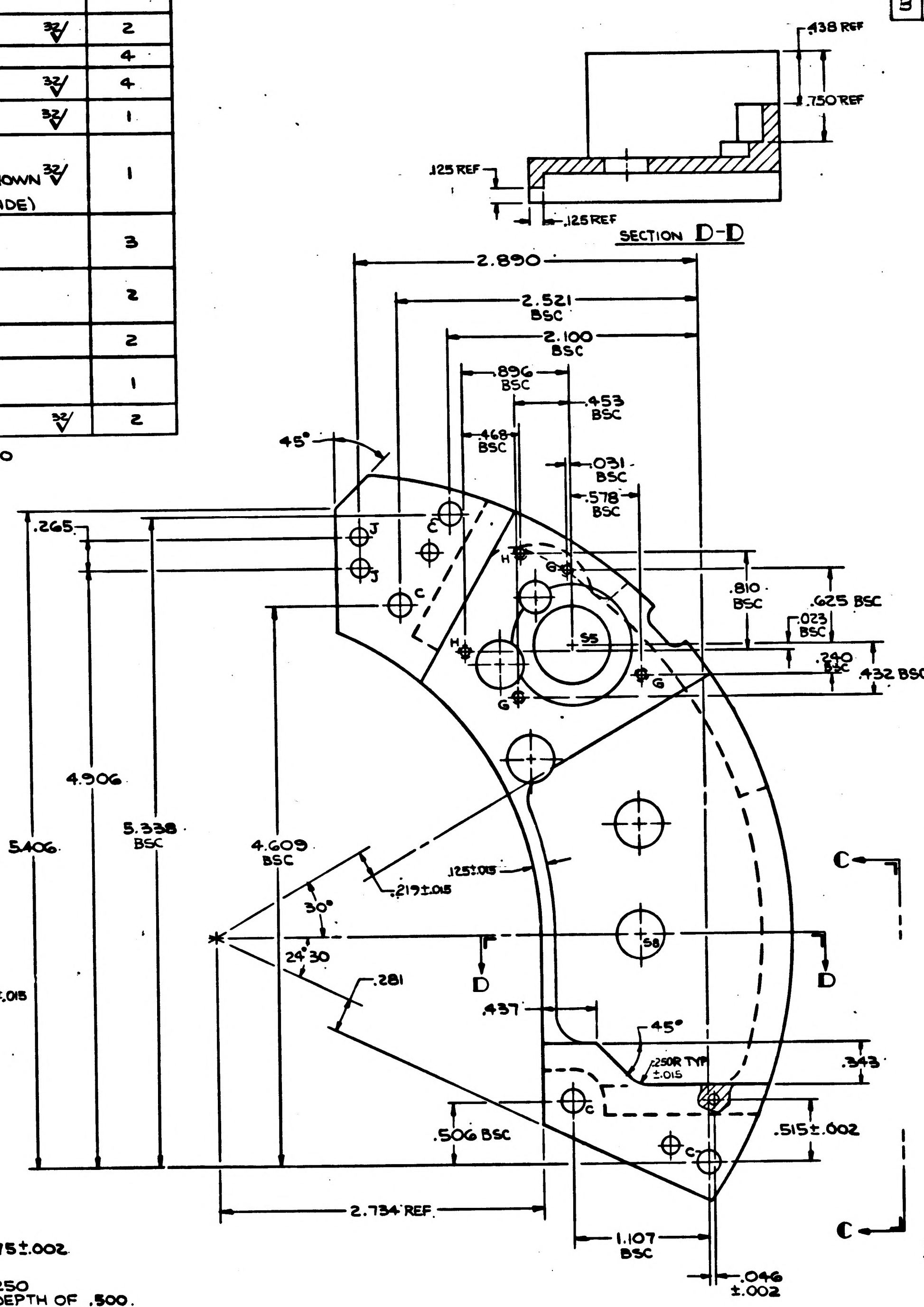
	HOLE	DESCRIPTION	QUANTITY
⊕ .010 DIA.	A	DR NO. 41(.096) X .380 DEEP CSK 90°$^{+0°}_{-5°}$ TO .140 DIA. NO. 4-40 NC-3B X .281 DEEP	6
	B	.0944$^{+.0005}_{-.0000}$ DIA X .187 DEEP 32/√	2
⊕ .010 DIA	C	DR NO. 15(.1800) THRU	4
	D	.3751 $^{+.0002}_{-.0000}$ DIA THRU 32/√	4
	E	.2501 $^{+.0002}_{-.0000}$ DIA THRU 32/√	1
	F	.628$^{+.005}_{-.000}$ DIA THRU 1.0003$^{+.0005}_{-.0000}$ DIA X DEPTH SHOWN 32/√ IN SECTION A-A (FROM OPP. SIDE)	1
⊕ .010 DIA	G	DR NO. 44 (.086) THRU CSK 90°$^{+0°}_{-5°}$ TO .120 DIA NO. 3-48 NC-3 THRU	3
⊕ .004 DIA	H	DR NO. 49 (.073) THRU CSK 90°$^{+0°}_{-5°}$ TO .109 DIA NO. 2-56 NC-3 THRU	2
	J	.1564$^{+.0003}_{-.0000}$ DIA THRU	2
	K	DR NO. 32 (.116) THRU CSK 90°$^{+0°}_{-5°}$ TO .156 DIA. NO. 6-32 NC-3B THRU	1
	L	.1250$^{+.0005}_{-.0000}$ DIA THRU 32/√	2

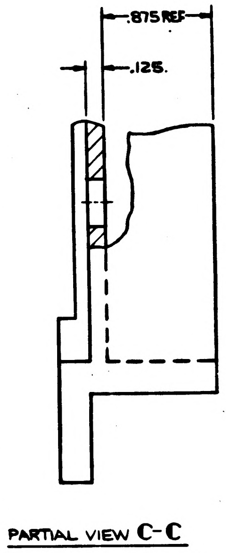
2011300 A

REVISIONS TDRR 13793

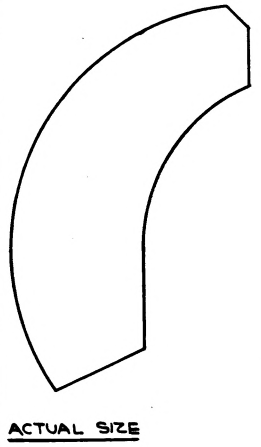
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13311	10/6/65	WK
B		REVISED PER TDRR NO 15356	1/6/65	WK

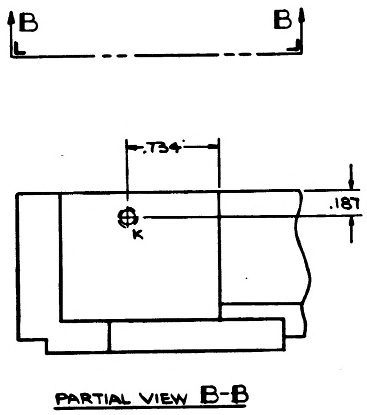

2.3080±.0002 (FOR "L" HOLE)
2.308 BSC (FOR "A" HOLE)
1.793 BSC
1.9490±.0002
.438±.015
.375±.015
.3100 +.0003 -.0000
.2604 +.0003 -.0000
.3054 +.0003 -.0000
.453 R
.871 BSC
.3776 +.0003 -.0000
.421 BSC
.125±.015
.5459 +.0003 -.0000
.7629 +.0003 -.0000
.9047 +.0003 -.0000
4.263 BSC
2.296 BSC
2.7990 ±.0003
2.2640 ±.0003
.250±.015 R TYP
.515 REF
.3709 ±.0002
.3637±.0002
.281 BSC
.5868 ±.0003
.718 BSC
1.4600±.0003
1.412±.002
.046 REF
.500 DIA CUTTER FROM ℄ OF "C" HOLE
3.812 R
.250
.199
3.000
1.718
2.734 R
3.687 R
50°
45°
18°
10°
60°
3.892 BSC
1.000
1.484
.125 ±.002
4.784 BSC
4.5140 ±.0002 BETWEEN "B" HOLES ONLY
4.8849 ±.0002 BETWEEN "L" HOLES
.750 ±.015
.125±.015
.438 ±.015
.875±.001
.375±.002
.250 DEPTH OF .500 DIA CUTTER
A.001
-A- .0005

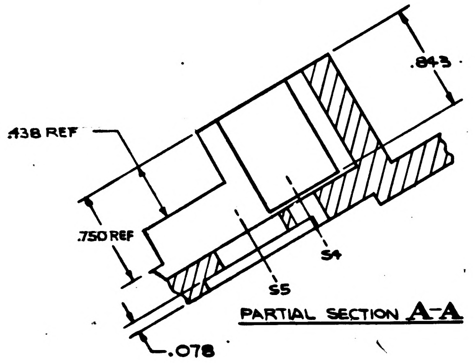

SECTION D-D
.438 REF
.750 REF
.125 REF
.125 REF
2.890
2.521 BSC
2.100 BSC
.896 BSC
.468 BSC
.453 BSC
.031 BSC
.578 BSC
45°
.265
.810 BSC
.625 BSC
.023 BSC
.240 BSC
.432 BSC
4.906
5.406
5.338 BSC
4.609 BSC
.125±.015
.219±.015
30°
24°30
.281
.437
45°
.250R TYP ±.015
.343
.506 BSC
.515±.002
2.734 REF
1.107 BSC
.046 ±.002
C
D
D
C


PARTIAL VIEW C-C

CENTERS	C.D. CHECKING DIM
S2-S3	.8061$^{+.0004}_{-.0000}$
S3-S4	.6255$^{+.0004}_{-.0000}$
S4-S5	.4885$^{+.0005}_{-.0000}$
S6-S8	.9047$^{+.0004}_{-.0000}$


ACTUAL SIZE


PARTIAL VIEW B-B


PARTIAL SECTION A-A
.843
.438 REF
.750 REF
S5
S4
.078

REPLACED WITH CHANGE BY REV. C

NOTE:-
GEAR TRAINS ARE INDICATED AS SHOWN ----

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011897	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND 1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910230
DRAWN E. DRAPALA DATE 4-7-64
CHECKED T. SULLIVAN 6-1-64
APPROVAL 6/25/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE: HOUSING, GEAR (SEXTANT SHAFT DRIVE)
CODE IDENT NO.
SIZE: E
NASA NUMBER: 2011300
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET OF

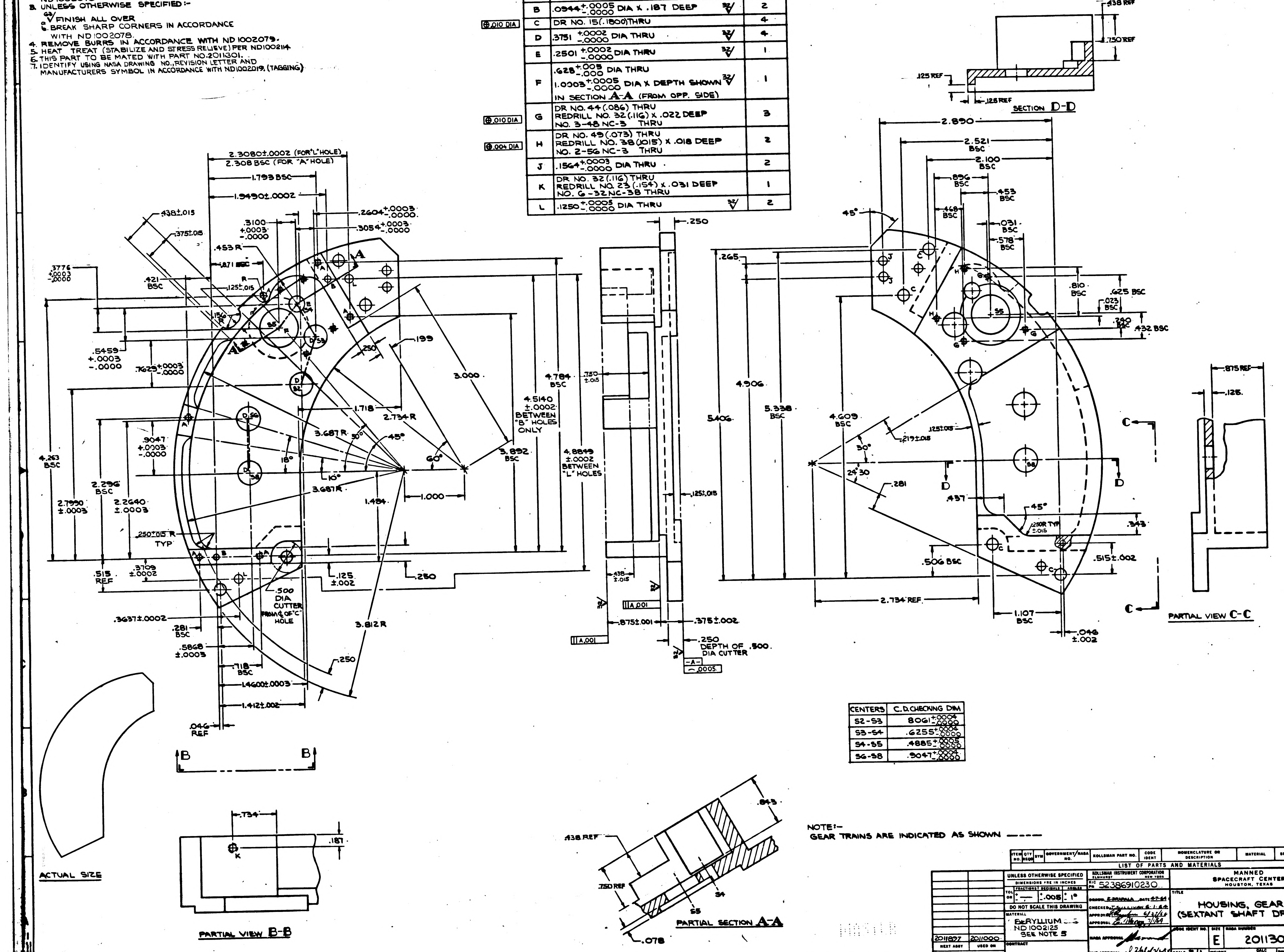
2011300

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:-
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. THIS PART TO BE MATED WITH PART NO. 2011301.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (TAGGING)

	HOLE	DESCRIPTION		QUANTITY
⊕ .010 DIA.	A	DR NO. 41 (.096) X .380 DEEP REDRILL NO. 30 (.1285) X .025 DEEP NO. 4-40 NC-3B X .281 DEEP		6
	B	.0944 $^{+.0005}_{-.0000}$ DIA X .187 DEEP	32/	2
⊕ .010 DIA	C	DR NO. 15 (.1800) THRU		4
	D	.3751 $^{+.0002}_{-.0000}$ DIA THRU	32/	4
	E	.2501 $^{+.0002}_{-.0000}$ DIA THRU	32/	1
	F	.628 $^{+.005}_{-.000}$ DIA THRU 1.0003 $^{+.0005}_{-.0000}$ DIA X DEPTH SHOWN IN SECTION A-A (FROM OPP. SIDE)	32/	1
⊕ .010 DIA	G	DR NO. 44 (.086) THRU REDRILL NO. 32 (.116) X .022 DEEP NO. 3-48 NC-3 THRU		3
⊕ .004 DIA	H	DR NO. 49 (.073) THRU REDRILL NO. 38 (.1015) X .018 DEEP NO. 2-56 NC-3 THRU		2
	J	.1564 $^{+.0003}_{-.0000}$ DIA THRU		2
	K	DR NO. 32 (.116) THRU REDRILL NO. 23 (.154) X .031 DEEP NO. 6-32 NC-3B THRU		1
	L	.1250 $^{+.0005}_{-.0000}$ DIA THRU	32/	2

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 10793


SECTION D-D
.438 REF
.750 REF
.125 REF
.125 REF
2.3080±.0002 (FOR "L" HOLE)
2.308 BSC (FOR "A" HOLE)
1.793 BSC
1.9490±.0002
.2604 +.0003 -.0000
.3054 +.0003 -.0000
.3100 +.0003 -.0000
.438±.015
.375±.015
.453 R
.171 R
.125±.015
.421 BSC
.3776 +.0003 -.0000
.5459 +.0003 -.0000
.7625 +.0003 -.0000
.9047 +.0003 -.0000
4.263 BSC
2.296 BSC
2.7990 ±.0003
2.2640 ±.0003
.250±.015 R TYP
.515 REF
.3709 ±.0002
.3637±.0002
.281 BSC
.5868 ±.0003
.718 BSC
1.4600±.0003
1.412±.002
.046 REF
.500 DIA CUTTER FROM ¢ OF "C" HOLE
3.812 R
.250
.125 ±.002
.250
1.484
1.000
3.687 R
3.687 R
2.734 R
1.718
3.000
.199
.250
60°
45°
30°
18°
10°
3.892 BSC
4.784 BSC
4.5140 ±.0002 BETWEEN "B" HOLES ONLY
4.8849 ±.0002 BETWEEN "L" HOLES
.750 ±.015
.250
.125±.015
.438 ±.015
.875±.001
.375±.002
.250 DEPTH OF .500 DIA CUTTER
A .001
A .001
-A-
.0005
2.890
2.521 BSC
2.100 BSC
.896 BSC
.468 BSC
.453 BSC
.031 BSC
.578 BSC
.265
.810 BSC
.625 BSC
.023 BSC
.240 BSC
.432 BSC
4.906
5.406
5.338 BSC
4.609 BSC
.125±.015
.219±.015
30°
24°30'
.281
.437
45°
.250R TYP ±.015
.343
.515±.002
.506 BSC
2.734 REF
1.107 BSC
.046 ±.002
S5
C
C
D
D
PARTIAL VIEW C-C
.875 REF
.125
ACTUAL SIZE
B
B
PARTIAL VIEW B-B
.734
.187
K
.438 REF
.750 REF
.843
.078
S5
S4
PARTIAL SECTION A-A

CENTERS	C.D. CHECKING DIM
S2-S3	.8061 $^{+.0004}_{-.0000}$
S3-S4	.6255 $^{+.0004}_{-.0000}$
S4-S5	.4885 $^{+.0005}_{-.0000}$
S6-S8	.9047 $^{+.0004}_{-.0000}$

NOTE:-
GEAR TRAINS ARE INDICATED AS SHOWN ----

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011897	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910230

DRAWN E. DRAPALA DATE 4-7-64
CHECKED T. SULLIVAN 6-1-64
APPROVAL 6/23/64
APPROVAL E. Wong 7/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
(SEXTANT SHAFT DRIVE)

CODE IDENT NO. | SIZE E | NASA NUMBER 2011300
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

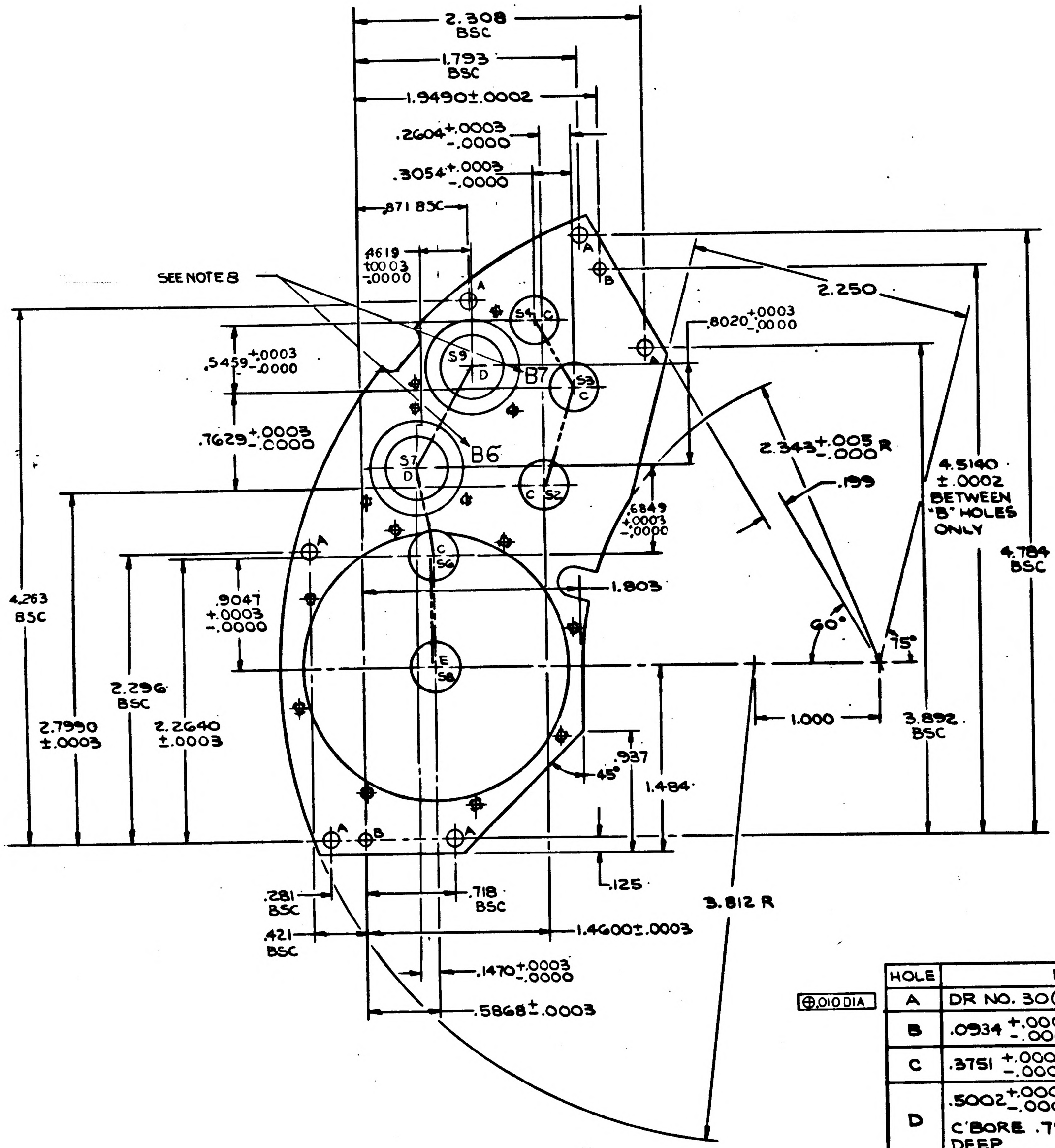
2011301

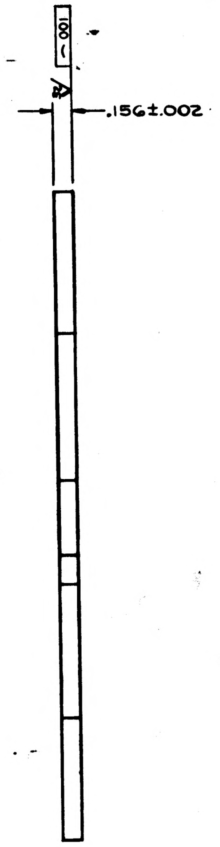
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15357	1/6/65	6K

REVISIONS TDRR 10793

replaced by rev B

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:-
   a. 63/√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. THIS PART TO BE MATED WITH PART NO.2011300.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019 (TAGGING)
8. MARK CHARACTERS $^{.14}_{.10}$ HIGH PER ND1002019 AT LOCATIONS SHOWN.


2.308 BSC
1.793 BSC
1.9490±.0002
.2604 +.0003 −.0000
.3054 +.0003 −.0000
.871 BSC
.4619 +.0003 −.0000
SEE NOTE 8
.5459 +.0003 −.0000
.7629 +.0003 −.0000
.8020 +.0003 −.0000
2.250
2.343 +.005 −.000 R
.199
4.5140 ±.0002 BETWEEN "B" HOLES ONLY
4.784 BSC
.6849 +.0003 −.0000
1.803
.9047 +.0003 −.0000
4.263 BSC
2.296 BSC
2.7990 ±.0003
2.2640 ±.0003
60°
15°
1.000
3.892 BSC
.937
45°
1.484
.125
.281 BSC
.421 BSC
.718 BSC
1.4600±.0003
.1470 +.0003 −.0000
.5868±.0003
3.812 R
S2
S3
S4
S5
S6
S7
S8
S9
B6
B7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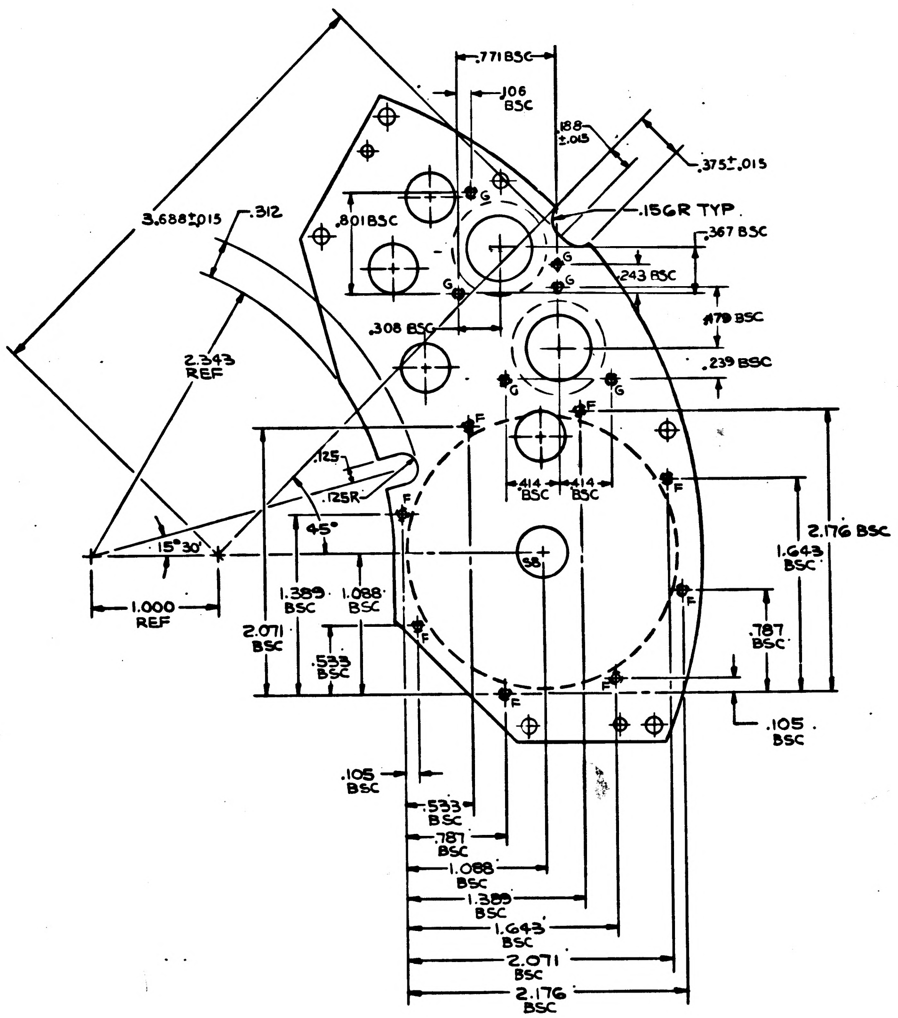

.771 BSC
.106 BSC
.188 ±.015
.375±.015
.156R TYP
.367 BSC
3.688±.015
.312
.801 BSC
.243 BSC
.179 BSC
.308 BSC
.239 BSC
2.343 REF
.125
.125R
.414 BSC
.414 BSC
2.176 BSC
1.643 BSC
15°30'
45°
1.000 REF
1.389 BSC
1.088 BSC
2.071 BSC
.533 BSC
.787 BSC
.105 BSC
.105 BSC
.533 BSC
.787 BSC
1.088 BSC
1.389 BSC
1.643 BSC
2.071 BSC
2.176 BSC
S8

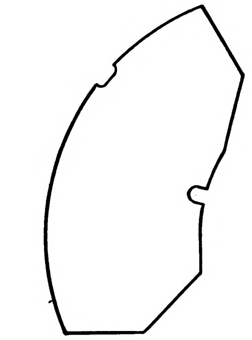
HOLE	DESCRIPTION	QUANTITY
A	DR NO. 30(.1285) THRU	6
B	.0934 +.0003 −.0000 DIA THRU 32/√	2
C	.3751 +.0002 −.0000 DIA THRU 32/√	3
D	.5002 +.0003 −.0000 DIA THRU 32/√ C'BORE .752 +.002 −.000 DIA X .052 +.000 −.002 DEEP	2
E	.3751 +.0002 −.0000 DIA THRU 32/√ C'BORE 2.093 +.005 −.000 DIA X .060 DEEP	1
F	DR NO. 49(.073) THRU REDRILL NO. 38(.1015) X .018 DEEP FROM OPPOSITE SIDE NO. 2-56 NC-3 THRU	8
G	DR NO. 44(.086) THRU REDRILL NO. 32 (.116) X .022 DEEP FROM OPPOSITE SIDE NO. 3-48 NC-3 THRU	6

⊕ .010 DIA (A)
⊕ .004 DIA (F)
⊕ .010 DIA (G)

CENTERS	C.D. CHECKING DIM
S2-S3	.8061
S3-S4	.6255
S6-S8	.9047
S6-S7	.7005
S7-S9	.9255

NOTE:-
C.D. (CHECKING DIMENSIONS) TO HAVE A TOLERANCE OF +.0004 −.0000
GEAR TRAINS ARE INDICATED AS SHOWN ——-—

REPLACED WITH CHANGE BY REV. B



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011715	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM ND 1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910240
DRAWN E.DRAPALA DATE 4-8-64
CHECKED T.SULLIVAN 6-1-64
APPROVAL 6/23/64
APPROVAL E. Morey 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
(SEXTANT SHAFT DRIVE)

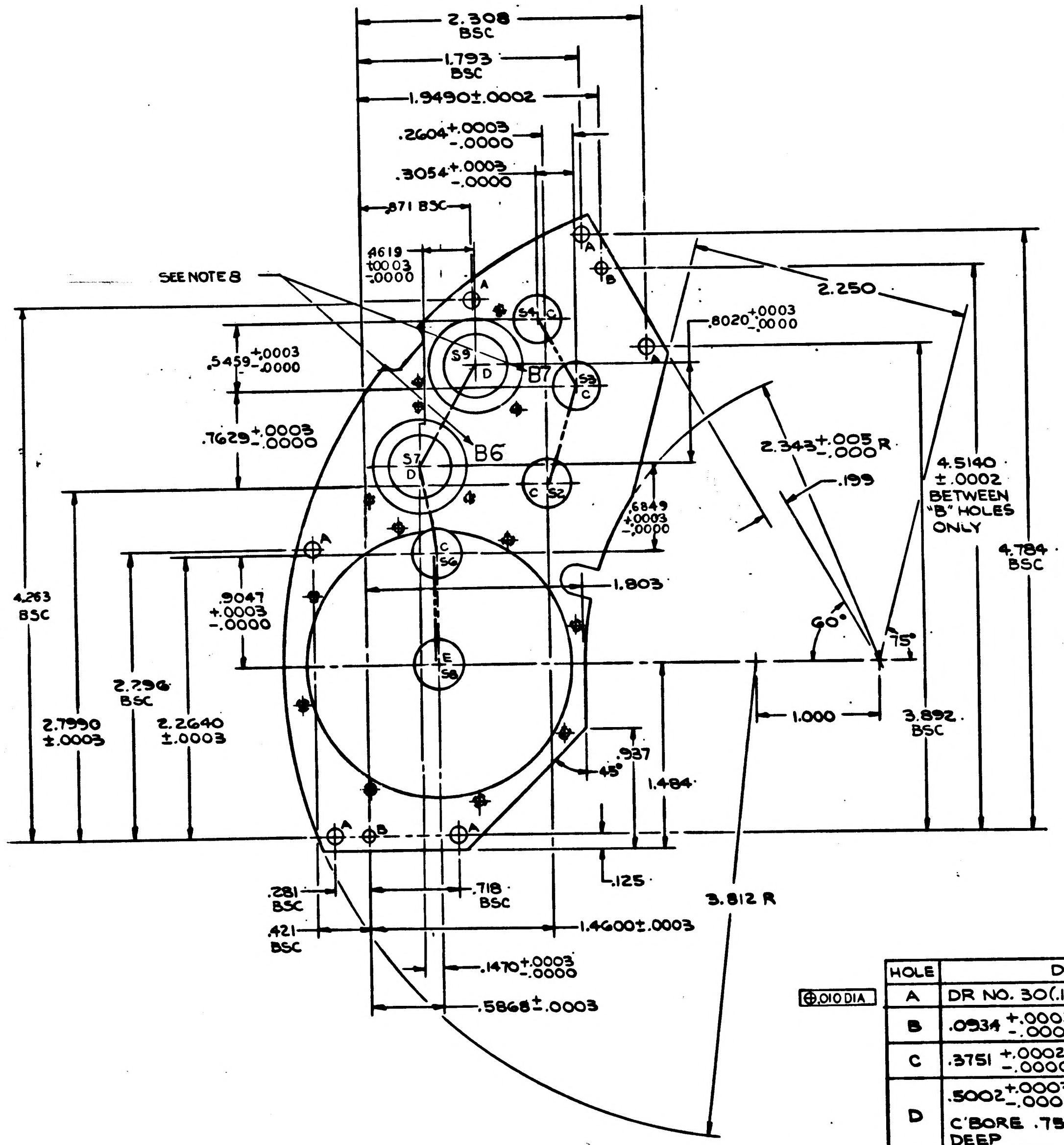
CODE IDENT NO.
SIZE E
NASA NUMBER 2011301
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

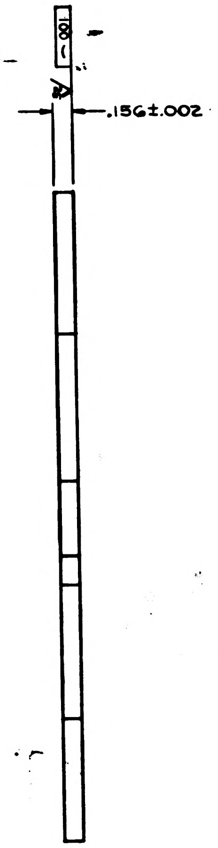
2011301

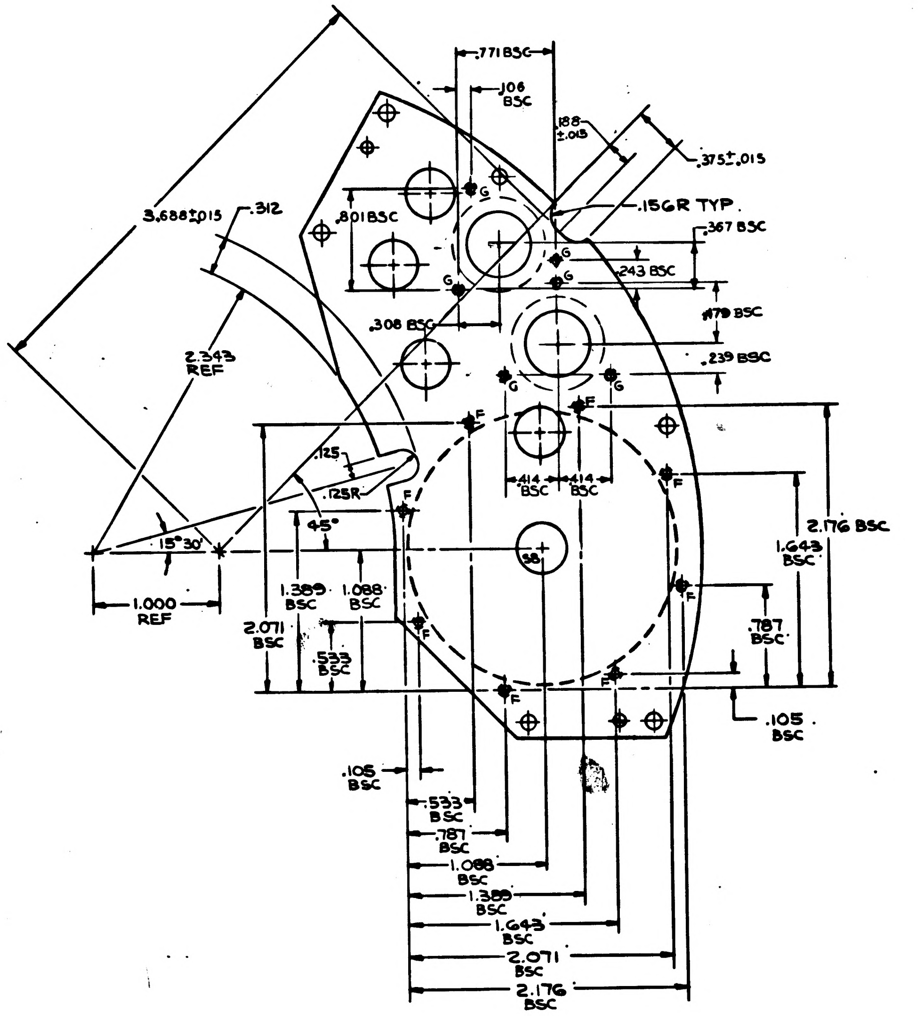
REVISIONS 7DRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:-
   a. 63/√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. THIS PART TO BE MATED WITH PART NO.2011300.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019 (TAGGING)
8. MARK CHARACTERS $^{.14}_{.10}$ HIGH PER ND1002019 AT LOCATIONS SHOWN.


2.308 BSC
1.793 BSC
1.9490±.0002
.2604 +.0003 -.0000
.3054 +.0003 -.0000
.871 BSC
.4619 ±.0003 -.0000
SEE NOTE 8
.5459 +.0003 -.0000
.7629 +.0003 -.0000
S4 C
S3
D
B7
S2 C
S7 D
B6
C S2
2.250
.8020 +.0003 -.0000
2.343 +.005 -.000 R
.199
4.5140 ±.0002 BETWEEN "B" HOLES ONLY
4.784 BSC
.6849 +.0003 -.0000
1.803
C S6
E S8
60°
15°
1.000
3.892 BSC
4.263 BSC
.9047 +.0003 -.0000
2.796 BSC
2.7990 ±.0003
2.2640 ±.0003
.937
45°
1.484
.125
.281 BSC
.421 BSC
.718 BSC
1.4600±.0003
.1470 +.0003 -.0000
.5868±.0003
3.812 R
A
B

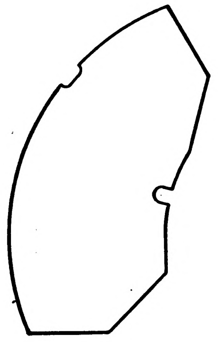



.771 BSC
.106 BSC
.188 ±.015
.375±.015
3.688±.015
.312
.801 BSC
.15GR TYP.
.367 BSC
.243 BSC
.179 BSC
.239 BSC
.308 BSC
2.343 REF
G
F
.125
.125R
45°
15° 30'
1.000 REF
.414 BSC
.414 BSC
S8
2.176 BSC
1.643 BSC
1.389 BSC
1.088 BSC
2.071 BSC
.533 BSC
.787 BSC
.105 BSC
.105 BSC
.533 BSC
.787 BSC
1.088 BSC
1.389 BSC
1.643 BSC
2.071 BSC
2.176 BSC

	HOLE	DESCRIPTION	QUANTITY
⊕.010 DIA	A	DR NO. 30(.1285) THRU	6
	B	.0934 +.0003 -.0000 DIA THRU 32/√	2
	C	.3751 +.0002 -.0000 DIA THRU 32/√	3
	D	.5002 +.0003 -.0000 DIA THRU 32/√ C'BORE .752 +.002 -.000 DIA X .052 +.000 -.002 DEEP	2
	E	.3751 +.0002 -.0000 DIA THRU 32/√ C'BORE 2.093 +.005 -.000 DIA X .060 DEEP	1
⊕.004 DIA	F	DR NO. 49(.073) THRU REDRILL NO. 38(.1015) X .018 DEEP FROM OPPOSITE SIDE NO. 2-56 NC-3 THRU	8
⊕.010 DIA	G	DR NO. 44(.086) THRU REDRILL NO. 32 (.116) X .022 DEEP FROM OPPOSITE SIDE NO. 3-48 NC-3 THRU	6

CENTERS	C.D. CHECKING DIM.
S2-S3	.8061
S3-S4	.6255
S6-S8	.9047
S6-S7	.7005
S7-S9	.9255

NOTE:-
C.D. (CHECKING DIMENSIONS) TO HAVE A TOLERANCE OF +.0004 -.0000
GEAR TRAINS ARE INDICATED AS SHOWN ----



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011715	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND 1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910240
DRAWN E.DRAPALA DATE 4-8-64
CHECKED J.SULLIVAN 6-1-64
APPROVAL 6/2/64
APPROVAL E. Mooney 7/1/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
(SEXTANT SHAFT DRIVE)

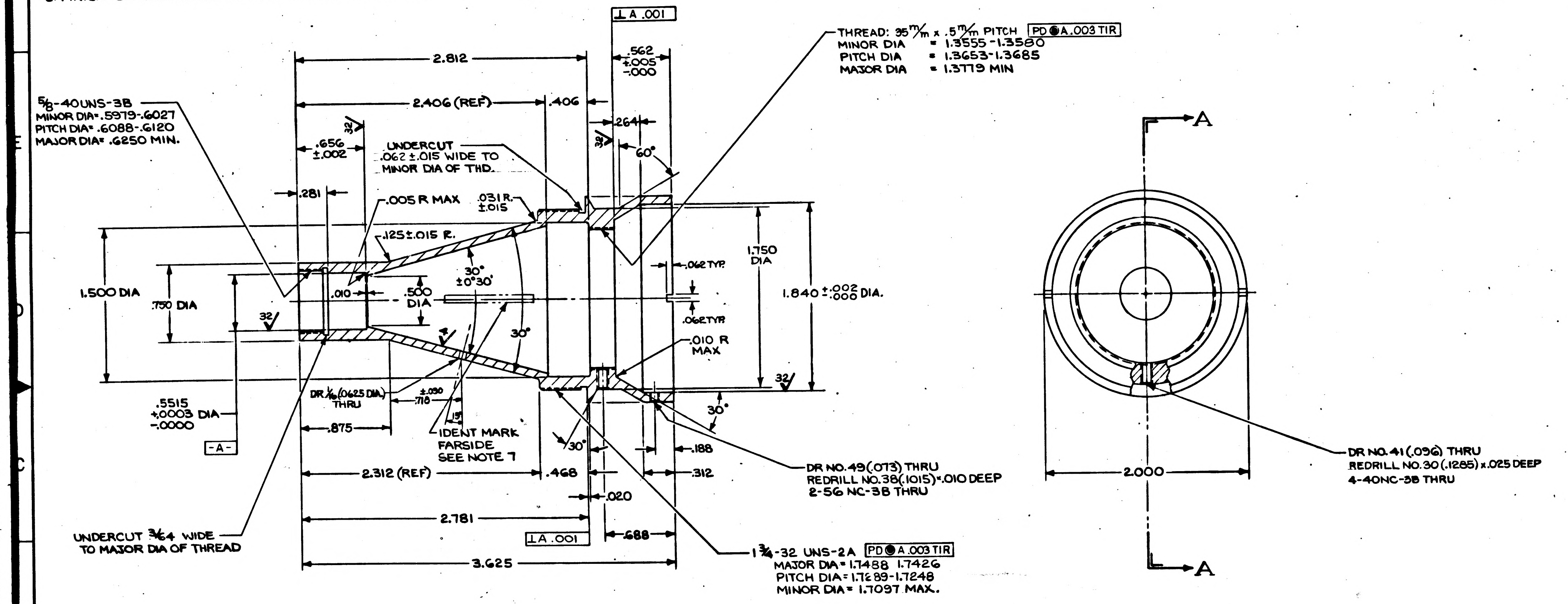
CODE IDENT NO.
SIZE E
NASA NUMBER 2011301
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011302 A

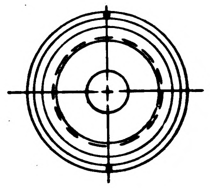
REVISIONS 0048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16671	2/24/65	GK

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT STABILIZE & STRESS RELIEVE IN ACCORD WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORD WITH ND1002019.
8. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127.


⊥ A .001
2.812
.562 +.005 -.000
THREAD: 35 m/m x .5 m/m PITCH PD ◉ A .003 TIR
MINOR DIA = 1.3555-1.3580
PITCH DIA = 1.3653-1.3685
MAJOR DIA = 1.3779 MIN
5/8-40UNS-3B
MINOR DIA = .5979-.6027
PITCH DIA = .6088-.6120
MAJOR DIA = .6250 MIN.
2.406 (REF)
.406
.264
32
.656 ±.002
UNDERCUT .062 ±.015 WIDE TO MINOR DIA OF THD.
60°
.281
.005 R MAX
.031 R. ±.015
.125 ±.015 R.
1.750 DIA
.062 TYP.
1.500 DIA
.750 DIA
.010
.500 DIA
30° ±0°30'
1.840 +.002 -.000 DIA.
.062 TYP.
30°
.010 R MAX
DR 1/16 (.0625 DIA) THRU
±.030 .718
15°
.5515 +.0003 -.0000 DIA
.875
IDENT MARK FARSIDE SEE NOTE 7
30°
-A-
2.312 (REF)
.468
.188
.312
.020
2.781
⊥ A .001
.688
3.625
DR NO. 49 (.073) THRU
REDRILL NO. 38 (.1015) × .010 DEEP
2-56 NC-3B THRU
UNDERCUT 3/64 WIDE TO MAJOR DIA OF THREAD
1 3/4-32 UNS-2A PD ◉ A .003 TIR
MAJOR DIA = 1.7488 1.7426
PITCH DIA = 1.7289-1.7248
MINOR DIA = 1.7097 MAX.
A
A
2.000
DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) x .025 DEEP
4-40NC-3B THRU

SECTION A-A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011796	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910350

DRAWN J. Dolan DATE 4-3-64
CHECKED 5/20/64
APPROVAL 5/13/64
APPROVAL E. Morey 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: HOLDER, LENS

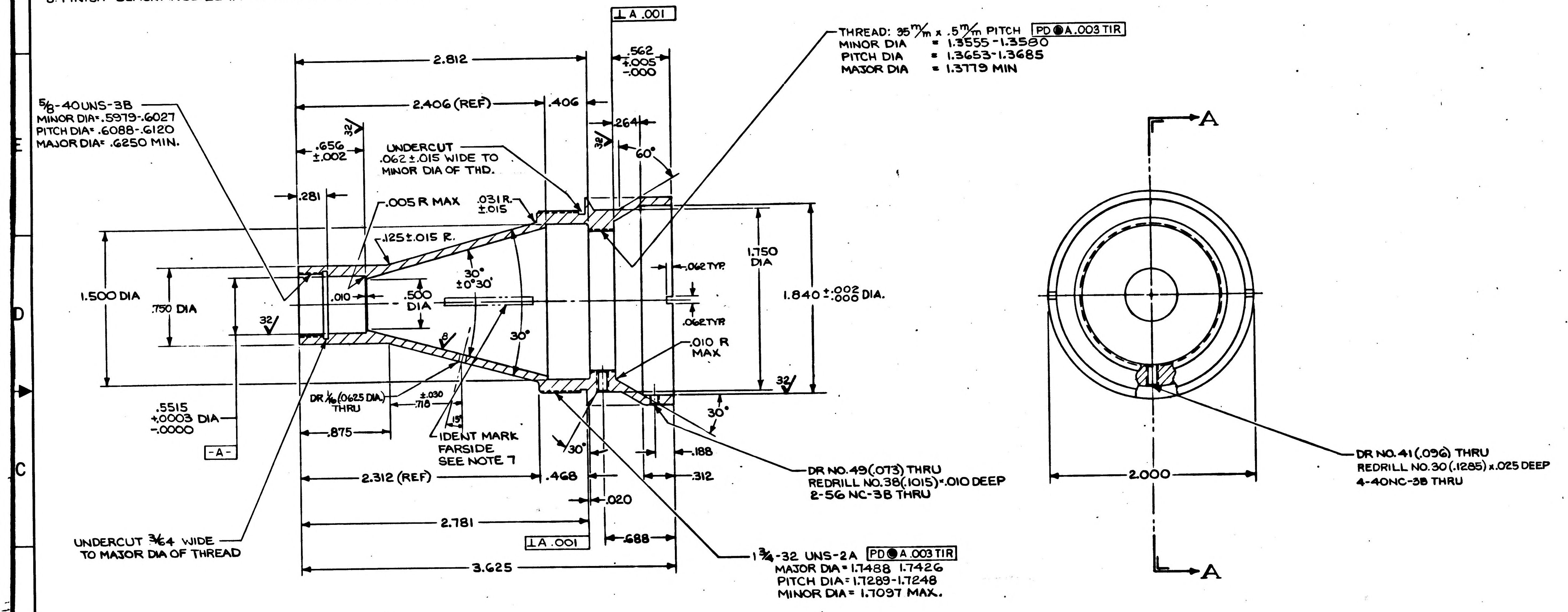
CODE IDENT NO. | SIZE D | NASA NUMBER 2011302

SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

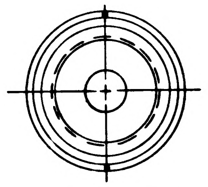
2011302 B

REVISIONS 0048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16671	2/24/65	wk.
B		REVISED PER TDRR 29868	7-5-61	Jusm

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER,
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT STABILIZE & STRESS RELIEVE IN ACCORD WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORD WITH ND1002019.
8. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127.


⊥ A .001
THREAD: 35 m/m x .5 m/m PITCH PD ● A .003 TIR
MINOR DIA = 1.3555-1.3580
PITCH DIA = 1.3653-1.3685
MAJOR DIA = 1.3779 MIN
2.812
.562 +.005 -.000
2.406 (REF)
.406
.264
60°
5/8-40UNS-3B
MINOR DIA = .5979-.6027
PITCH DIA = .6088-.6120
MAJOR DIA = .6250 MIN.
.656 ±.002
32
UNDERCUT .062 ±.015 WIDE TO MINOR DIA OF THD.
.281
.005 R MAX
.031 R. ±.015
.125 ±.015 R.
30° ±0°30'
1.500 DIA
.750 DIA
.010
.500 DIA
.062 TYP.
.062 TYP.
1.750 DIA
1.840 +.002 -.000 DIA.
8
30°
.010 R MAX
32
.5515 +.0003 -.0000 DIA
-A-
DR 1/16 (.0625 DIA.) THRU
.718 ±.030
15°
IDENT MARK FARSIDE SEE NOTE 7
.875
30°
30°
.188
2.312 (REF)
.468
.312
.020
DR NO. 49 (.073) THRU
REDRILL NO. 38 (.1015) × .010 DEEP
2-56 NC-3B THRU
2.781
⊥ A .001
.688
3.625
UNDERCUT 3/64 WIDE TO MAJOR DIA OF THREAD
1 3/4-32 UNS-2A PD ● A .003 TIR
MAJOR DIA = 1.7488 1.7426
PITCH DIA = 1.7289-1.7248
MINOR DIA = 1.7097 MAX.
A
A
2.000
DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) × .025 DEEP
4-40NC-3B THRU

SECTION A-A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011796	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910350

DRAWN F. Seller DATE 4-3-64
CHECKED [illegible] 5/20/64
APPROVAL L. Rimbon 5/13/64
APPROVAL E. Thomp 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

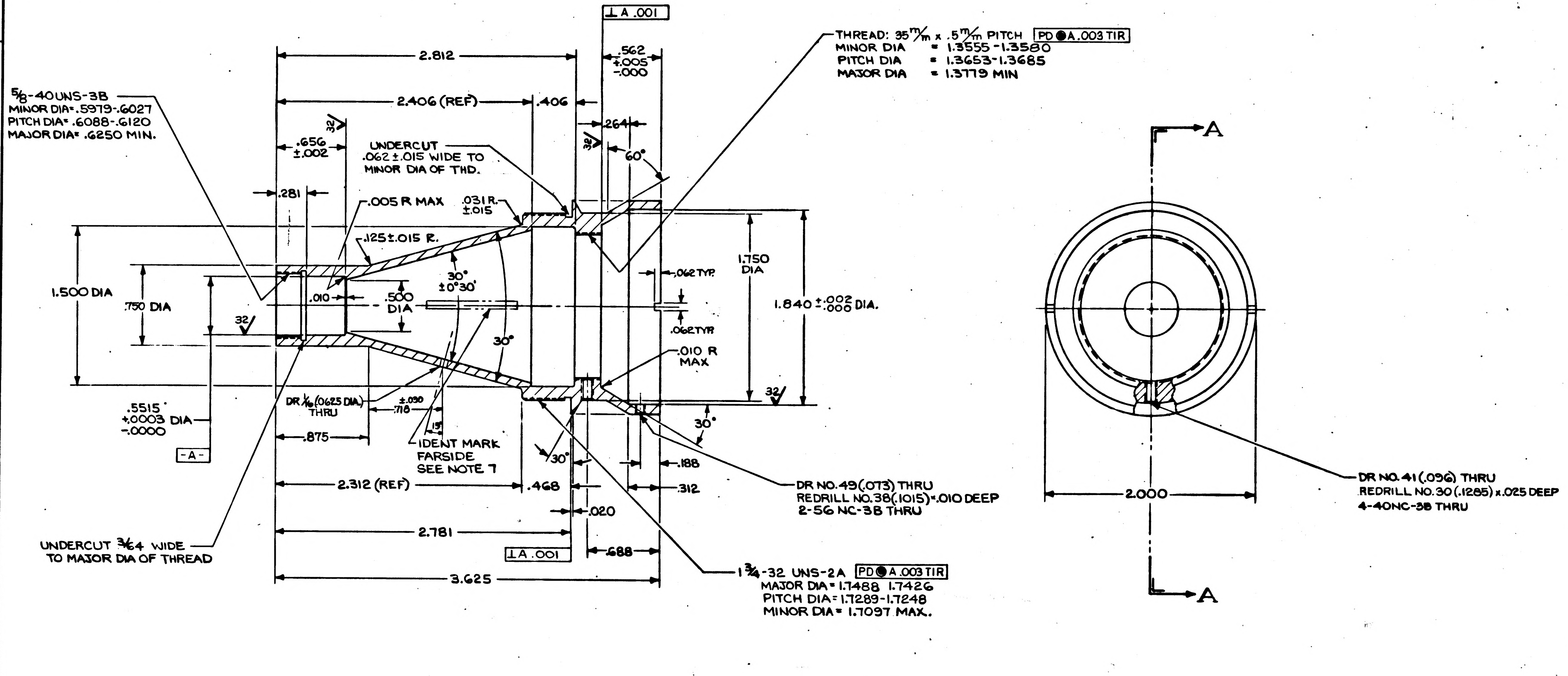
TITLE
HOLDER, LENS

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011302
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

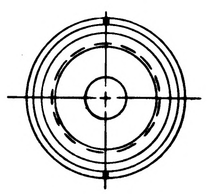
C	2011302

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16671	2/24/65	WK
B		REVISED PER TDRR 29868	7-5-6.	
C		REVISED PER TDRR 29869	7-12-66	

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT STABILIZE & STRESS RELIEVE IN ACCORD WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORD WITH ND1002019.
8. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127, TYPE I.


⊥ A .001
2.812
.562 +.005 -.000
2.406 (REF)
.406
5/8-40UNS-3B
MINOR DIA=.5979-.6027
PITCH DIA=.6088-.6120
MAJOR DIA=.6250 MIN.
.656 ±.002
UNDERCUT .062±.015 WIDE TO MINOR DIA OF THD.
.264
60°
.281
.005 R MAX
.031 R ±.015
.125±.015 R.
30° ±0°30'
1.500 DIA
.750 DIA
.010
.500 DIA
30°
.062 TYP.
1.750 DIA
1.840 +.002 -.000 DIA.
.062 TYP
.010 R MAX
32
.5515 +.0003 -.0000 DIA
-A-
DR 1/16 (.0625 DIA) THRU
±.030 .718
.875
15°
IDENT MARK FARSIDE SEE NOTE 7
30°
30°
.188
2.312 (REF)
.468
.312
.020
2.781
⊥ A .001
.688
3.625
UNDERCUT 3/64 WIDE TO MAJOR DIA OF THREAD
THREAD: 35 m/m x .5 m/m PITCH PD ⊚ A .003 TIR
MINOR DIA = 1.3555-1.3580
PITCH DIA = 1.3653-1.3685
MAJOR DIA = 1.3779 MIN
DR NO.49 (.073) THRU
REDRILL NO.38 (.1015) x .010 DEEP
2-56 NC-3B THRU
1 3/4-32 UNS-2A PD ⊚ A .003 TIR
MAJOR DIA = 1.7488 1.7426
PITCH DIA = 1.7289-1.7248
MINOR DIA = 1.7097 MAX.
A
A
2.000
DR NO.41 (.096) THRU
REDRILL NO.30 (.1285) x .025 DEEP
4-40NC-3B THRU

SECTION A-A



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011796	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910350
DRAWN DATE 4-3-64
CHECKED 5/20/64
APPROVAL 5/13/64
APPROVAL E. Manning 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, LENS

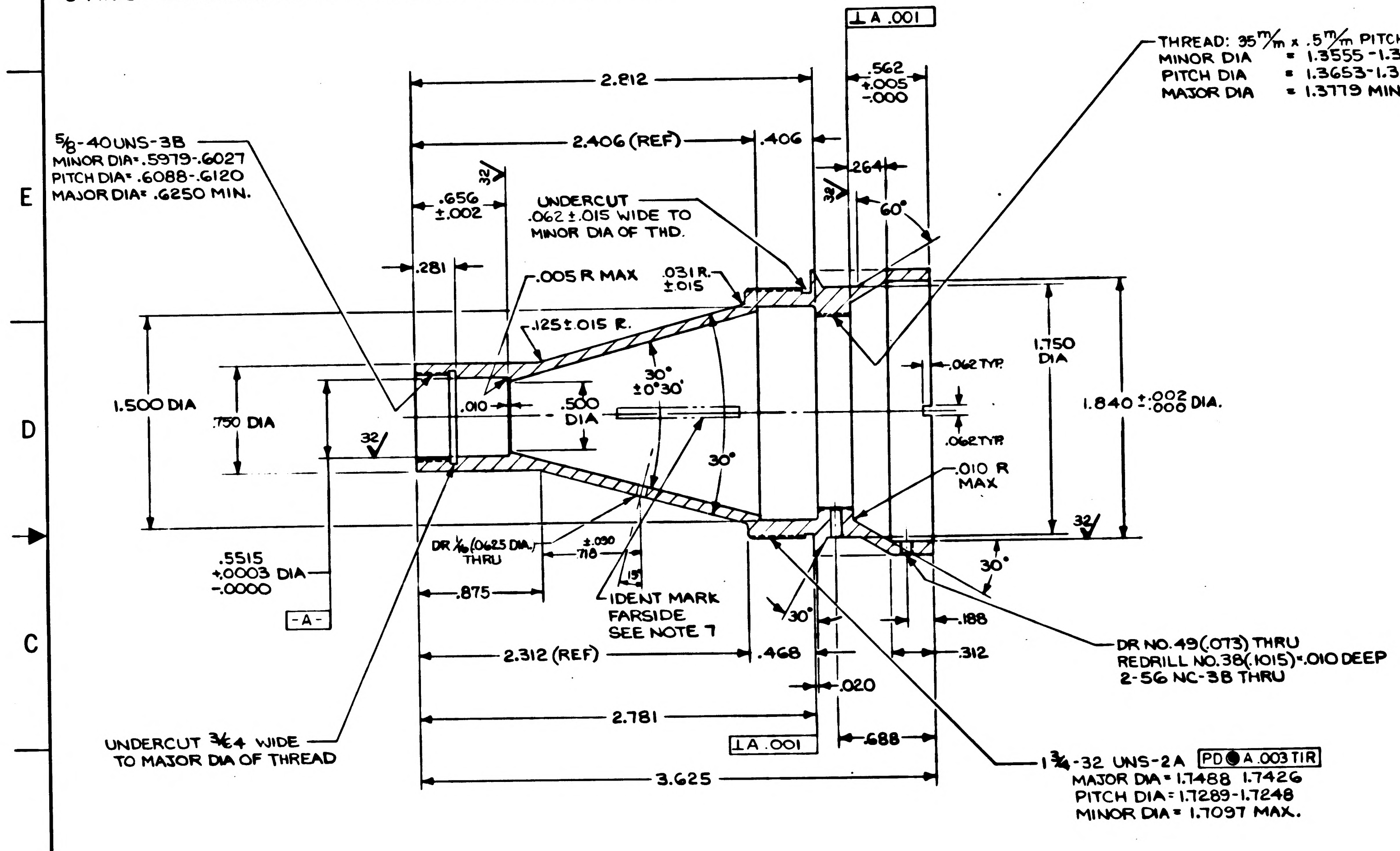
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011302
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011302 C

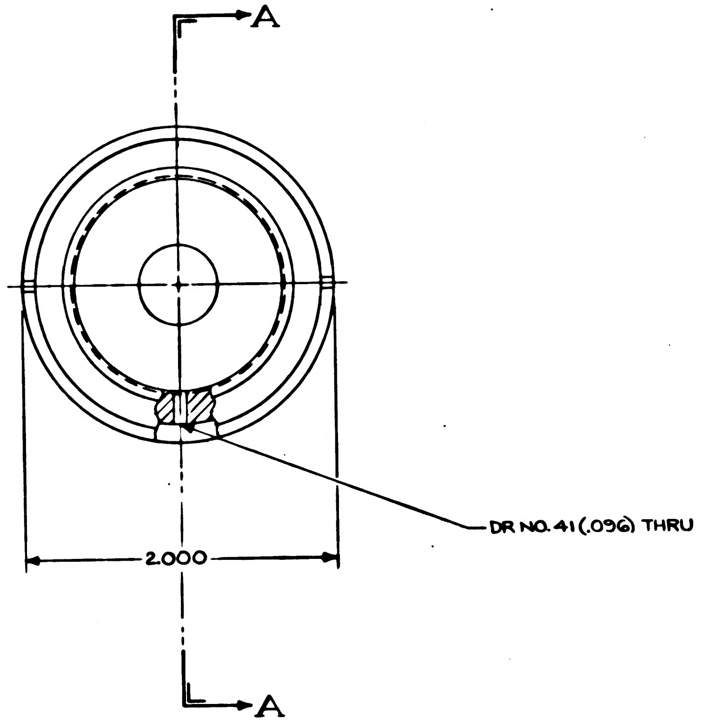
NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT STABILIZE & STRESS RELIEVE IN ACCORD WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORD WITH ND1002019.
8. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127, TYPE I.

D 2011302

REVISIONS 0048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16671	2/24/65	
B		REVISED PER TDRR 29868	7-5-66	
C		REVISED PER TDRR 29869	7-12-66	
D		REVISED PER TDRR 31547	10-14-66	

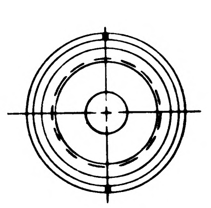


⊥ A .001
2.812
.562 +.005 -.000
2.406 (REF)
.406
.264
60°
5/8-40UNS-3B
MINOR DIA = .5979-.6027
PITCH DIA = .6088-.6120
MAJOR DIA = .6250 MIN.
.656 ±.002
32
UNDERCUT .062 ±.015 WIDE TO MINOR DIA OF THD.
.281
.005 R MAX
.031 R. ±.015
.125 ±.015 R.
1.500 DIA
.750 DIA
.010
.500 DIA
30° ±0°30'
30°
.062 TYP.
.062 TYP.
.010 R MAX
1.750 DIA
1.840 +.002 -.000 DIA.
THREAD: 35 m/m x .5 m/m PITCH
PD ● A .003 TIR
MINOR DIA = 1.3555-1.3580
PITCH DIA = 1.3653-1.3685
MAJOR DIA = 1.3779 MIN
.5515 +.0003 -.0000 DIA
-A-
DR 1/16 (.0625 DIA.) THRU
±.030 .718
15°
.875
IDENT MARK FARSIDE SEE NOTE 7
30°
30°
.188
.312
2.312 (REF)
.468
.020
DR NO. 49 (.073) THRU
REDRILL NO. 38 (.1015) × .010 DEEP
2-56 NC-3B THRU
2.781
⊥ A .001
.688
3.625
UNDERCUT 3/64 WIDE TO MAJOR DIA OF THREAD
1 3/4-32 UNS-2A
PD ● A .003 TIR
MAJOR DIA = 1.7488 1.7426
PITCH DIA = 1.7289-1.7248
MINOR DIA = 1.7097 MAX.



A
A
DR NO. 41 (.096) THRU
2.000

SECTION A-A



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011796	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910350

DRAWN DATE 4-3-64
CHECKED 5/20/64
APPROVAL 5/13/64
APPROVAL E. 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, LENS

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011302
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011302 D

E-186

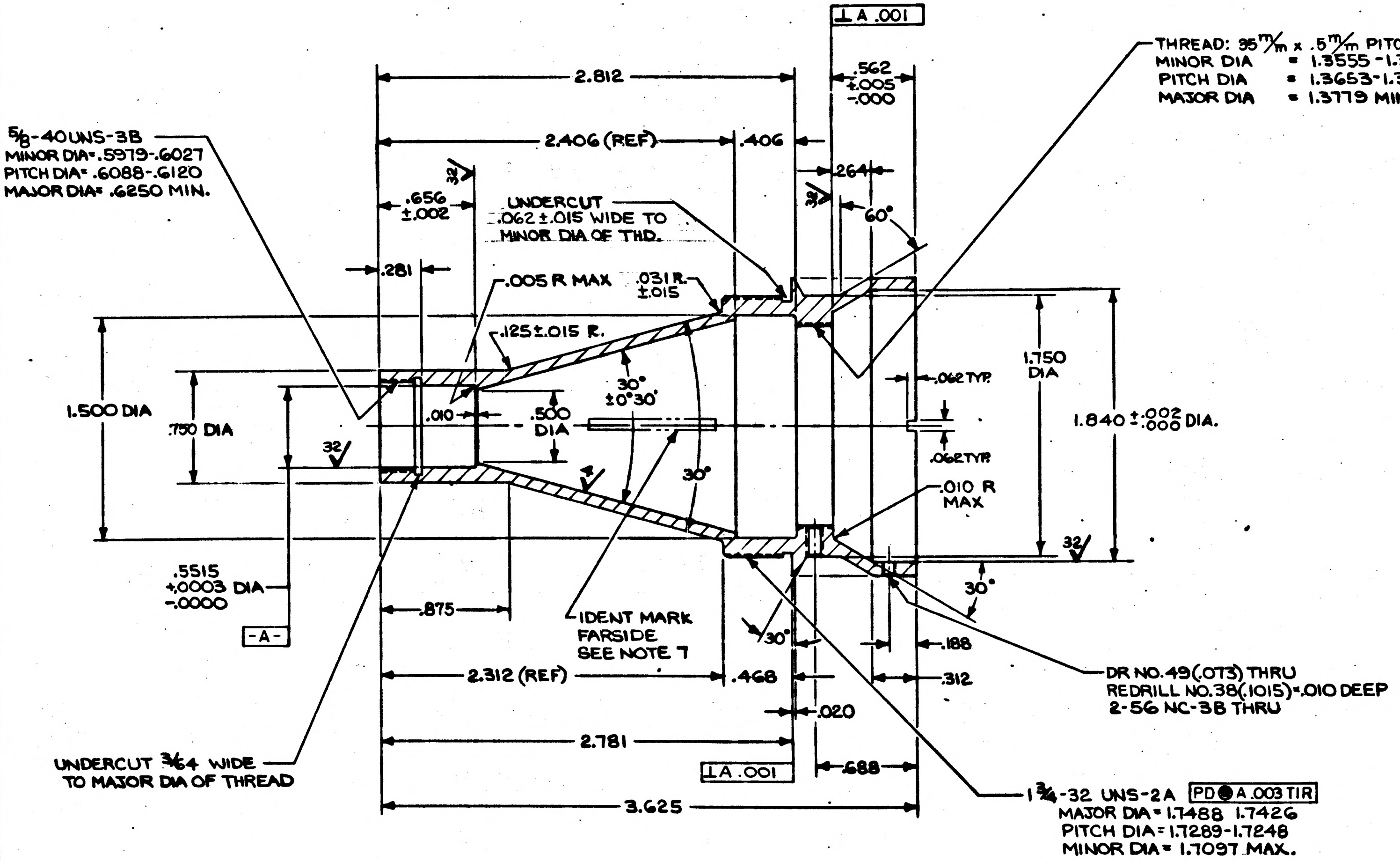
2011302

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

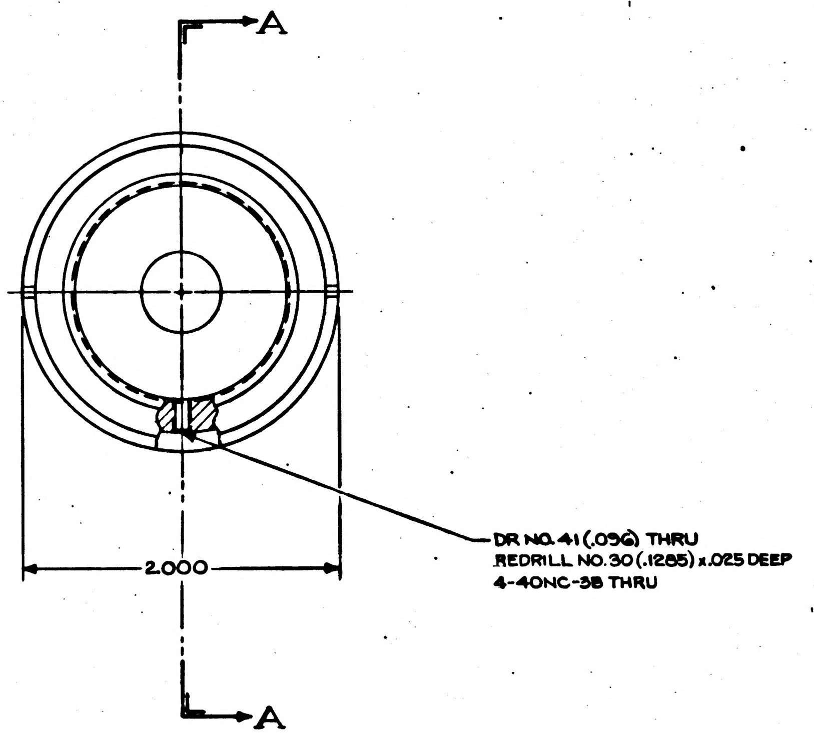
10049

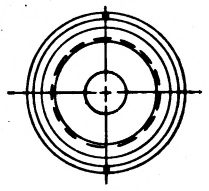
NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORD WITH ND1002125.
6. HEAT TREAT STABILIZE & STRESS RELIEVE IN ACCORD WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORD WITH ND1002019.
8. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127.


⊥ A .001
2.812
.562 +.005 -.000
2.406 (REF)
.406
.264
5/8-40UNS-3B
MINOR DIA=.5979-.6027
PITCH DIA=.6088-.6120
MAJOR DIA=.6250 MIN.
.656 ±.002
32
UNDERCUT .062 ±.015 WIDE TO MINOR DIA OF THD.
60°
.281
.005 R MAX
.031 R. ±.015
.125 ±.015 R.
THREAD: 35m/m x .5m/m PITCH
PD ● A .003 TIR
MINOR DIA = 1.3555-1.3580
PITCH DIA = 1.3653-1.3685
MAJOR DIA = 1.3779 MIN
1.500 DIA
.750 DIA
.010
.500 DIA
30° ±0°30'
.062 TYP.
1.750 DIA
1.840 +.002 -.000 DIA.
.062 TYP.
.010 R MAX
30°
4
.5515 +.0003 -.0000 DIA
-A-
.875
IDENT MARK FARSIDE SEE NOTE 7
30°
.188
.312
2.312 (REF)
.468
.020
DR NO.49(.073) THRU
REDRILL NO.38(.1015)×.010 DEEP
2-56 NC-3B THRU
2.781
⊥ A .001
.688
UNDERCUT 3/64 WIDE TO MAJOR DIA OF THREAD
3.625
1 3/4-32 UNS-2A
PD ● A .003 TIR
MAJOR DIA=1.7488 1.7426
PITCH DIA=1.7289-1.7248
MINOR DIA=1.7097 MAX.

SECTION A-A


A
A
2.000
DR NO.41(.096) THRU
REDRILL NO.30(.1285)×.025 DEEP
4-40NC-3B THRU



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011796	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910350

DRAWN DATE 4-3-64
CHECKED 5/20/64
APPROVAL 5/13/64
APPROVAL E. 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, LENS

CODE IDENT NO.
SIZE D
NASA NUMBER 2011302

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011302

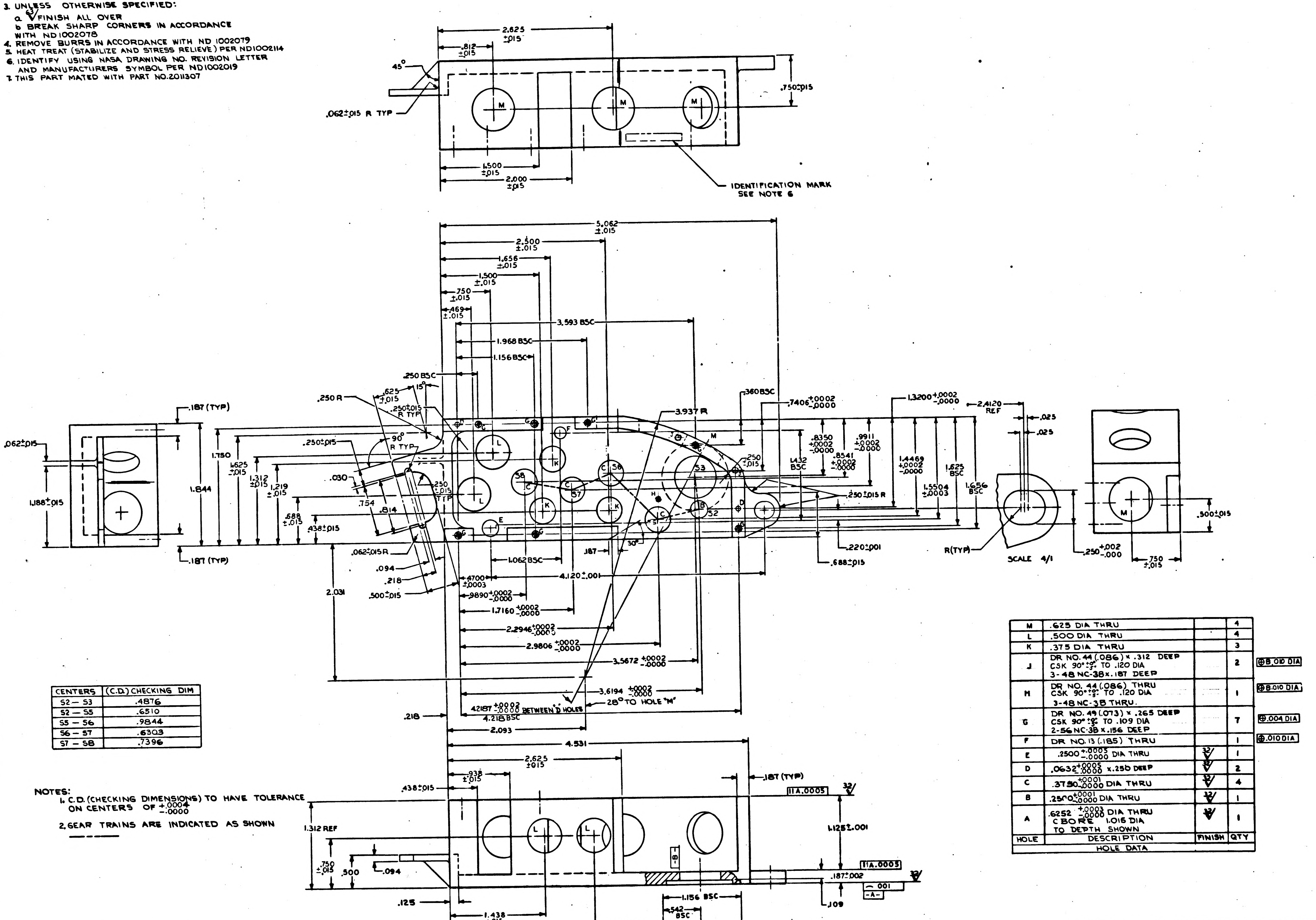
INCHES
0 1 2

A	2011306

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13312	10/6/64	VK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a $\sqrt{}^{63}$ FINISH ALL OVER
   b BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH PART NO.2011307

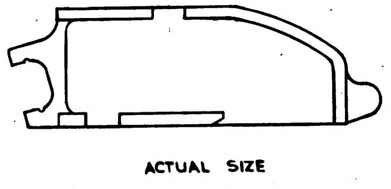

2.625 ±.015
.812 ±.015
45°
.062±.015 R TYP
.750±.015
1.500 ±.015
2.000 ±.015
IDENTIFICATION MARK SEE NOTE 6
M
5.062 ±.015
2.500 ±.015
1.656 ±.015
1.500 ±.015
.750 ±.015
.469 ±.015
3.593 BSC
1.968 BSC
1.156 BSC
.250 BSC
.625 ±.015
15°
.250 R
.250±.015 R TYP
90° R TYP
.250±.015
.187 (TYP)
.062±.015
1.750
1.625 ±.015
1.312 ±.015
1.219 ±.015
1.844
1.188±.015
.688 ±.015
.438±.015
.030
.754
.814
.250 ±.015 TYP
.062±.015R
.094
.218
.500±.015
2.031
3.937 R
.360 BSC
.7406 +.0002 -.0000
.8350 +.0002 -.0000
.8541 +.0002 -.0000
.9911 +.0002 -.0000
1.3200 +.0002 -.0000
1.432 BSC
1.4469 +.0002 -.0000
1.5504 ±.0003
1.625 BSC
1.656 BSC
2.4120 REF
.025
.250 ±.015
.250±.015 R
.220±.001
.688±.015
.187
30°
1.062 BSC
4.120±.001
.4700 ±.0003
.9890 +.0002 -.0000
1.7160 +.0002 -.0000
2.2946 +.0002 -.0000
2.9806 +.0002 -.0000
3.5672 +.0002 -.0000
3.6194 +.0002 -.0000
28° TO HOLE "M"
.42187 +.0002 -.0000 BETWEEN "D" HOLES
4.218 BSC
.218
2.093
4.531
R(TYP)
SCALE 4/1
.250 +.002 -.000
.750 ±.015
.500±.015
S2
S3
S5
S6
S7
S8
A B C D E F G H J K L M
2.625 ±.015
.938 ±.015
.438±.015
.187 (TYP)
11A.0005
$\sqrt{}^{32}$
1.312 REF
1.125±.001
.750 ±.015
.500
.094
.187±.002
.001 -A-
.109
.125
1.438 ±.015
2.188±.015
1.156 BSC
.542 BSC
.345 BSC
-B-

CENTERS	(C.D.) CHECKING DIM
S2 — S3	.4876
S2 — S5	.6510
S5 — S6	.9844
S6 — S7	.6303
S7 — S8	.7396

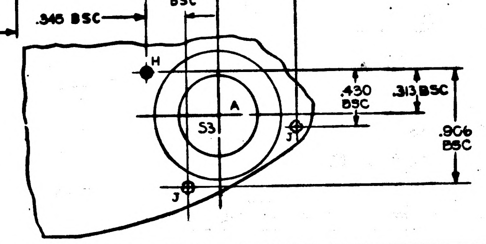
NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN

HOLE	DESCRIPTION	FINISH	QTY	
M	.625 DIA THRU		4	
L	.500 DIA THRU		4	
K	.375 DIA THRU		3	
J	DR NO. 44 (.086) × .312 DEEP CSK 90° $^{+0°}_{-5°}$ TO .120 DIA 3-48 NC-3B × .187 DEEP		2	⊕B.010 DIA
H	DR NO. 44 (.086) THRU CSK 90° $^{+0°}_{-5°}$ TO .120 DIA 3-48 NC-3B THRU.		1	⊕B.010 DIA
G	DR NO. 49 (.073) × .265 DEEP CSK 90° $^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-3B × .156 DEEP		7	⊕.004 DIA
F	DR NO. 13 (.185) THRU		1	⊕.010 DIA
E	.2500 $^{+.0005}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	1	
D	.0632 $^{+.0005}_{-.0000}$ × .250 DEEP	$\sqrt{}^{32}$	2	
C	.3750 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	4	
B	.2500 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	1	
A	.6252 $^{+.0003}_{-.0000}$ DIA THRU C BORE 1.016 DIA TO DEPTH SHOWN	$\sqrt{}^{32}$	1	

HOLE DATA



ACTUAL SIZE


.345 BSC
.430 BSC
.313 BSC
.906 BSC
H
A
S3
J

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM (ND 1002125) SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910610
DRAWN E.PAPALA DATE 4-10-64
CHECKED T. SULLIVAN 6-1-64
APPROVAL 6/13/64
APPROVAL 6/17/64
NASA APPROVAL
MIT APPROVAL 2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
SCT TRUNNION DRIVE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011306
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

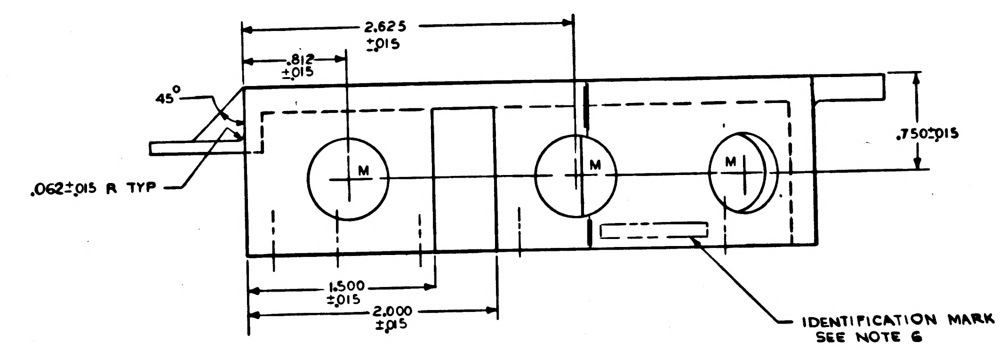
2011306 A

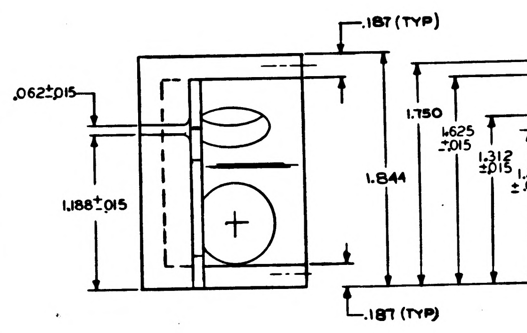
B	2011306

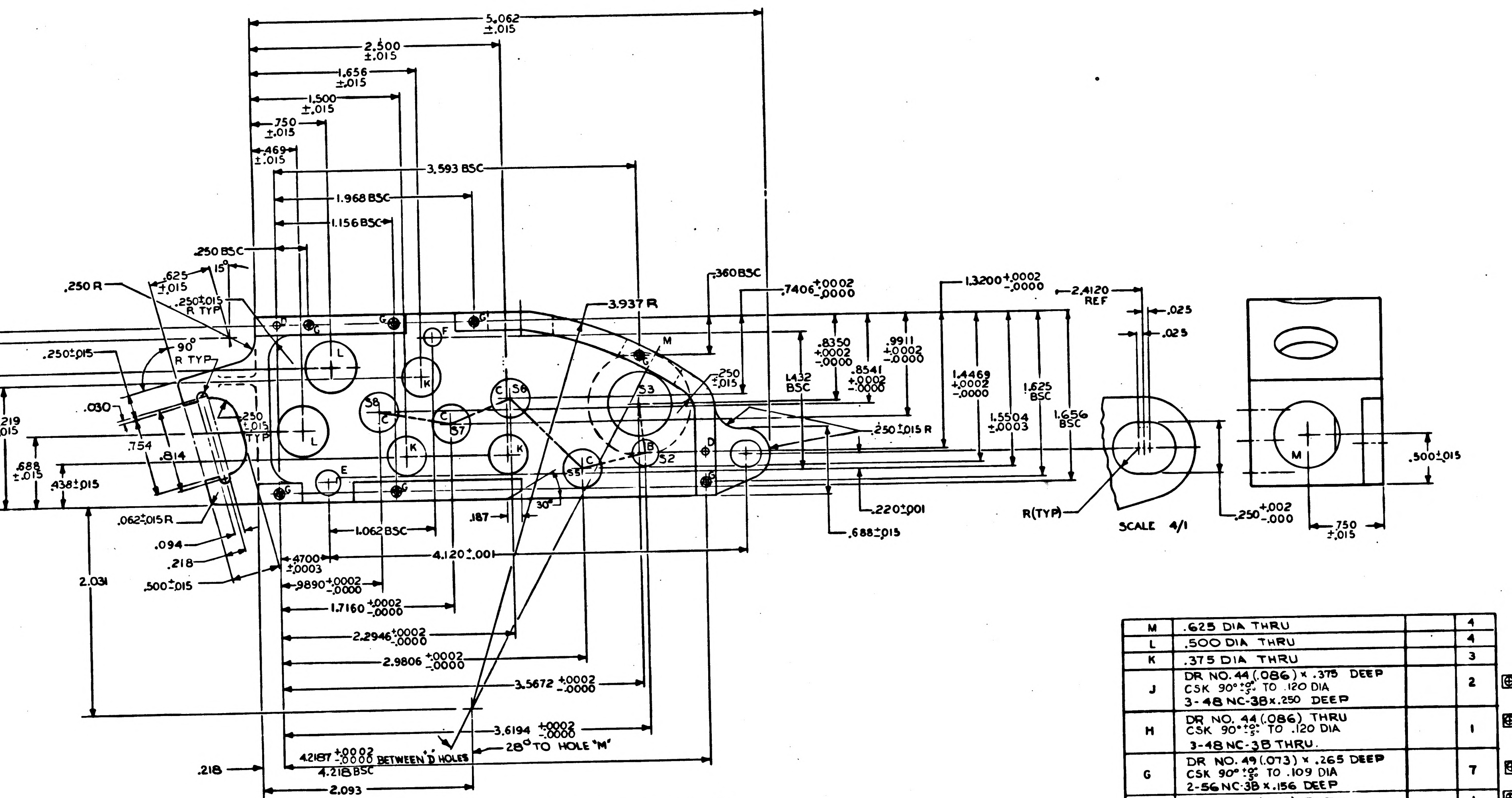
REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13312	10/6/64	UK
B		REVISED PER TDRR 18572	5-5-65	UK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH PART NO.2011307

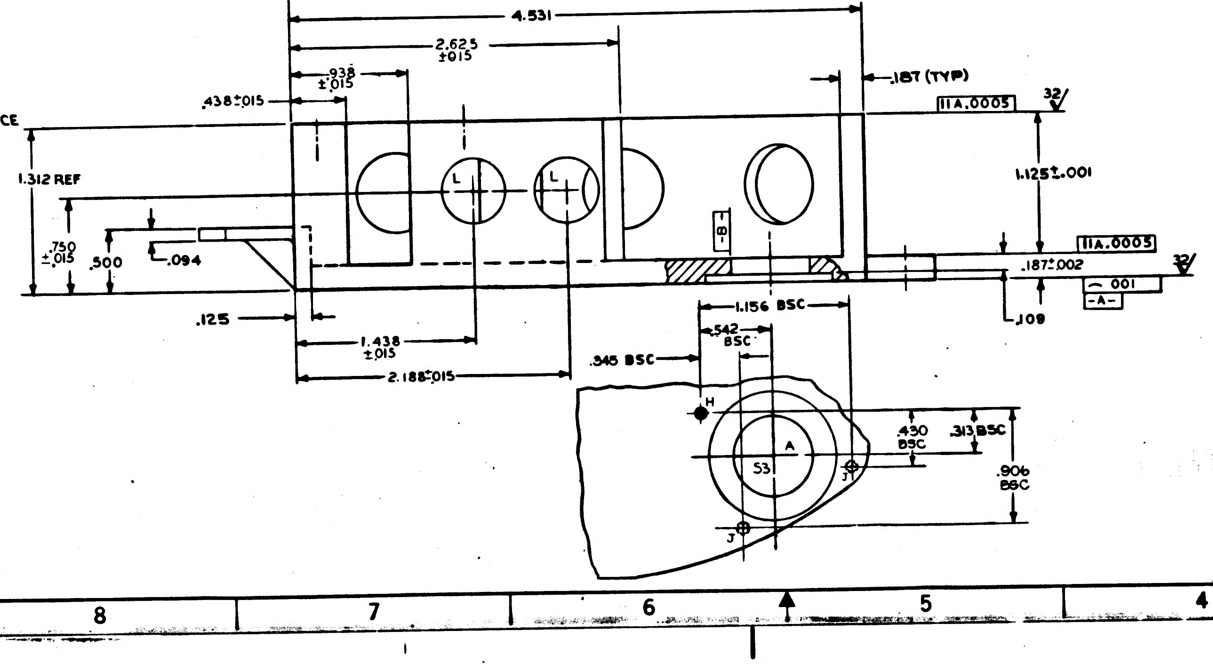

2.625 ±.015
.812 ±.015
45°
.750±.015
M
M
M
.062±.015 R TYP
1.500 ±.015
2.000 ±.015
IDENTIFICATION MARK
SEE NOTE 6

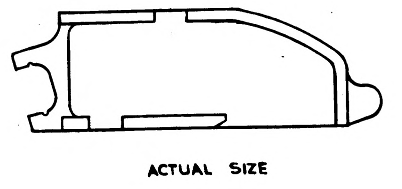

.187 (TYP)
.062±.015
1.188±.015
1.844
.187 (TYP)


5.062 ±.015
2.500 ±.015
1.656 ±.015
1.500 ±.015
.750 ±.015
.469 ±.015
3.593 BSC
1.968 BSC
1.156 BSC
.250 BSC
.625 ±.015
15°
.250 R
.250±.015 R TYP
90° R TYP
.250±.015
3.937 R
.360 BSC
.7406 +.0002 −.0000
1.3200 +.0002 −.0000
2.4120 REF
.025
.025
1.750
1.625 ±.015
1.312 ±.015
1.219 ±.015
.030
.754
.814
.688 ±.015
.438±.015
.250 ±.015 TYP
.8350 +.0002 −.0000
1.432 BSC
.8541 +.0002 −.0000
.9911 +.0002 −.0000
.250 ±.015
1.4469 +.0002 −.0000
1.5504 ±.0003
1.625 BSC
1.656 BSC
.250±.015 R
R(TYP)
SCALE 4/1
.250 +.002 −.000
.750 ±.015
.500±.015
M
L
K
C
S8
S7
S6
S5
S3
S2
B
D
E
F
G
J
.062±.015 R
.094
.218
.500±.015
2.031
1.062 BSC
.187
30°
.220±.001
.688±.015
.6700 ±.0003
4.120±.001
.9890 +.0002 −.0000
1.7160 +.0002 −.0000
2.2946 +.0002 −.0000
2.9806 +.0002 −.0000
3.5672 +.0002 −.0000
3.6194 +.0002 −.0000
4.2187 +.0002 −.0000 BETWEEN "D" HOLES
28° TO HOLE "M"
4.218 BSC
2.093
.218

CENTERS	(C.D.) CHECKING DIM
S2 – S3	.4876
S2 – S5	.6510
S5 – S6	.9844
S6 – S7	.6303
S7 – S8	.7396

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN


4.531
2.625 ±.015
.938 ±.015
.438±.015
.187 (TYP)
11A.0005
32
1.312 REF
1.125±.001
L
L
-B-
11A.0005
.750 ±.015
.500
.094
.187±.002
.001
-A-
32
.125
.109
1.438 ±.015
2.188±.015
1.156 BSC
.542 BSC
.345 BSC
H
A
S3
J
.430 BSC
.313 BSC
.906 BSC



ACTUAL SIZE

HOLE	DESCRIPTION	FINISH	QTY	
M	.625 DIA THRU		4	
L	.500 DIA THRU		4	
K	.375 DIA THRU		3	
J	DR NO. 44 (.086) × .375 DEEP CSK 90° +0° −5° TO .120 DIA 3-48 NC-3B × .250 DEEP		2	⊕B.010 DIA
H	DR NO. 44 (.086) THRU CSK 90° +0° −5° TO .120 DIA 3-48 NC-3B THRU.		1	⊕B.010 DIA
G	DR NO. 49 (.073) × .265 DEEP CSK 90° +0° −5° TO .109 DIA 2-56 NC-3B × .156 DEEP		7	⊕.004 DIA
F	DR NO. 13 (.185) THRU		1	⊕.010 DIA
E	.2500 +.0005 −.0000 DIA THRU	32√	1	
D	.0632 +.0005 −.0000 × .250 DEEP	32√	2	
C	.3750 +.0001 −.0000 DIA THRU	32√	4	
B	.2500 +.0001 −.0000 DIA THRU	32√	1	
A	.6252 +.0003 −.0000 DIA THRU CBORE 1.015 DIA TO DEPTH SHOWN	32√	1	

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
(ND 1002125)
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910610
DRAWN E. SPARALA DATE 4-10-64
CHECKED T. SULLIVAN 6-1-64
APPROVAL 6/13/64
APPROVAL 6/19/64
NASA APPROVAL
MIT APPROVAL 23 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
SCT TRUNNION DRIVE

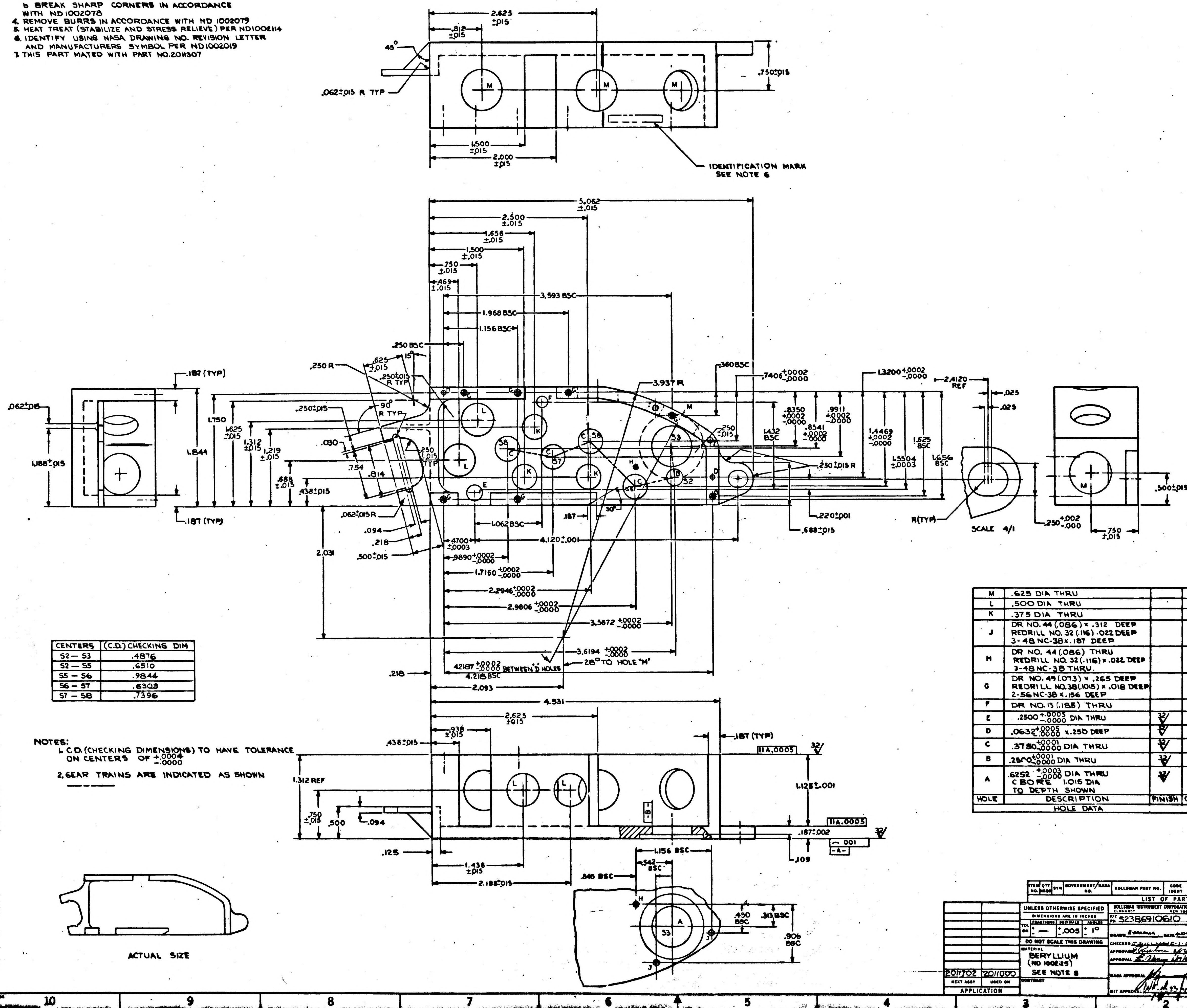
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011306
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET OF

2011306 B

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS		

2011306

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH PART NO. 2011307



2.625 ±.015
.812 ±.015
45°
.062±.015 R TYP
.750±.015
1.500 ±.015
2.000 ±.015
IDENTIFICATION MARK SEE NOTE 6
5.062 ±.015
2.500 ±.015
1.656 ±.015
1.500 ±.015
.750 ±.015
.469 ±.015
3.593 BSC
1.968 BSC
1.156 BSC
.250 BSC
15°
.625 ±.015
.250 R
.250±.015 R TYP
.250±.015
90° R TYP
.187 (TYP)
.062±.015
1.750
1.625 ±.015
1.312 ±.015
1.219 ±.015
1.844
1.188±.015
.688 ±.015
.438±.015
.030
.754
.814
.062±.015 R
.094
.218
.500±.015
2.031
.360 BSC
3.937 R
.7406 +.0002 -.0000
.8350 +.0002 -.0000
.8541 +.0002 -.0000
.9911 +.0002 -.0000
1.432 BSC
1.3200 +.0002 -.0000
1.4469 +.0002 -.0000
1.5504 ±.0003
1.625 BSC
1.656 BSC
2.4120 REF
.025
.250 ±.015
.250±.015 R
.220±.001
.688±.015
.187
30°
1.062 BSC
4.120±.001
.4700 ±.0003
.9890 +.0002 -.0000
1.7160 +.0002 -.0000
2.2946 +.0002 -.0000
2.9806 +.0002 -.0000
3.5672 +.0002 -.0000
3.6194 +.0002 -.0000
28° TO HOLE "M"
4.2187 +.0002 -.0000 BETWEEN "D" HOLES
4.218 BSC
2.093
.218
R (TYP)
SCALE 4/1
.250 +.002 -.000
.750 ±.015
.500±.015
4.531
2.625 ±.015
.938 ±.015
.438±.015
.187 (TYP)
11A.0005
32
1.125±.001
1.312 REF
.750 ±.015
.500
.094
.125
.187±.002
-A-
-B-
.001
.109
1.156 BSC
.542 BSC
.346 BSC
1.438 ±.015
2.188±.015
.430 BSC
.313 BSC
.906 BSC
ACTUAL SIZE

CENTERS	(C.D.) CHECKING DIM
S2 — S3	.4876
S2 — S5	.6510
S5 — S6	.9844
S6 — S7	.6303
S7 — S8	.7396

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF +.0004 -.0000
2. GEAR TRAINS ARE INDICATED AS SHOWN

HOLE	DESCRIPTION	FINISH	QTY	
M	.625 DIA THRU		4	
L	.500 DIA THRU		4	
K	.375 DIA THRU		3	
J	DR NO. 44 (.086) × .312 DEEP REDRILL NO. 32 (.116) .022 DEEP 3-48 NC-3B × .187 DEEP		2	⊕B .010 DIA
H	DR NO. 44 (.086) THRU REDRILL NO. 32 (.116) × .022 DEEP 3-48 NC-3B THRU.		1	⊕B .010 DIA
G	DR NO. 49 (.073) × .265 DEEP REDRILL NO. 38 (.1015) × .018 DEEP 2-56 NC-3B × .156 DEEP		7	⊕ .004 DIA
F	DR NO. 13 (.185) THRU		1	⊕ .010 DIA
E	.2500 +.0005 -.0000 DIA THRU	32√	1	
D	.0632 +.0005 -.0000 × .250 DEEP	32√	2	
C	.3750 +.0001 -.0000 DIA THRU	32√	4	
B	.2500 +.0001 -.0000 DIA THRU	32√	1	
A	.6252 +.0003 -.0000 DIA THRU C BORE 1.015 DIA TO DEPTH SHOWN	32√	1	

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
(ND 1002125)
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K/C PN 52386910610

DRAWN E. GRAMALA DATE 6-10-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
SCT TRUNNION DRIVE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011306
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011306

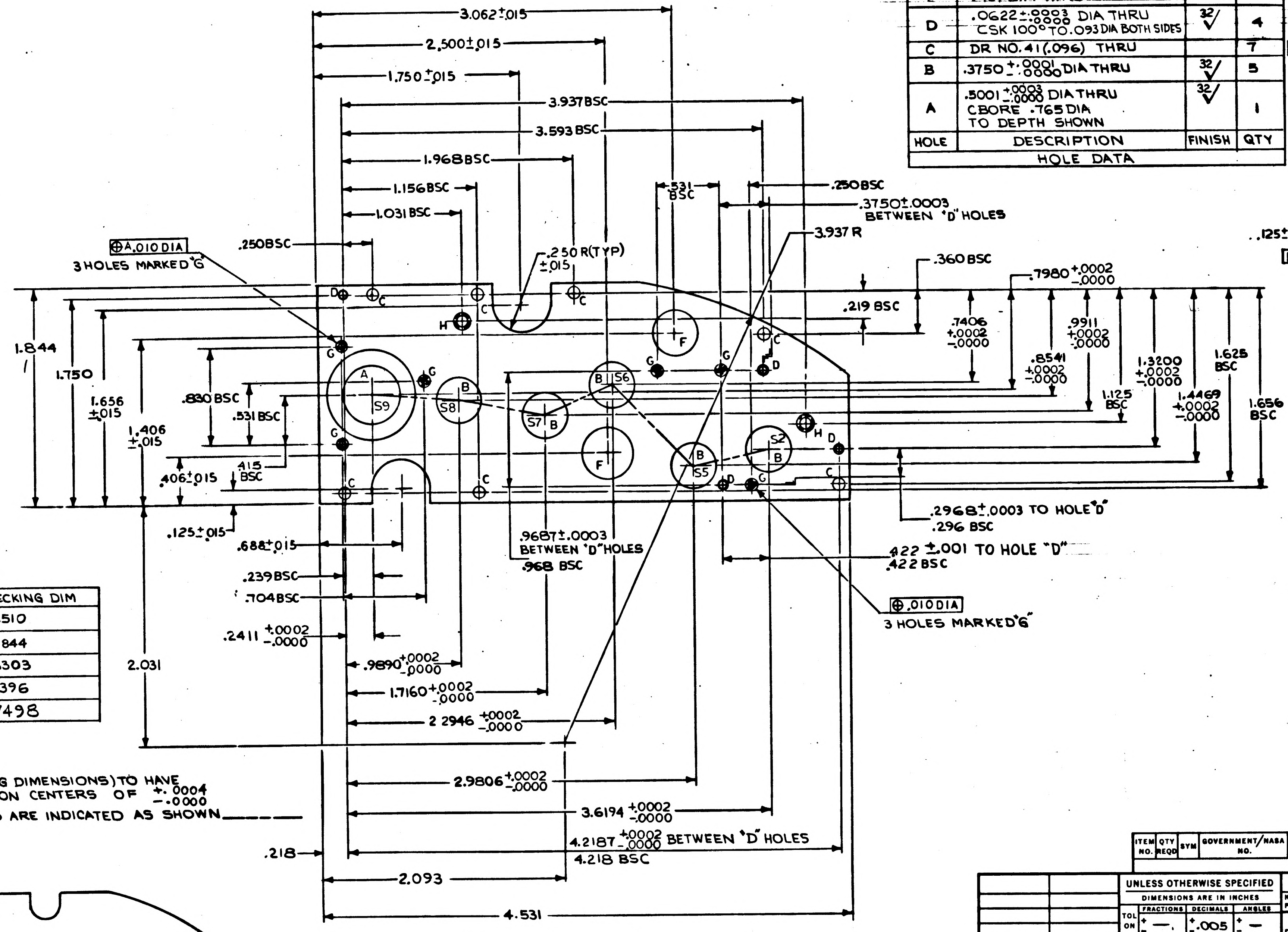
2011307 A

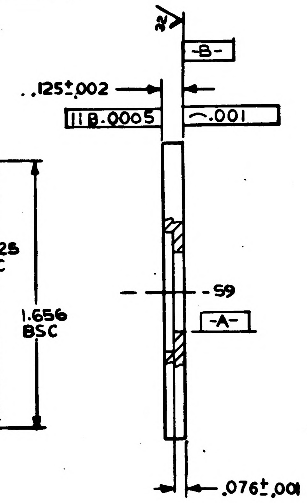
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114
6. THIS PART MATED WITH ND2011306

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13313	10/6/64	WR

HOLE	DESCRIPTION	FINISH	QTY	
H	DR NO. 32 (.116) THRU CSK 90° +0° −5° TO .156 DIA. 6-32 NC-3B THRU		2	⊕.010 DIA
G	DR NO. 44 (.086) THRU CSK 90° +0° −5° TO .120 DIA. 3-48 NC-3B THRU		6	
E	.437 DIA THRU		2	
D	.0622 +.0003 −.0000 DIA THRU CSK 100° TO .093 DIA BOTH SIDES	32√	4	
C	DR NO. 41 (.096) THRU		7	⊕.004 DIA
B	.3750 +.0001 −.0000 DIA THRU	32√	5	
A	.5001 +.0003 −.0000 DIA THRU CBORE .765 DIA TO DEPTH SHOWN	32√	1	

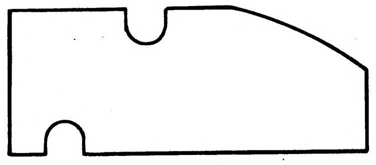
HOLE DATA


3.062±.015
2.500±.015
1.750±.015
3.937BSC
3.593BSC
1.968BSC
1.156BSC
1.031BSC
.250BSC
⊕A.010 DIA
3 HOLES MARKED "G"
.250 R(TYP) ±.015
.531 BSC
.250BSC
.3750±.0003 BETWEEN "D" HOLES
3.937 R
.360 BSC
.219 BSC
.7980 +.0002 −.0000
.7406 +.0002 −.0000
.8541 +.0002 −.0000
.9911 +.0002 −.0000
1.125 BSC
1.3200 +.0002 −.0000
1.4469 +.0002 −.0000
1.625 BSC
1.656 BSC
1.844
1.750
1.656 ±.015
1.406 ±.015
.830 BSC
.531 BSC
.406±.015
.415 BSC
.125±.015
.688±.015
.239BSC
.704BSC
.2411 +.0002 −.0000
2.031
.9890 +.0002 −.0000
1.7160 +.0002 −.0000
2.2946 +.0002 −.0000
.9687±.0003 BETWEEN "D" HOLES
.968 BSC
.2968±.0003 TO HOLE "D"
.296 BSC
.422 ±.001 TO HOLE "D"
.422 BSC
⊕.010 DIA
3 HOLES MARKED "G"
2.9806 +.0002 −.0000
3.6194 +.0002 −.0000
4.2187 +.0002 −.0000 BETWEEN "D" HOLES
4.218 BSC
.218
2.093
4.531
A
B
C
D
E
F
G
H
S2
S5
S6
S7
S8
S9


32√
-B-
.125±.002
// B .0005
⌒ .001
S9
-A-
.076±.001

CENTERS	(C.D) CHECKING DIM
S2 - S5	.6510
S5 - S6	.9844
S6 - S7	.6303
S7 - S8	.7396
S8 - S9	.7498

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF +.0004 −.0000
2. GEAR TRAINS ARE INDICATED AS SHOWN



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011308	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910630

DRAWN E. DRAPALA DATE 4-10-64
CHECKED I. SULLIVAN 6-1-64
APPROVAL 6/5/64
APPROVAL 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
SCT TRUNNION DRIVE

CODE IDENT NO. | SIZE D | NASA NUMBER 2011307
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011307 A

MASTER

2011307

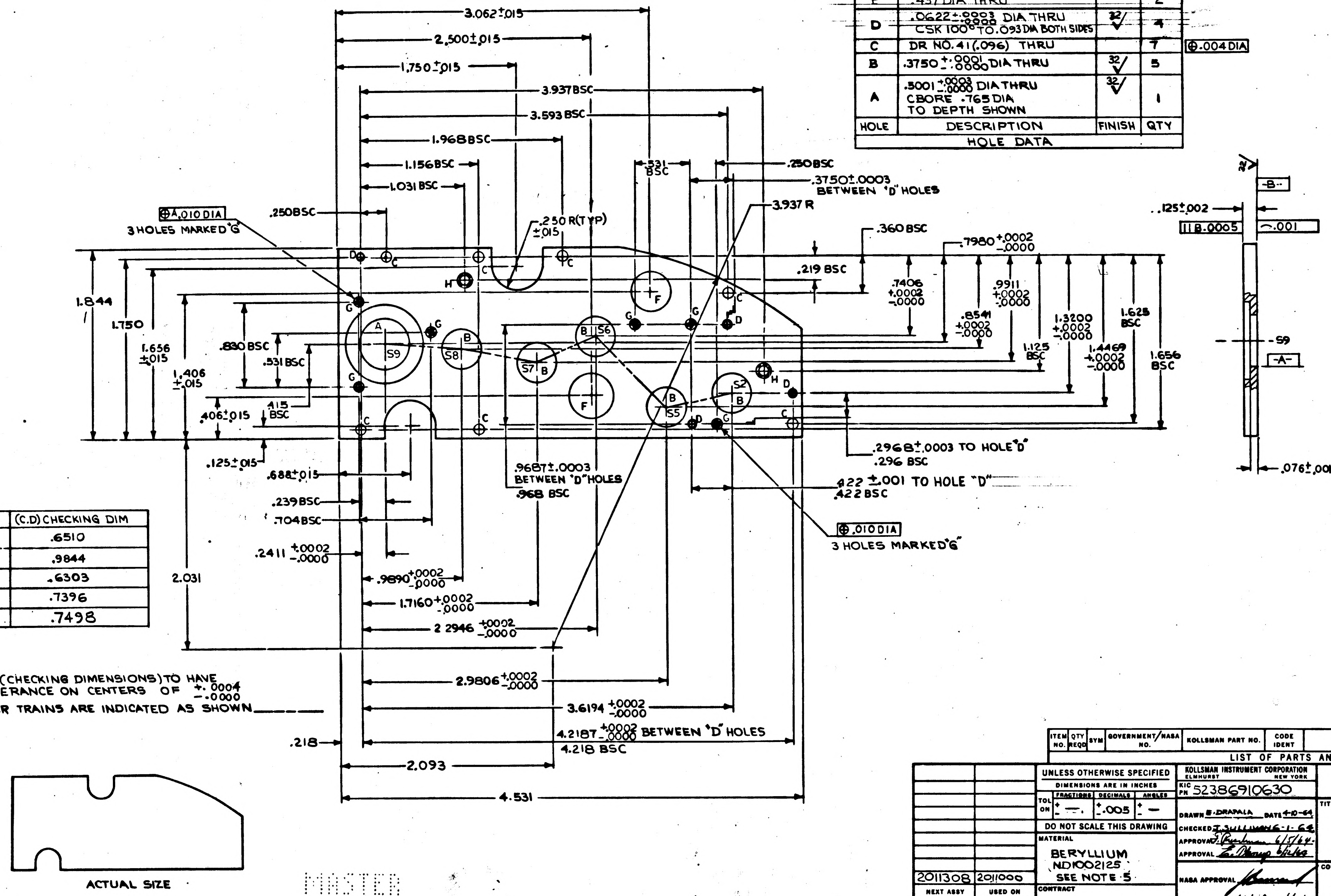
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 10230

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
    a. $\sqrt{}^{63}$ FINISH ALL OVER
    b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114
6. THIS PART MATED WITH ND2011306

HOLE	DESCRIPTION	FINISH	QTY	
H	DR NO.32 (.116) THRU REDRILL NO.23 (.154) x.031 DEEP 6-32 NC-3B THRU		2	⊕.010 DIA
G	DR NO.44 (.086) THRU REDRILL NO.32 (.116) x.022 DEEP 3-48 NC-3B THRU		6	
F	.437 DIA THRU		2	
D	$.0622^{+.0003}_{-.0000}$ DIA THRU CSK 100° TO .093 DIA BOTH SIDES	$\sqrt{}^{32}$	4	
C	DR NO.41 (.096) THRU		7	⊕.004 DIA
B	$.3750^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	5	
A	$.5001^{+.0003}_{-.0000}$ DIA THRU CBORE .765 DIA TO DEPTH SHOWN	$\sqrt{}^{32}$	1	

HOLE DATA



3.062±.015
2,500±.015
1.750±.015
3.937BSC
3.593BSC
1.968BSC
1.156BSC
1.031 BSC
.531 BSC
.250BSC
.3750±.0003 BETWEEN 'D' HOLES
3.937 R
.250 R(TYP) ±.015
⊕A .010 DIA 3 HOLES MARKED 'G'
.250BSC
.360 BSC
.219 BSC
.7980 +.0002 -.0000
.7406 +.0002 -.0000
.8541 +.0002 -.0000
.9911 +.0002 -.0000
1.125 BSC
1.3200 +.0002 -.0000
1.4469 +.0002 -.0000
1.625 BSC
1.656 BSC
1.844
1.750
1.656 ±.015
1.406 ±.015
.830 BSC
.531 BSC
.415 BSC
.406±.015
.125±.015
.688±.015
.239BSC
.704BSC
.2411 +.0002 -.0000
2.031
.9890 +.0002 -.0000
1.7160 +.0002 -.0000
2 2946 +.0002 -.0000
2.9806 +.0002 -.0000
3.6194 +.0002 -.0000
4.2187 +.0002 -.0000 BETWEEN 'D' HOLES
4.218 BSC
.218
2.093
4.531
.9687±.0003 BETWEEN 'D' HOLES
.968 BSC
.2968±.0003 TO HOLE 'D'
.296 BSC
.422 ±.001 TO HOLE 'D'
.422 BSC
⊕.010 DIA 3 HOLES MARKED 'G'
A B C D F G H
S2 S5 S6 S7 S8 S9
32
-B-
.125±.002
// B .0005
⌒ .001
S9
-A-
.076±.001
ACTUAL SIZE

CENTERS	(C.D) CHECKING DIM
S2 - S5	.6510
S5 - S6	.9844
S6 - S7	.6303
S7 - S8	.7396
S8 - S9	.7498

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011308	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910630

DRAWN E. DRAPALA DATE 4-10-64
CHECKED I. SULLIVAN 6-1-64
APPROVAL E. Buschman 6/5/64
APPROVAL E. Mong 6/12/64
NASA APPROVAL
MIT APPROVAL 6/11/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
SCT TRUNNION DRIVE

CODE IDENT NO.
SIZE D
NASA NUMBER 2011307
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011307

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011309

REVISIONS			10720	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

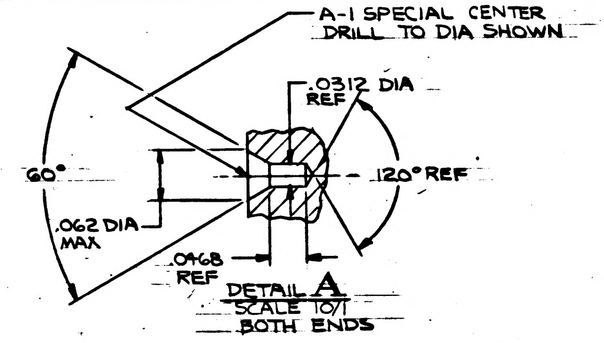
SPUR GEAR DATA
GEAR A

NO. OF TEETH	197
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIAMETER	1.64167
OUTSIDE DIAMETER	1.6583 $^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32√

EXTERNAL SPLINE DATA (INVOLUTE).

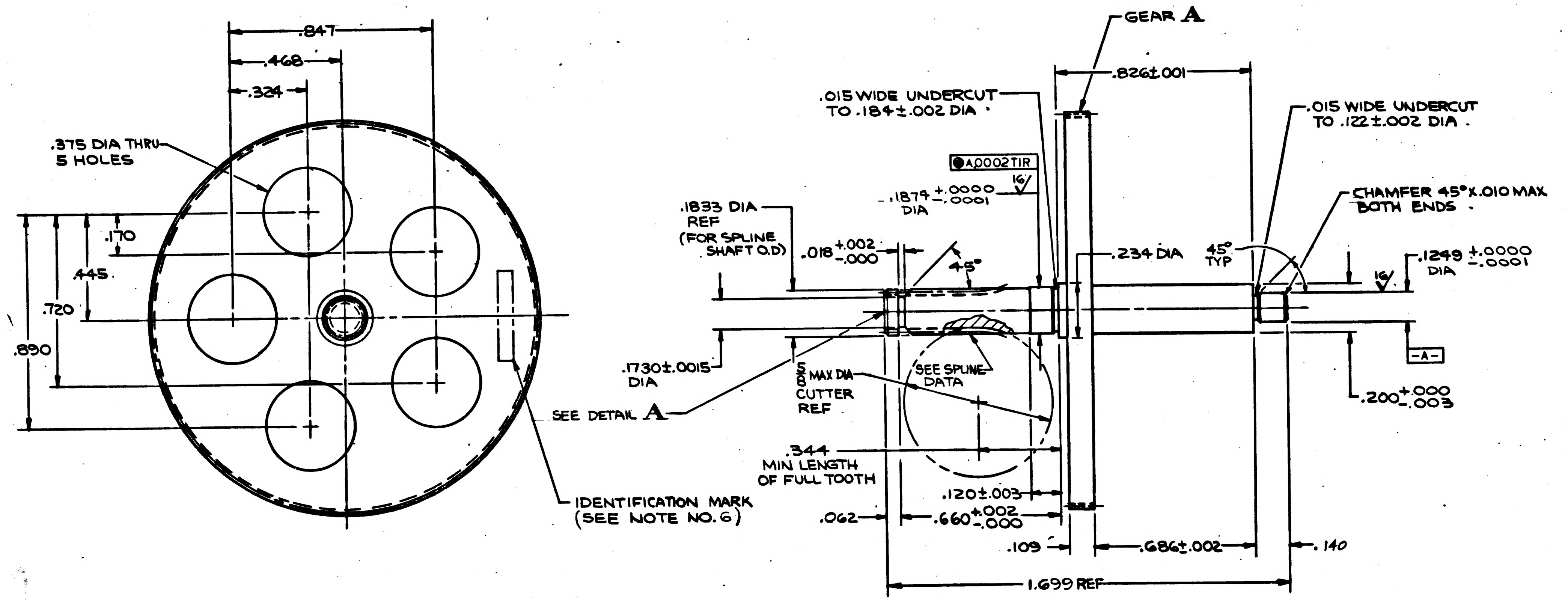
AM. ST'D FLAT ROOT SIDE FIT - CLASS 2.

NO. OF TEETH	8
PITCH	48/96
PRESSURE ANGLE	30°
PITCH DIAMETER (REF)	.1667
MAJOR DIAMETER	.1833 $^{+.0000}_{-.0040}$ (SEE DWG)
MINOR DIAMETER	.1417 $^{+.000}_{-.004}$
CIRC. TOOTH THICKNESS	.03272 $^{+.0000}_{-.0002}$
FINISH	32√



A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF

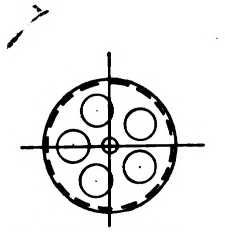
DETAIL A
SCALE 10/1
BOTH ENDS



GEAR A
.847
.468
.324
.375 DIA THRU 5 HOLES
.170
.445
.720
.890
SEE DETAIL A
IDENTIFICATION MARK (SEE NOTE NO. 6)
.826±.001
.015 WIDE UNDERCUT TO .184±.002 DIA
.015 WIDE UNDERCUT TO .122±.002 DIA
A .0002 TIR
16√
.1879 +.0000 -.0001 DIA
.1833 DIA REF (FOR SPLINE SHAFT O.D)
.018 +.002 -.000
45°
.234 DIA
45° TYP
CHAMFER 45°X.010 MAX BOTH ENDS
.1249 +.0000 -.0001 DIA
-A-
.200 +.000 -.003
.1730±.0015 DIA
5/8 MAX DIA CUTTER REF
SEE SPLINE DATA
.344 MIN LENGTH OF FULL TOOTH
.120±.003
.062
.660 +.002 -.000
.109
.686±.002
.140
1.699 REF

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171. (TABLE V-A FINISH NO.5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
63√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327.

NOTES:-



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910210
DRAWN E. DRAPALA DATE 4-8-64
CHECKED J. SULLIVAN 6-5-64
APPROVAL F. Ruchinsen (ECE)
APPROVAL E. Meng 6-17-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(197T - 120P)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011309

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011309

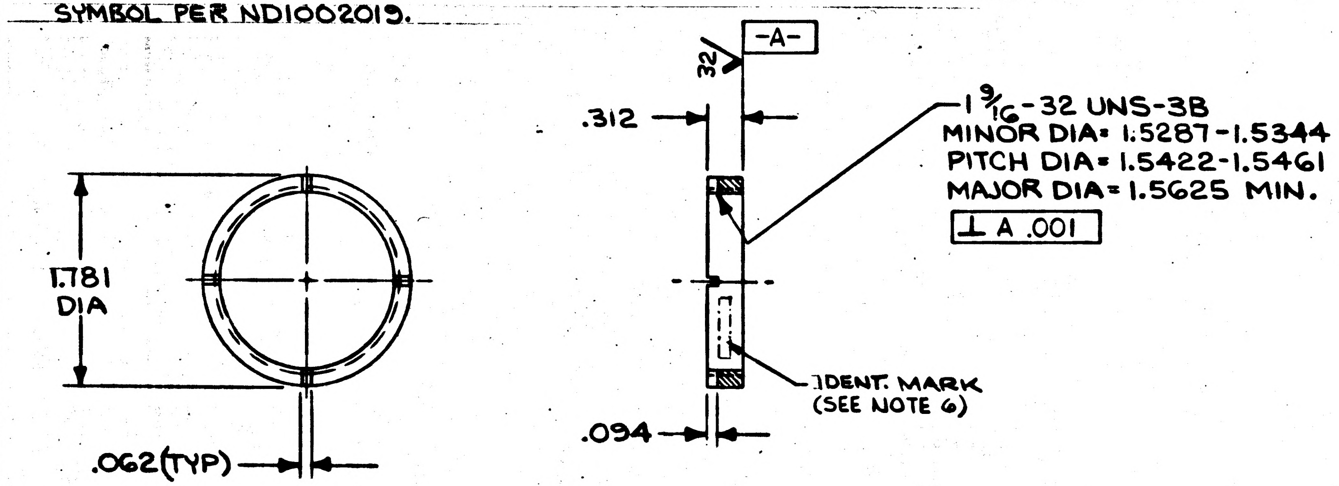
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011311

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL
	10048		

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4. REMOVE BURRS IN ACCORD WITH ND1002079
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011797	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 , COND. H.

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910250

DRAWN F. Schiller DATE 4-2-64
CHECKED 4-27-64
APPROVAL 5/27/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 9 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
NUT, LOCKING, ROTOR

CODE IDENT NO.
SIZE B
NASA NUMBER 2011311
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

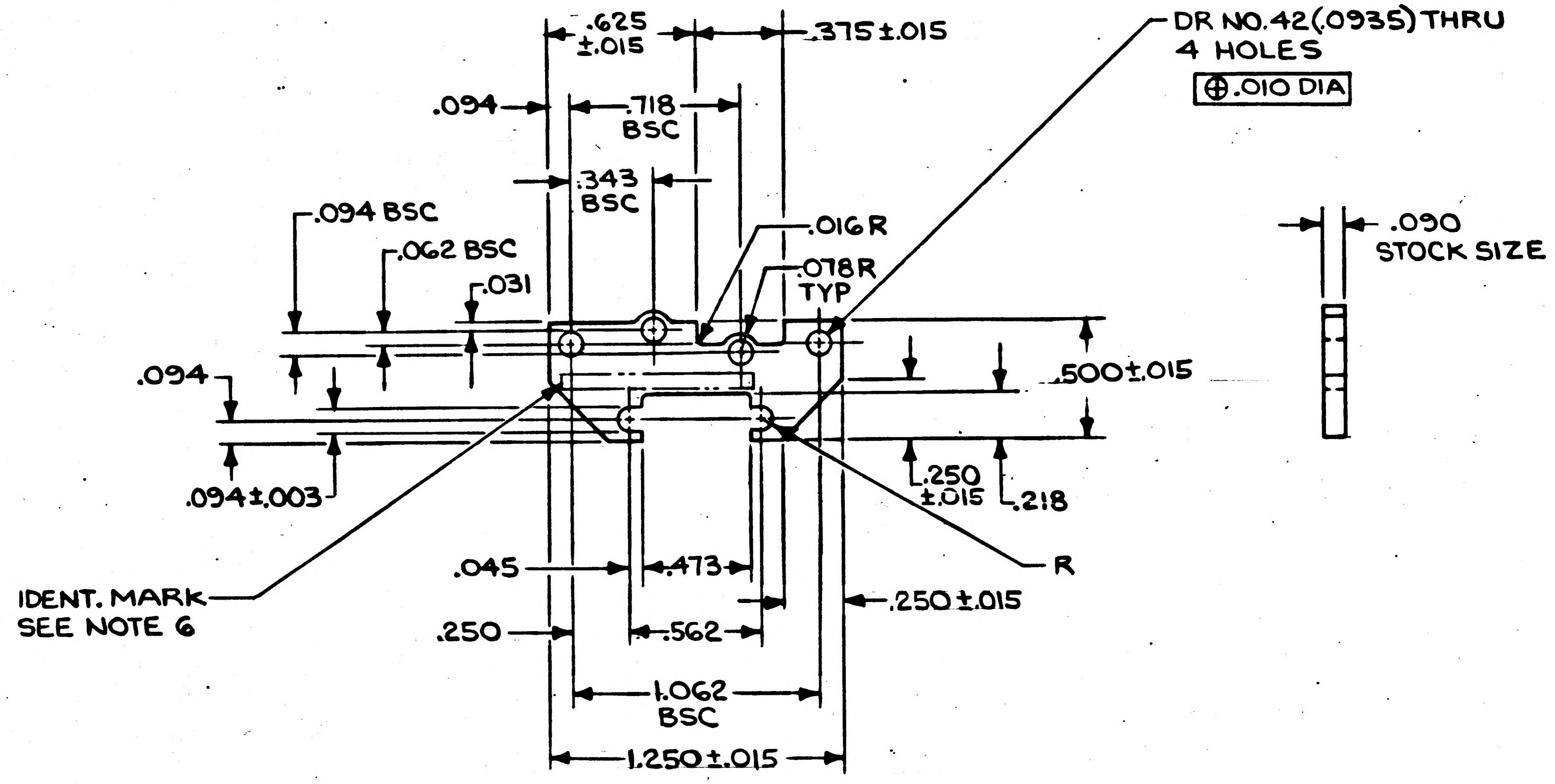
K+E E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

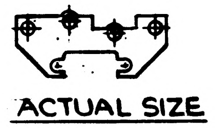
2011322

REVISIONS ~~TOAR~~ 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ UNLESS OTHERWISE SPECIFIED.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE II (KPS.1005A.200)
6. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019



.625 ±.015
.375±.015
DR NO.42(.0935) THRU
4 HOLES
⊕ .010 DIA
.094
.718 BSC
.343 BSC
.094 BSC
.062 BSC
.031
.016R
.078R TYP
.090 STOCK SIZE
.094
.500±.015
.094±.003
.250 ±.015
.218
IDENT. MARK SEE NOTE 6
.045
.473
R
.250±.015
.250
.562
1.062 BSC
1.250±.015



ACTUAL SIZE

MASTER

2011322

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	±	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY 6061-T6 FED. SPEC QQ-A-327 TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910300

DRAWN DATE 4-8-64
CHECKED 6/2/64
APPROVAL 6/17/64
APPROVAL E. Thomas 6/16/64
NASA APPROVAL
MIT APPROVAL G.J. Wilson 6/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, MOUNTING, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2011322
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

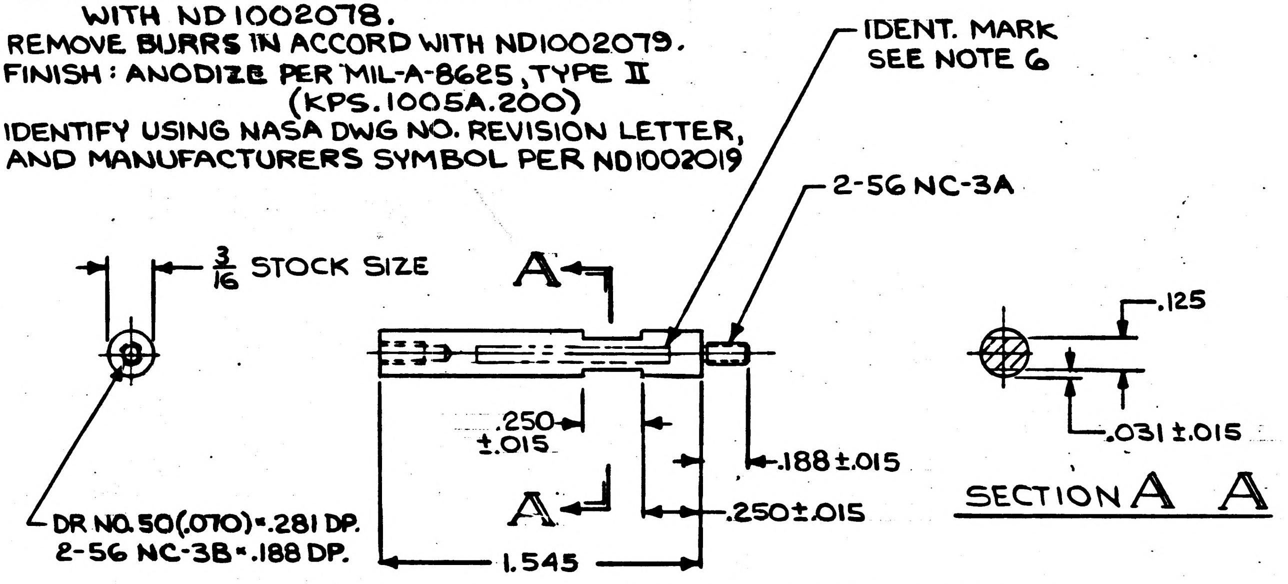
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011323

REVISIONS TDRR 10230			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND 1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE II (KPS.1005A.200)
6. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

ACTUAL SIZE

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-325 TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 53386910020

DRAWN J. Schiller DATE 4-8-64
CHECKED 6/2/64
APPROVAL 6/18/64
APPROVAL E. Wong 6/16/64

NASA APPROVAL

MIT APPROVAL 4/14/6

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
POST, SHOULDERED THREADED

CODE IDENT NO. | SIZE B | NASA NUMBER 2011323

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

K+E
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\vee}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH MIL-B-21531.
6. HEAT TREAT STABILIZE AND STRESS RELIEVE IN ACCORDANCE WITH ND 1002092.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

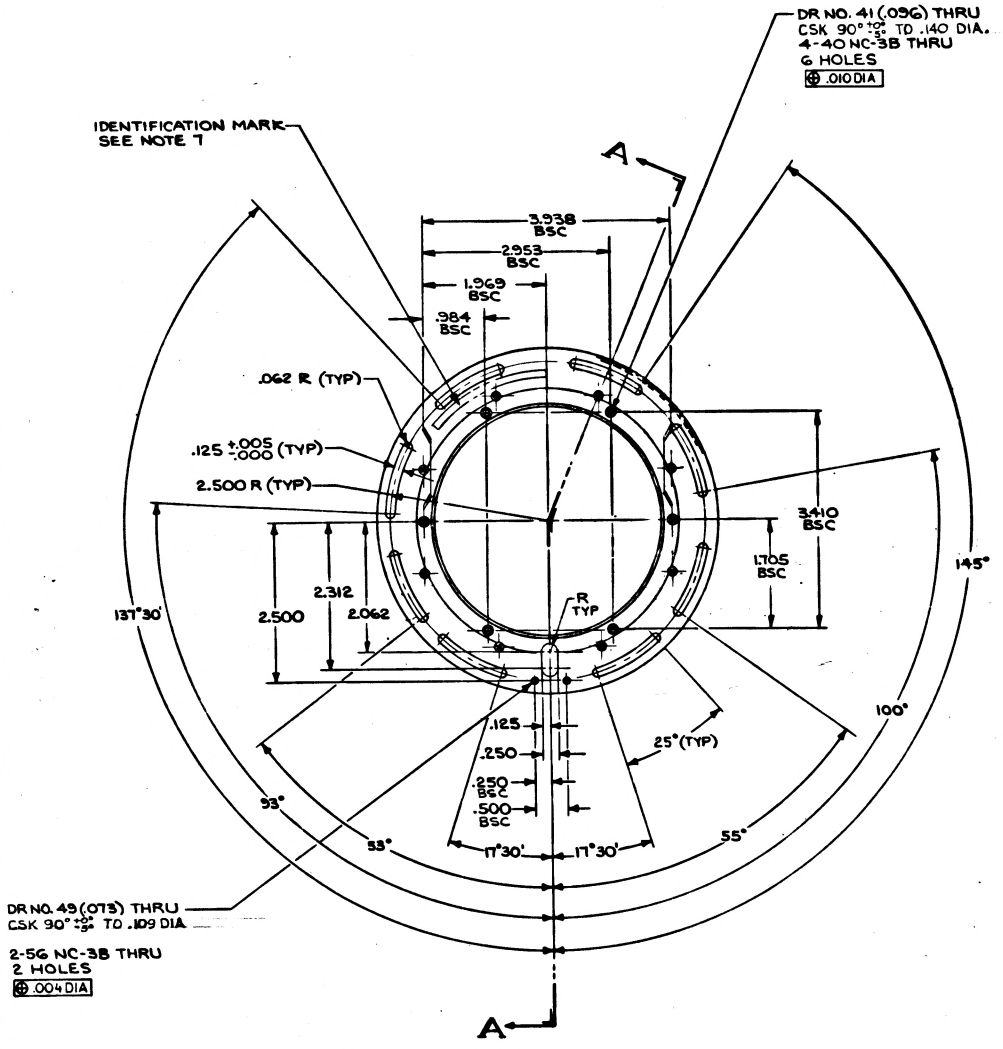
SPUR GEAR DATA (SECTOR)

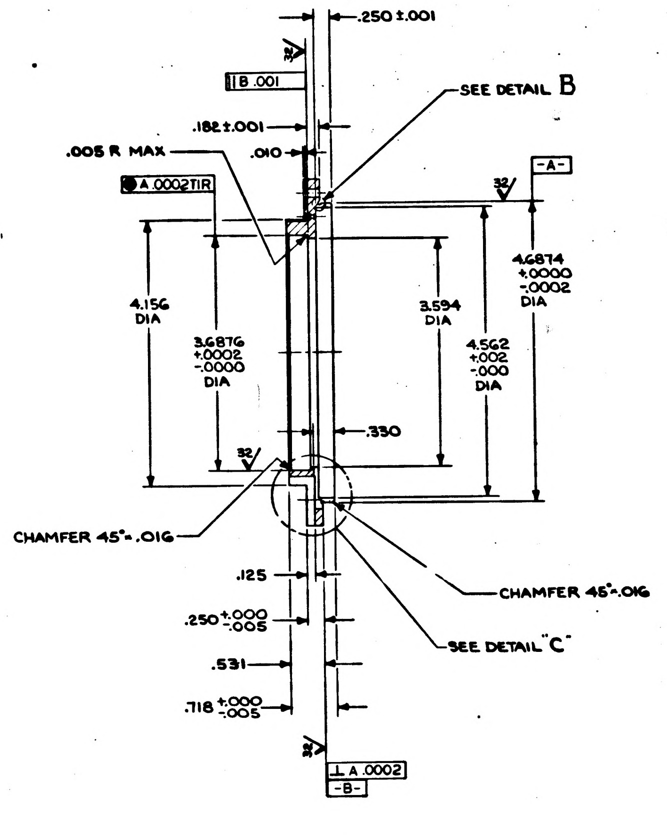
NO. OF TEETH	258
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
PITCH DIAMETER	5.3750
OUTSIDE DIAMETER	$5.4166^{+.0000}_{-.0030}$
A.G.M.A CLASS	PREC 1D
GEAR TEETH FINISH	$\overset{32}{\vee}$

2011325 A

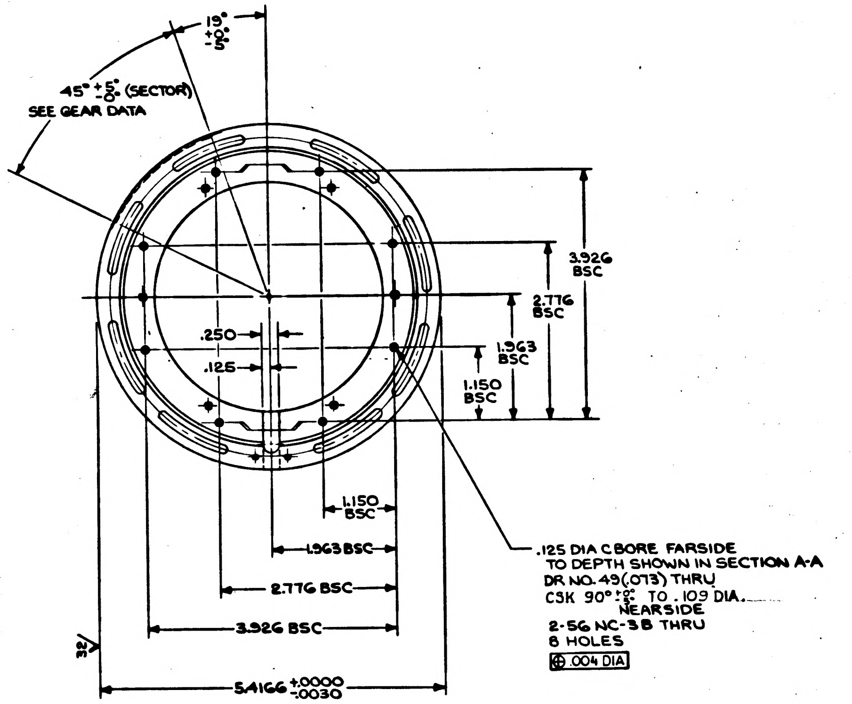
REVISIONS 1604

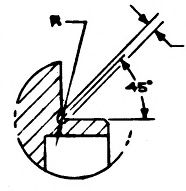
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13314	10/6/64	WR


DR NO. 41 (.096) THRU
CSK 90° +0° −5° TO .140 DIA.
4-40 NC-3B THRU
6 HOLES
⊕ .010 DIA
IDENTIFICATION MARK SEE NOTE 7
A
3.938 BSC
2.953 BSC
1.969 BSC
.984 BSC
.062 R (TYP)
.125 +.005 −.000 (TYP)
2.500 R (TYP)
3.410 BSC
1.705 BSC
145°
137°30'
2.500
2.312
2.062
R TYP
100°
25° (TYP)
.125
.250
.250 BSC
.500 BSC
93°
53°
17°30'
17°30'
55°
DR NO. 49 (.073) THRU
CSK 90° +0° −5° TO .109 DIA
2-56 NC-3B THRU
2 HOLES
⊕ .004 DIA
A

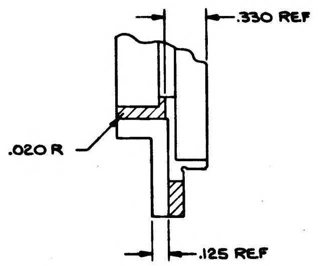

.250 ±.001
32
B .001
SEE DETAIL B
.182 ±.001
.005 R MAX
.010
A .0002 TIR
-A-
32
4.156 DIA
3.6876 +.0002 −.0000 DIA
3.594 DIA
4.562 +.002 −.000 DIA
4.6874 +.0000 −.0002 DIA
.330
32
CHAMFER 45° × .016
CHAMFER 45° × .016
SEE DETAIL "C"
.125
.250 +.000 −.005
.531
.718 +.000 −.005
32
⊥ A .0002
-B-

SECTION A-A


19° +0° −5°
45° +5° −0° (SECTOR)
SEE GEAR DATA
3.926 BSC
2.776 BSC
1.963 BSC
1.150 BSC
.250
.125
1.150 BSC
1.963 BSC
2.776 BSC
3.926 BSC
32
5.4166 +.0000 −.0030
.125 DIA C BORE FARSIDE
TO DEPTH SHOWN IN SECTION A-A
DR NO. 49 (.073) THRU
CSK 90° +0° −5° TO .109 DIA.
NEARSIDE
2-56 NC-3B THRU
8 HOLES
⊕ .004 DIA



DETAIL B
SCALE 4/1


.330 REF
.020 R
.125 REF

DETAIL "C"
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910520

DRAWN F. Schiller DATE 4-7-64
CHECKED 6/2/64
APPROVAL 6/1/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR
(16 SPEED)

CODE IDENT NO. | SIZE E | NASA NUMBER 2011325
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011325 A

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
a. 63√ FINISH ALL OVER.
b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH MIL-B-21531.
6. HEAT TREAT STABILIZE AND STRESS RELIEVE IN ACCORDANCE WITH ND1002092.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

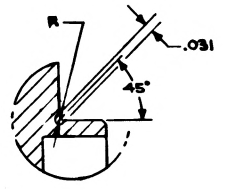
SPUR GEAR DATA (SECTOR)

NO. OF TEETH	258
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
PITCH DIAMETER	5.3750
OUTSIDE DIAMETER	5.4166 $^{+.0000}_{-.0030}$
A.G.M.A CLASS	PREC 1D
GEAR TEETH FINISH	32√

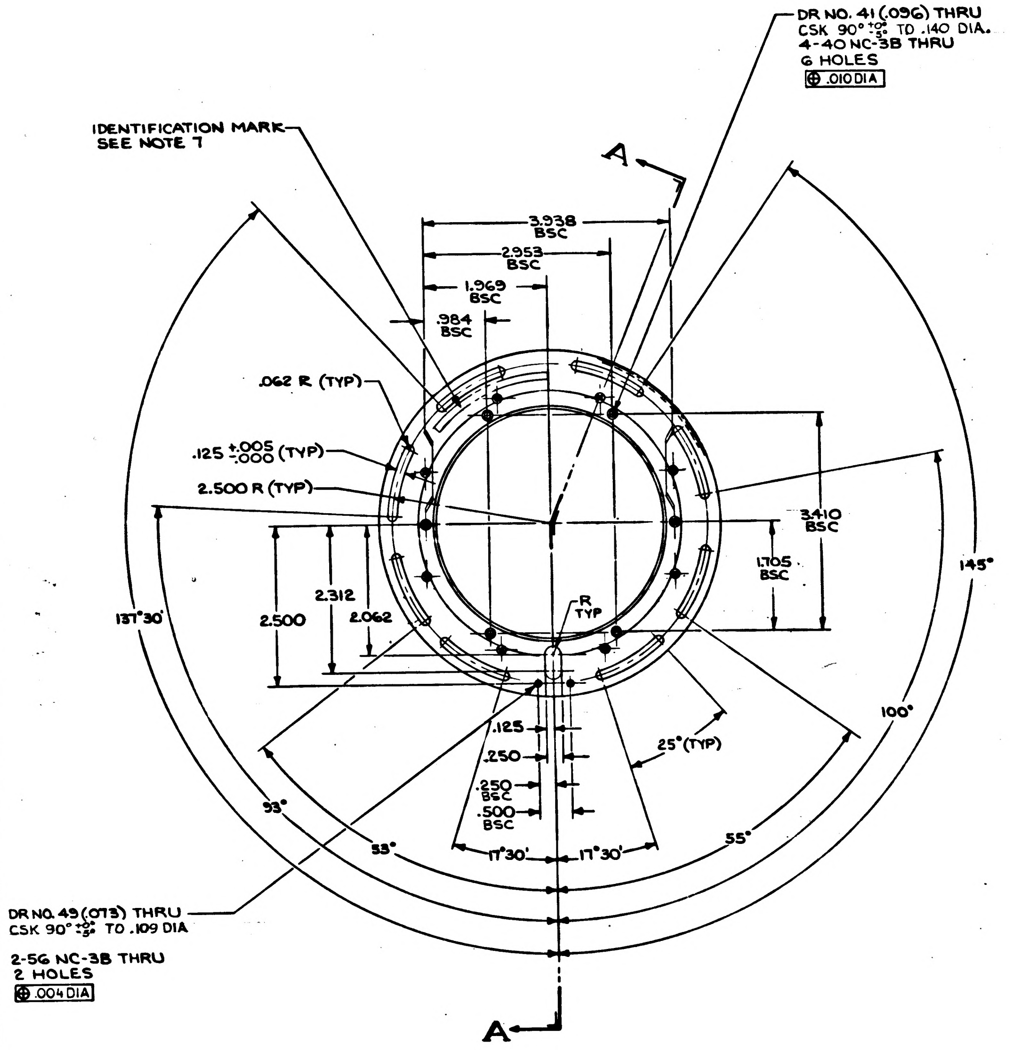
B 2011325

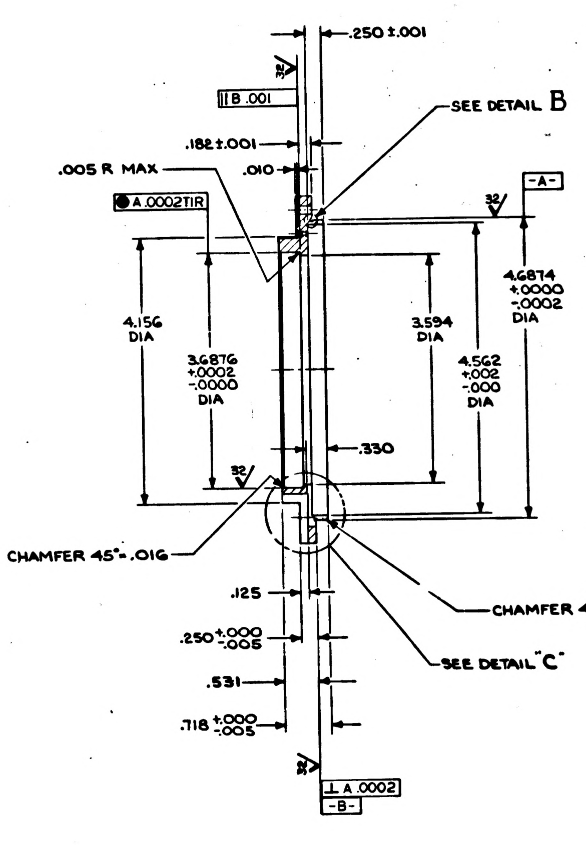
REVISIONS 1004

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13314	10/64	WR
B		REVISED PER TDRR 20192		WR

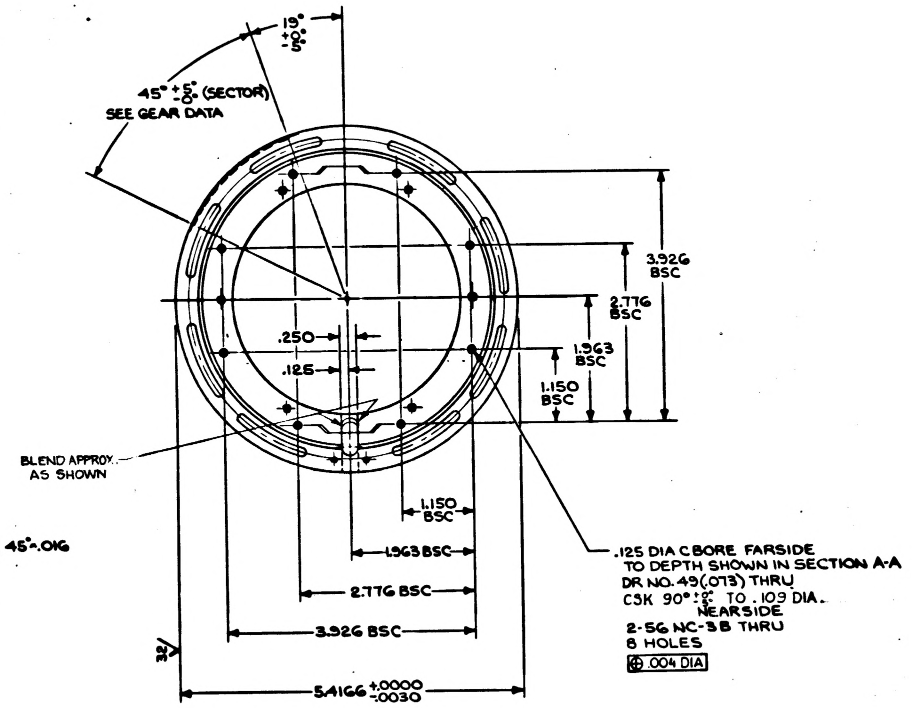


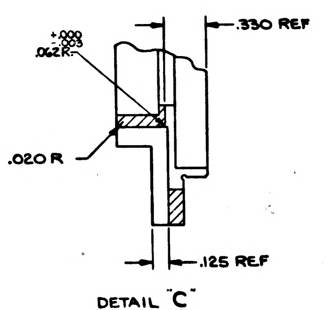
DETAIL B
SCALE 4/1


DR NO. 41 (.096) THRU
CSK 90° +0° -5° TO .140 DIA.
4-40 NC-3B THRU
6 HOLES
⊕ .010 DIA
IDENTIFICATION MARK SEE NOTE 7
A
3.938 BSC
2.953 BSC
1.969 BSC
.984 BSC
.062 R (TYP)
.125 +.005 -.000 (TYP)
2.500 R (TYP)
3.410 BSC
1.705 BSC
145°
137°30'
2.312
2.500
2.062
R TYP
100°
25° (TYP)
.125
.250
.250 BSC
.500 BSC
53°
53°
17°30'
17°30'
55°
DR NO. 49 (.073) THRU
CSK 90° +0° -5° TO .109 DIA
2-56 NC-3B THRU
2 HOLES
⊕ .004 DIA
A


.250 ±.001
32√
∥ B .001
SEE DETAIL B
.182 ±.001
.005 R MAX
.010
-A-
◉ A .0002 TIR
32√
4.156 DIA
3.6876 +.0002 -.0000 DIA
3.594 DIA
4.562 +.002 -.000 DIA
4.6874 +.0000 -.0002 DIA
.330
32√
CHAMFER 45° × .016
CHAMFER 45° × .016
.125
.250 +.000 -.005
SEE DETAIL "C"
.531
.718 +.000 -.005
32√
⊥ A .0002
-B-

SECTION A-A


19° +0° -5°
45° +5° -0° (SECTOR) SEE GEAR DATA
3.926 BSC
2.776 BSC
1.963 BSC
1.150 BSC
.250
.125
BLEND APPROX. AS SHOWN
1.150 BSC
1.963 BSC
2.776 BSC
3.926 BSC
32√
5.4166 +.0000 -.0030
.125 DIA C BORE FARSIDE TO DEPTH SHOWN IN SECTION A-A
DR NO. 49 (.073) THRU
CSK 90° +0° -5° TO .109 DIA. NEARSIDE
2-56 NC-3B THRU
8 HOLES
⊕ .004 DIA


+.000 -.003 .062 R
.330 REF
.020 R
.125 REF

DETAIL "C"
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011806	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910520
DRAWN J. Schuller DATE 4-7-64
CHECKED 6/2/64
APPROVAL 6/7/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR
(16 SPEED)

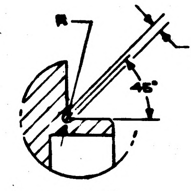
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011325
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
 a. 63/ FINISH ALL OVER.
 b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH MIL-B-21531.
6. HEAT TREAT STABILIZE AND STRESS RELIEVE IN ACCORDANCE WITH ND1002092.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

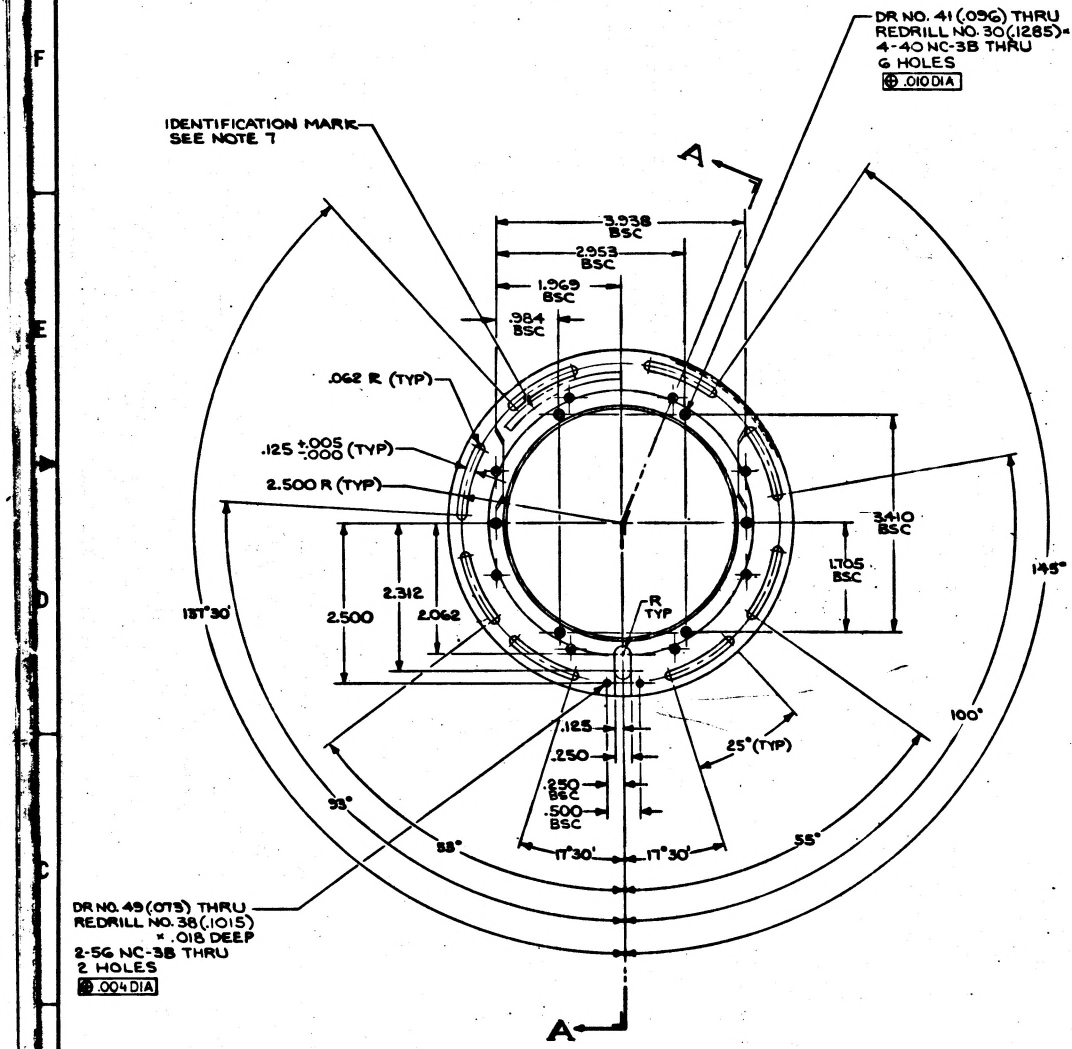
SPUR GEAR DATA (SECTOR)	
NO. OF TEETH	258
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
PITCH DIAMETER	5.3750
OUTSIDE DIAMETER	5.4166 +.0000 -.0030
A.G.M.A CLASS	PREC 1D
GEAR TEETH FINISH	32/

2011325

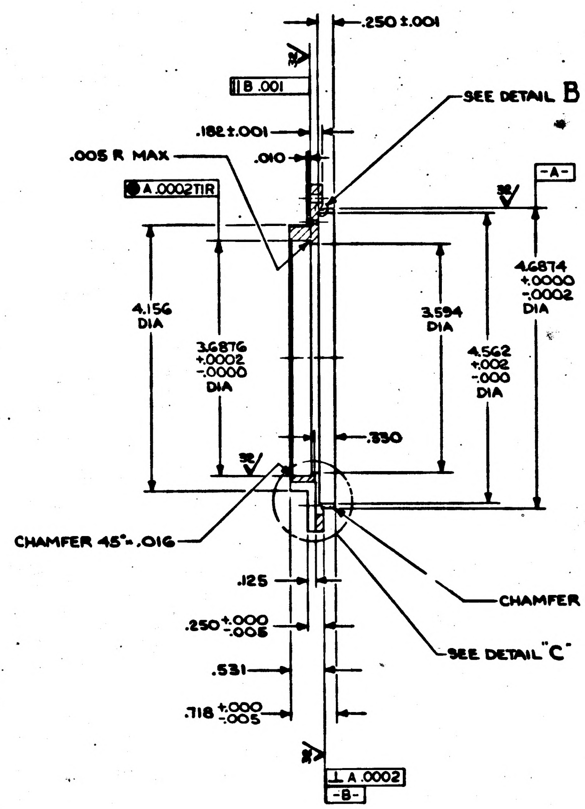
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL



DETAIL B
SCALE 4/1

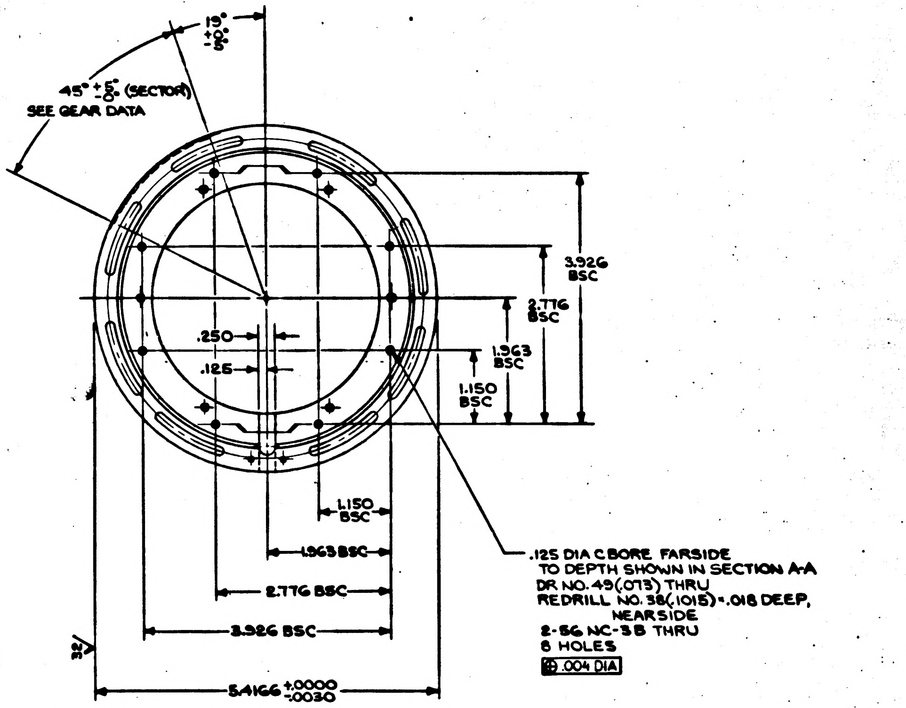


DR NO. 41 (.096) THRU
REDRILL NO. 30 (.1285) × .025 DEEP
4-40 NC-3B THRU
6 HOLES
⊕ .010 DIA
IDENTIFICATION MARK SEE NOTE 7
A
3.938 BSC
2.953 BSC
1.969 BSC
.984 BSC
.062 R (TYP)
.125 +.005 -.000 (TYP)
2.500 R (TYP)
3.410 BSC
1.705 BSC
2.312
2.062
2.500
R TYP
145°
131°30'
100°
25° (TYP)
.125
.250
.250 BSC
.500 BSC
33°
58°
55°
11°30'
11°30'
DR NO. 49 (.073) THRU
REDRILL NO. 38 (.1015) × .018 DEEP
2-56 NC-3B THRU
2 HOLES
⊕ .004 DIA
A

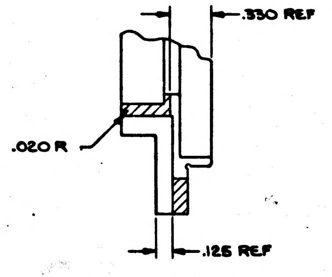


.250 ±.001
32/
B .001
SEE DETAIL B
.182 ±.001
.005 R MAX
.010
A .0002 TIR
-A-
32/
4.156 DIA
3.6876 +.0002 -.0000 DIA
3.594 DIA
4.562 +.002 -.000 DIA
4.6874 +.0000 -.0002 DIA
.330
32/
CHAMFER 45° × .016
CHAMFER 45° × .016
SEE DETAIL C
.125
.250 +.000 -.005
.531
.718 +.000 -.005
32/
A .0002
-B-

SECTION A-A



19° +0° -5°
45° +5° -0° (SECTOR)
SEE GEAR DATA
3.926 BSC
2.776 BSC
1.963 BSC
1.150 BSC
.250
.125
1.150 BSC
1.963 BSC
2.776 BSC
3.926 BSC
5.4166 +.0000 -.0030
32/
.125 DIA C BORE FARSIDE TO DEPTH SHOWN IN SECTION A-A
DR NO. 49 (.073) THRU
REDRILL NO. 38 (.1015) × .018 DEEP, NEARSIDE
2-56 NC-3B THRU
8 HOLES
⊕ .004 DIA



.330 REF
.020 R
.125 REF

DETAIL C
SCALE 8/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011806	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ½; DECIMALS ±.005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910520
DRAWN: DATE 4-7-64
CHECKED: 4/8/64
APPROVAL: 6/5/64
APPROVAL: 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: HOUSING, STATOR (16 SPEED)

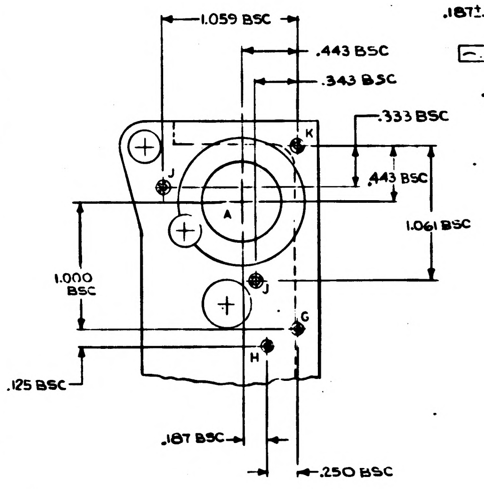
CODE IDENT NO. | SIZE E | NASA NUMBER 2011325
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

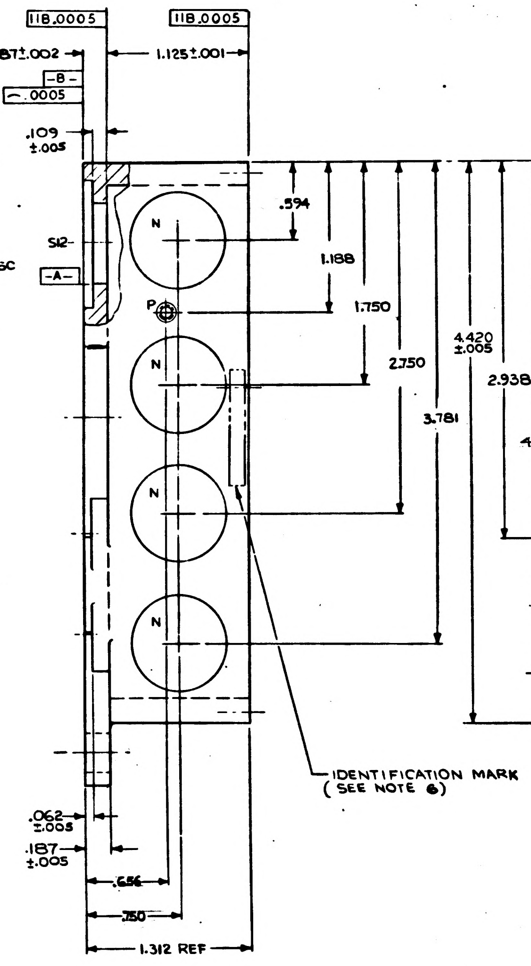
MASTER

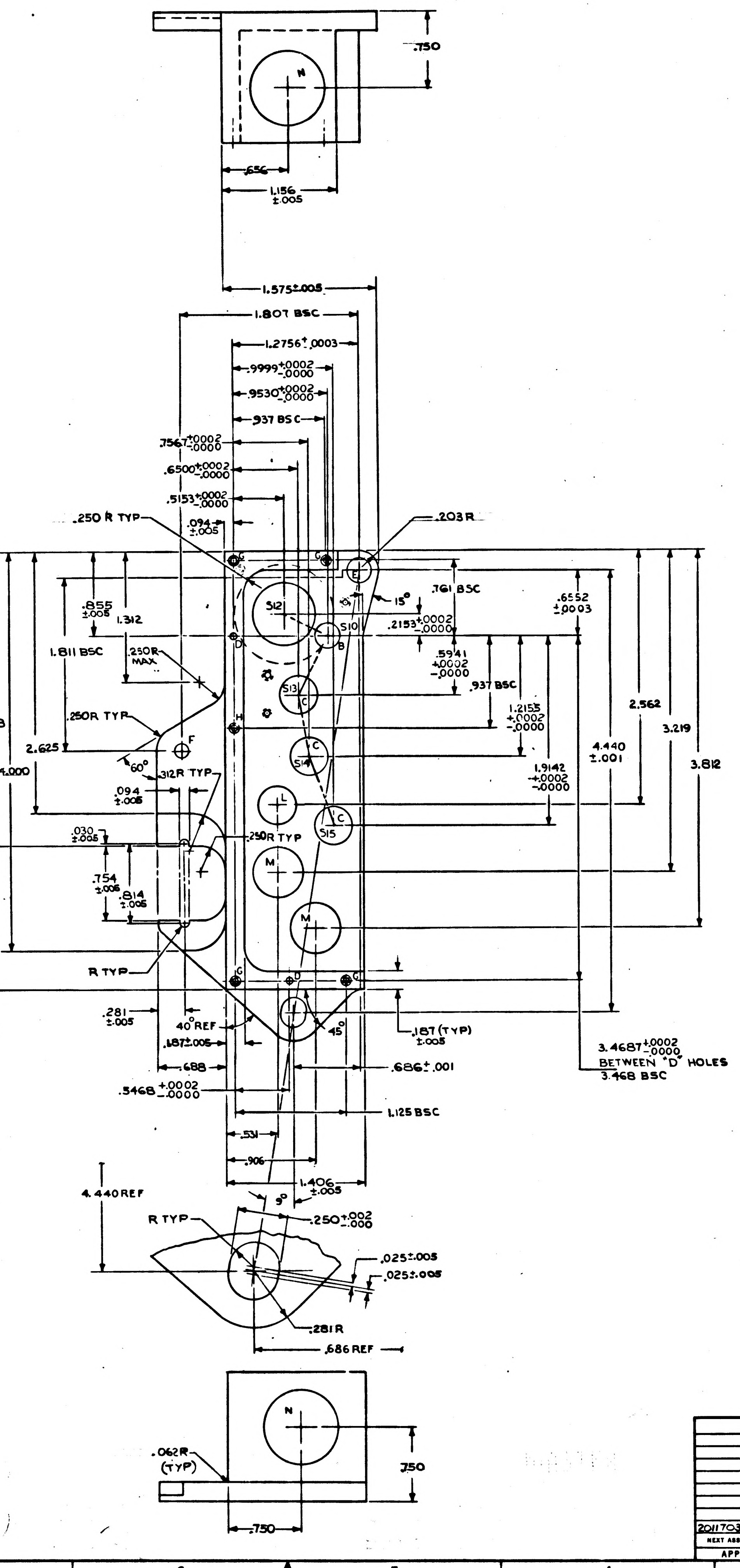
A	2011329

REVISIONS (1142)				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13315	10/6/64	KK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH ND 2011330.

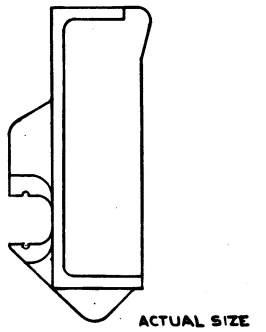

1.059 BSC
.443 BSC
.343 BSC
.333 BSC
.443 BSC
1.061 BSC
1.000 BSC
.125 BSC
.187 BSC
.250 BSC
A
J
K
G
H


118.0005
118.0005
.187±.002
-B-
⌓ .0005
1.125±.001
.109 ±.005
S12
-A-
.594
1.188
1.750
2.750
3.781
P
N
N
N
N
IDENTIFICATION MARK (SEE NOTE 6)
.062 ±.005
.187 ±.005
.656
.750
1.312 REF


.750
N
.656
1.156 ±.005
1.575±.005
1.807 BSC
1.2756±.0003
.9999 +.0002 -.0000
.9530 +.0002 -.0000
.937 BSC
.7567 +.0002 -.0000
.6500 +.0002 -.0000
.5153 +.0002 -.0000
.094 ±.005
.250 R TYP
.203 R
15°
.761 BSC
.6552 ±.0003
.2153 +.0002 -.0000
.5941 +.0002 -.0000
.937 BSC
1.2153 +.0002 -.0000
1.9142 +.0002 -.0000
.855 ±.005
1.312
.250 R MAX
1.811 BSC
.250 R TYP
2.625
60°
.312 R TYP
4.420 ±.005
2.938
4.000
.094 ±.005
.030 ±.005
.250 R TYP
.754 ±.005
.814 ±.005
R TYP
.281 ±.005
40° REF
.187±.005
.688
.5468 +.0002 -.0000
.531
.906
1.406 ±.005
.686±.001
1.125 BSC
45°
.187 (TYP) ±.005
2.562
3.219
3.812
4.440 ±.001
3.4687 +.0002 -.0000 BETWEEN "D" HOLES
3.468 BSC
S10
S12
S13
S14
S15
B
C
C
C
D
E
F
G
H
L
M
M
4.440 REF
R TYP
9°
.250 +.002 -.000
.025±.005
.025±.005
.281 R
.686 REF
N
.062 R (TYP)
.750
.750

CENTER	(C.D.)CHECKING DIM
S10 — S12	.4876
S10 — S13	.6668
S13 — S14	.6303
S14 — S15	.7396

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN — - - —



ACTUAL SIZE

HOLE	DESCRIPTION	FINISH	QTY	
P	DR NO. 32 (.116) THRU CSK 90° $^{+0°}_{-5°}$ TO .156 DIA. 6-32 NC-3B THRU		1	
N	.750 DIA THRU		6	
M	.500 DIA THRU		2	
L	.375 DIA THRU		1	
K	DR NO. 44 (.086) x .312 DEEP CSK 90° $^{+0°}_{-5°}$ TO .120 DIA. 3-48 NC-3B x .187 DEEP		1	⊕A .010 DIA
J	DR NO. 44 (.086) THRU CSK 90° $^{+0°}_{-5°}$ TO .120 DIA. 3-48 NC-3B THRU		2	⊕A .010 DIA
H	DR NO 49 (.073) THRU (TO HOLE) CSK 90° $^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-3B THRU		2	⊕.010 DIA
G	DR NO. 49 (.073) x .265 DEEP CSK 90° $^{+0°}_{-5°}$ TO .109 DIA. 2-56 NC-3B x .156 DEEP		5	⊕.004 DIA
F	DR NO. 13 (.185) THRU		1	⊕.010 DIA
E	.2500 $^{+.0005}_{-.0000}$ DIA THRU	32√	1	
D	.0632 $^{+.0005}_{-.0000}$ DIA THRU TO HOLE	32√	2	
C	.3750 $^{+.0001}_{-.0000}$ DIA THRU	32√	3	
B	.2500 $^{+.0001}_{-.0000}$ DIA THRU	32√	1	
A	.6252 $^{+.0003}_{-.0000}$ DIA THRU CBORE 1.015 DIA TO DEPTH SHOWN	32√	1	

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	201100

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .015	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910480

DRAWN E.ERAPALA DATE 4-3-64
CHECKED T.SULLIVAN 4-20-64
APPROVAL 6/1/64
APPROVAL E. 6/16/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
SCT SHAFT DRIVE

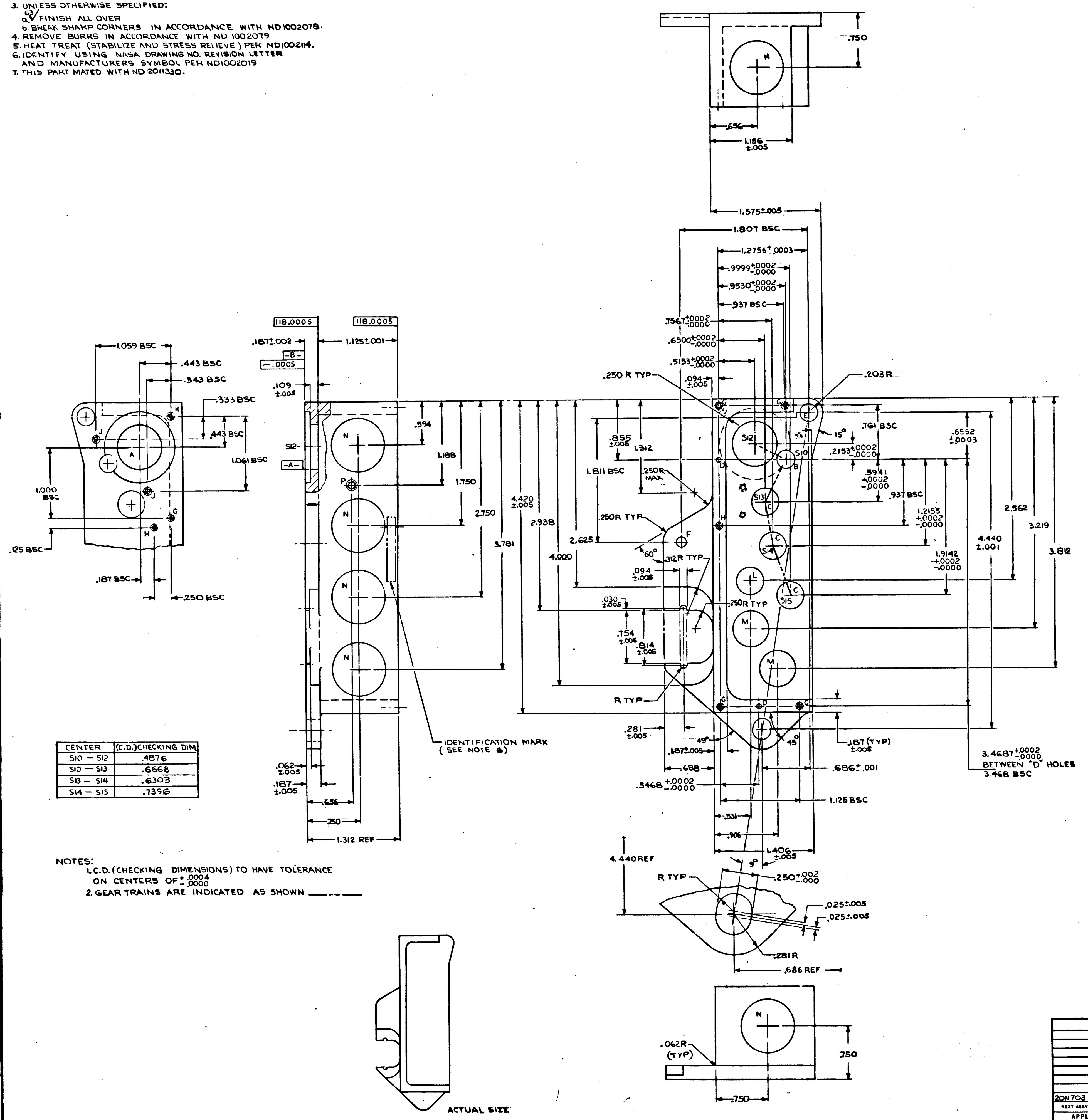
CODE IDENT NO.
SIZE E
NASA NUMBER 2011329
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET OF 1

2011329 A

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH ND 2011330.

2011329 B

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13315	10/6/64	
B		REVISED PER TDRR NO. 14297		



.750
.656
1.156 ±.005
1.575±.005
1.807 BSC
1.2756+.0003
.9999+.0002 -.0000
.9530+.0002 -.0000
.937 BSC
.7567+.0002 -.0000
.6500+.0002 -.0000
.5153+.0002 -.0000
.094 ±.005
.250 R TYP
.203R
1.059 BSC
.443 BSC
.343 BSC
.333 BSC
.443 BSC
1.061 BSC
1.000 BSC
.125 BSC
.187 BSC
.250 BSC
A
J
K
G
H
118.0005
.187±.002
-B-
⌒.0005
1.125±.001
.109 ±.005
S12
-A-
P
N
.594
1.188
1.750
2.750
3.781
4.420 ±.005
2.938
4.000
2.625
.855 ±.005
1.312
1.811 BSC
.250R MAX
.250R TYP
60°
.312R TYP
F
.094 ±.005
.030 ±.005
.754 ±.005
.814 ±.005
R TYP
.281 ±.005
49°
.187±.005
.688
.5468+.0002 -.0000
.531
.906
1.406 ±.005
1.125 BSC
.686±.001
.187 (TYP)
45°
S10
S13
S14
S15
B
C
D
E
L
M
15°
.761 BSC
.2153+.0002 -.0000
.6552 ±.0003
.5941 +.0002 -.0000
.937 BSC
1.2155 +.0002 -.0000
1.9142 +.0002 -.0000
4.440 ±.001
2.562
3.219
3.812
3.4687+.0002 -.0000 BETWEEN "D" HOLES
3.468 BSC
.062 ±.005
.187 ±.005
.750
1.312 REF
IDENTIFICATION MARK (SEE NOTE 6)
4.440 REF
R TYP
9°
.250+.002 -.000
.025±.005
.025±.005
.281R
.686 REF
.062R (TYP)
ACTUAL SIZE

CENTER	(C.D.)CHECKING DIM
S10 — S12	.4876
S10 — S13	.6668
S13 — S14	.6303
S14 — S15	.7396

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN ——-—-——

HOLE	DESCRIPTION	FINISH	QTY	
P	DR NO. 32 (.116) THRU CSK 90° $^{+0°}_{-5°}$ TO .156 DIA. 6-32 NC-3B THRU		1	
N	.750 DIA THRU		6	
M	.500 DIA THRU		2	
L	.375 DIA THRU		1	
K	DR NO. 44 (.086) x .312 DEEP CSK 90° $^{+0°}_{-5°}$ TO .120 DIA. 3-48 NC-3B x .187 DEEP		1	⊕A .010 DIA
J	DR NO. 44 (.086) THRU CSK 90° $^{+0°}_{-5°}$ TO .120 DIA. 3-48 NC-3B THRU		2	⊕A .010 DIA
H	DR NO 49 (.073) THRU (TO HOLE) CSK 90° $^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-3B THRU		2	⊕.010 DIA
G	DR NO. 49 (.073) x .265 DEEP CSK 90° $^{+0°}_{-5°}$ TO .109 DIA. 2-56 NC-3B x .156 DEEP		5	⊕.004 DIA
F	DR NO. 13 (.185) THRU		1	⊕.010 DIA
E	.2500 $^{+.0005}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	1	
D	.0632 $^{+.0005}_{-.0000}$ DIA THRU TO HOLE	$\sqrt{}^{32}$	2	
C	.3750 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	3	
B	.2500 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	1	
A	.6252 $^{+.0003}_{-.0000}$ DIA THRU CBORE 1.015 DIA TO DEPTH SHOWN	$\sqrt{}^{32}$	1	

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011703	201100
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .015 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910480
DRAWN E.BRAPALA DATE 4-13-64
CHECKED T. SULLIVAN 4-20-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

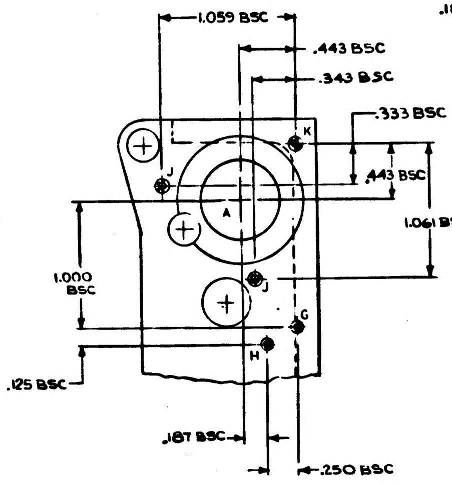
TITLE
HOUSING, GEAR
SCT SHAFT DRIVE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011329
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET
OF 1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011329

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. THIS PART MATED WITH ND 2011330.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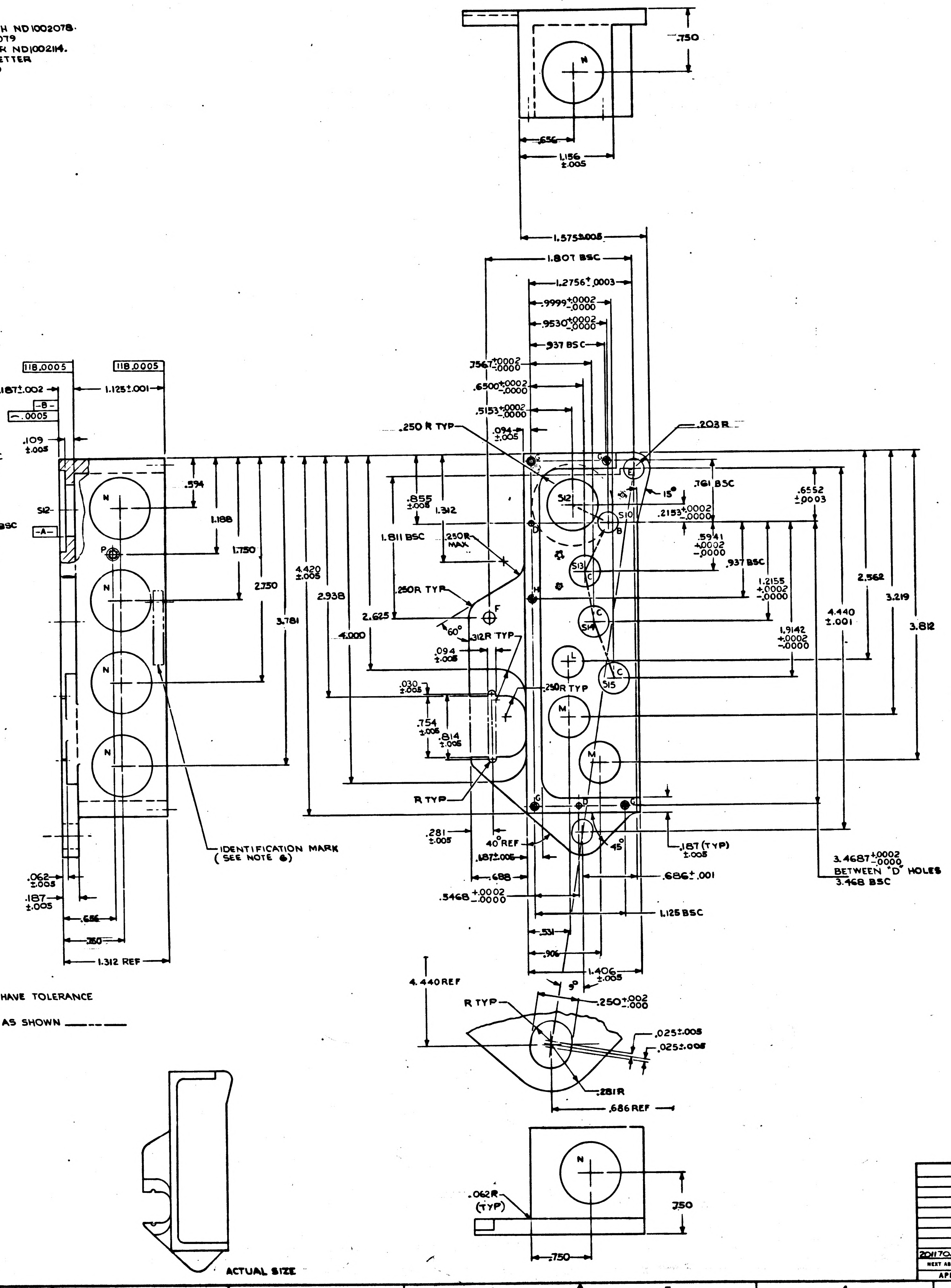
.443 BSC
.343 BSC
.333 BSC
.443 BSC
1.061 BSC
1.000 BSC
.125 BSC
.187 BSC
.250 BSC
A
J
K
G
H


.750
N
.656
1.156 ±.005
1.575±.005
1.807 BSC
1.2756±.0003
.9999 +.0002 -.0000
.9530 +.0002 -.0000
.937 BSC
.7567 +.0002 -.0000
.6500 +.0002 -.0000
.5153 +.0002 -.0000
.094 ±.005
.250 R TYP
.203 R
.118 .0005
.187±.002
-B-
.0005
1.125±.001
.109 ±.005
.594
S12
-A-
1.188
1.750
2.750
3.781
4.420 ±.005
2.938
2.625
4.000
.855 ±.005
1.312
1.811 BSC
.250R MAX
.250R TYP
60°
.312R TYP
.094 ±.005
.030 ±.005
.250R TYP
.754 ±.005
.814 ±.005
R TYP
.281 ±.005
40° REF
.187±.005
.688
.5468 +.0002 -.0000
S12
S10
S13
S14
S15
15°
.761 BSC
.2153 +.0002 -.0000
.5941 +.0002 -.0000
.937 BSC
1.2155 +.0002 -.0000
1.9142 +.0002 -.0000
.6552 ±.0003
2.562
3.219
3.812
4.440 ±.001
45°
.187 (TYP) ±.005
.686±.001
3.4687 +.0002 -.0000 BETWEEN "D" HOLES 3.468 BSC
1.125 BSC
.531
.906
1.406 ±.005
IDENTIFICATION MARK (SEE NOTE 6)
.062 ±.005
.187 ±.005
.656
.750
1.312 REF
4.440 REF
5°
R TYP
.250 +.002 -.000
.025±.005
.025±.005
.281R
.686 REF
.062R (TYP)
.750
.750
ACTUAL SIZE

CENTER	(C.D.) CHECKING DIM
S10 — S12	.4876
S10 — S13	.6668
S13 — S14	.6303
S14 — S15	.7396

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN ———

HOLE	DESCRIPTION	FINISH	QTY	
P	DR NO. 32 (.116) THRU REDRILL NO. 23 (.154) x .031 DEEP 6-32 NC-3B THRU		1	
N	.750 DIA THRU		6	
M	.500 DIA THRU		2	
L	.375 DIA THRU		1	
K	DR NO. 44 (.086) x .312 DEEP REDRILL NO. 32 (.116) x .022 DEEP 3-48 NC-3B x .187 DEEP		1	⊕A .010 DIA
J	DR NO. 44 (.086) THRU REDRILL NO 32 (.116) x .022 DEEP 3-48 NC-3B THRU		2	⊕A .010 DIA
H	DR NO 49 (.073) THRU (TO HOLE) REDRILL NO. 38 (.1015) x .018 DEEP 2-56 NC-3B THRU		2	⊕ .010 DIA
G	DR NO. 49 (.073) x .265 DEEP REDRILL NO. 38 (.1015) x .018 DEEP 2-56 NC-3B x .156 DEEP		5	⊕ .004 DIA
F	DR NO. 13 (.185) THRU		1	⊕ .010 DIA
E	.2500 $^{+.0005}_{-.0000}$ DIA THRU	$\sqrt{32}$	1	
D	.0632 $^{+.0005}_{-.0000}$ DIA THRU TO HOLE	$\sqrt{32}$	2	
C	.3750 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{32}$	3	
B	.2500 $^{+.0001}_{-.0000}$ DIA THRU	$\sqrt{32}$	1	
A	.6252 $^{+.0003}_{-.0000}$ DIA THRU CBORE 1.015 DIA TO DEPTH SHOWN	$\sqrt{32}$	1	

HOLE DATA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	201100

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .015 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910480
DRAWN S. SRAPALA DATE 4-3-64
CHECKED T. SULLIVAN 4-20-64
APPROVAL
APPROVAL
NASA APPROVAL
APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
SCT SHAFT DRIVE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011329
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF 1

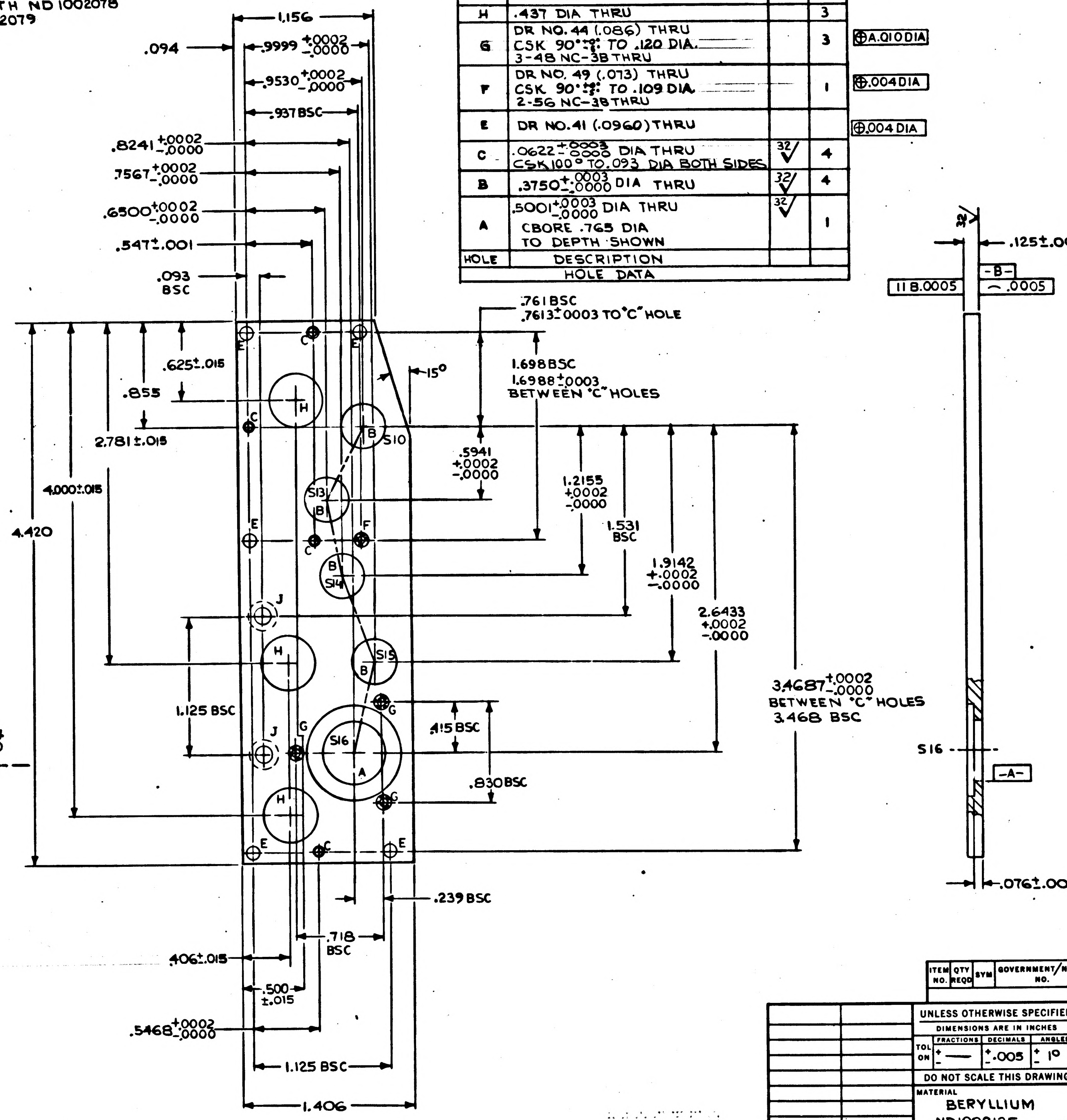
2011329

INCHES

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt[63]{}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND 1002114.
6. THIS PART MATED WITH ND 2011329.

HOLE	DESCRIPTION			
J	DR NO. 28 (.1405) THRU CSK 100° x .240 DIA FARSIDE		2	⊕ .004 DIA
H	.437 DIA THRU		3	
G	DR NO. 44 (.086) THRU CSK 90° TO .120 DIA. 3-48 NC-3B THRU		3	⊕ A .010 DIA
F	DR NO. 49 (.073) THRU CSK 90° TO .109 DIA. 2-56 NC-3B THRU		1	⊕ .004 DIA
E	DR NO. 41 (.0960) THRU			⊕ .004 DIA
C	$.0622^{+.0003}_{-.0000}$ DIA THRU CSK 100° TO .093 DIA BOTH SIDES	$\sqrt[32]{}$	4	
B	$.3750^{+.0003}_{-.0000}$ DIA THRU	$\sqrt[32]{}$	4	
A	$.5001^{+.0003}_{-.0000}$ DIA THRU CBORE .765 DIA TO DEPTH SHOWN	$\sqrt[32]{}$	1	

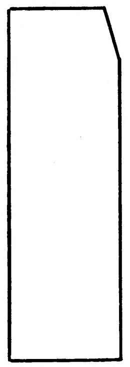
HOLE DATA



1.156
.094
$.9999^{+.0002}_{-.0000}$
$.9530^{+.0002}_{-.0000}$
.937 BSC
$.8241^{+.0002}_{-.0000}$
$.7567^{+.0002}_{-.0000}$
$.6500^{+.0002}_{-.0000}$
.547±.001
.093 BSC
.761 BSC
.7613±.0003 TO "C" HOLE
15°
1.698 BSC
1.6988±.0003 BETWEEN "C" HOLES
.625±.015
.855
2.781±.015
4.000±.015
4.420
.5941 +.0002 -.0000
1.2155 +.0002 -.0000
1.531 BSC
1.9142 +.0002 -.0000
2.6433 +.0002 -.0000
$3.4687^{+.0002}_{-.0000}$ BETWEEN "C" HOLES
3.468 BSC
1.125 BSC
.415 BSC
.830 BSC
.239 BSC
.718 BSC
.406±.015
.500 ±.015
$.5468^{+.0002}_{-.0000}$
1.125 BSC
1.406
E
C
H
B
S10
S13
S14
S15
S16
F
J
G
A
32
.125±.002
-B-
∥ B .0005
— .0005
S16
-A-
.076±.001

CENTERS	(C.D.) CHEKING DIM
S10-S13	.6668
S13-S14	.6303
S14-S15	.7396
S15-S16	.7498

NOTES:
1. C.D (CHECKING DIMENSIONS) TO HAVE TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN — — —



ACTUAL SIZE

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13316	4/6/65	VK

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011333	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910490

DRAWN E. DRAPALA DATE 4-2-64
CHECKED J. SULLIVAN 4-20-64
APPROVAL F. Rankin 6/5/64
APPROVAL E. Thomp 6/12/64
NASA APPROVAL
MIT APPROVAL J. Wilson 6/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
SCT SHAFT DRIVE

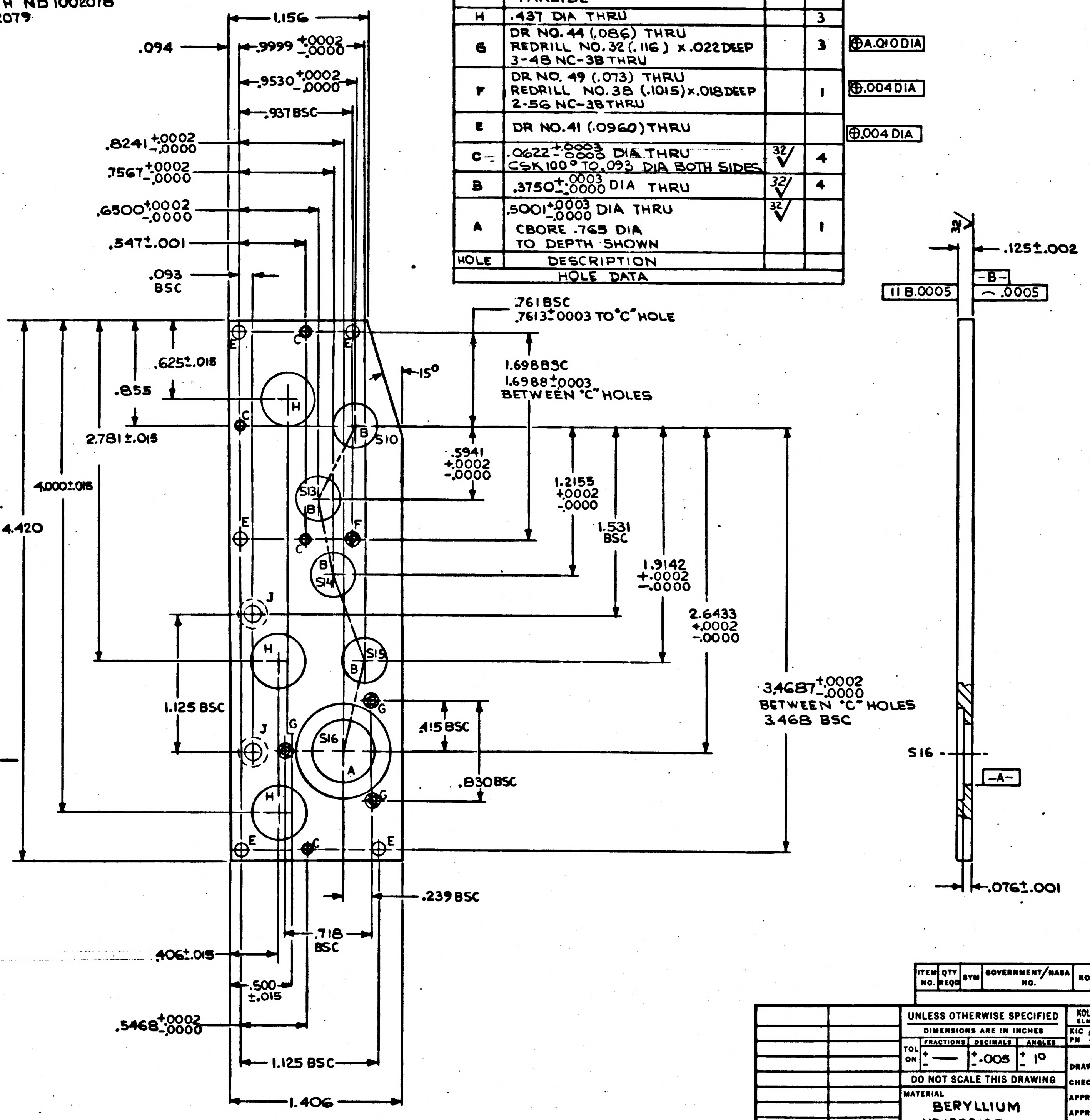
CODE IDENT NO. | SIZE D | NASA NUMBER 2011330
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

MASTER

MASTER

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) PER ND 1002114.
6. THIS PART MATED WITH ND 2011329.

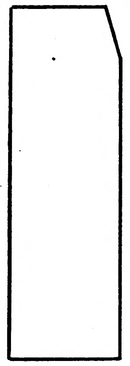

1.156
.094
.9999 +.0002 -.0000
.9530 +.0002 -.0000
.937 BSC
.8241 +.0002 -.0000
.7567 +.0002 -.0000
.6500 +.0002 -.0000
.547±.001
.093 BSC
.625±.015
.855
2.781±.015
4.000±.015
4.420
15°
.761 BSC
.7613±.0003 TO "C" HOLE
1.698 BSC
1.6988±.0003
BETWEEN "C" HOLES
.5941 +.0002 -.0000
1.2155 +.0002 -.0000
1.531 BSC
1.9142 +.0002 -.0000
2.6433 +.0002 -.0000
3.4687 +.0002 -.0000
BETWEEN "C" HOLES
3.468 BSC
.415 BSC
.830 BSC
1.125 BSC
.239 BSC
.718 BSC
.406±.015
.500 ±.015
.5468 +.0002 -.0000
1.125 BSC
1.406
E
C
H
B
S10
S13
F
S14
J
S15
G
S16
A
32
.125±.002
-B-
// B.0005
⌒ .0005
S16
-A-
.076±.001

HOLE DATA

HOLE	DESCRIPTION			
J	DR NO. 28 (.1405) THRU CSK 100° x .240 DIA FARSIDE		2	⊕ .004 DIA
H	.437 DIA THRU		3	
G	DR NO. 44 (.086) THRU REDRILL NO. 32 (.116) x .022 DEEP 3-48 NC-3B THRU		3	⊕ A .010 DIA
F	DR NO. 49 (.073) THRU REDRILL NO. 38 (.1015) x .018 DEEP 2-56 NC-3B THRU		1	⊕ .004 DIA
E	DR NO. 41 (.0960) THRU			⊕ .004 DIA
C	$.0622^{+.0003}_{-.0000}$ DIA THRU CSK 100° TO .093 DIA BOTH SIDES	$\sqrt{}^{32}$	4	
B	$.3750^{+.0003}_{-.0000}$ DIA THRU	$\sqrt{}^{32}$	4	
A	$.5001^{+.0003}_{-.0000}$ DIA THRU CBORE .765 DIA TO DEPTH SHOWN	$\sqrt{}^{32}$	1	

CENTERS	(C.D.) CHEKING DIM
S10-S13	.6668
S13-S14	.6303
S14-S15	.7396
S15-S16	.7498

NOTES:
1. C.D (CHECKING DIMENSIONS) TO HAVE TO HAVE TOLERANCE ON CENTERS OF $^{+.0004}_{-.0000}$
2. GEAR TRAINS ARE INDICATED AS SHOWN — — —


ACTUAL SIZE

MASTER

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

TARR 10230

2011330

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011333	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910490

DRAWN E. DRAPALA DATE 4-2-64
CHECKED J. SULLIVAN 4-20-64
APPROVAL F. Rumlen 6/5/64
APPROVAL E. Thomp 6/12/64
NASA APPROVAL
MIT APPROVAL J. Wilson 6/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, BEARING
SCT SHAFT DRIVE

CODE IDENT NO.
SIZE D
NASA NUMBER 2011330
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

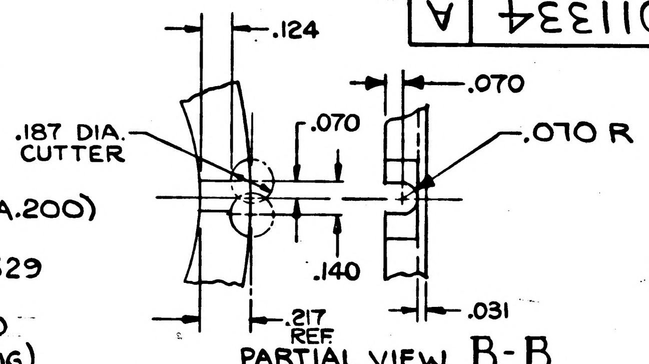
2011330

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011334 | A

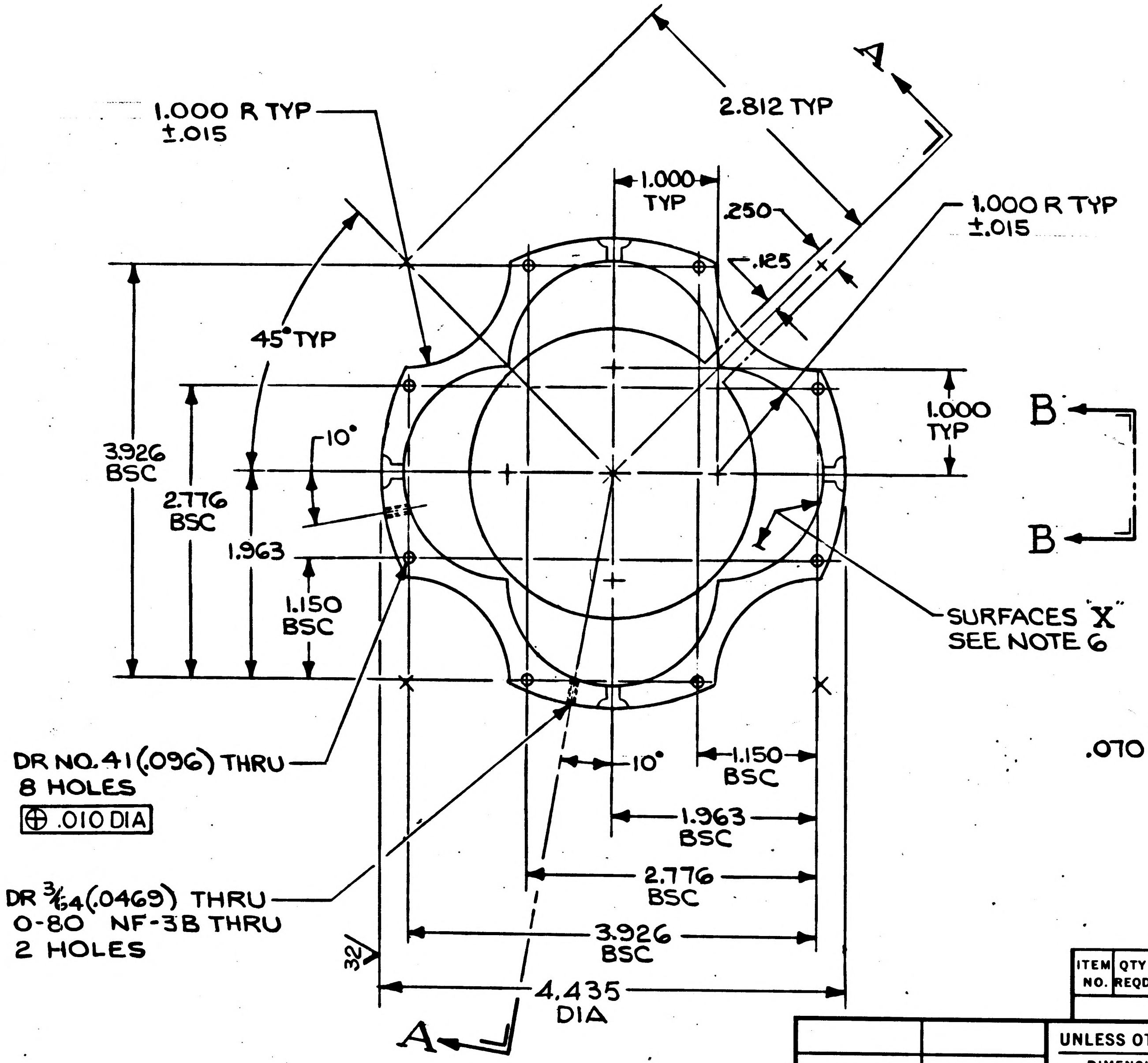
NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
    a. 63/ FINISH ALL OVER
    b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4. REMOVE BURRS IN ACCORD WITH ND1002079
5. FINISH: ANODIZE IN ACCORD WITH MIL-A-8625 TYPE II (KPS.1005A.200)
6. PAINT SURFACES "X" WITH PRIMER PER MIL-P-8585 APPLY SEMI-GLOSS WHITE ENAMEL PER FED. SPEC TT-E-529 COLOR NUMBER 27875 PER FED.-STD-595
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MFRS. SYMBOL PER ND1002019 (BAGGING OR TAGGING)

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 10986	7/14/64	wk

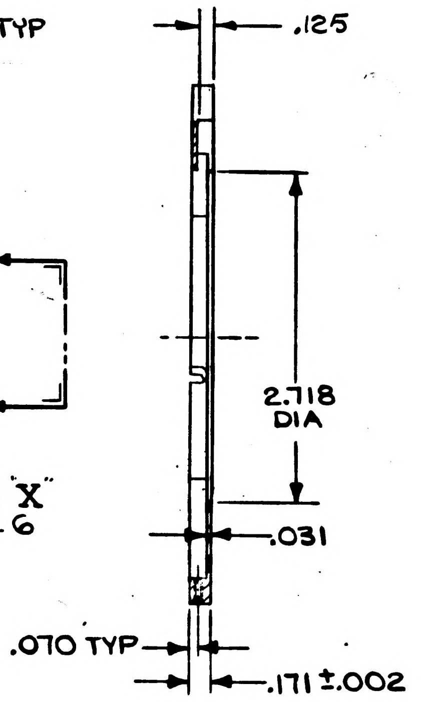


.124
.070
.187 DIA. CUTTER
.070
.070 R
.140
.217 REF
.031

PARTIAL VIEW B-B
TYP 4 PLACES
SCALE 2/1



A
2.812 TYP
1.000 R TYP ±.015
1.000 TYP
.250
.125
1.000 R TYP ±.015
45° TYP
10°
3.926 BSC
2.776 BSC
1.963
1.150 BSC
1.000 TYP
B
B
SURFACES "X" SEE NOTE 6
DR NO. 41 (.096) THRU 8 HOLES
⊕ .010 DIA
10°
1.150 BSC
1.963 BSC
2.776 BSC
DR 3/64 (.0469) THRU 0-80 NF-3B THRU 2 HOLES
3.926 BSC
32
4.435 DIA
A



.125
2.718 DIA
.031
.070 TYP
.171 ±.002

SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011563	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-355 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910510

DRAWN DATE 4-7-64
CHECKED 4/1/64
APPROVAL G. Rechtmann 6/13/64
APPROVAL E. Mangg 6/15/64
NASA APPROVAL
MIT APPROVAL 4/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE,
LAMP MOUNTING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011334
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

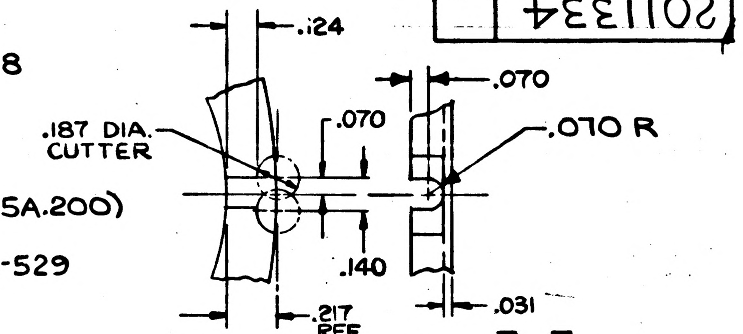
2011334 A

2011334

REVISIONS TORR10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

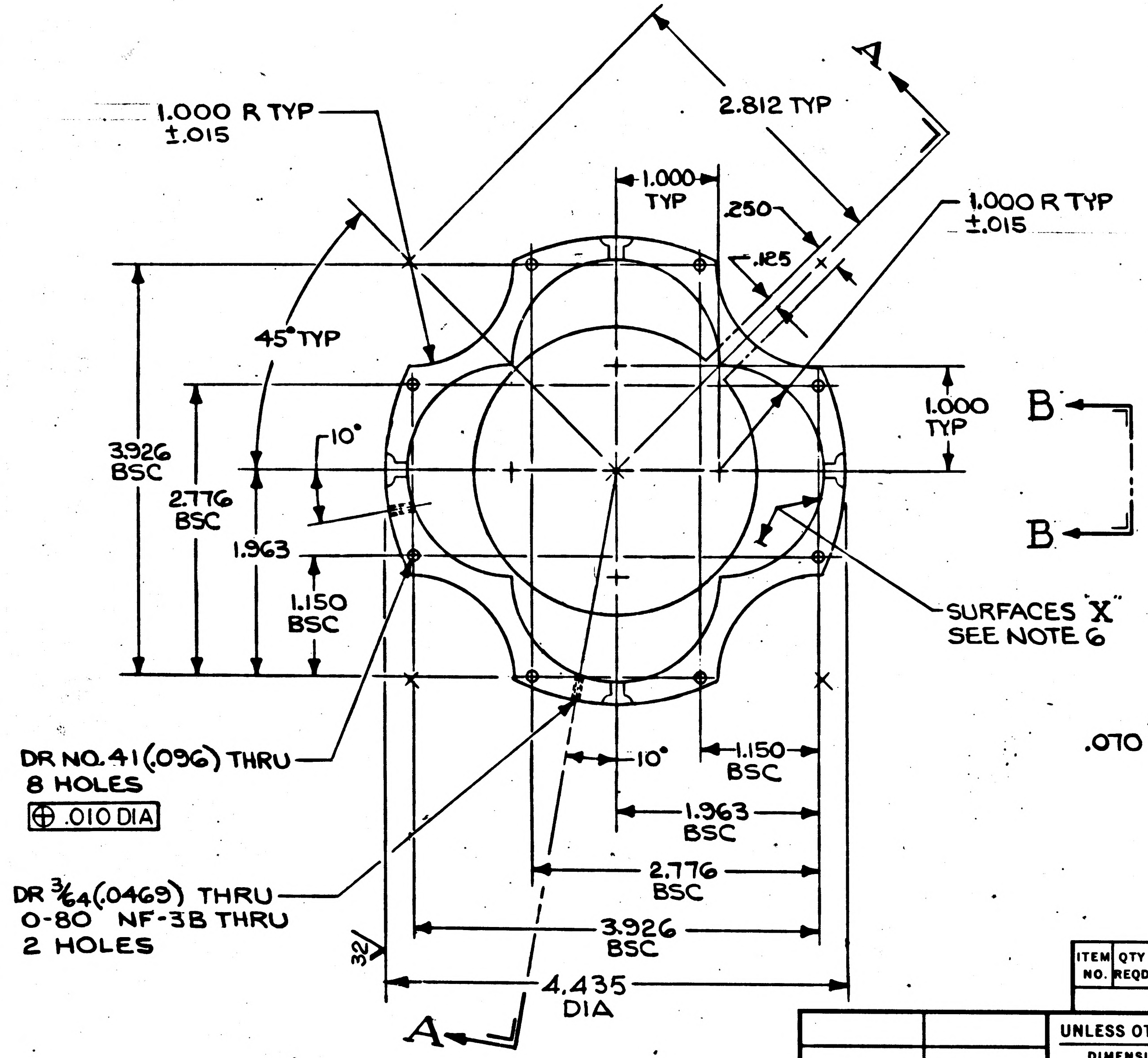
NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63/ FINISH ALL OVER
   - b. ✓BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4. REMOVE BURRS IN ACCORD WITH ND1002079
5. FINISH: ANODIZE IN ACCORD WITH MIL-A-8625 TYPE II (KPS.1005A.200)
6. PAINT SURFACES "X" WITH PRIMER PER MIL-P-8585 APPLY SEMI-GLOSS WHITE ENAMEL PER FED. SPEC TT-E-529 COLOR NUMBER 27875 PER FED.-STD-595

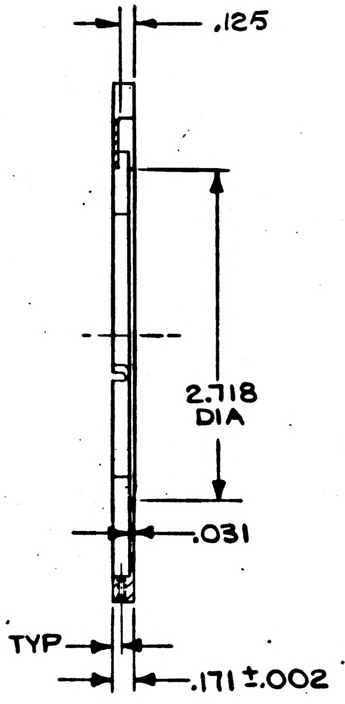


.124
.070
.187 DIA. CUTTER
.070
.070 R
.140
.217 REF
.031

PARTIAL VIEW B-B
TYP 4 PLACES
SCALE 2/1



A
2.812 TYP
1.000 R TYP ±.015
1.000 TYP
.250
.125
1.000 R TYP ±.015
45° TYP
10°
3.926 BSC
2.776 BSC
1.963
1.150 BSC
1.000 TYP
B
B
SURFACES "X" SEE NOTE 6
DR NO. 41 (.096) THRU 8 HOLES
⊕ .010 DIA
10°
1.150 BSC
1.963 BSC
2.776 BSC
3.926 BSC
DR 3/64 (.0469) THRU 0-80 NF-3B THRU 2 HOLES
32/
4.435 DIA
A



.125
2.718 DIA
.031
.070 TYP
.171 ±.002

SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011563	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-355 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910510

DRAWN J. Schuller DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/13/64
APPROVAL E. Mongo 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE,
LAMP MOUNTING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011334
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011334

MASTER

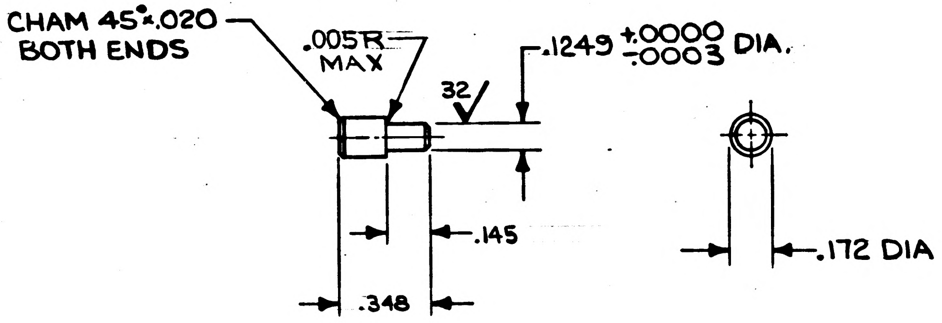
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A	2011339

REVISIONS TDRR 09890			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO. 15353	4/65	UK

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012386	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 53386910010

DRAWN J. Schuller DATE 4-9-64
CHECKED J. SULLIVAN 5-28-64
APPROVAL 5-29-64
APPROVAL E. Munyo 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PIN, SHOULDER

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011339

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

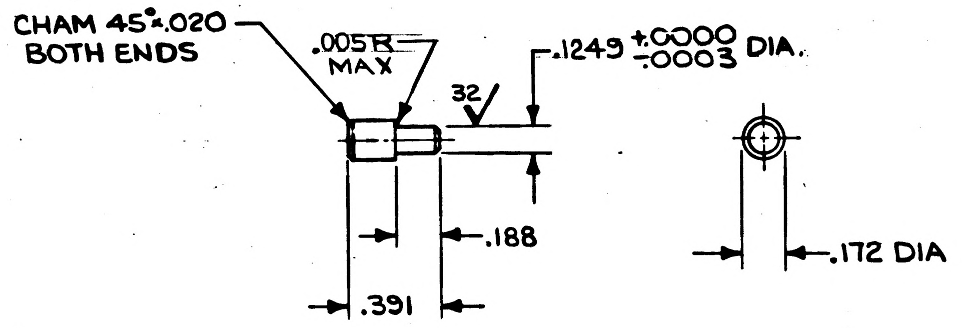
E-183

2011339

REVISIONS TDRR 09890

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011340	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 53386910010

DRAWN J. Schiller DATE 4-9-64
CHECKED J. SULLIVAN 5-28-64
APPROVAL 5-29-64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PIN, SHOULDER

CODE IDENT NO. SIZE B NASA NUMBER 2011339

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

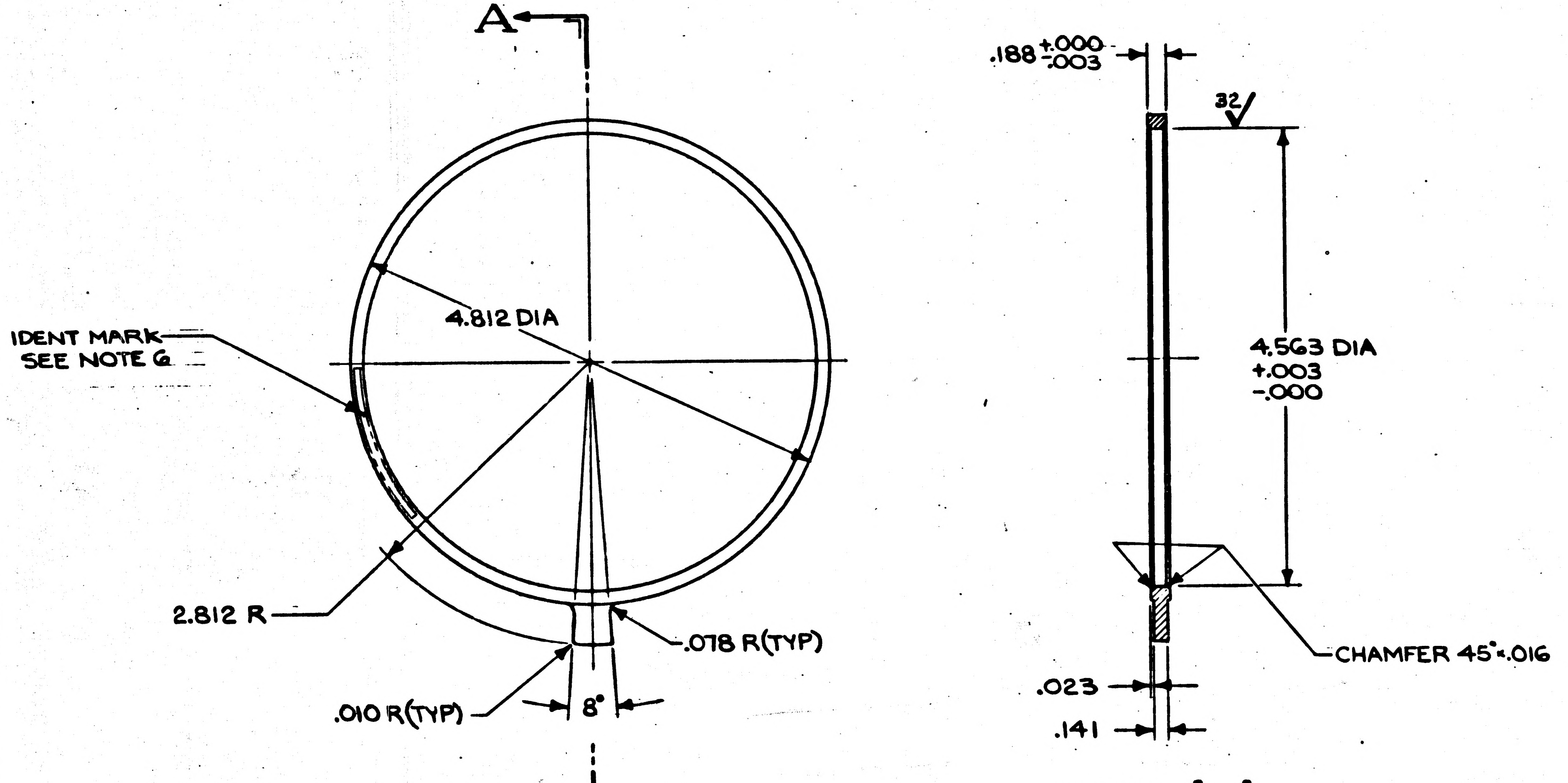
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011342

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND1002078
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
6. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORD WITH ND1002019.



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011890 / NEXT ASSY	2011000 / USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ±0°30' DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 57386910570	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C, COND A	DRAWN DATE 4-8-64 CHECKED 6/3/64 APPROVAL 6/5/64 APPROVAL E. Dhmp 6-5-64	TITLE RING, LIMIT STOP
		CONTRACT	NASA APPROVAL MIT APPROVAL W 9 June 64	CODE IDENT NO. — SIZE C — NASA NUMBER 2011342
				SCALE 1/1 — WEIGHT CALC ACTUAL — SHEET 1 OF 1

MASTER

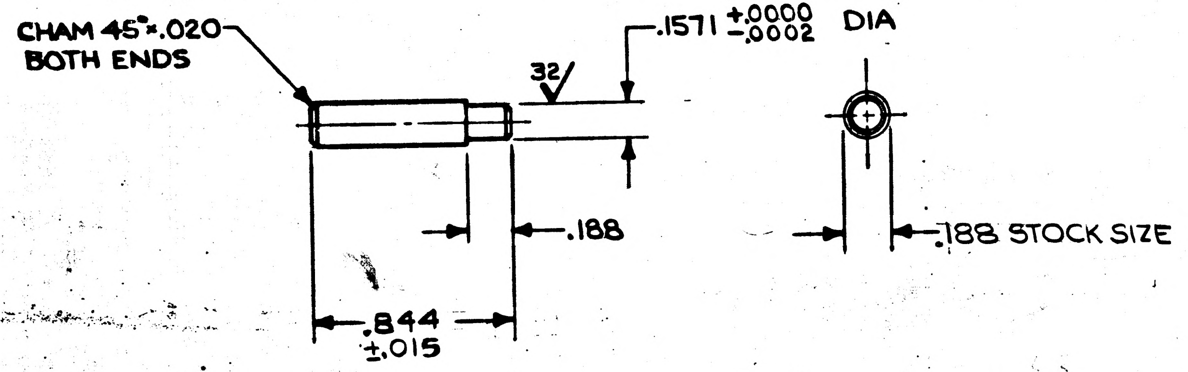
E-194

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

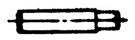
2011345.

REVISIONS		10048.	
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 (TABLE V-A FINISH NO.541 (KPS-10051.200)



MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011897	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 53386910030

DRAWN E. DRAPALA DATE 4-8-64
CHECKED I. SULLIVAN 6-1-64
APPROVAL 6/5/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PIN, SHOULDER

CODE IDENT NO.
SIZE B
NASA NUMBER 2011345
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

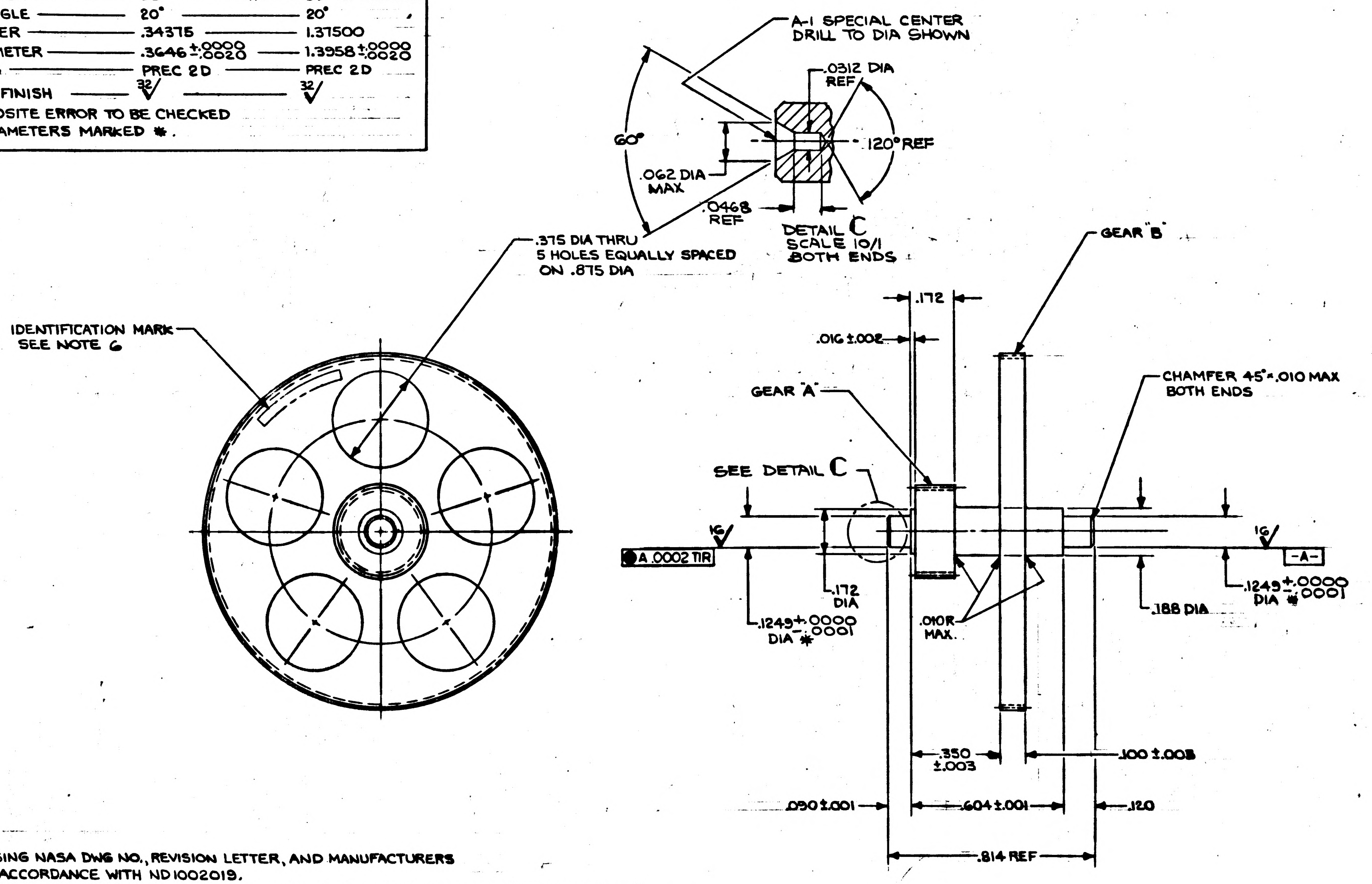
2011346

REVISIONS TDLR 10690				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

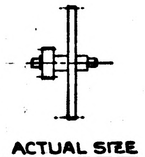
	GEAR "A"	GEAR "B"
NO. OF TEETH	33	132
DIAMETRAL PITCH	96	96
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.34375	1.37500
OUTSIDE DIAMETER	$.3646^{+.0000}_{-.0020}$	$1.3958^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D	PREC 2D
GEAR TEETH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED ✱.


A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF
DETAIL C
SCALE 10/1
BOTH ENDS
.375 DIA THRU
5 HOLES EQUALLY SPACED
ON .875 DIA
IDENTIFICATION MARK
SEE NOTE 6
GEAR "B"
.172
.016 ±.002
GEAR "A"
CHAMFER 45° × .010 MAX
BOTH ENDS
SEE DETAIL C
16
A .0002 TIR
-A-
.172 DIA
.1249 +.0000 -.0001 DIA ✱
.010R MAX.
.188 DIA
.1249 +.0000 -.0001 DIA ✱
.350 ±.003
.100 ±.003
.090 ±.001
.604 ±.001
.120
.814 REF

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011796	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± 1/64; DECIMALS ± .005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910020
DRAWN DATE 12-19-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL E. Mhoup 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(33T-96P) (132T-96P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011346
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011347 A

REVISIONS				10420
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 17713	4/2/65	wk

SPUR GEAR DATA

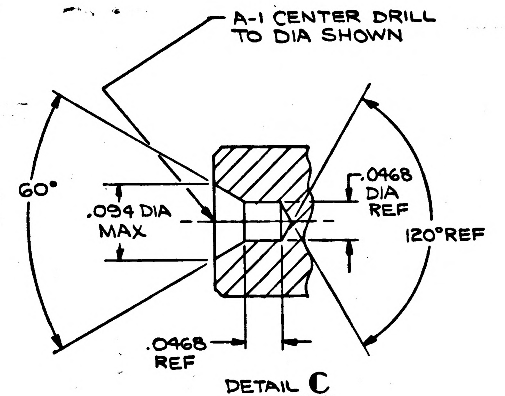
	GEAR A	GEAR B
NO. OF TEETH	21	130
DIAMETRAL PITCH	96	96
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.21875	1.35416
OUTSIDE DIAMETER	.2396 +.0000 −.0020	1.3750 +.0000 −.0020
AGMA CLASS	PREC 2D	PREC 2D
TOOTH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *

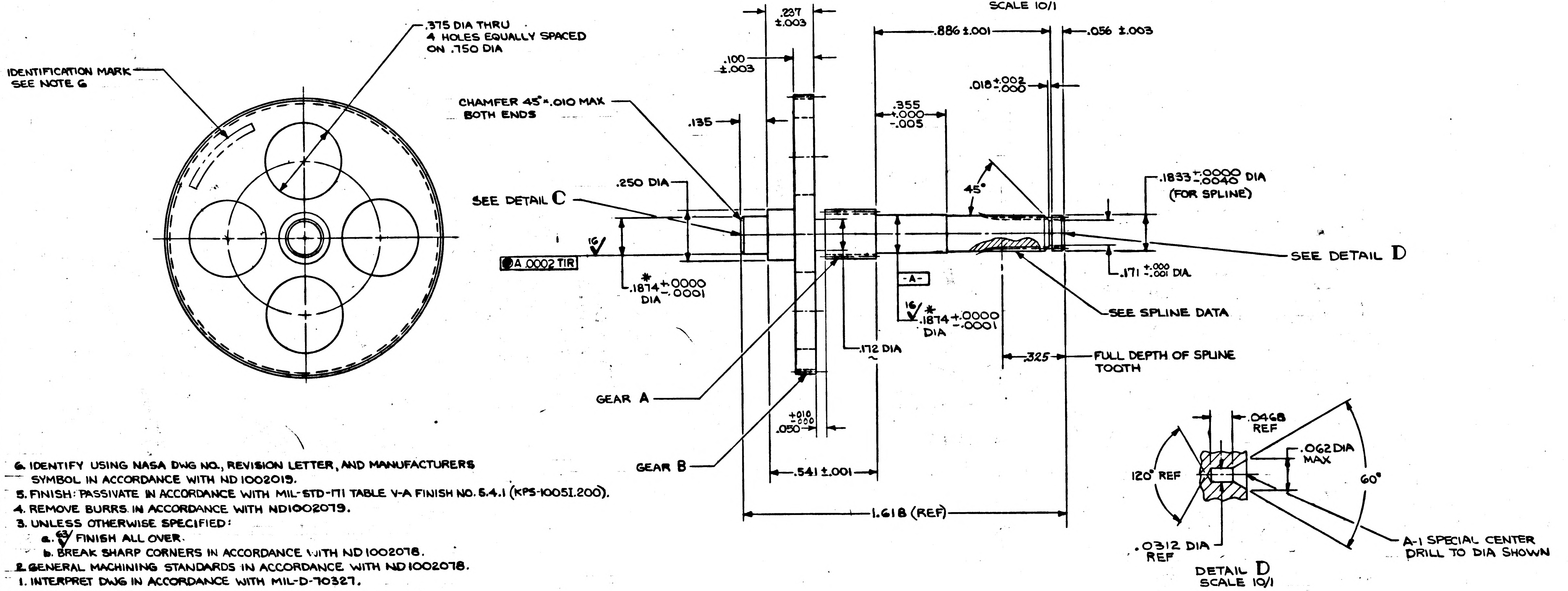
EXTERNAL SPLINE DATA (INVOLUTE)

AM. STD FLAT ROOT SIDE FIT - CLASS 2

NO. OF TEETH	8
PITCH	48/96
PRESSURE ANGLE	30°
PITCH DIAMETER (REF)	.1667
MAJOR DIAMETER	.1833 +.0000 −.0040
MINOR DIAMETER	.1417 +.0000 −.0040
CIRCULAR TOOTH THICKNESS	.0327 +.0000 −.0020
TOOTH FINISH	32√


A-1 CENTER DRILL TO DIA SHOWN
60°
.094 DIA MAX
.0468 DIA REF
120°REF
.0468 REF

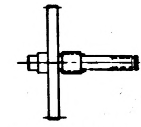
DETAIL C
SCALE 10/1


.375 DIA THRU 4 HOLES EQUALLY SPACED ON .750 DIA
IDENTIFICATION MARK SEE NOTE 6
.237 ±.003
.100 ±.003
.886 ±.001
.056 ±.003
.018 +.002 −.000
CHAMFER 45°×.010 MAX BOTH ENDS
.135
.355 +.000 −.005
45°
.250 DIA
.1833 +.0000 −.0040 DIA (FOR SPLINE)
SEE DETAIL C
16√
A .0002 TIR
.1874* +.0000 −.0001 DIA
-A-
16√ .1874* +.0000 −.0001 DIA
.171 +.000 −.001 DIA
SEE DETAIL D
SEE SPLINE DATA
.172 DIA
.325
FULL DEPTH OF SPLINE TOOTH
GEAR A
.050 +.010 −.000
GEAR B
.541 ±.001
1.618 (REF)
.0468 REF
.062 DIA MAX
120° REF
60°
.0312 DIA REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN

DETAIL D
SCALE 10/1

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/64	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910030

DRAWN DATE 12-20-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL E. Thomp 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(21T-96P) (130T-96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011347

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011347

REVISIONS			0420	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

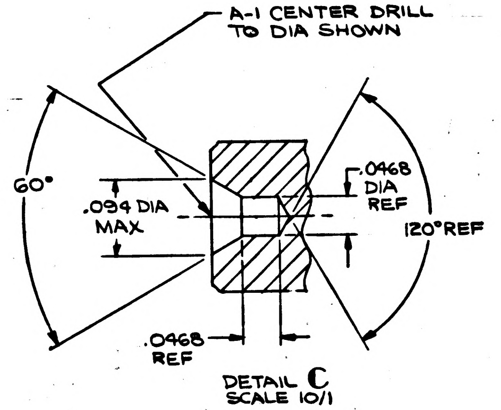
	GEAR A	GEAR B
NO. OF TEETH	21	130
DIAMETRAL PITCH	96	96
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.21875	1.35416
OUTSIDE DIAMETER	$.2396^{+.0000}_{-.0020}$	$1.3750^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D	PREC 2D
TOOTH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *

EXTERNAL SPLINE DATA (INVOLUTE)

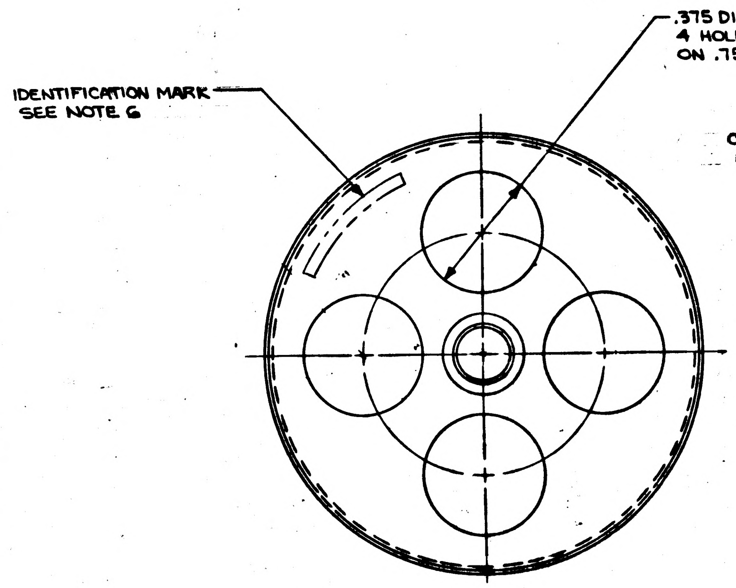
AM. STD FLAT ROOT SIDE FIT - CLASS 2

NO. OF TEETH	8
PITCH	48/96
PRESSURE ANGLE	30°
PITCH DIAMETER (REF)	.1667
MAJOR DIAMETER	$.1833^{+.0000}_{-.0040}$
MINOR DIAMETER	$.1417^{+.0000}_{-.0040}$
CIRCULAR TOOTH THICKNESS	$.0327^{+.0000}_{-.0020}$
TOOTH FINISH	32√

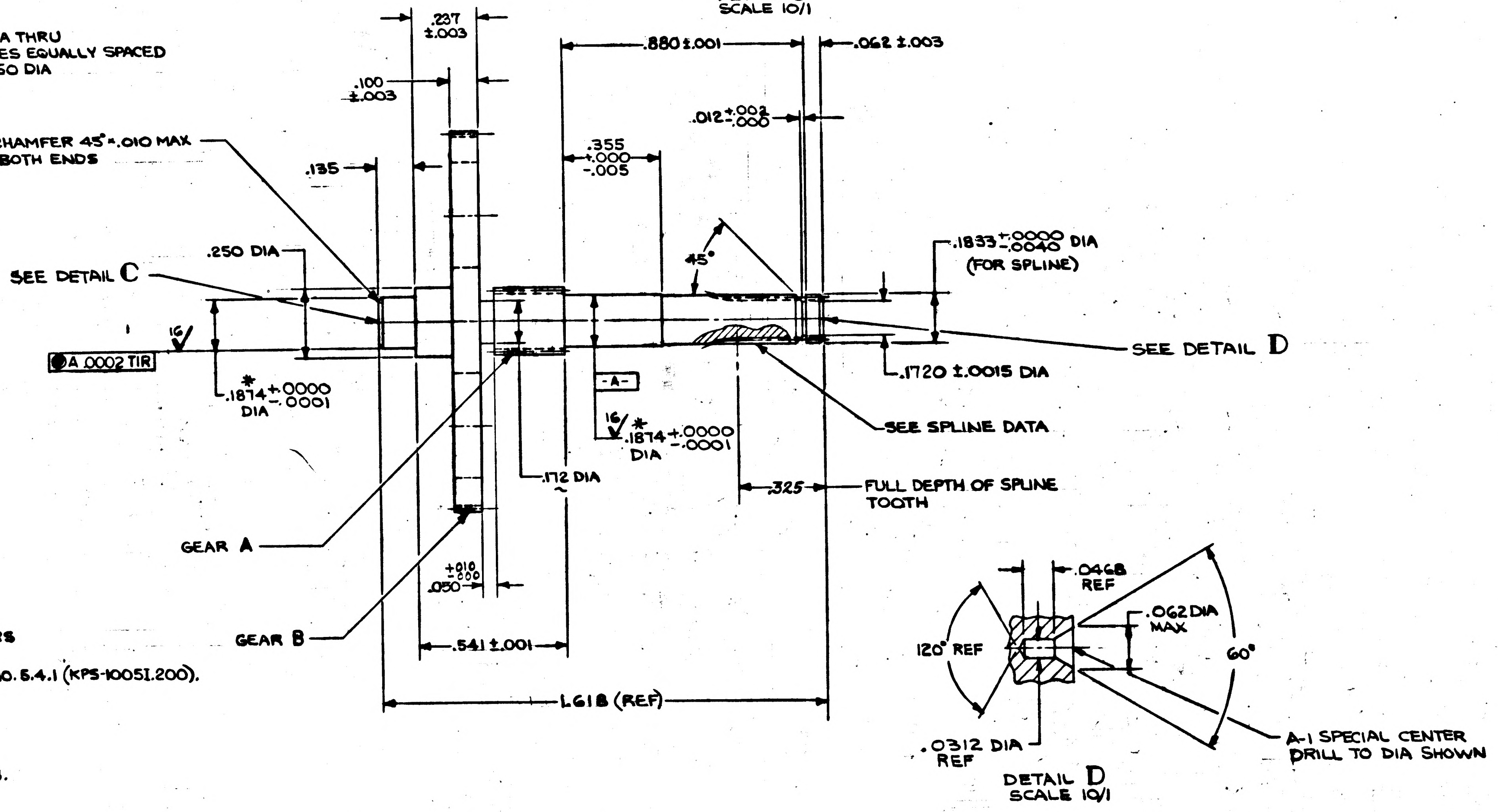


A-1 CENTER DRILL TO DIA SHOWN
60°
.094 DIA MAX
.0468 DIA REF
120° REF
.0468 REF

DETAIL C
SCALE 10/1



IDENTIFICATION MARK SEE NOTE 6
.375 DIA THRU 4 HOLES EQUALLY SPACED ON .750 DIA

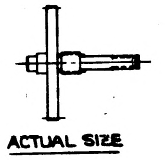


.237 ±.003
.100 ±.003
.880 ±.001
.062 ±.003
$.012^{+.002}_{-.000}$
CHAMFER 45° × .010 MAX BOTH ENDS
.135
$.355^{+.000}_{-.005}$
45°
$.1833^{+.0000}_{-.0040}$ DIA (FOR SPLINE)
.250 DIA
SEE DETAIL C
16√
A .0002 TIR
$^{*}.1874^{+.0000}_{-.0001}$ DIA
-A-
16√
$^{*}.1874^{+.0000}_{-.0001}$ DIA
.1720 ±.0015 DIA
SEE DETAIL D
SEE SPLINE DATA
.172 DIA
.325
FULL DEPTH OF SPLINE TOOTH
GEAR A
GEAR B
$.050^{+.010}_{-.000}$
.541 ±.001
1.618 (REF)
.0468 REF
.062 DIA MAX
120° REF
60°
.0312 DIA REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN

DETAIL D
SCALE 10/1

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/64	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910030
DRAWN J. Sa.o.oo DATE 12-30-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL E. Thomp 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(21T-96P) (130T-96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011347

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

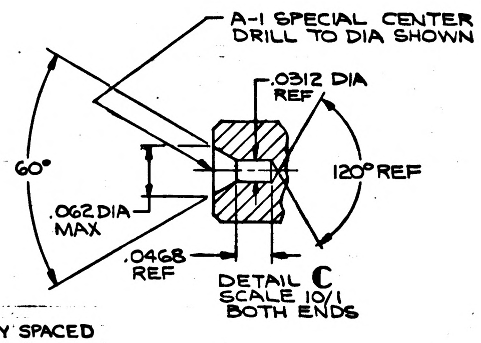
2011348

REVISIONS TDRR 0680				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

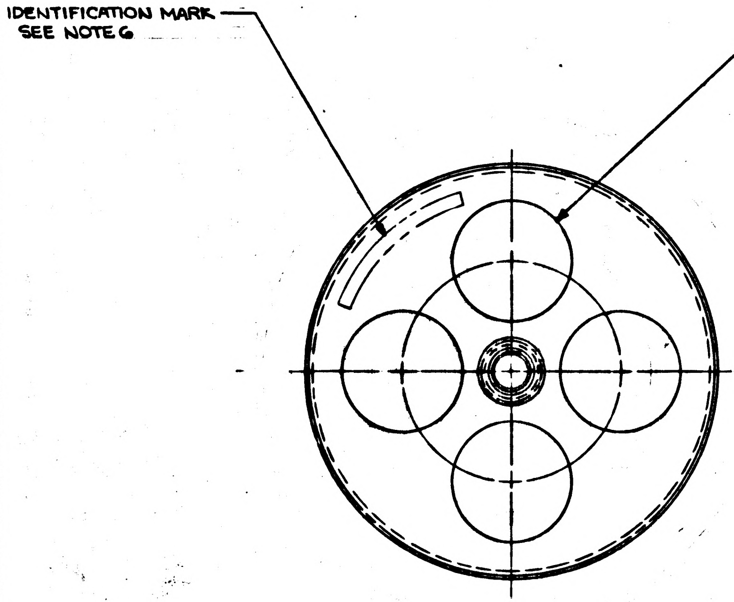
SPUR GEAR DATA

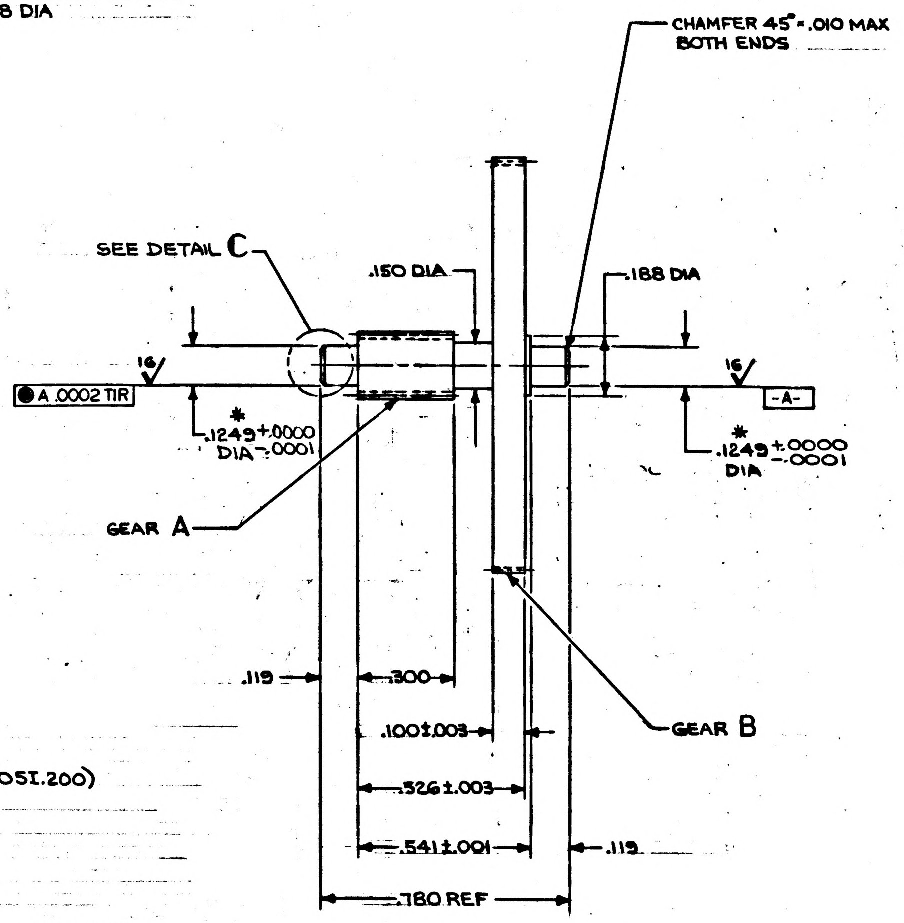
	GEAR A	GEAR B
NO. OF TEETH	18	153
DIAMETRAL PITCH	96	120
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.18750	1.27500
OUTSIDE DIAMETER	$.2083^{+.0000}_{-.0020}$	$1.2917^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D	PREC 2D
TOOTH FINISH	32√	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED ✱


A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF

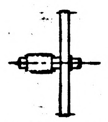
DETAIL C
SCALE 10/1
BOTH ENDS


IDENTIFICATION MARK SEE NOTE 6
.375 DIA THRU 4 HOLES EQUALLY SPACED ON .688 DIA


CHAMFER 45° × .010 MAX BOTH ENDS
SEE DETAIL C
.150 DIA
.188 DIA
16√
16√
● A .0002 TIR
-A-
✱ .1249 +.0000 -.0001 DIA
✱ .1249 +.0000 -.0001 DIA
GEAR A
GEAR B
.119
.300
.100±.003
.526±.003
.541±.001
.119
.780 REF

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.
5. FINISH ; PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
3. UNLESS OTHERWISE SPECIFIED :
   - a. 63√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± 1/64	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910040

DRAWN J. Sebb DATE 12-30-63
CHECKED T. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL E. Thorup 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
(18T-96P) (153T-120P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011348
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

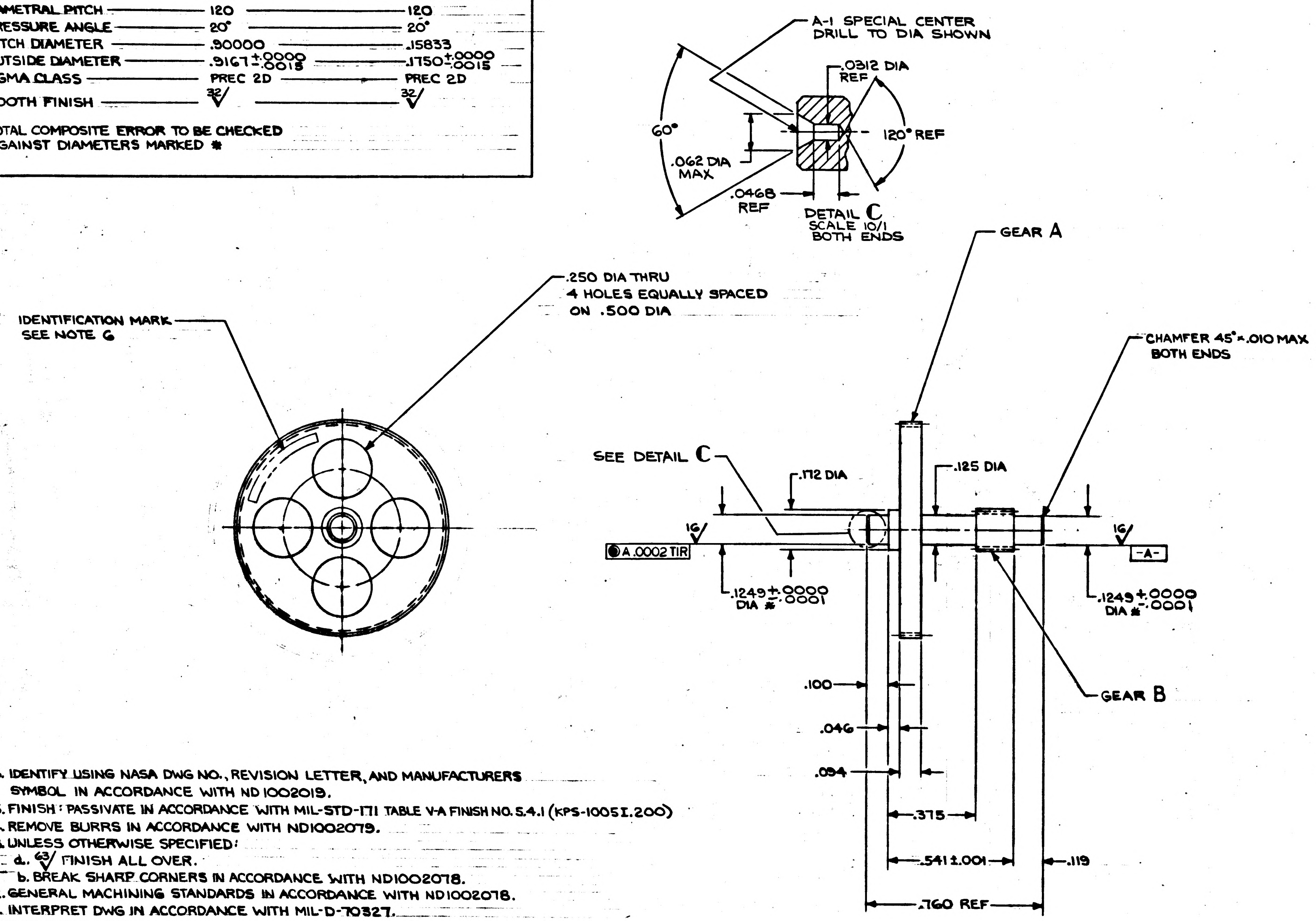
2011349

REVISIONS TDA 10680				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

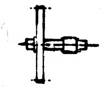
	GEAR A	GEAR B
NO. OF TEETH	108	19
DIAMETRAL PITCH	120	120
PRESSURE ANGLE	20°	20°
PITCH DIAMETER	.90000	.15833
OUTSIDE DIAMETER	$.9167^{+.0000}_{-.0015}$	$.1750^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D	PREC 2D
TOOTH FINISH	$\overset{32}{\surd}$	$\overset{32}{\surd}$

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED *


A-1 SPECIAL CENTER DRILL TO DIA SHOWN
.0312 DIA REF
60°
120° REF
.062 DIA MAX
.0468 REF
DETAIL C
SCALE 10/1
BOTH ENDS
GEAR A
.250 DIA THRU
4 HOLES EQUALLY SPACED
ON .500 DIA
IDENTIFICATION MARK
SEE NOTE 6
CHAMFER 45° × .010 MAX
BOTH ENDS
SEE DETAIL C
.172 DIA
.125 DIA
16
A .0002 TIR
-A-
.1249 +.0000 -.0001 DIA *
.1249 +.0000 -.0001 DIA *
GEAR B
.100
.046
.094
.375
.541±.001
.119
.760 REF

6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\surd}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± 1/64 DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc 28-32)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910050
DRAWN
CHECKED T. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 6/29/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

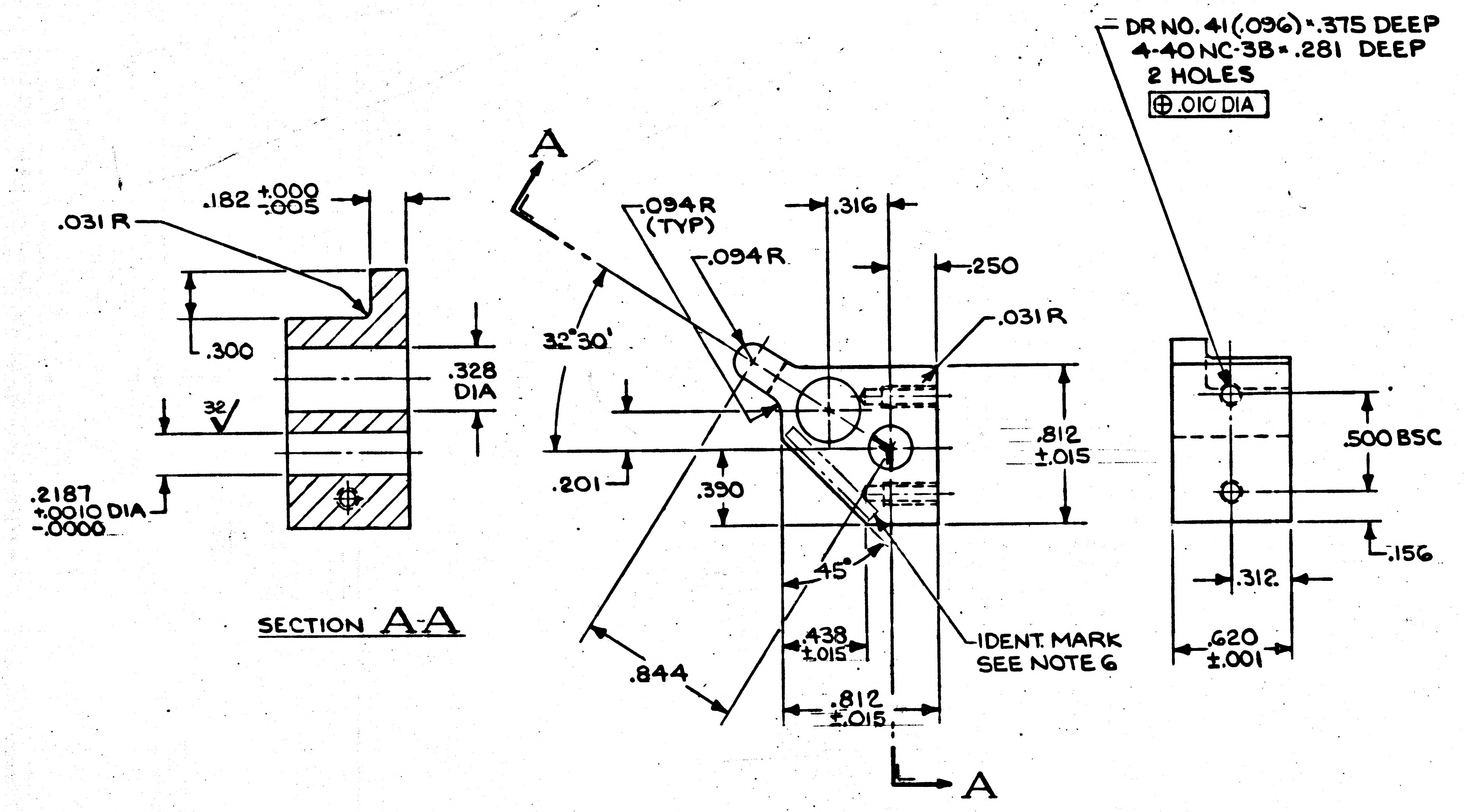
TITLE
GEARSHAFT
(108T-120P) (19T-120P)

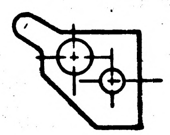
CODE IDENT NO. SIZE D NASA NUMBER 2011349
SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011350

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORD. WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS 1005I.200)
6. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.


DR NO. 41 (.096) ▾ .375 DEEP
4-40 NC-3B ▾ .281 DEEP
2 HOLES
⊕ .010 DIA
A
.031 R
.182 +.000 −.005
.300
.328 DIA
32/
.2187 +.0010 −.0000 DIA
SECTION A-A
.094 R (TYP)
.094 R
.316
.250
.031 R
32°30'
.201
.390
.812 ±.015
45°
.438 ±.015
.844
.812 ±.015
IDENT. MARK SEE NOTE 6
A
.500 BSC
.156
.312
.620 ±.001


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011714	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910550

DRAWN DATE 4-8-64
CHECKED J. SULLIVAN 5-29-64
APPROVAL 5-29-64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, SPRING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011350

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

E-184

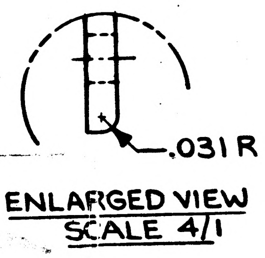
INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

2011352

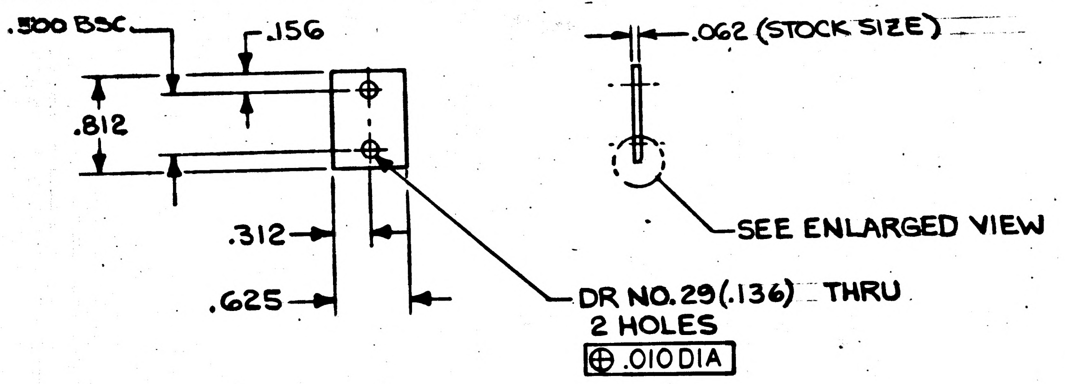
SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 10048

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. ✓ BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-5I.200)
6. IDENTIFY USING NASA DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019, (BAGGING)



ENLARGED VIEW
SCALE 4/1



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011714	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-766 CLASS 302-FIN #2B-COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 56386910240

DRAWN DATE 4-8-64
CHECKED J. SULLIVAN 5-29-64
APPROVAL 6/5/64
APPROVAL 6/5/64
NASA APPROVAL
MIT APPROVAL 9 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE,
SPRING RETAINING

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011352

SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

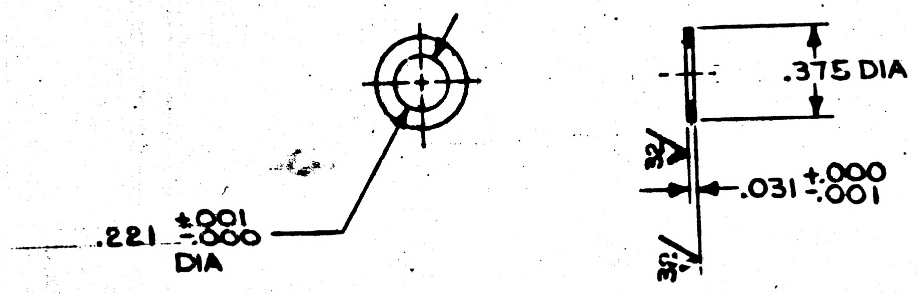
INCHES
0 1 2

2011353

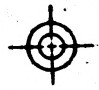
REVISIONS 10048,			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2. (KPS-1005I.200).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-766 CLASS 302 FIN 2B - COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

K.I.C. PN 56386910260

DRAWN J. Schiller DATE 4-8-64
CHECKED J. SULLIVAN 5-20-64
APPROVAL 5-21-64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER,
SPRING HOLDER

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011353

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

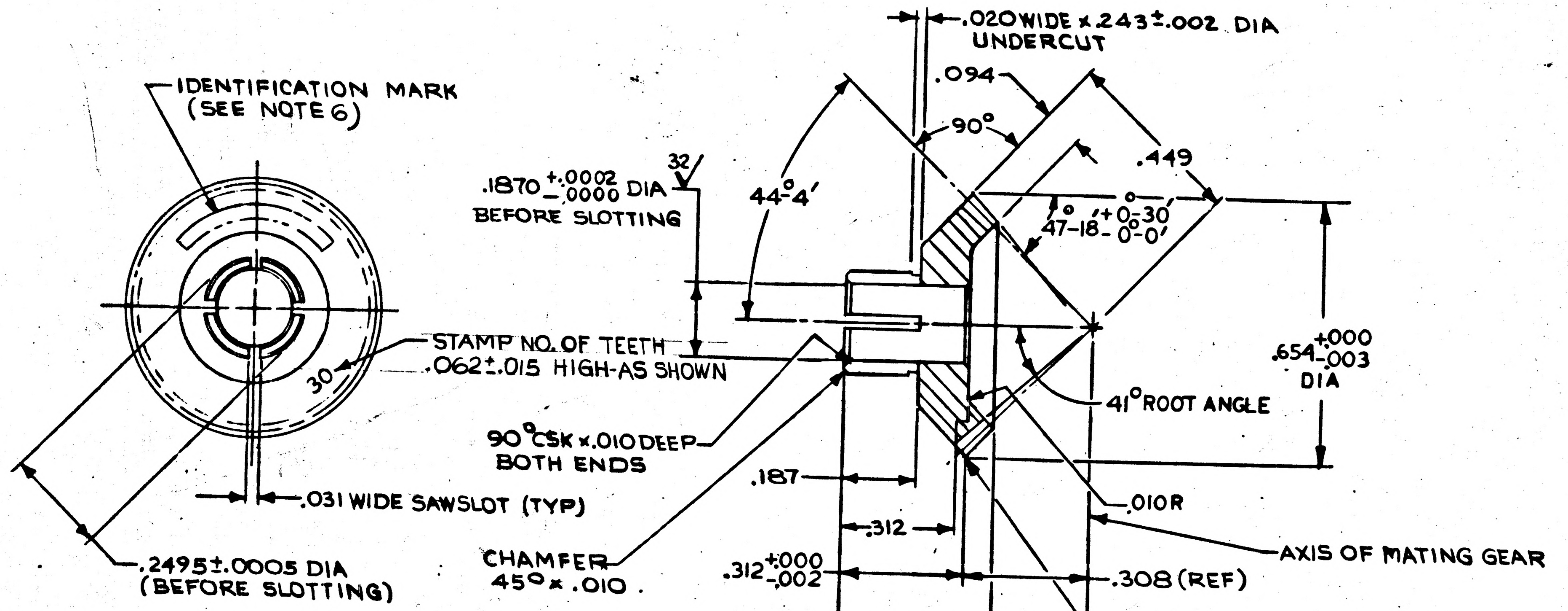
INCHES
0 1 2

2011356

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

BEVEL GEAR DATA (GLEASON SYSTEM STRAIGHT BEVEL)

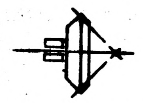
NO. OF TEETH	30
PITCH DIA (THEORETICAL)	.6250
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
SHAFT ANGLE	90°
ADDENDUM (THEORETICAL)	.021
WHOLE DEPTH	.047
CIRCULAR THICKNESS (THEORETICAL)	.032
MESHES WITH	2011357
NO OF TEETH IN MATING GEAR	31
GEAR TEETH FINISH	32√
AGMA CLASS	PREC. 2C


IDENTIFICATION MARK (SEE NOTE 6)
30
STAMP NO. OF TEETH .062±.015 HIGH-AS SHOWN
.031 WIDE SAWSLOT (TYP)
.2495±.0005 DIA (BEFORE SLOTTING)
.020 WIDE x .243±.002 DIA UNDERCUT
.094
90°
.449
44°4′
.1870 +.0002 -.0000 DIA BEFORE SLOTTING
32√
47°-18′ +0°-30′ -0°-0′
.654 +.000 -.003 DIA
41° ROOT ANGLE
90° CSK x .010 DEEP BOTH ENDS
.187
.010R
.312
CHAMFER 45° x .010
.312 +.000 -.002
.308 (REF)
AXIS OF MATING GEAR
.375 (REF)
.010R
.620

6. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1 (KPS 10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327

NOTES:

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±0°30′

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910150

DRAWN E. DRAPALA DATE 4-6-64
CHECKED J. SULLIVAN 5-6-64
APPROVAL [illegible] 5-25-64
APPROVAL E. Phoup 6-5-64
NASA APPROVAL
MIT APPROVAL [illegible] Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, BEVEL
(30T/48P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011356

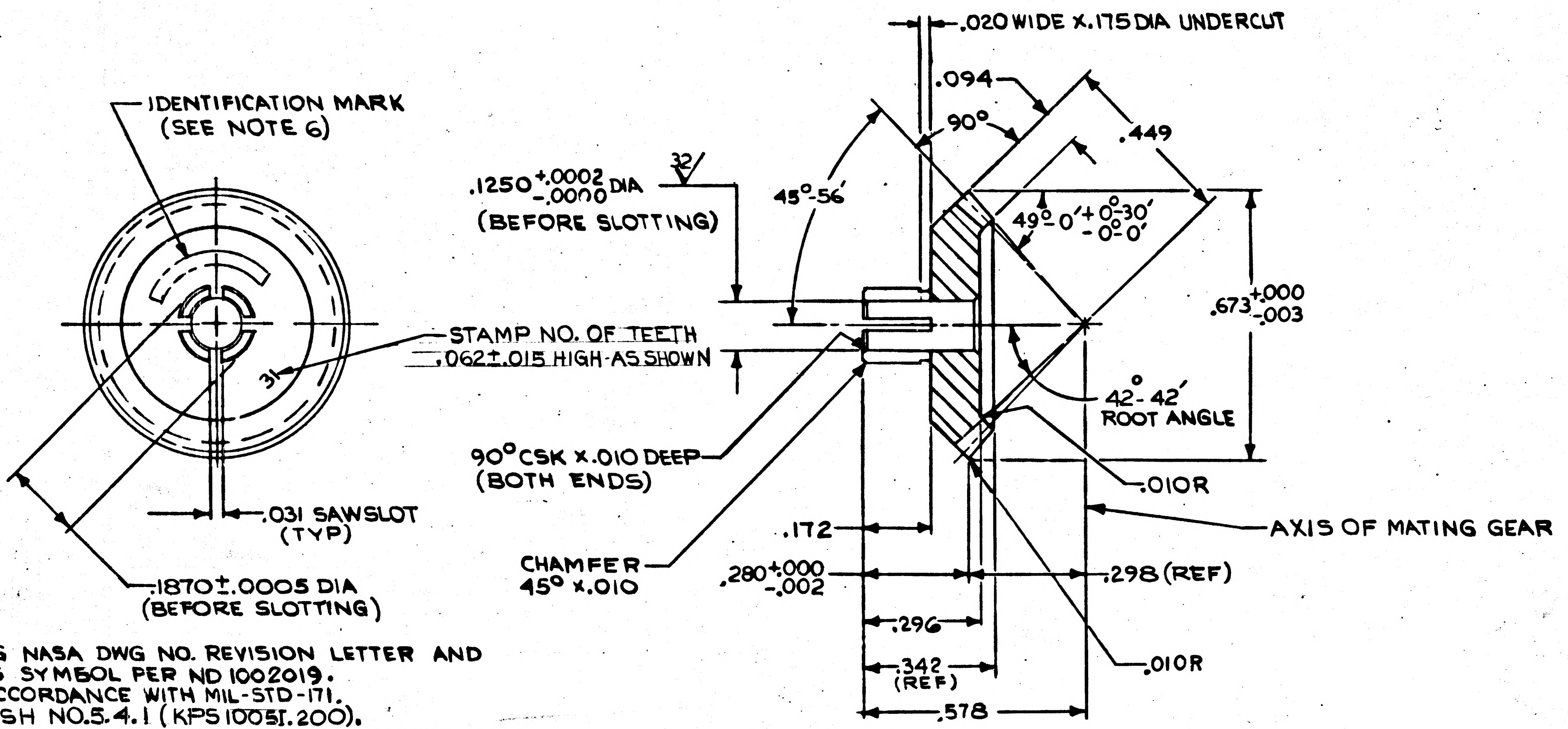
SCALE 4/1 WEIGHT CALC ACTUAL SHEET OF 1

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

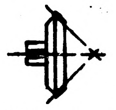
BEVEL GEAR DATA (GLEASON SYSTEM STRAIGHT BEVEL)

NO. OF TEETH	31
PITCH DIA (THEORETICAL)	.6458
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
SHAFT ANGLE	90°
ADDENDUM (THEORETICAL)	.020
WHOLE DEPTH	.047
CIRCULAR THICKNESS (THEORETICAL)	.032
MESHES WITH	2011356
NO OF TEETH IN MATING GEAR	30
GEAR TEETH FINISH	32✓
A.G.M.A. CLASS	PREC. 2C


IDENTIFICATION MARK (SEE NOTE 6)
31
STAMP NO. OF TEETH .062±.015 HIGH-AS SHOWN
.031 SAWSLOT (TYP)
.1870±.0005 DIA (BEFORE SLOTTING)
.020 WIDE X .175 DIA UNDERCUT
.094
90°
.449
45°-56'
.1250 +.0002 -.0000 DIA (BEFORE SLOTTING)
32
49°-0' +0°30' -0°-0'
.673 +.000 -.003
42°-42' ROOT ANGLE
90° CSK X .010 DEEP (BOTH ENDS)
.010R
AXIS OF MATING GEAR
.172
CHAMFER 45° X .010
.280 +.000 -.002
.298 (REF)
.296
.342 (REF)
.010R
.578

6. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171. TABLE V-A FINISH NO.5.4.1 (KPS 10051.200).
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63✓ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCOCORDANCE WITH ND 1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±0°30'

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 (Rc. 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
~~KIC~~ PN 33386910140

DRAWN E. DRAPALA DATE 4-6-64
CHECKED J. SULLIVAN 5-6-64
APPROVAL G. Rushmore 5-21-64
APPROVAL E. Thomp 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, BEVEL
(31T/48P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011357

SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011357

E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

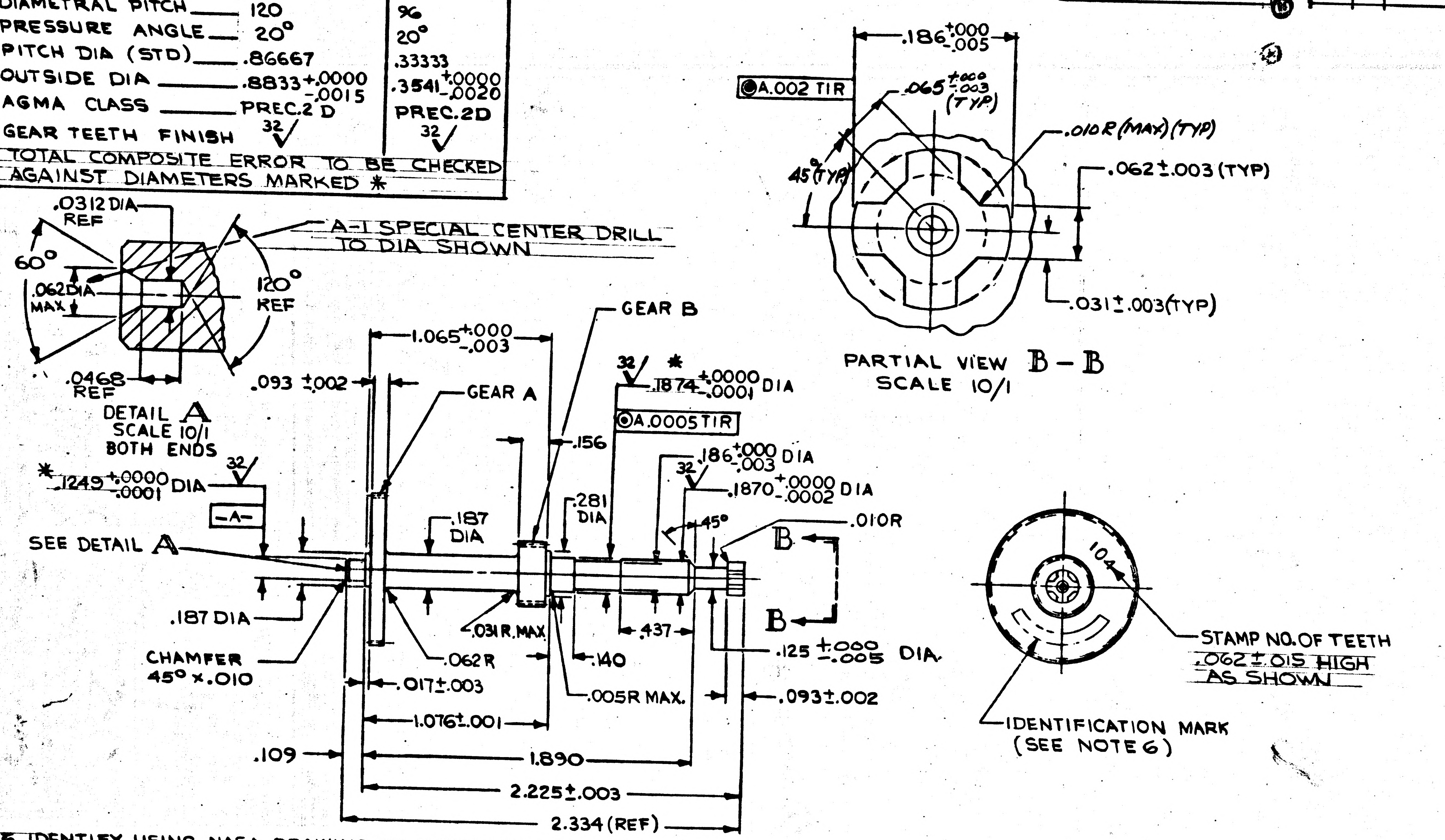
2011358

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

10048

SPUR GEAR DATA	A	B
NO. OF TEETH	104	32
DIAMETRAL PITCH	120	96
PRESSURE ANGLE	20°	20°
PITCH DIA (STD)	.86667	.33333
OUTSIDE DIA	.8833 +.0000 −.0015	.3541 +.0000 −.0020
AGMA CLASS	PREC.2 D	PREC.2D
GEAR TEETH FINISH	32√	32√

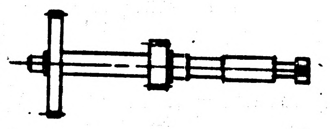
~~TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETERS MARKED~~ *


.0312 DIA REF
60°
.062 DIA MAX
.0468 REF
120° REF
A-1 SPECIAL CENTER DRILL TO DIA SHOWN
DETAIL A
SCALE 10/1
BOTH ENDS
.186 +.000 −.005
Ⓞ A.002 TIR
.065 +.000 −.003 (TYP)
45° (TYP)
.010R (MAX) (TYP)
.062±.003 (TYP)
.031±.003 (TYP)
PARTIAL VIEW B-B
SCALE 10/1
GEAR B
1.065 +.000 −.003
.093 ±.002
GEAR A
32√ *
.1874 +.0000 −.0001 DIA
Ⓞ A.0005 TIR
* .1249 +.0000 −.0001 DIA
32√
-A-
SEE DETAIL A
.187 DIA
.156
.281 DIA
.186 +.000 −.003 DIA
32√
.1870 +.0000 −.0002 DIA
45°
.010R
B
.187 DIA
.031R MAX
.437
B
.125 +.000 −.005 DIA
CHAMFER 45° × .010
.062R
.140
.017±.003
.005R MAX.
.093±.002
1.076±.001
.109
1.890
2.225±.003
2.334 (REF)
104
STAMP NO. OF TEETH .062±.015 HIGH AS SHOWN
IDENTIFICATION MARK (SEE NOTE 6)

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS 10051-200).
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011702	2011000
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763, CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910110

DRAWN E. DRAPALA DATE 4-2-64
CHECKED J. SULLIVAN 4-20-64
APPROVAL E. Ruchman 5-29-64
APPROVAL E. Thorup 6-5-64
NASA APPROVAL
MIT APPROVAL W. Coffer 9 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEARSHAFT
104T/120P — 32T/96P

CODE IDENT NO. | SIZE C | NASA NUMBER 2011358

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

E-154

52V510

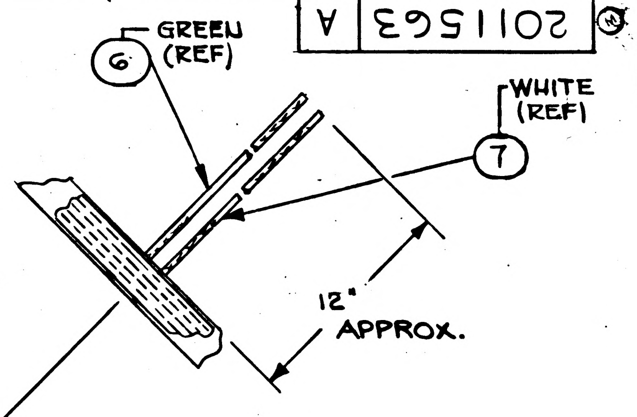
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011563 A

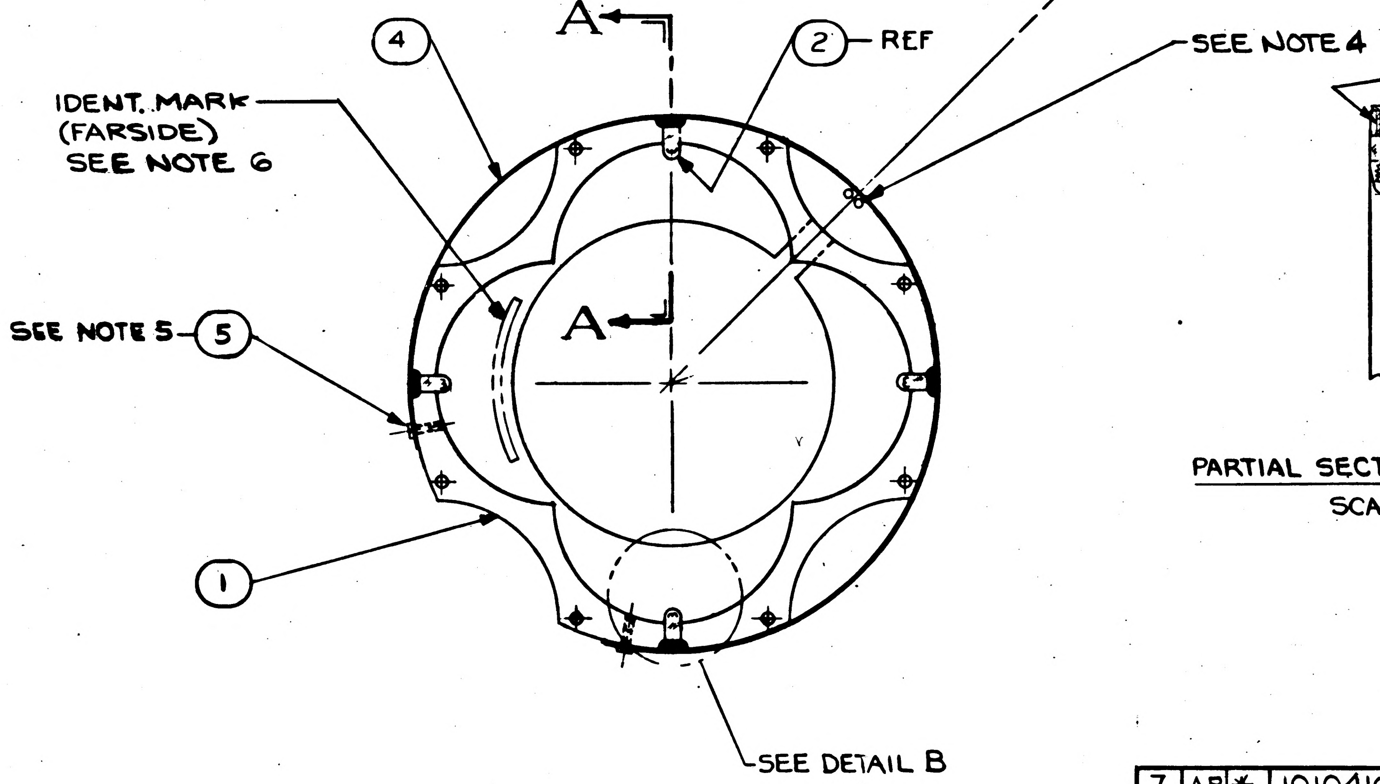
SYM	ZONE	REVISIONS 10952 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15427	1/7/65	WK

NOTES:

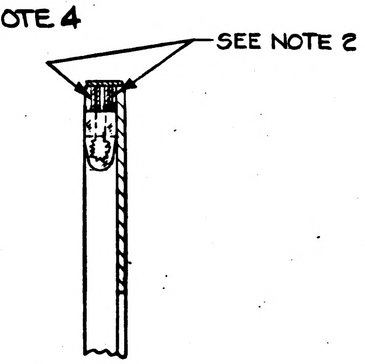
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSULATE LEADS OF ITEM 2 BY PLASTIC COATING IN ACCORDANCE WITH ND1002035 (USING YELLOW PIGMENT). SECURE ITEM 2 TO ITEM 1 (AS SHOWN IN DETAIL B) USING BONDING AGENT IN ACCORDANCE WITH ND1002004.
3. SEE WIRING SCHEMATIC NASA DWG NO. 2012391.
4. SOLDER PER MSFC-PROC 158 PROTECTING ASSEMBLY PER KES-15 W.1C (3.1).
5. VIBRATION PROOF ITEM 5 IN ACCORDANCE WITH MIL-S-22473 GRADE (H). PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



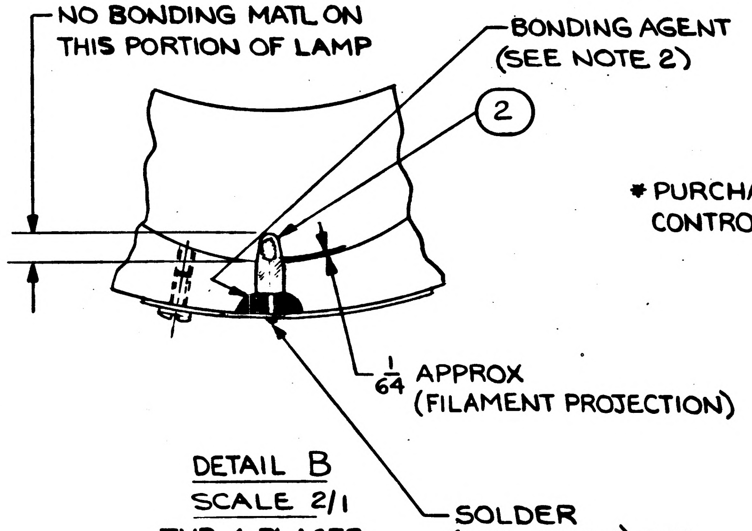
6
GREEN (REF)
WHITE (REF)
7
12" APPROX.



4
A
2
REF
IDENT. MARK (FARSIDE) SEE NOTE 6
SEE NOTE 4
SEE NOTE 5
5
A
1
SEE DETAIL B



PARTIAL SECTION A-A
SCALE 2/1



NO BONDING MATL ON THIS PORTION OF LAMP
BONDING AGENT (SEE NOTE 2)
2
$\frac{1}{64}$ APPROX (FILAMENT PROJECTION)
SOLDER (SEE NOTE 4) TYP

DETAIL B
SCALE 2/1
TYP 4 PLACES

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	AR	*	1010416-20	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-16	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	2		2011904	45386910010		SCREW, MINIATURE			
4	1	*	1011903	—		FLEXPRINT			
3									
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011334	57386910510		PLATE, LAMP MOUNTING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000.

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910420
DRAWN J. Schuller DATE 4-7-64
CHECKED C. LEINZ (CRZ) 7-13-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Thomas 7/13/64
NASA APPROVAL W.J. [illegible] 7-14-64
MIT APPROVAL W. Kupfer 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP AND PLATE,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011563
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

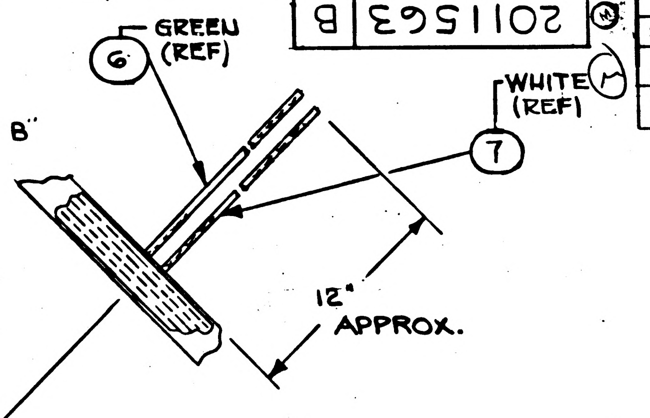
2011563 B

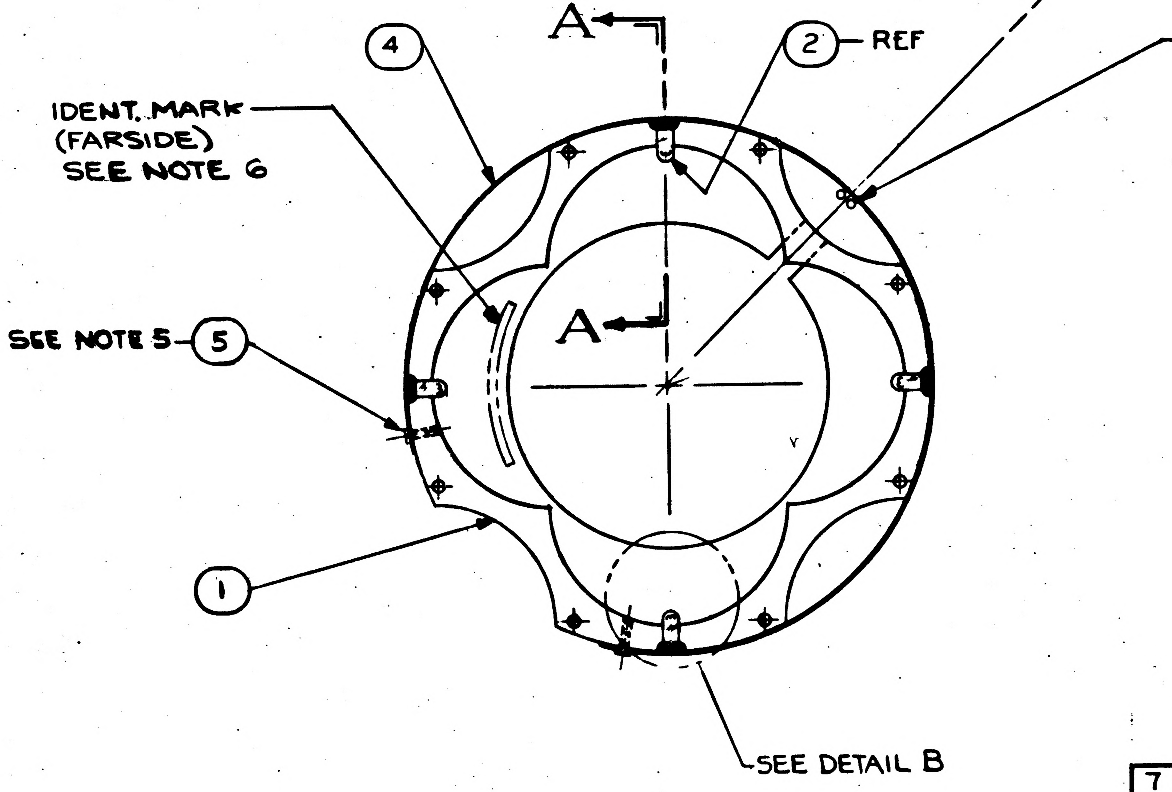
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15427	1/7/65	WK
B		REVISED PER TDRR 17153	4/2/65	WK.

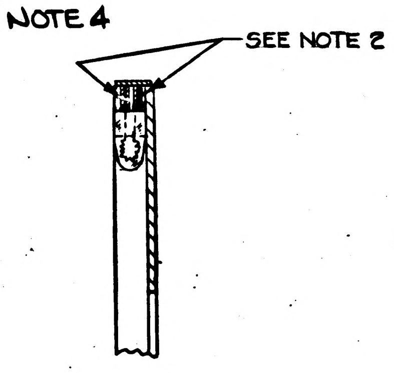
REVISIONS 10952

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSULATE LEADS OF ITEM 2 BY PLASTIC COATING IN ACCORDANCE WITH ND1002035 (USING YELLOW PIGMENT). SECURE ITEM 2 TO IT 1 (AS SHOWN IN DETAIL B) USING POTTING COMPOUND IN ACCORDANCE WITH ND 1002240, METHOD "B"
3. SEE WIRING SCHEMATIC NASA DWG NO. 2012391.
4. SOLDER PER ND1002071
5. VIBRATION PROOF ITEM 5 IN ACCORDANCE WITH MIL-S-22473 GRADE (H). PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

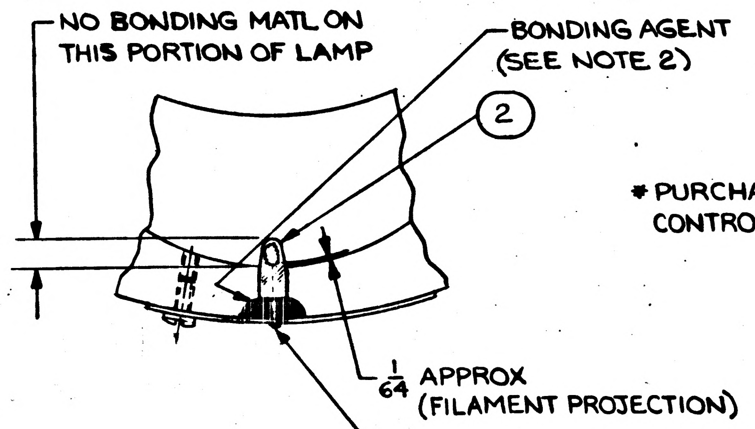

6
GREEN
(REF)
WHITE
(REF)
7
12" APPROX.


A
A
4
2 REF
IDENT. MARK
(FARSIDE)
SEE NOTE 6
SEE NOTE 5 5
1
SEE DETAIL B
SEE NOTE 4



PARTIAL SECTION A-A
SCALE 2/1

MASTER


NO BONDING MATL ON
THIS PORTION OF LAMP
BONDING AGENT
(SEE NOTE 2)
2
1/64 APPROX
(FILAMENT PROJECTION)
SOLDER
(SEE NOTE 4) TYP

DETAIL B
SCALE 2/1
TYP 4 PLACES

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	AR	*	1010416-20	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-16	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	2		2011904	45386910010		SCREW, MINIATURE			
4	1	*	1011903	—		FLEXPRINT			
3									
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011334	57386910510		PLATE, LAMP MOUNTING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910420
DRAWN J. Schuller DATE 4-7-64
CHECKED C. LEINZ (CRZ) 7-13-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Thomas 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL W. Keyes 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP AND PLATE,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011563
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

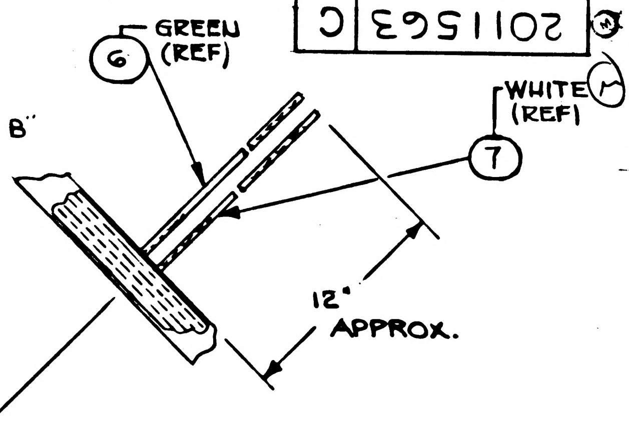
2011563B

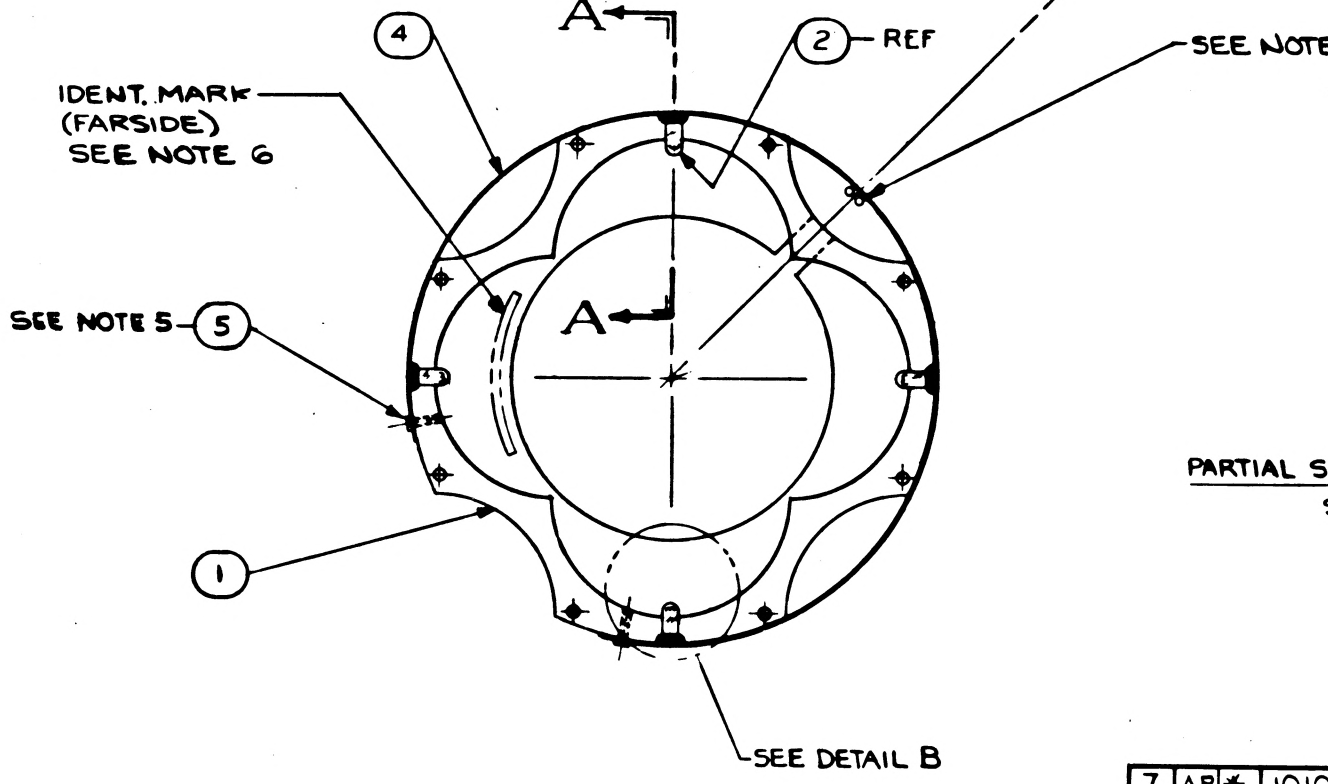
2011563 C

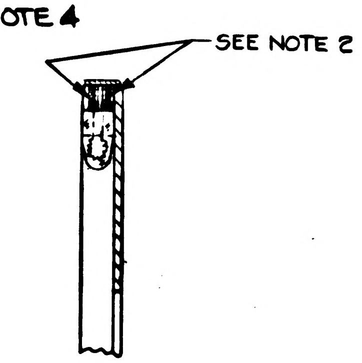
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSULATE LEADS OF ITEM 2 BY PLASTIC COATING IN ACCORDANCE WITH ND1002035 (USING YELLOW PIGMENT). SECURE ITEM 2 TO ITEM 1 (AS SHOWN IN DETAIL B) USING POTTING COMPOUND IN ACCORDANCE WITH ND 1002240, METHOD "B"
3. SEE WIRING SCHEMATIC NASA DWG NO. 2012391.
4. SOLDER PER ND1002071
5. VIBRATION PROOF ITEM 5 IN ACCORDANCE WITH MIL-S-22473 GRADE "B". PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15427	1/7/65	wK
B		REVISED PER TDRR 17153	4/2/65	wK.
C		REVISED PER TDRR 31875	11-10-66	


6
GREEN (REF)
WHITE (REF)
7
12" APPROX.


IDENT. MARK (FARSIDE) SEE NOTE 6
4
A
2 REF
SEE NOTE 4
A
SEE NOTE 5
5
1
SEE DETAIL B

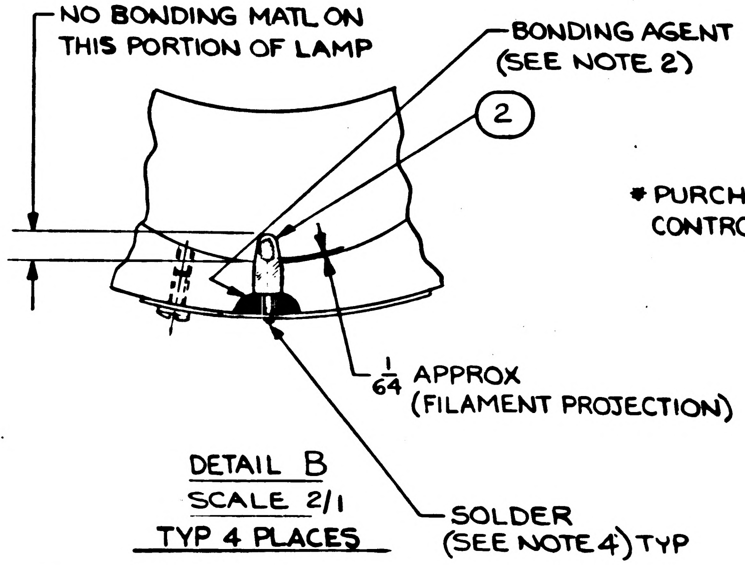


PARTIAL SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	AR	*	1010416-20	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-16	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	2		2011904	45386910010		SCREW, MINIATURE			
4	1	*	1011903	—		FLEXPRINT			
3									
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011334	57386910510		PLATE, LAMP MOUNTING			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING


NO BONDING MATL ON THIS PORTION OF LAMP
BONDING AGENT (SEE NOTE 2)
2
1/64 APPROX (FILAMENT PROJECTION)
SOLDER (SEE NOTE 4) TYP

DETAIL B
SCALE 2/1
TYP 4 PLACES

2011906	2011000.
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910420

DRAWN DATE 4-7-64
CHECKED C. LEINZ (CRZ) 7-13-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Phoung 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL 14 July 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP AND PLATE, ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011563
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

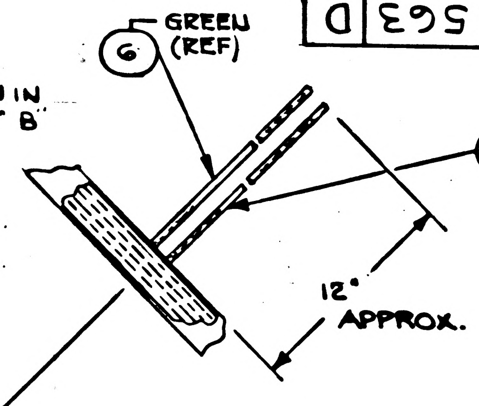
2011563C

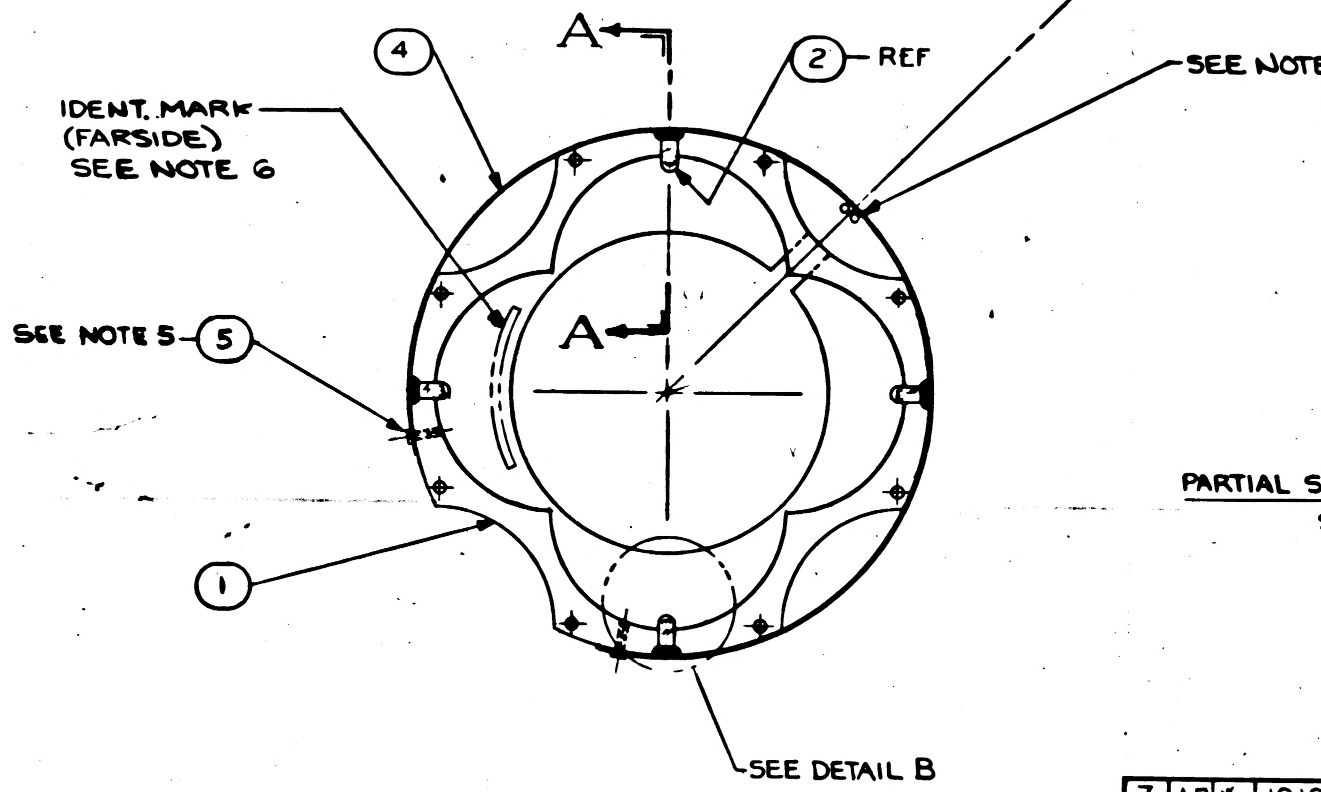
K+E

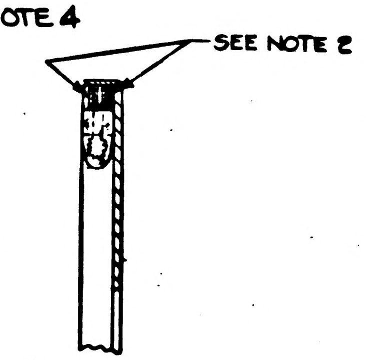
E-154

2011563 D

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSULATE LEADS OF ITEM 2 BY PLASTIC COATING IN ACCORDANCE WITH ND1002035 (USING UNPIGMENTED COATING). SECURE ITEM 2 TO ITEM 1 (AS SHOWN IN DETAIL B) USING POTTING COMPOUND IN ACCORDANCE WITH ND 1002240, METHOD "B"
3 SEE WIRING SCHEMATIC NASA DWG NO. 2012391.
4. SOLDER PER ND1002071.
5. VIBRATION PROOF ITEM 5 IN ACCORDANCE WITH MIL-S-22473 GRADE "B". PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.


⑥ GREEN (REF)
WHITE (REF)
⑦
12" APPROX.

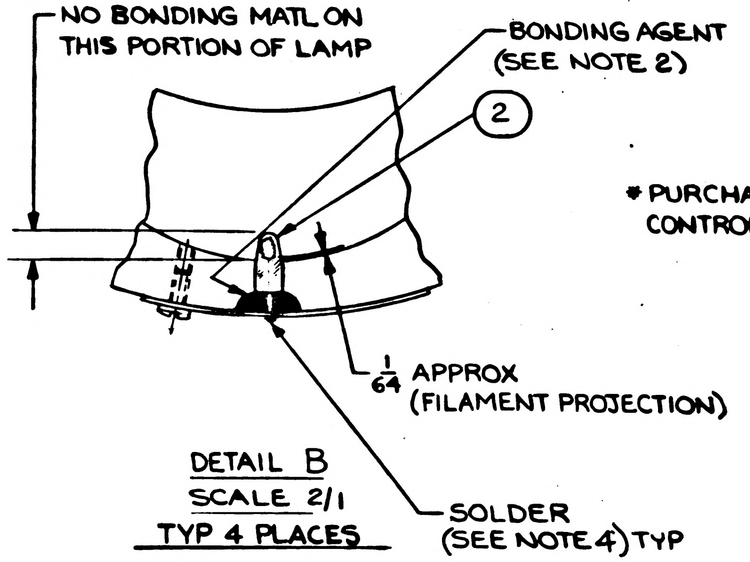

A
A
④
② REF
IDENT. MARK (FARSIDE) SEE NOTE 6
SEE NOTE 4
SEE NOTE 5 ⑤
①
SEE DETAIL B



PARTIAL SECTION A-A
SCALE 2/1

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15427	4/7/65	WK
B		REVISED PER TDRR 17153	4/2/65	WK.
C		REVISED PER TDRR 31875	11-10-66	
D		REVISED PER TDRR 33161	3/3/67	

REVISIONS 10952


NO BONDING MATL ON THIS PORTION OF LAMP
BONDING AGENT (SEE NOTE 2)
②
$\frac{1}{64}$ APPROX (FILAMENT PROJECTION)
SOLDER (SEE NOTE 4) TYP

DETAIL B
SCALE 2/1
TYP 4 PLACES

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	AR	*	1010416-20	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-16	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	2		2011904	45386910010		SCREW, MINIATURE			
4	1	*	1011903	—		FLEXPRINT			
3									
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011334	57386910510.		PLATE, LAMP MOUNTING			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000.

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910420

DRAWN DATE 4-7-64
CHECKED C. LEINZ (CRZ) 7-13-64
APPROVAL 7/13/64
APPROVAL E. Thomas 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP AND PLATE,
ASSY OF

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011563
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011563D

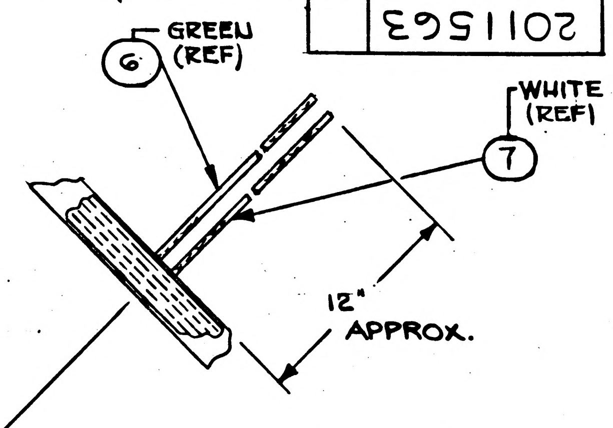
E-184

2011563

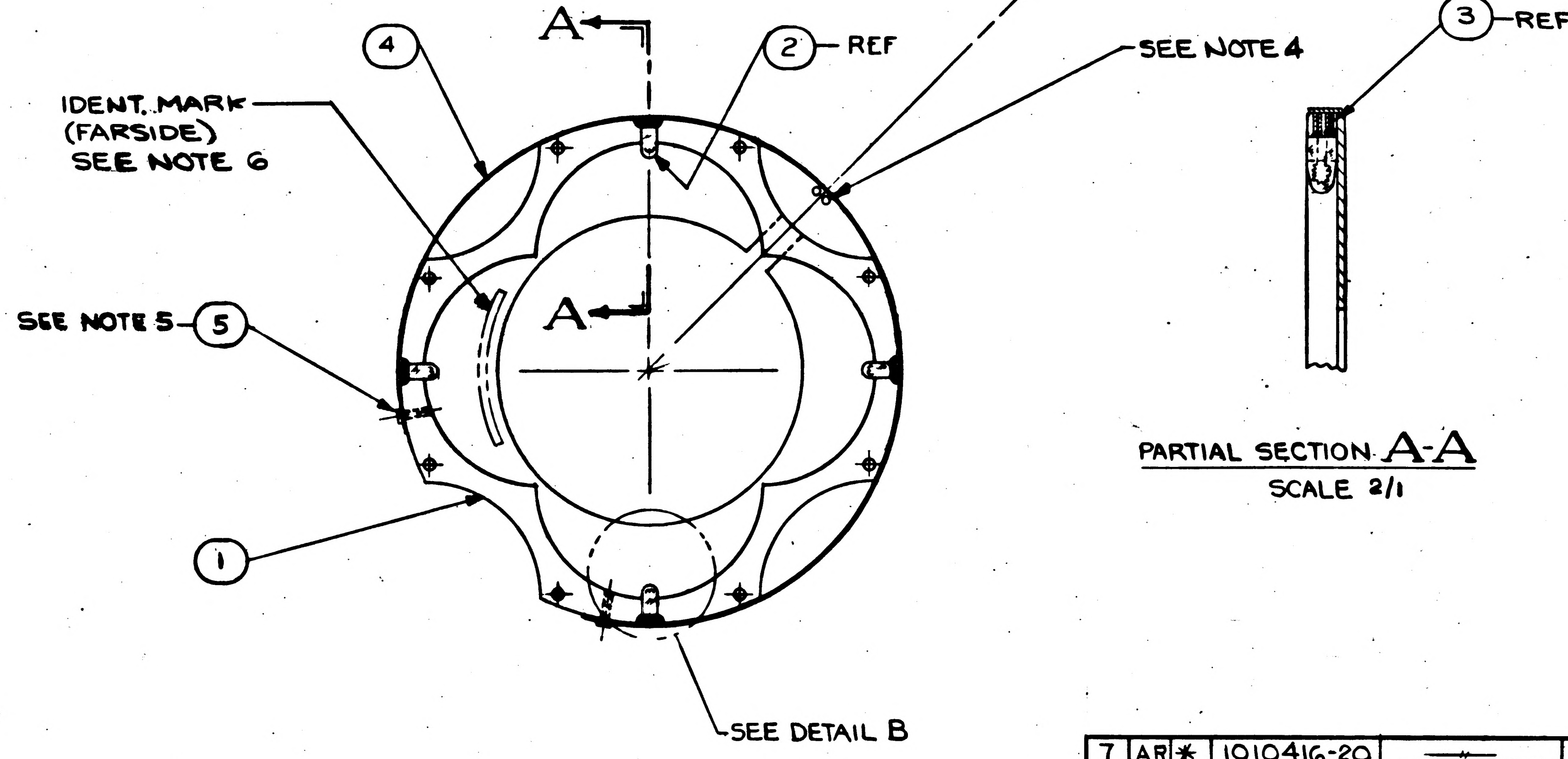
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SECURE ITEM 2 TO ITEM 1 (AS SHOWN IN DETAIL "B") USING BONDING AGENT IN ACCORDANCE WITH ND1002004.
3. SEE WIRING SCHEMATIC NASA DWG NO. 2012391.
4. SOLDER PER MSFC-PROC 158 PROTECTING ASSEMBLY PER KES-15W.1C (3.1).
5. VIBRATION PROOF ITEM 5 IN ACCORDANCE WITH MIL-S-22473 GRADE (H). PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



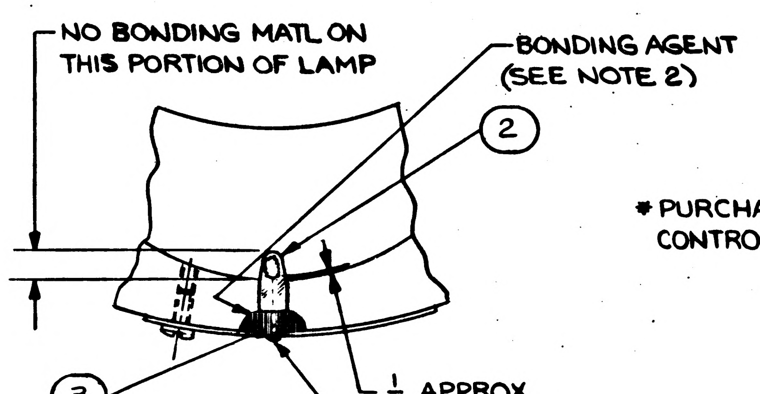
GREEN (REF)
6
WHITE (REF)
7
12" APPROX.



4
A
2 REF
SEE NOTE 4
IDENT. MARK (FARSIDE) SEE NOTE 6
A
SEE NOTE 5
5
1
SEE DETAIL B
3 REF

PARTIAL SECTION A-A
SCALE 2/1

MASTER



NO BONDING MATL ON THIS PORTION OF LAMP
BONDING AGENT (SEE NOTE 2)
2
3
$\frac{1}{64}$ APPROX (FILAMENT PROJECTION)
SOLDER (SEE NOTE 4) TYP

DETAIL B
SCALE 2/1
TYP 4 PLACES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	AR	*	1010416-20	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-16	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	2		2011904	45386910010		SCREW, MINIATURE			
4	1	*	1011903	—		FLEXPRINT			
3	AR	*	1006776-25	—		INSULATION SLEEVING ELECTRICAL			
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011334	57386910510		PLATE, LAMP MOUNTING			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011906	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910420

DRAWN J. Schuller DATE 4-7-64
CHECKED C. LEINZ (CRZ) 7-13-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Dhouip 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL W. Kupfer 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP AND PLATE,
ASSY OF

CODE IDENT NO. | SIZE C | NASA NUMBER 2011563
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011563

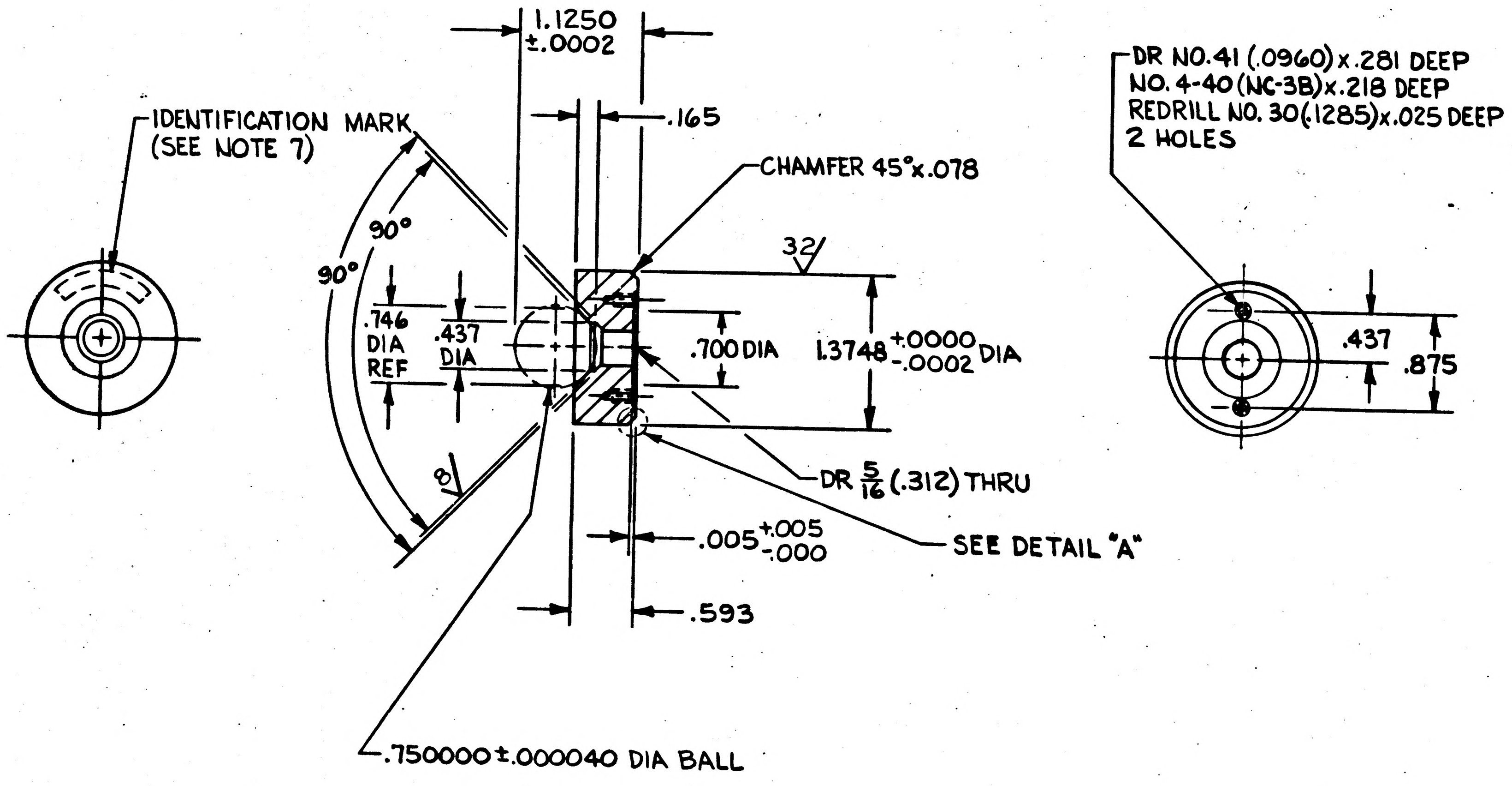
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

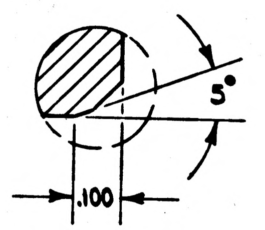
2011566

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
    a. 63√ FINISH ALL OVER.
    b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT TO ROCKWELL C-58 MIN PER ND 1002114
6. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5-4-1 (KPS-10051.200).
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019.


IDENTIFICATION MARK (SEE NOTE 7)
1.1250 ±.0002
.165
CHAMFER 45°x.078
90°
90°
.746 DIA REF
.437 DIA
32
.700 DIA
1.3748 +.0000 -.0002 DIA
8
DR 5/16 (.312) THRU
.005 +.005 -.000
SEE DETAIL "A"
.593
.750000 ±.000040 DIA BALL
DR NO. 41 (.0960) x .281 DEEP
NO. 4-40 (NC-3B) x .218 DEEP
REDRILL NO. 30 (.1285) x .025 DEEP
2 HOLES
.437
.875



DETAIL "A"
SCALE 4/1

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED. SPEC: QQ-S-763, CLASS 440C, CONDITION A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910840

DRAWN V. AMATO DATE 4-10-64
CHECKED J. SULLIVAN 5-29-64
APPROVAL E. Russlan 5/30/64
APPROVAL E. Morey 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT, STATIONARY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011566

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

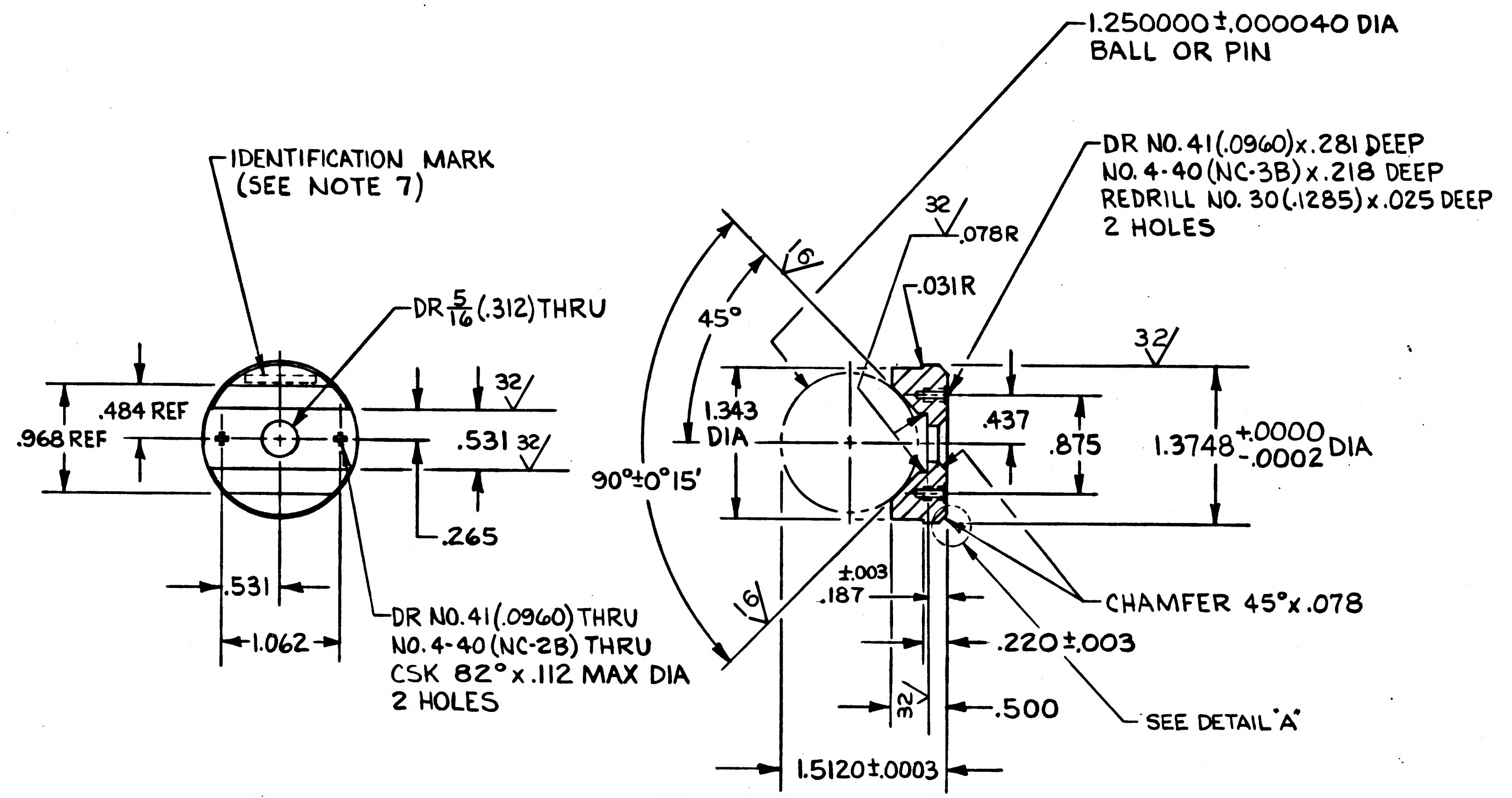
2011566

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

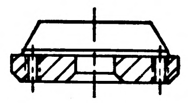
2011569 A

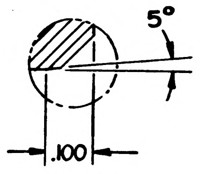
REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15034	12-10-64	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT TO ROCKWELL C-58 MIN PER ND1002114
6. PASSIVATE PER MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019.



1.250000±.000040 DIA
BALL OR PIN
IDENTIFICATION MARK
(SEE NOTE 7)
DR NO. 41 (.0960) x .281 DEEP
NO. 4-40 (NC-3B) x .218 DEEP
REDRILL NO. 30 (.1285) x .025 DEEP
2 HOLES
DR 5/16 (.312) THRU
32
.078R
.031R
16
45°
32
.484 REF
.968 REF
.531
.265
.531
1.062
DR NO. 41 (.0960) THRU
NO. 4-40 (NC-2B) THRU
CSK 82° x .112 MAX DIA
2 HOLES
1.343 DIA
90°±0°15'
.437
.875
1.3748 +.0000 -.0002 DIA
CHAMFER 45° x .078
±.003 .187
.220±.003
.500
SEE DETAIL "A"
1.5120±.0003





DETAIL "A"
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011739	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC: QQ-S-763, CLASS 440C, CONDITION A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910870

DRAWN V. AMATO DATE 4-10-64
CHECKED 6/1/64
APPROVAL 6/15/64
APPROVAL E. 6/15/64
NASA APPROVAL
MIT APPROVAL G.J. Nelson 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT,
LINE BASE

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011569

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011569 A

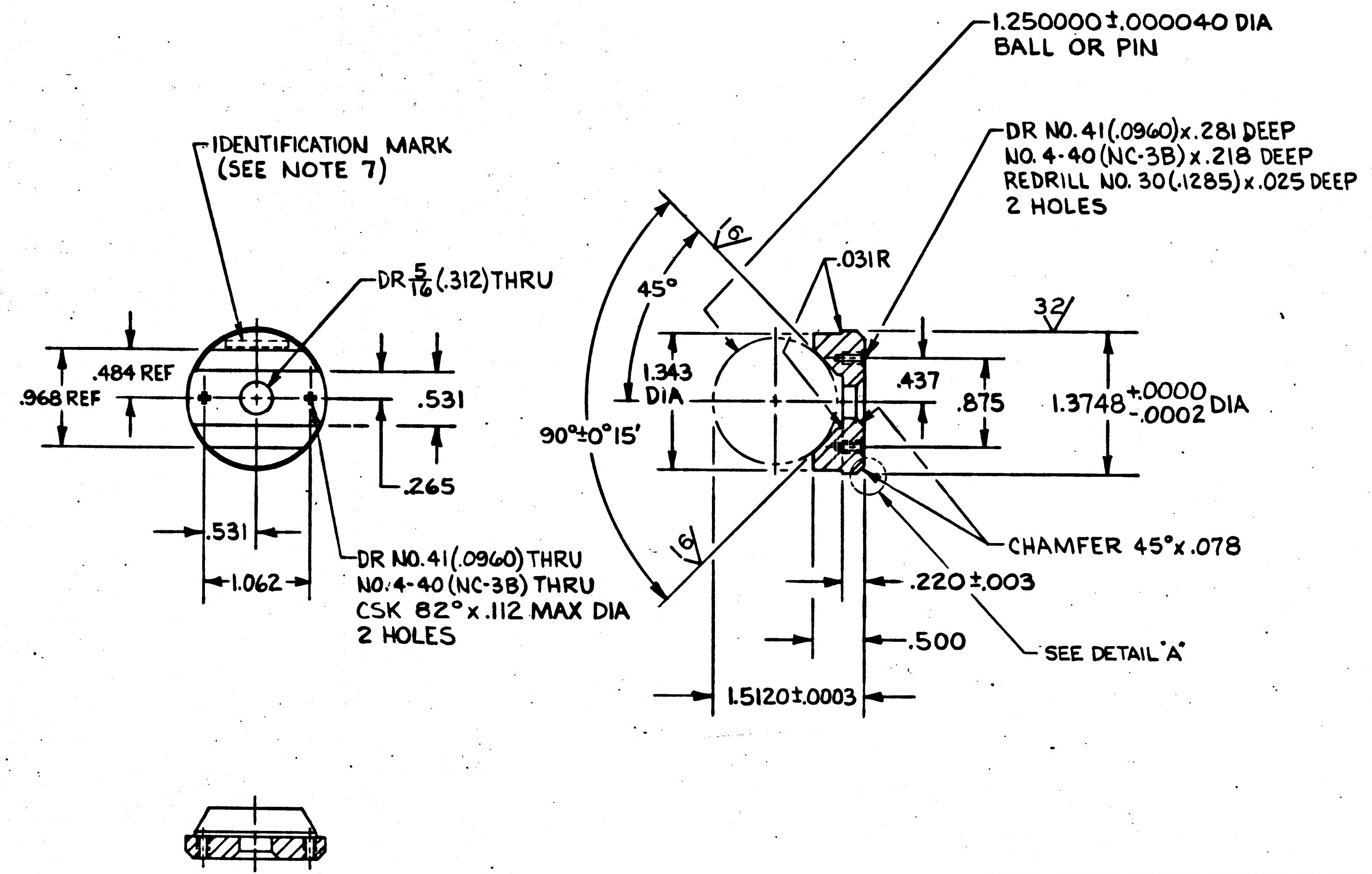
E-184

2011569

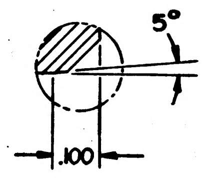
REVISIONS TORR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\vee}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT TO ROCKWELL C-58 MIN PER ND1002114
6. PASSIVATE PER MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



1.250000 ±.000040 DIA
BALL OR PIN
DR NO. 41 (.0960) x .281 DEEP
NO. 4-40 (NC-3B) x .218 DEEP
REDRILL NO. 30 (.1285) x .025 DEEP
2 HOLES
IDENTIFICATION MARK
(SEE NOTE 7)
DR 5/16 (.312) THRU
.484 REF
.968 REF
.531
.265
.531
1.062
DR NO. 41 (.0960) THRU
NO. 4-40 (NC-3B) THRU
CSK 82° x .112 MAX DIA
2 HOLES
16
45°
1.343 DIA
90°±0°15'
16
.031R
32
.437
.875
1.3748 +.0000 -.0002 DIA
CHAMFER 45° x .078
.220 ±.003
.500
SEE DETAIL "A"
1.5120 ±.0003



DETAIL "A"
SCALE 4/1

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011739	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC: QQ-S-763, CLASS 440 C, CONDITION A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910870

DRAWN V. AMATO DATE 4-10-64
CHECKED 6/1/64
APPROVAL 6/15/64
APPROVAL E. Mhoup 6/15/64
NASA APPROVAL
MIT APPROVAL G.J. Nelson 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT,
LINE BASE

CODE IDENT NO.
SIZE C
NASA NUMBER 2011569
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011569

E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

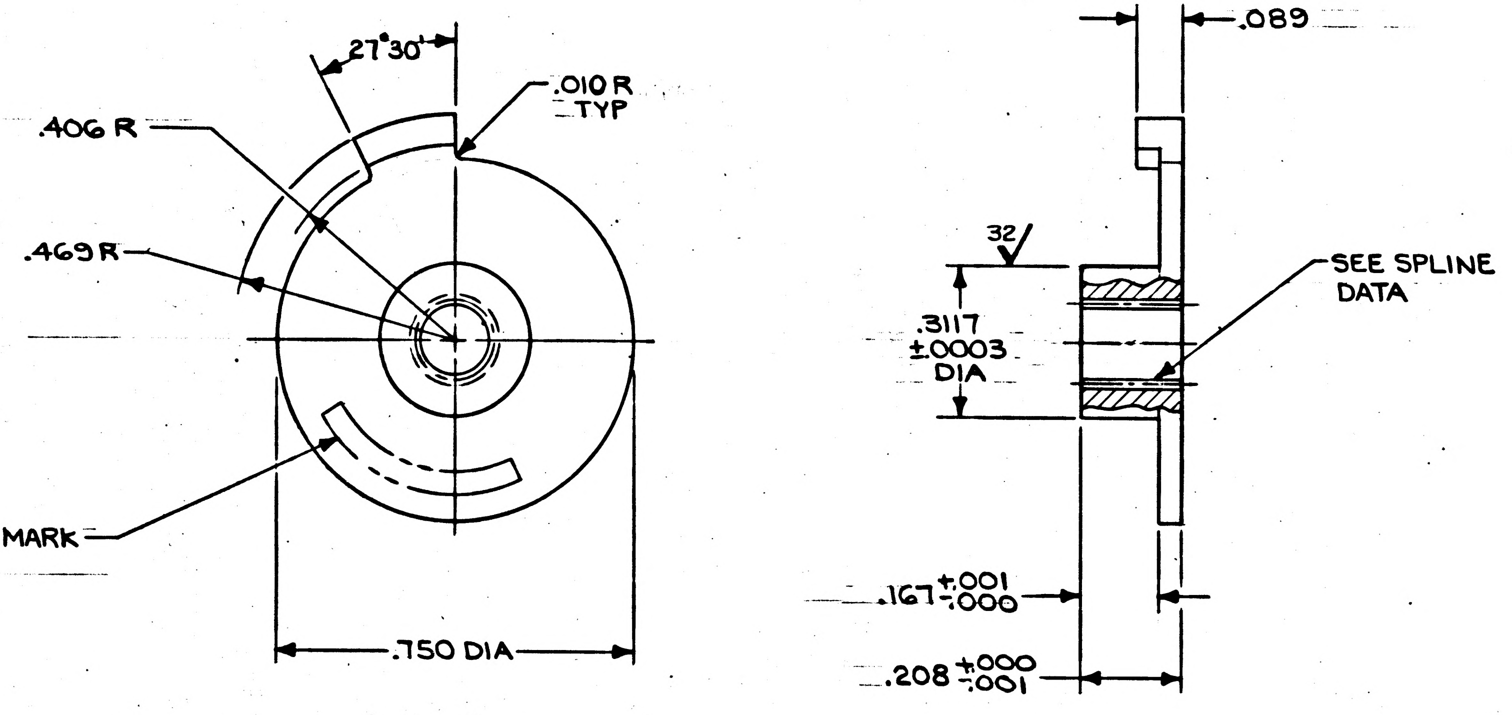
2011578

REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

INTERNAL SPLINE DATA (INVOLUTE)

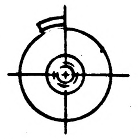
AM. STD FLAT ROOT SIDE FIT - CLASS 2

NO. OF TEETH	8
PITCH	48/96
PRESSURE ANGLE	30°
PITCH DIAMETER (REF)	.1667
MAJOR DIAMETER	.1875 +.0020 −.0000
MINOR DIAMETER	.1458 +.0020 −.0000
CIRCULAR SPACE WIDTH	.0330 +.0002 −.0000
TOOTH FINISH	32√



6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
5. FINISH: PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) √ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± −	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED. SPEC QQ-S-763
CLASS 416 COND. H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910130

DRAWN J. Schiller DATE 1-2-64
CHECKED J. SULLIVAN 3-27-64
APPROVAL E. Amlaw 6/1/64
APPROVAL E. Morgo 6/22/64
NASA APPROVAL
MIT APPROVAL W Griffer 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOG, LIMIT STOP, OUTER

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011578

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011578

E-184

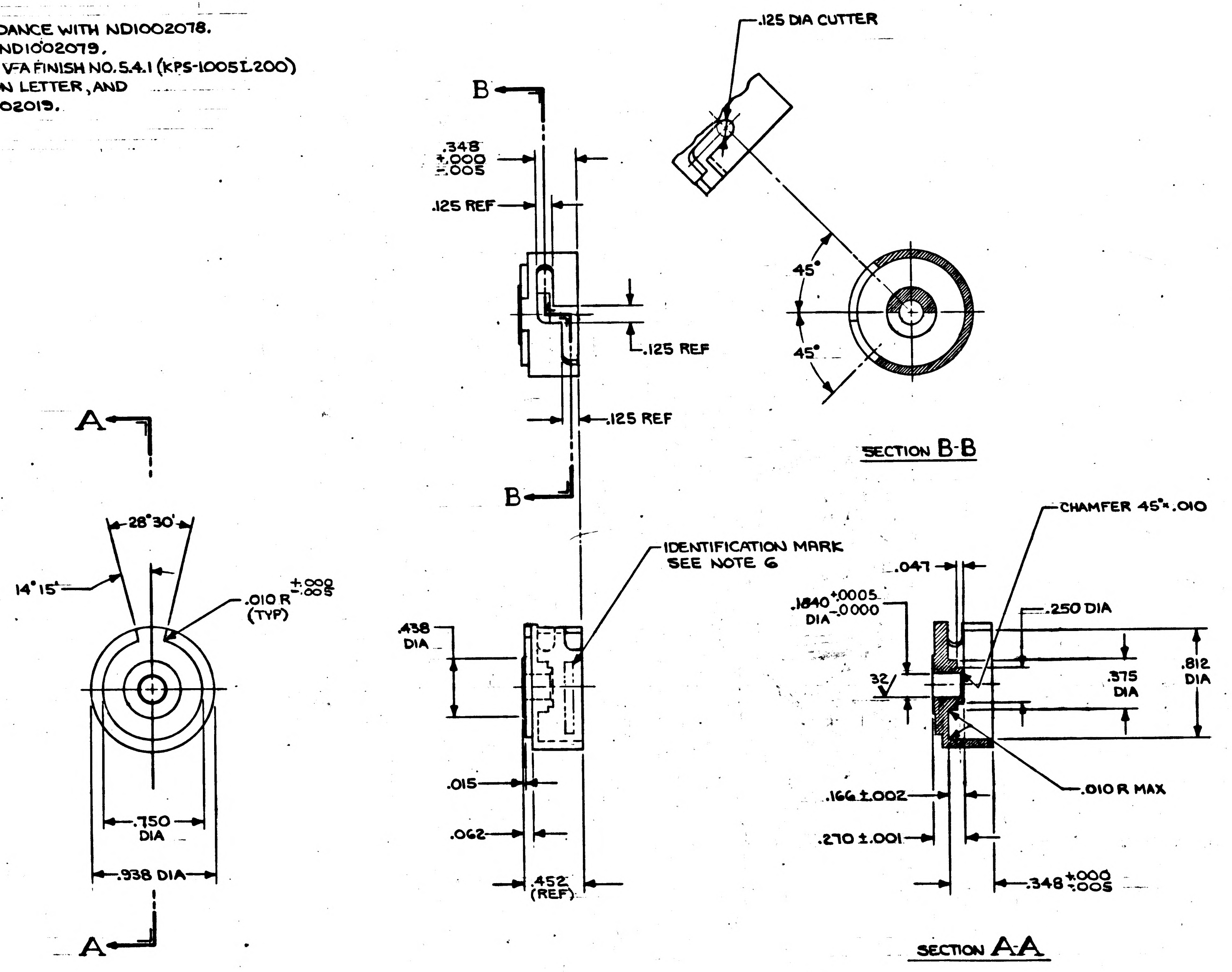
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

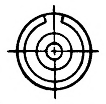
2011580

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS 0420

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005L200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019.


.125 DIA CUTTER
B
B
.348 +.000 -.005
.125 REF
.125 REF
.125 REF
45°
45°
SECTION B-B
A
A
28°30'
14°15'
.010 R +.000 -.005 (TYP)
.750 DIA
.938 DIA
IDENTIFICATION MARK SEE NOTE 6
.438 DIA
.015
.062
.452 (REF)
CHAMFER 45°×.010
.047
.1840 +.0005 -.0000 DIA
.250 DIA
32
.375 DIA
.812 DIA
.010 R MAX
.166 ±.002
.270 ±.001
.348 +.000 -.005
SECTION A-A


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 COND.H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910140
DRAWN J. Sullivan DATE 1-3-64
CHECKED J. SULLIVAN 3-30-64
APPROVAL [illegible] 6/1/64
APPROVAL E. [illegible] 6/22/64
NASA APPROVAL
MIT APPROVAL [illegible] 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DOG, LIMIT STOP,
INNER

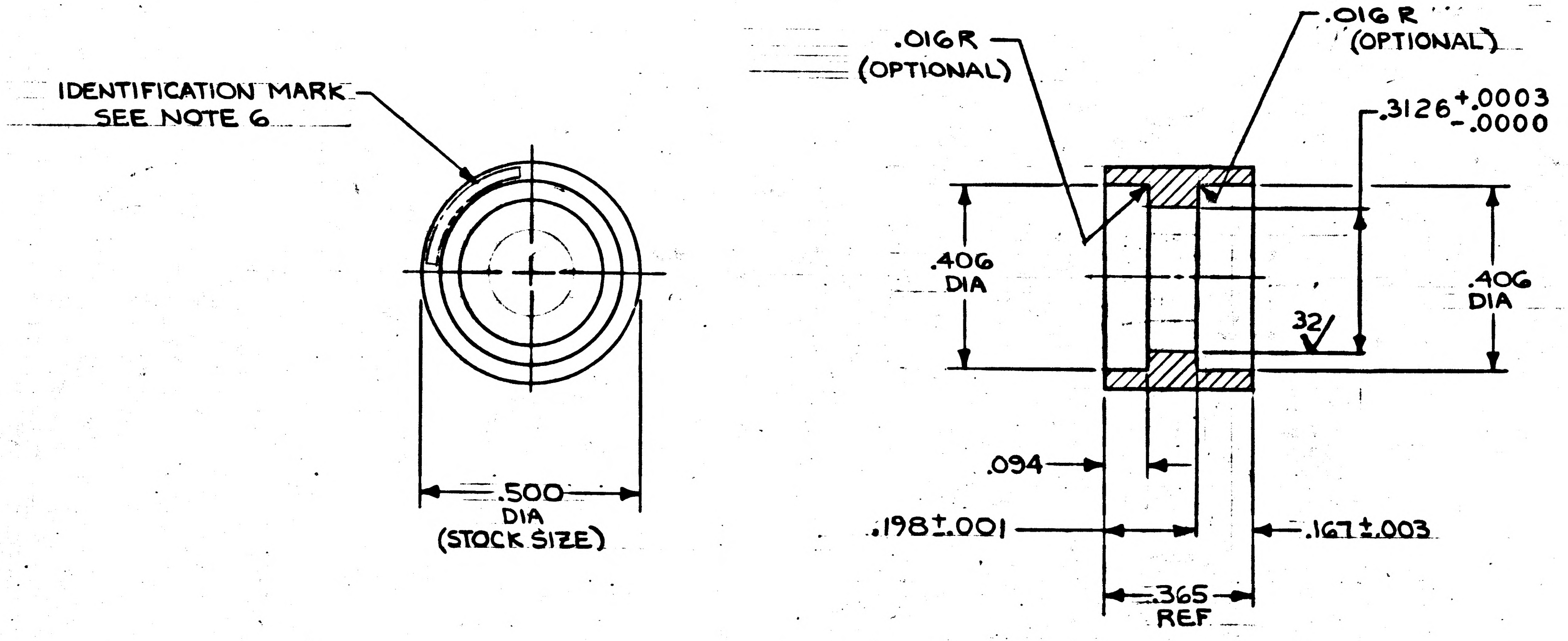
CODE IDENT NO.
SIZE D
NASA NUMBER 2011580
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

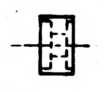
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

2011581

REVISIONS		10420		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.





ACTUAL SIZE

2011581

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND.H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 57386910110

DRAWN F. Schiller DATE 12-31-63
CHECKED J. SULLIVAN 3-27-64
APPROVAL F. Ruschman 6/1/64
APPROVAL E. Thomas 6/22/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BUSHING,
LIMIT STOP

CODE IDENT NO.
SIZE C
NASA NUMBER 2011581
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

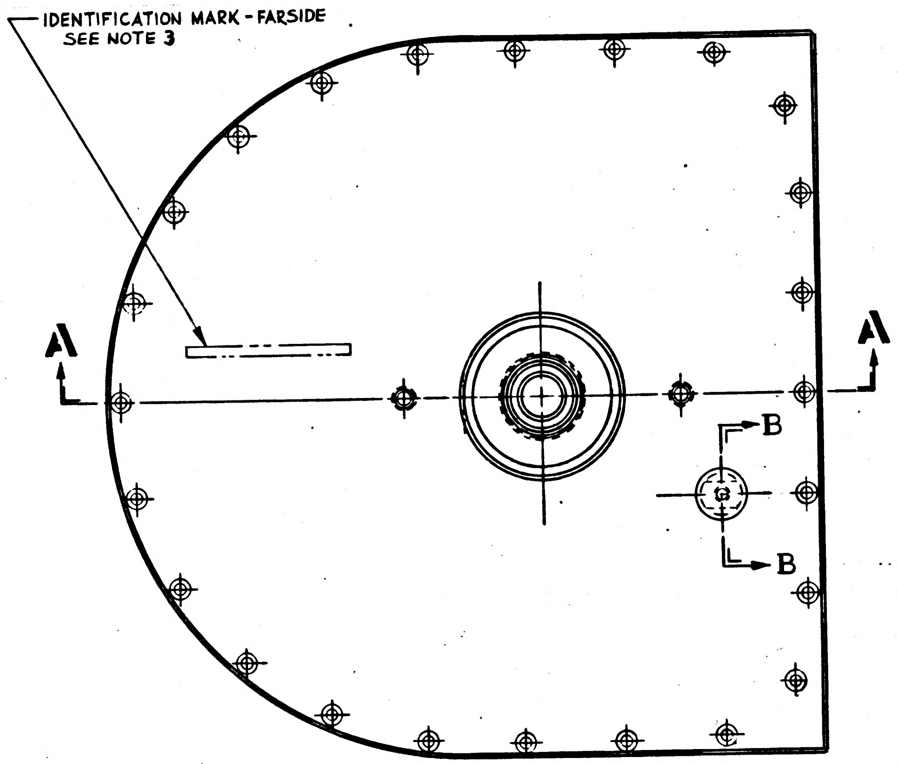
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

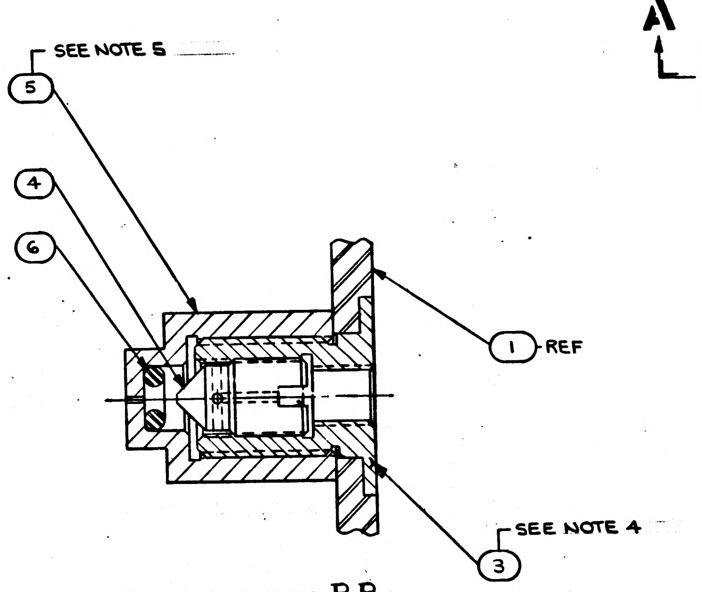
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEM ② PER ND1002121
3. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
4. VACUUM SEAL ITEM ③ TO ITEM ① USING ITEM ⑦ PER ND1002219
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑤ TO ITEM ③ USING GRADE "HV" OF MIL-S-22473 IN ACCORDANCE WITH ND 1002211.

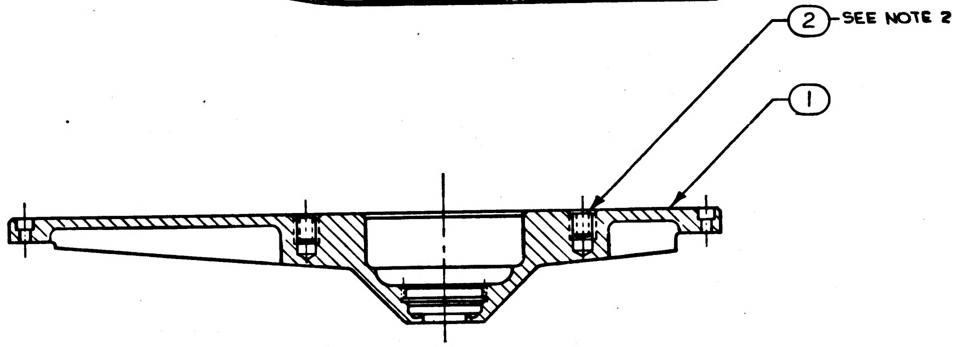
A	2011586

REVISIONS			1748	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16916	2/24/65	WK





PARTIAL SECTION B-B
SCALE 4/1



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1011541	74471435001		ADHESIVE, EPOXY			
6	1	*	1011768-4	74453043004		PACKING, PREFORMED			
5	1		2012034	57386911160		HOUSING, GAS INJECTION			
4	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
3	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
2	2		NAS1394C-3	—		INSERT, THREADED			
1	1		2011590	52386910660		PANEL, SEXTANT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011711	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910770

DRAWN ~~E.R. BRUNELLE~~ DATE ~~4-14-64~~
CHECKED [illegible] 7/22/64
APPROVED [illegible] 7/22/64
APPROVAL E. Mourp 8/15/64
NASA APPROVAL
MIT APPROVAL W Kupfer [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT PANEL & INSERT, ASS'Y OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011586
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011586A

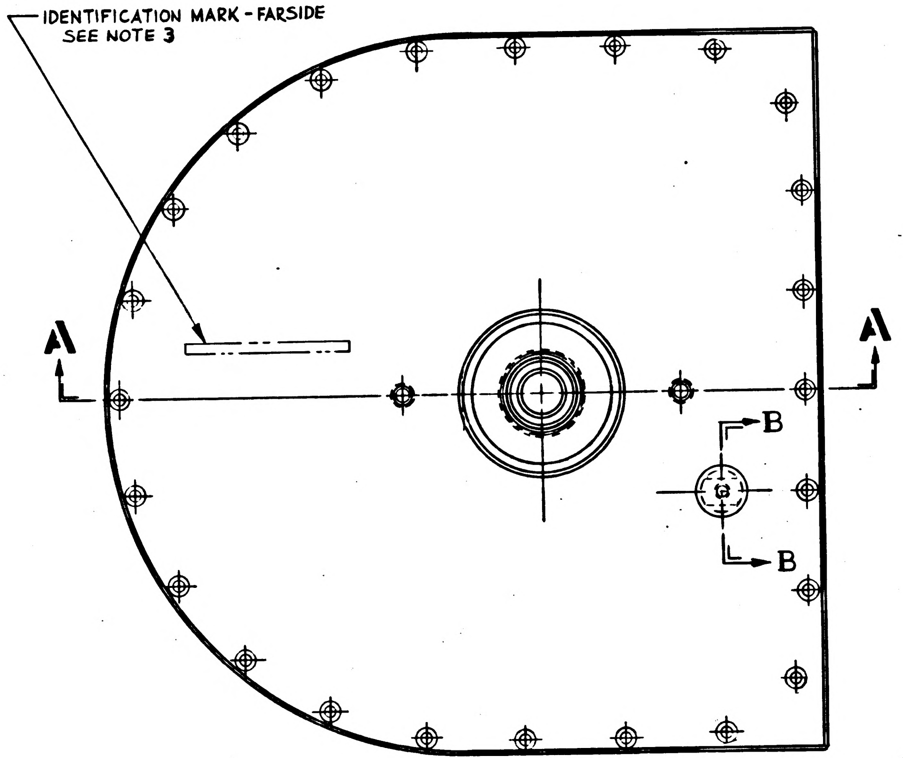
2011586 B

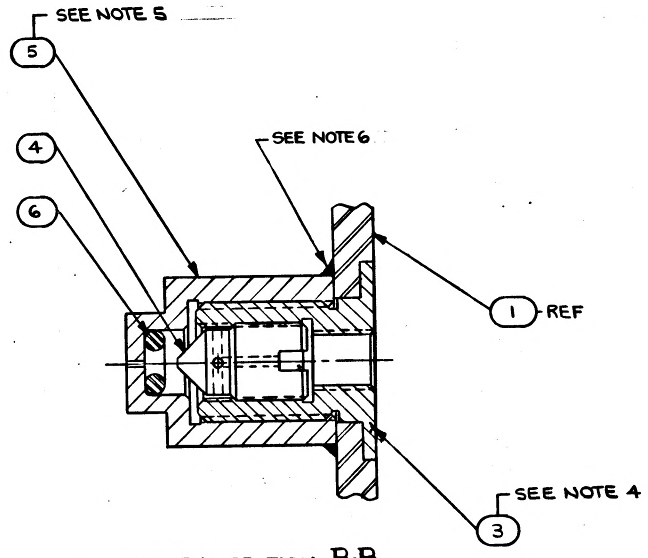
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11916	2/24/65	WK
B		REVISED PER TDRR 18866	5/11/65	WK

REVISIONS 11748

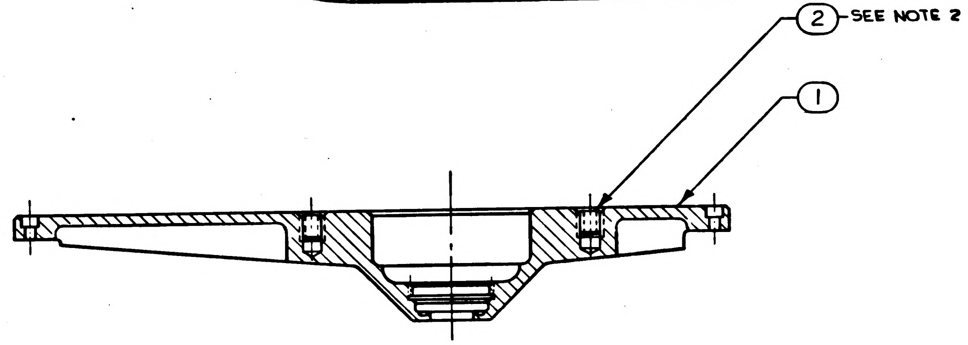
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEM ② PER ND1002121
3. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
4. VACUUM SEAL ITEM ③ TO ITEM ① USING ITEM ⑦ IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑤ TO ITEM ③ USING GRADE "HV" OF MIL-S-22473 IN ACCORDANCE WITH ND 1002211.
6. AN .062 MAX. FILLET OF ITEM ⑦ IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.





PARTIAL SECTION B-B
SCALE 4/1



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1011541	7447143500I		ADHESIVE, EPOXY			
6	1	*	1011768-4	74453043004		PACKING, PREFORMED			
5	1		2012034	57386911160		HOUSING, GAS INJECTION			
4	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
3	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
2	2		NAS1394C-3	—		INSERT, THREADED			
1	1		2011590	52386910660		PANEL, SEXTANT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011711	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910770
DRAWN E.R. BRUNELLE DATE 4-14-64
CHECKED 4/22/64
APPROVED 7/22/64
APPROVAL 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT PANEL & INSERT,
ASS'Y OF

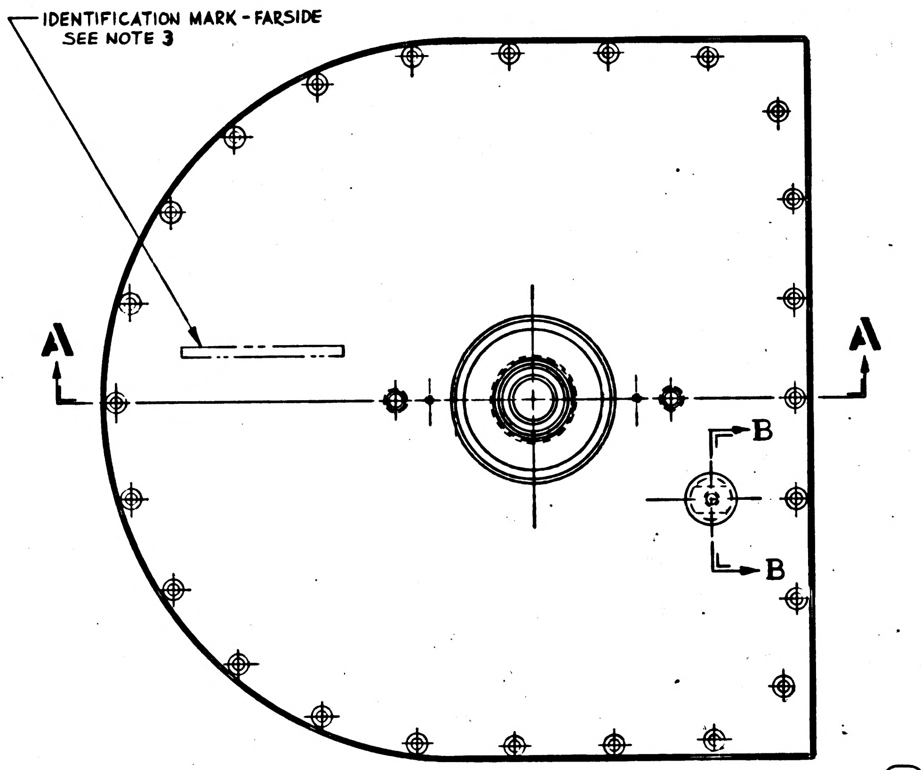
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011586
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

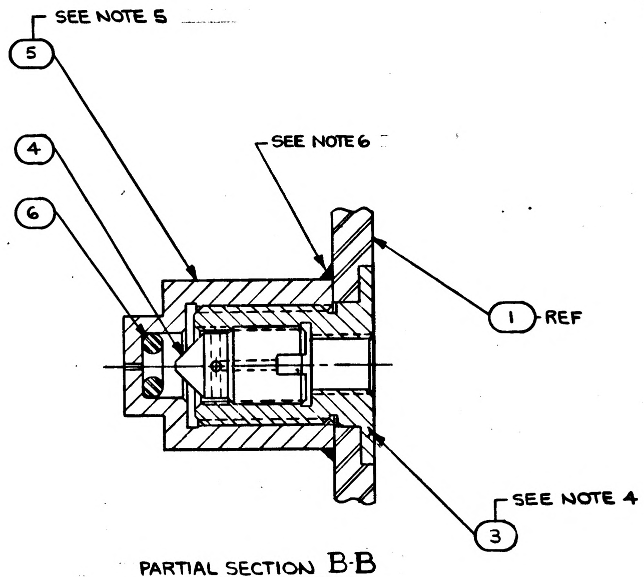
2011586 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16916	2/24/65	WK
B		REVISED PER TDRR 18866	5/11/65	WK
C		REVISED PER TDRR 22634	9/28/65	WK

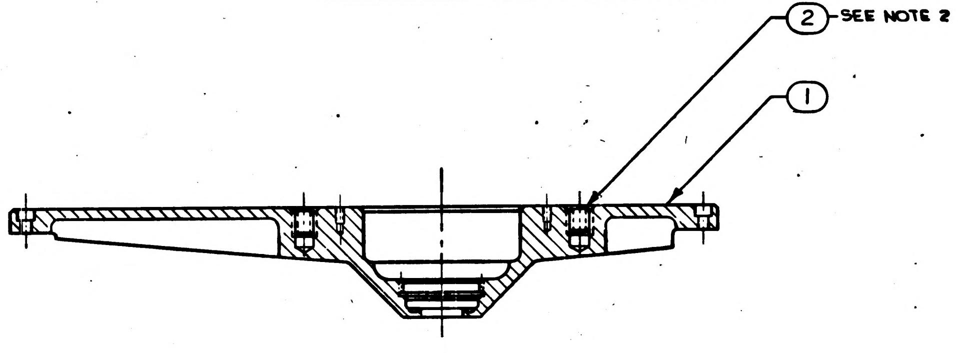
REVISIONS 11748

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEM ② PER ND1002121
3. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
4. VACUUM SEAL ITEM ③ TO ITEM ① USING ITEM ⑦ IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑤ TO ITEM ③ USING GRADE "HV" OF MIL-S-22473 IN ACCORDANCE WITH ND 1002211.
6. AN .062 MAX. FILLET OF ITEM ⑦ IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.





PARTIAL SECTION B-B
SCALE 4/1



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1011541	74471435001		ADHESIVE, EPOXY			
6	1	*	1011768-4	74453043004		PACKING, PREFORMED			
5	1		2012034	57386911160		HOUSING, GAS INJECTION			
4	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
3	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
2	2		NAS1394C-3	—		INSERT, THREADED			
1	1		2011590	52386910660		PANEL, SEXTANT			

LIST OF PARTS AND MATERIALS

MASTER

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011711	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910770
DRAWN E.R. BRUNELLE DATE 6-14-64
CHECKED 7/22/64
APPROVAL 7/22/64
APPROVAL E. Morup 8/15/64
NASA APPROVAL
MIT APPROVAL W Kupfer King 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT PANEL & INSERT,
ASS'Y OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011586
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

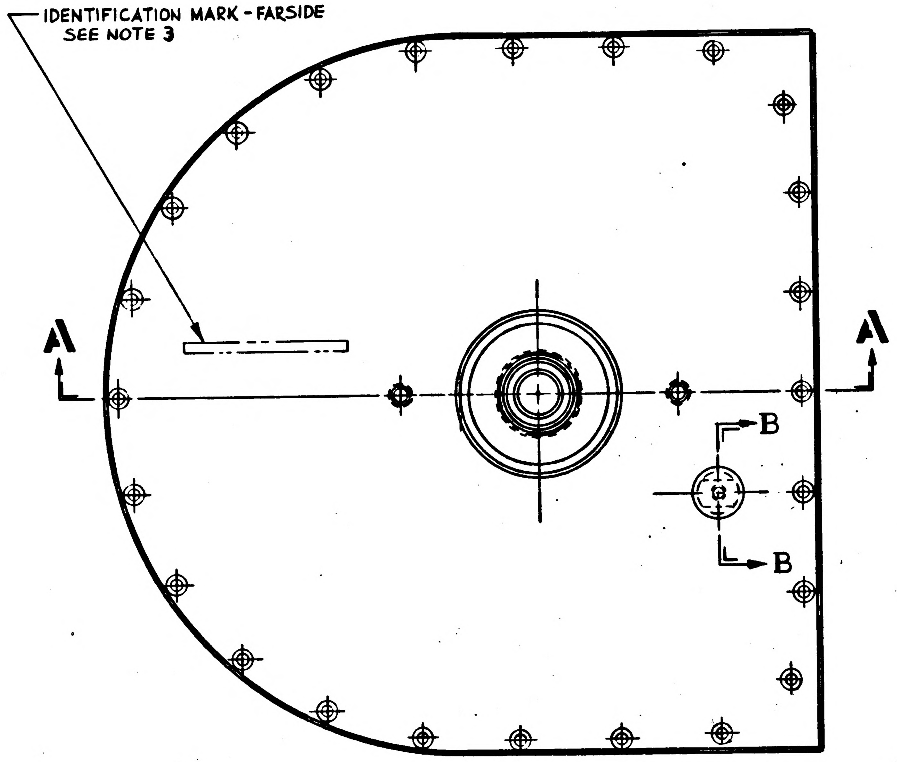
2011586

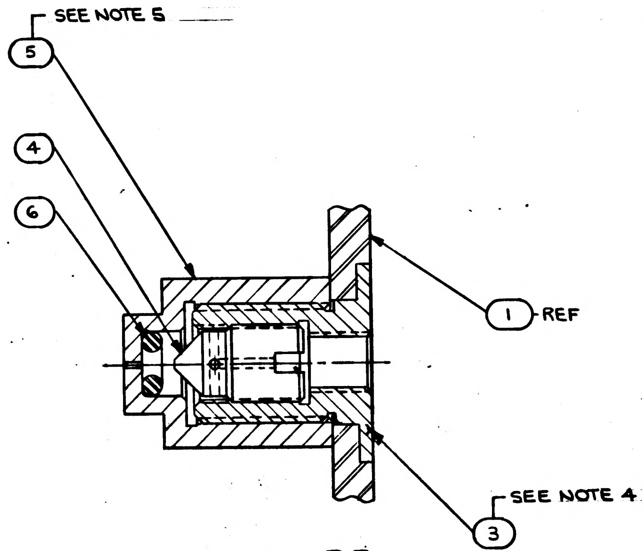
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS 1748

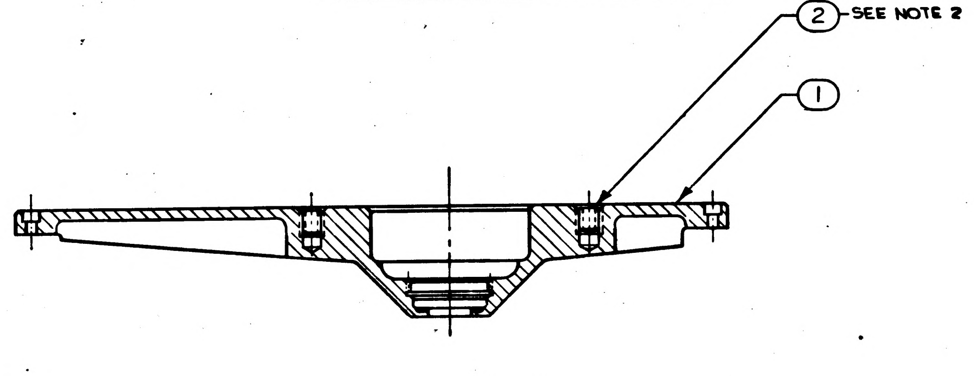
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEM ② PER ND1002121
3. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
4. CEMENT ITEM ③ TO ITEM ① USING ITEM ⑦ AND CURE AT 150°±3° F. FOR 2 HOURS
5. VIBRATION PROOF ITEM ⑤ TO ITEM ③ IN ACCORDANCE WITH MIL-S-22473 GRADE (H)





PARTIAL SECTION B-B
SCALE 4/1



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1011541	7447143500I		ADHESIVE, EPOXY			
6	1	*	1011768-4	74453043004		PACKING, PREFORMED			
5	1		2012034	57386911160		HOUSING, GAS INJECTION			
4	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
3	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
2	2		NAS1394C-3	—		INSERT, THREADED !			
1	1		2011590	52386910660		PANEL, SEXTANT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011711	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910770

DRAWN ~~F.R. BRUNELLE~~ DATE ~~4-14-64~~
CHECKED 7/22/64
APPROVAL 7/22/64
APPROVAL 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT PANEL & INSERT,
ASS'Y OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011586
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011586

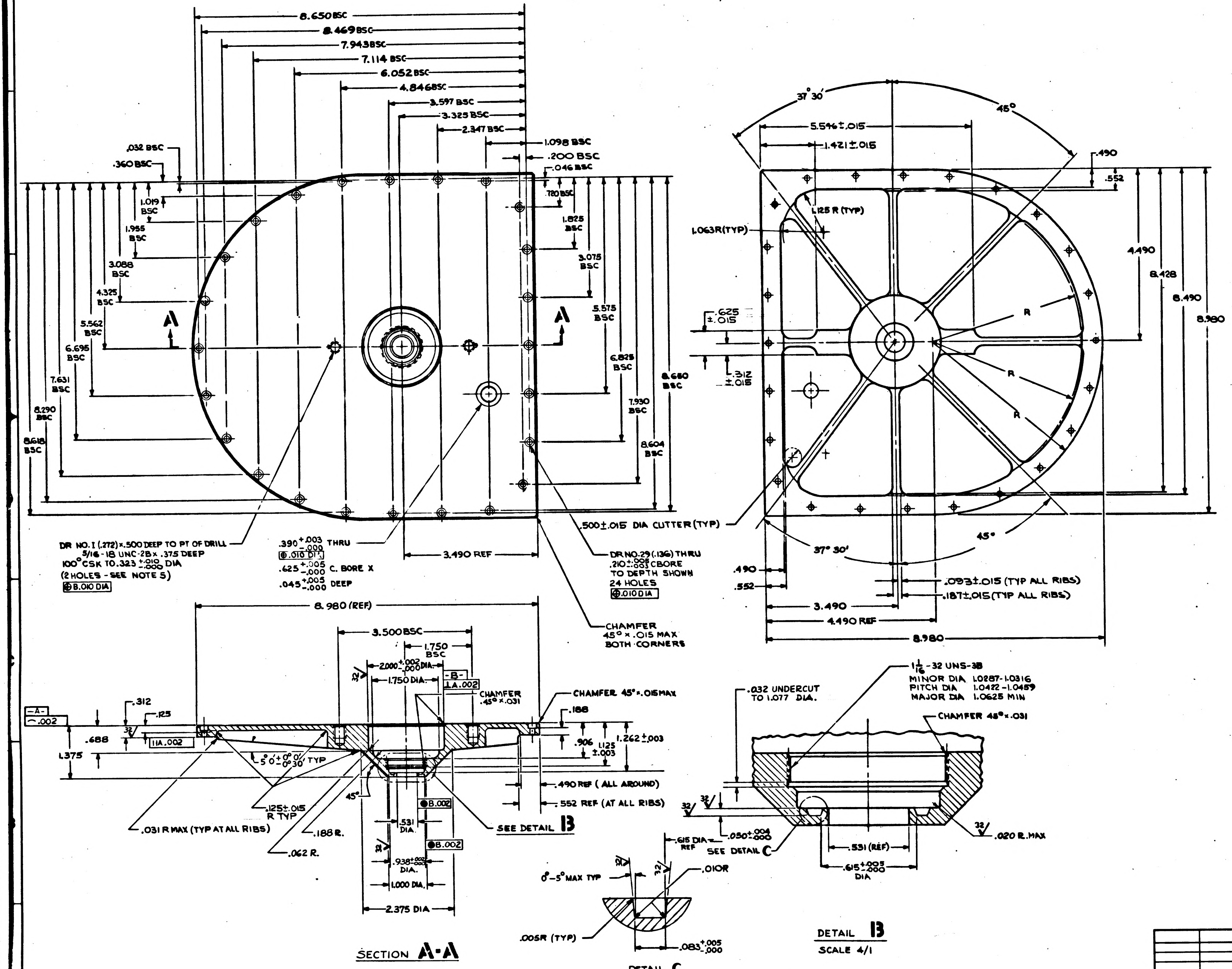
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011590 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 10230				
A		REVISED PER TDRR 17275		LK

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63 √ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114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8.469 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
3.597 BSC
3.325 BSC
2.347 BSC
1.098 BSC
.200 BSC
.046 BSC
.032 BSC
.360 BSC
.720 BSC
1.019 BSC
1.955 BSC
3.088 BSC
4.325 BSC
5.562 BSC
6.695 BSC
7.631 BSC
8.290 BSC
8.618 BSC
1.825 BSC
3.075 BSC
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.680 BSC
A
A
DR NO. 1 (.272) x .500 DEEP TO PT OF DRILL
5/16-18 UNC-2B x .375 DEEP
100° CSK TO .323 +.010 -.000 DIA
(2 HOLES - SEE NOTE 5)
⊕ B .010 DIA
.390 +.003 -.000 THRU
⊕ .010 DIA
.625 +.005 -.000 C. BORE X
.045 +.005 -.000 DEEP
3.490 REF
.500 ± .015 DIA CUTTER (TYP)
DR NO. 29 (.136) THRU
.210 +.005 -.003 CBORE
TO DEPTH SHOWN
24 HOLES
⊕ .010 DIA
CHAMFER
45° x .015 MAX
BOTH CORNERS
37° 30'
45°
5.546 ± .015
1.421 ± .015
.490
.552
1.125 R (TYP)
1.063 R (TYP)
.625 ± .015
.312 ± .015
4.490
8.428
8.490
8.980
R
R
R
45°
37° 30'
.490
.552
.093 ± .015 (TYP ALL RIBS)
.187 ± .015 (TYP ALL RIBS)
3.490
4.490 REF
8.980
8.980 (REF)
3.500 BSC
1.750 BSC
2.000 +.002 -.000 DIA.
1.750 DIA.
-B-
⊥ A .002
CHAMFER 45° x .031
CHAMFER 45° x .015 MAX
.188
-A-
⌒ .002
.312
.125
32
∥ A .002
.688
1.375
5° 0' +0° 0' -0° 30' TYP
.906
1.125 ± .003
1.262 ± .003
.490 REF (ALL AROUND)
.552 REF (AT ALL RIBS)
45°
.125 ± .015 R TYP
.031 R MAX (TYP AT ALL RIBS)
.188 R.
.062 R.
● B .002
.531 DIA.
● B .002
.938 +.002 -.000 DIA.
1.000 DIA.
2.375 DIA
SEE DETAIL B
SECTION A-A
0°-5° MAX TYP
32
.615 DIA REF
.010 R
.005 R (TYP)
.083 +.005 -.000
DETAIL C
SCALE 10/1
1 1/16 -32 UNS-3B
MINOR DIA 1.0287-1.0316
PITCH DIA 1.0422-1.0459
MAJOR DIA 1.0625 MIN
.032 UNDERCUT TO 1.077 DIA.
CHAMFER 45° x .031
32
.050 +.004 -.000
SEE DETAIL C
.020 R. MAX
.531 (REF)
.615 +.005 -.000 DIA
DETAIL B
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011586 NEXT ASSY	2011000 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± 1° DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 52386910660
APPLICATION		MATERIAL BERYLLIUM PER ND1002125 (SEE NOTE 6)	DRAWN R. BRUNELL DATE 4-14-64 CHECKED APPROVAL 5/12/64 APPROVAL E. Moore 6/15/64 NASA APPROVAL MIT APPROVAL 6/16/64
		CONTRACT	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: PANEL, SEXTANT

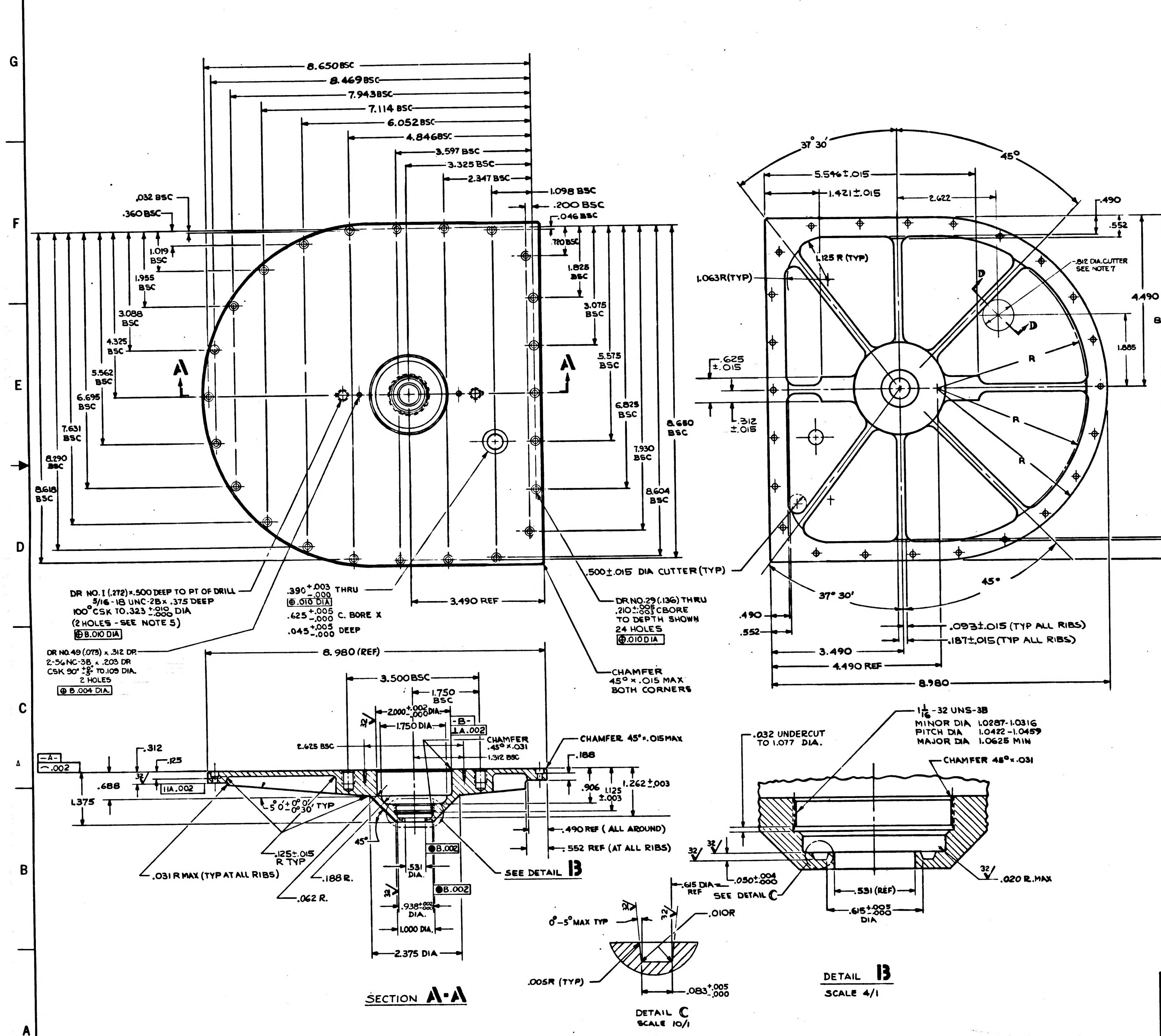
CODE IDENT NO.:
SIZE: E
NASA NUMBER: 2011590
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:

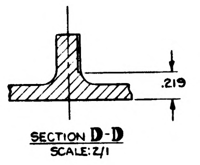
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63✓ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114
7. DUE TO TOLERANCE ON LOCATION OF STIFFENER RIB .812 DIA. CUTTER MAY OR MAY NOT CUT INTO RIB.

B 2011590

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
A		REVISED PER TDRR 17275		
B		REVISED PER TDRR 18573		



8.650 BSC
8.469 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
3.597 BSC
3.325 BSC
2.347 BSC
1.098 BSC
.200 BSC
.046 BSC
.032 BSC
.360 BSC
.720 BSC
1.019 BSC
1.955 BSC
3.088 BSC
4.325 BSC
5.562 BSC
6.695 BSC
7.631 BSC
8.290 BSC
8.618 BSC
1.825 BSC
3.075 BSC
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.680 BSC
A
A
DR NO. 1 (.272) x .500 DEEP TO PT OF DRILL
5/16-18 UNC-2B x .375 DEEP
100° CSK TO .323 +.010 -.000 DIA
(2 HOLES - SEE NOTE 5)
⊕B.010 DIA
DR NO.49 (.073) x .312 DP.
2-56NC-3B x .203 DR
CSK 90° +0° -5° TO .109 DIA.
2 HOLES
⊕B.004 DIA.
.390 +.003 -.000 THRU
⊕.010 DIA
.625 +.005 -.000 C. BORE X
.045 +.005 -.000 DEEP
3.490 REF
.500±.015 DIA CUTTER (TYP)
DR NO.29 (.136) THRU
.210 +.005 -.003 CBORE
TO DEPTH SHOWN
24 HOLES
⊕.010 DIA
CHAMFER
45° x .015 MAX
BOTH CORNERS
37° 30'
45°
5.546±.015
1.421±.015
2.622
.490
.552
1.125 R (TYP)
1.063 R (TYP)
.812 DIA. CUTTER SEE NOTE 7
D
D
4.490
8.428
8.490
8.980
1.885
.625 ±.015
.312 ±.015
R
R
R
37° 30'
45°
.490
.552
.093±.015 (TYP ALL RIBS)
.187±.015 (TYP ALL RIBS)
3.490
4.490 REF
8.980
8.980 (REF)
3.500 BSC
1.750 BSC
2.000 +.002 -.000 DIA.
1.750 DIA.
-B-
⊥A.002
CHAMFER .45° x .031
2.625 BSC
1.312 BSC
CHAMFER 45° x .015 MAX
.188
-A-
⌒.002
.312
.125
.688
∥A.002
1.375
5°0' +0°0' -0°30' TYP
.906
1.125 ±.003
1.262 ±.003
.490 REF (ALL AROUND)
.552 REF (AT ALL RIBS)
45°
.125±.015 R TYP
.031 R MAX (TYP AT ALL RIBS)
.188 R.
.062 R.
●B.002
.531 DIA.
●B.002
.938 +.002 -.000 DIA.
1.000 DIA.
2.375 DIA
SEE DETAIL B
32
SECTION A-A
0°-5° MAX TYP
.010R
.005R (TYP)
.083 +.005 -.000
DETAIL C
SCALE 10/1
.615 DIA REF
.050 +.004 -.000
SEE DETAIL C
.032 UNDERCUT TO 1.077 DIA.
1 1/16-32 UNS-3B
MINOR DIA 1.0287-1.0316
PITCH DIA 1.0422-1.0459
MAJOR DIA 1.0625 MIN
CHAMFER 45° x .031
.020 R. MAX
.531 (REF)
.615 +.005 -.000 DIA
DETAIL B
SCALE 4/1



SECTION D-D
SCALE: 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
PER ND1002125
(SEE NOTE 6)

CONTRACT

2011586	2011000
NEXT ASSY	USED ON

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910660

DRAWN R. BRUNELL DATE 3-19-64
CHECKED
APPROVAL 5/29/64
APPROVAL 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, SEXTANT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011590
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

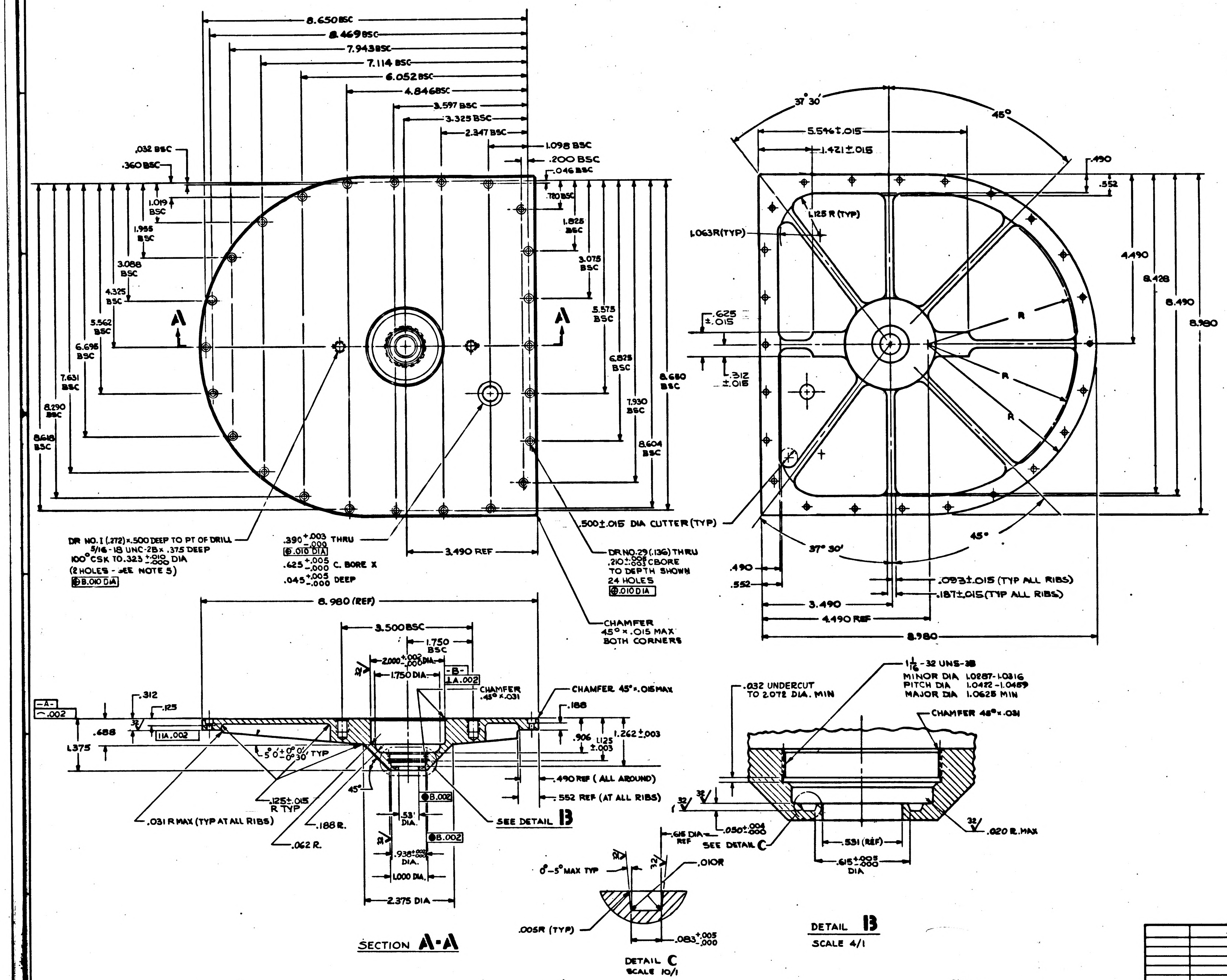
2011590 B

2011590

REVISIONS TRAC 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 32/ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114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8.469 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
3.597 BSC
3.325 BSC
2.347 BSC
1.098 BSC
.200 BSC
.046 BSC
.032 BSC
.360 BSC
1.019 BSC
1.955 BSC
3.088 BSC
4.325 BSC
5.562 BSC
6.695 BSC
7.631 BSC
8.290 BSC
8.618 BSC
.780 BSC
1.825 BSC
3.075 BSC
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.680 BSC
A
A
DR NO. 1 (.272) x .500 DEEP TO PT OF DRILL 5/16-18 UNC-2B x .375 DEEP 100° CSK TO .323 +.010 -.000 DIA (2 HOLES - SEE NOTE 5) B .010 DIA
.390 +.003 -.000 THRU .010 DIA
.625 +.005 -.000 C. BORE X
.045 +.005 -.000 DEEP
3.490 REF
.500±.015 DIA CUTTER (TYP)
DR NO. 29 (.136) THRU .210 +.005 -.003 CBORE TO DEPTH SHOWN 24 HOLES .010 DIA
CHAMFER 45° x .015 MAX BOTH CORNERS
37° 30'
45°
5.546±.015
1.421±.015
.490
.552
1.125 R (TYP)
1.063R (TYP)
.625 ±.015
.312 ±.015
4.490
8.428
8.490
8.980
R
R
R
45°
37° 30'
.490
.552
.093±.015 (TYP ALL RIBS)
.187±.015 (TYP ALL RIBS)
3.490
4.490 REF
8.980
8.980 (REF)
3.500 BSC
1.750 BSC
2.000 +.002 -.000 DIA.
1.750 DIA.
-B-
⊥ A .002
CHAMFER 45° x .031
CHAMFER 45° x .015 MAX
-A-
⌒ .002
.312
.125
32
// A .002
.688
1.375
.188
.906
1.125 ±.003
1.262 ±.003
5° 0' +0° 0' -0° 30' TYP
45°
.490 REF (ALL AROUND)
.552 REF (AT ALL RIBS)
.125±.015 R TYP
.031 R MAX (TYP AT ALL RIBS)
.188 R.
.062 R.
.53' DIA.
B .002
B .002
.938 +.002 -.000 DIA.
1.000 DIA.
2.375 DIA
SEE DETAIL B
SECTION A-A
1 1/16-32 UNS-3B
MINOR DIA 1.0287-1.0316
PITCH DIA 1.0422-1.0459
MAJOR DIA 1.0625 MIN
.032 UNDERCUT TO 2.072 DIA. MIN
CHAMFER 45° x .031
32
.050 +.004 -.000
.615 DIA REF
SEE DETAIL C
.531 (REF)
.615 +.005 -.000 DIA
.020 R. MAX
DETAIL B
SCALE 4/1
0°-5° MAX TYP
.010R
.005R (TYP)
.083 +.005 -.000
DETAIL C
SCALE 10/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011586	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
PER ND1002125
(SEE NOTE 6)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910660

DRAWN F. BRUNELL DATE [illegible]
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, SEXTANT

CODE IDENT NO.
SIZE E
NASA NUMBER 2011590

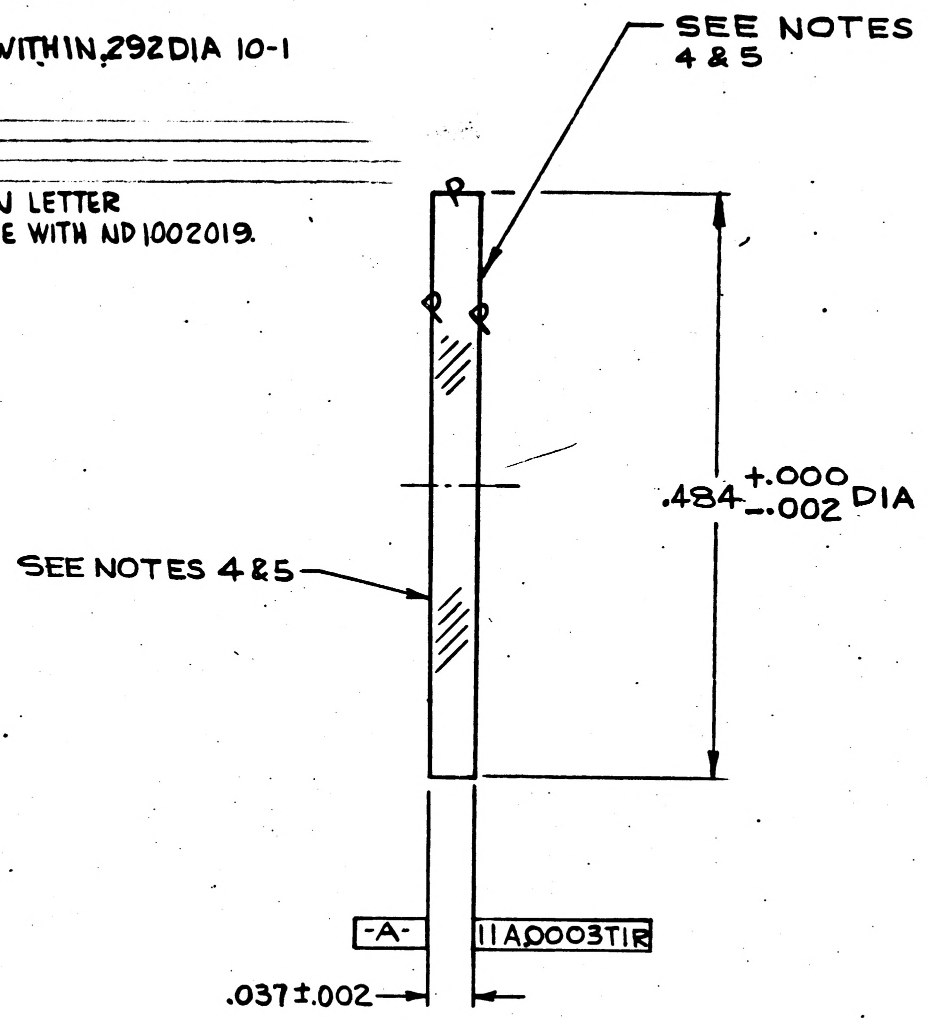
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3- GLASS- TO BE IN ACCORD WITH GOVT SPEC JAN-G-174 TYPE 573-574, GRADE C.
4- SURFACE QUALITY INNER ZONE WITHIN .292 DIA 10-1 OUTER ZONE 10-5.
5- FLATNESS 5 λ AT 5461 Å
6- SURFACES MARKED "P" POLISHED
7- COAT PER ND 1002224 (ALL OVER)
8- IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019. (BAGGING)



2011592

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011594	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910080

DRAWN DATE 4-3-64
CHECKED 5/28/64
APPROVAL 5/26/64
APPROVAL 6-12-64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: WINDOW, RETICLE, ELEMENT, SXT

CODE IDENT NO.
SIZE: C
NASA NUMBER: 2011592
SCALE 10/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

-||-
ACTUAL SIZE

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011593

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. GLASS- TO BE IN ACCORD WITH GOVT SPEC JAN-G-174 TYPE NO. 573-574, GRADE C.
4. SURFACE QUAL. INNER ZONE = .292 DIA 10-1, OUTER ZONE 10-5.
5. FLATNESS 5 λ AT 5461 Å.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION ⟶ A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 (ALL OVER) BEFORE ENGRAVING
9. ENGRAVING ON THIS SURFACE.
10. IDENTIFY USING NASA DWG. NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019 (BAGGING).

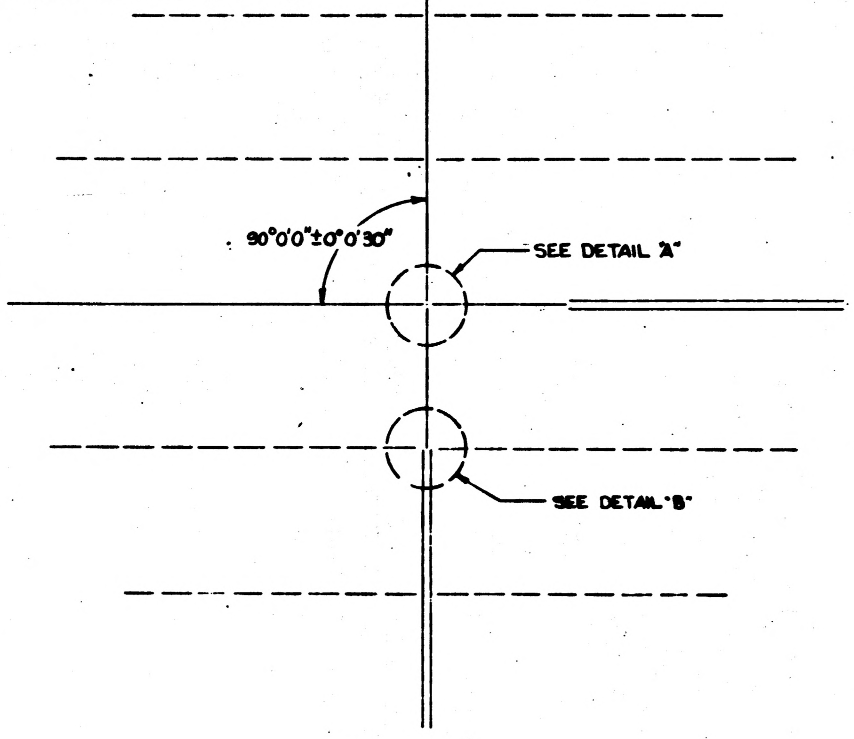
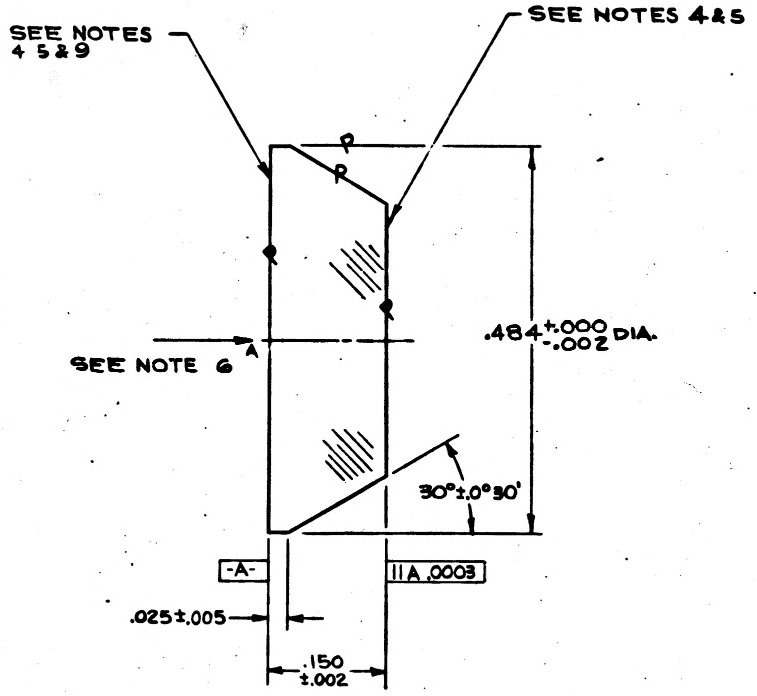
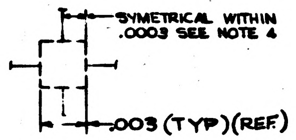
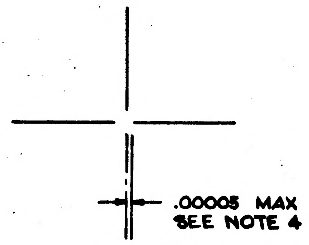


FIGURE A

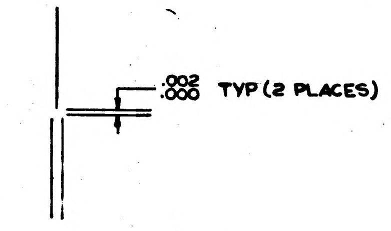




ENLARGED VIEW OF CENTER SPACING



DETAIL "A"



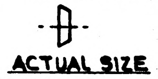
DETAIL "B"

ENGRAVING NOTES:

1- ALL LINE WIDTHS = .00025 ±.00005
2- DASH LINE LENGTHS = .010 ±.001
3- SPACING BETWEEN DASHES = .003 ±.001
4- CENTER SPACING = .003 ±.001 SYMETRICAL WITHIN .0003 EACH SIDE OF ℄. NO OFFSET OF LINES EXCEEDING .00005 AT CENTER GAP
5- SPACING ℄ TO ℄ OF DOUBLE LINES = .003 ±.0003 SYMMETRICAL WITHIN .00005
6- START OF DOUBLE LINES FROM CENTER = .050 ±.005
7- DISTANCE OF DASH LINE FROM CENTER = .050 ±.005 & .100 ±.005
8- DASH LINES TO BE .003 ±.001 AWAY FROM CENTER LINE AND DOUBLE LINE.

9- WHITE OPAQUE FILLER IN ENGRAVING (TITANIUM DIOXIDE IN ANY CONVENIENT VEHICLE).
10- DIA = .292 ±.005. OVER ENDS OF LINES
11- PATTERN CONCENTRIC WITH .484 DIA WITHIN .002 T.I.R.

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011594	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910070
DRAWN DATE 4-3-64
CHECKED 5/28/64
APPROVAL
APPROVAL E. [illegible] 6-12-64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT, ENGRAVED, SXT

CODE IDENT NO. | SIZE D | NASA NUMBER 2011593
SCALE AS NOTED | WEIGHT CALC ACTUAL | SHEET 1 OF 1

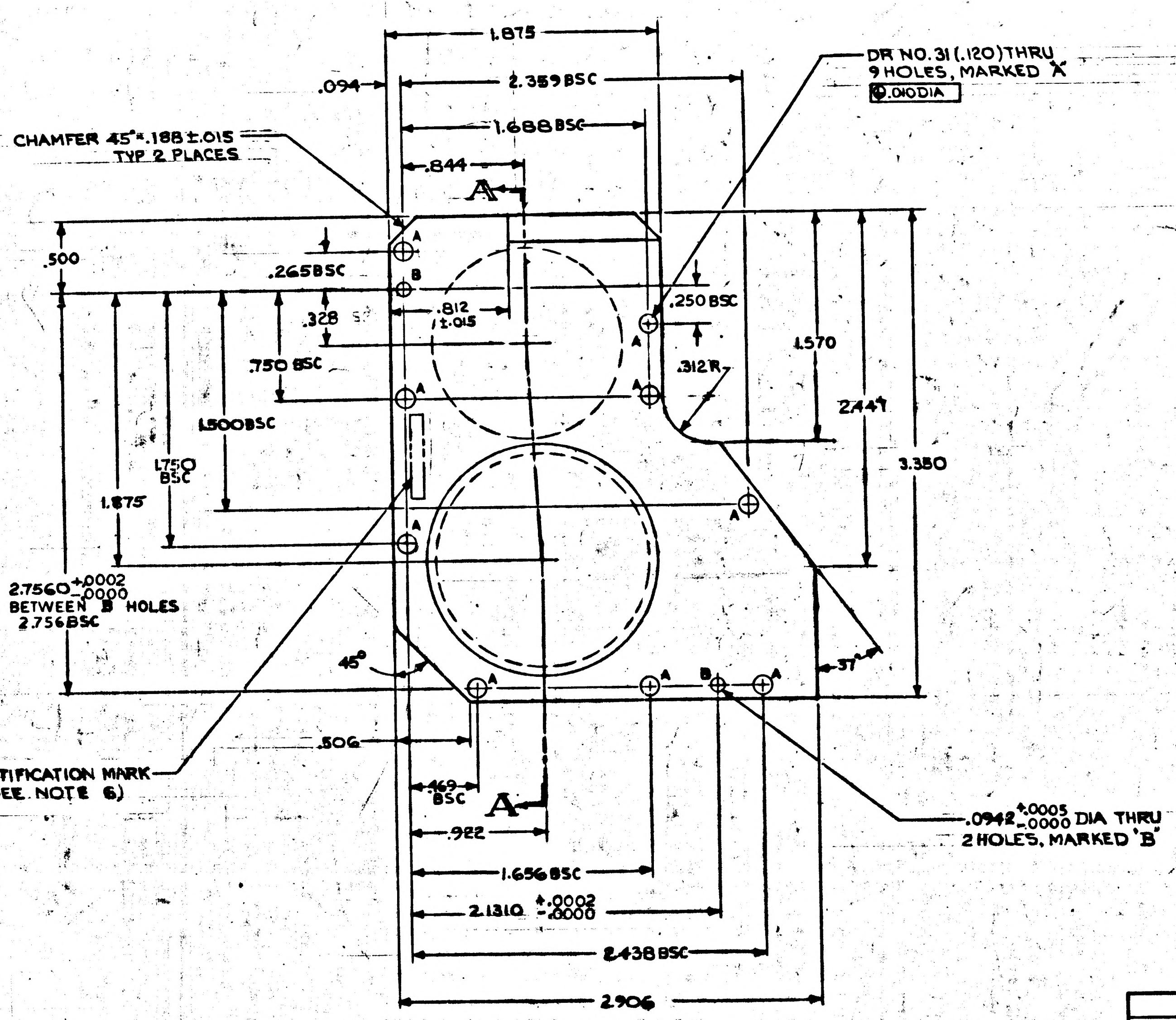
2011593

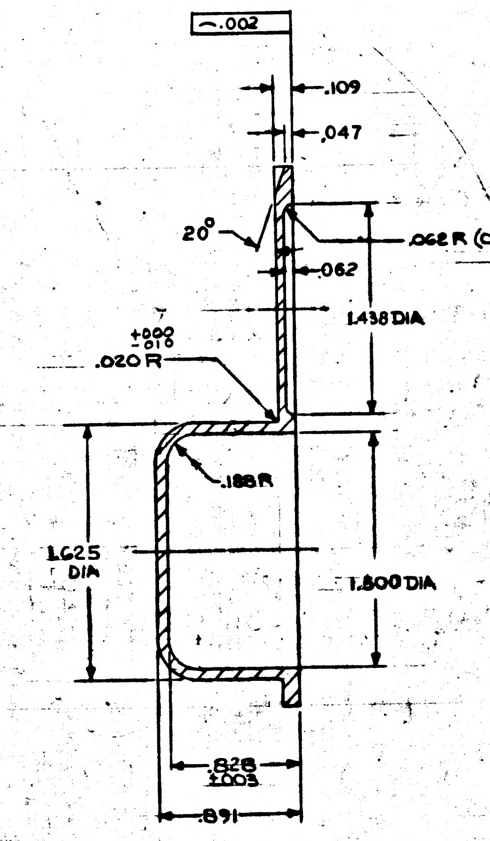
2011595 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12844	9/23/64	UK

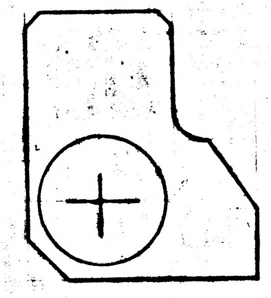
REVISIONS 10420

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002079.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ALODINE 1200 PER MIL-C-5541 (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
7. THIS PART TO BE MATED WITH PART NO. 2011600.


1.875
.094
2.359 BSC
1.688 BSC
.844
CHAMFER 45° × .188 ± .015 TYP 2 PLACES
DR NO. 31 (.120) THRU 9 HOLES, MARKED 'A'
⊕ .010 DIA
A
B
.500
.265 BSC
.328
.812 ±.015
.250 BSC
.750 BSC
.312 R
1.570
2.447
3.380
1.500 BSC
1.750 BSC
1.875
2.7560 +.0002 −.0000 BETWEEN B HOLES
2.756 BSC
45°
37°
.506
IDENTIFICATION MARK (SEE NOTE 6)
.469 BSC
.922
.0942 +.0005 −.0000 DIA THRU 2 HOLES, MARKED 'B'
1.656 BSC
2.1310 +.0002 −.0000
2.438 BSC
2.906


.002
.109
.047
20°
.062 R (OPTIONAL)
.062
1.438 DIA
.020 R +.000 −.010
.188 R
1.625 DIA
1.800 DIA
.828 ±.003
.891

SECTION A-A



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
~~TEMPER~~ T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910220

DRAWN [illegible] DATE 1-2-64
CHECKED T. SULLIVAN 3-27-64
APPROVAL [illegible] 6/1/64
APPROVAL [illegible] 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER, GEARBOX

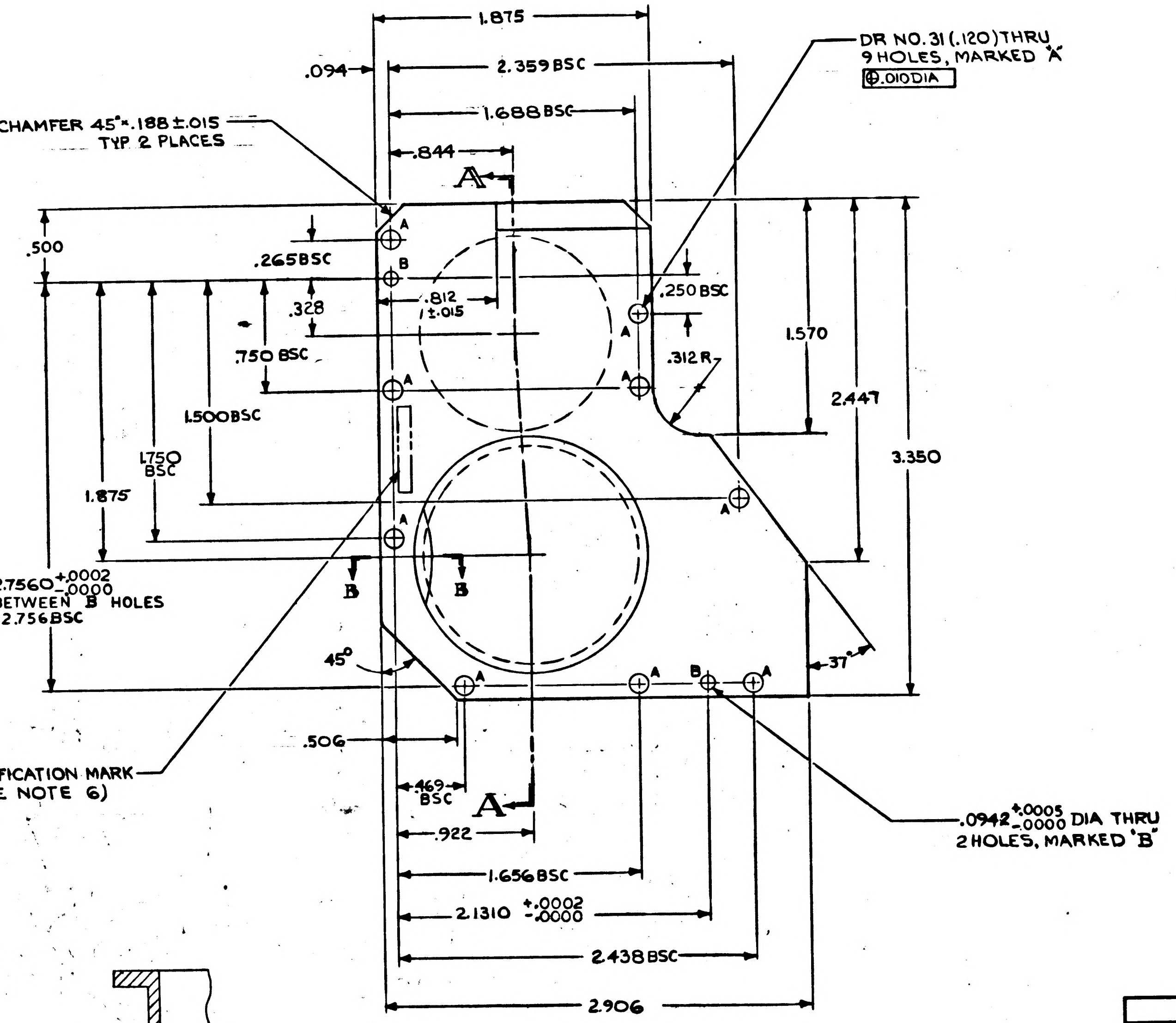
CODE IDENT NO.
SIZE D
NASA NUMBER 2011595
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

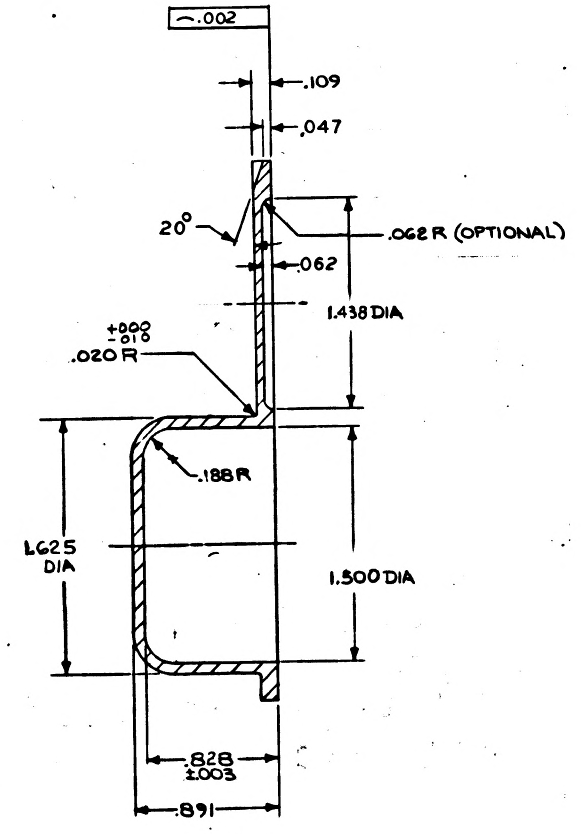
MASTER

2011595 B

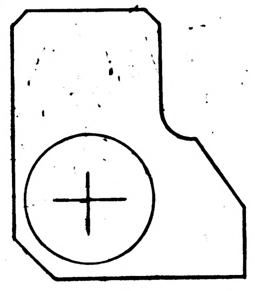
REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12844	9/23/64	UK.
B		REVISED PER TDRR 18869	5/11/65	wk

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002079.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ALODINE 1200 PER MIL-C-5541 (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
7. THIS PART TO BE MATED WITH PART NO. 2011600.

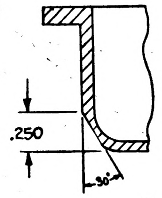

1.875
.094
2.359 BSC
1.688 BSC
.844
CHAMFER 45° × .188 ± .015 TYP 2 PLACES
DR NO. 31 (.120) THRU 9 HOLES, MARKED 'A'
⊕ .010 DIA
A
A
.500
.265 BSC
.328
.812 ±.015
.250 BSC
.312 R
.750 BSC
1.500 BSC
1.750 BSC
1.875
1.570
2.447
3.350
2.7560 +.0002 -.0000 BETWEEN 'B' HOLES 2.756 BSC
B
B
45°
37°
.506
.469 BSC
.922
IDENTIFICATION MARK (SEE NOTE 6)
.0942 +.0005 -.0000 DIA THRU 2 HOLES, MARKED 'B'
1.656 BSC
2.1310 +.0002 -.0000
2.438 BSC
2.906


⌒ .002
.109
.047
20°
.062 R (OPTIONAL)
.062
1.438 DIA
+.000 -.010
.020 R
.188 R
1.625 DIA
1.500 DIA
.828 ±.003
.891

SECTION A-A



ACTUAL SIZE



SECTION B-B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910220

DRAWN E. DRAPALA DATE 1-2-64
CHECKED T. SULLIVAN 3-27-64
APPROVAL 6/1/64
APPROVAL E. [illegible] 6/22/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER, GEARBOX

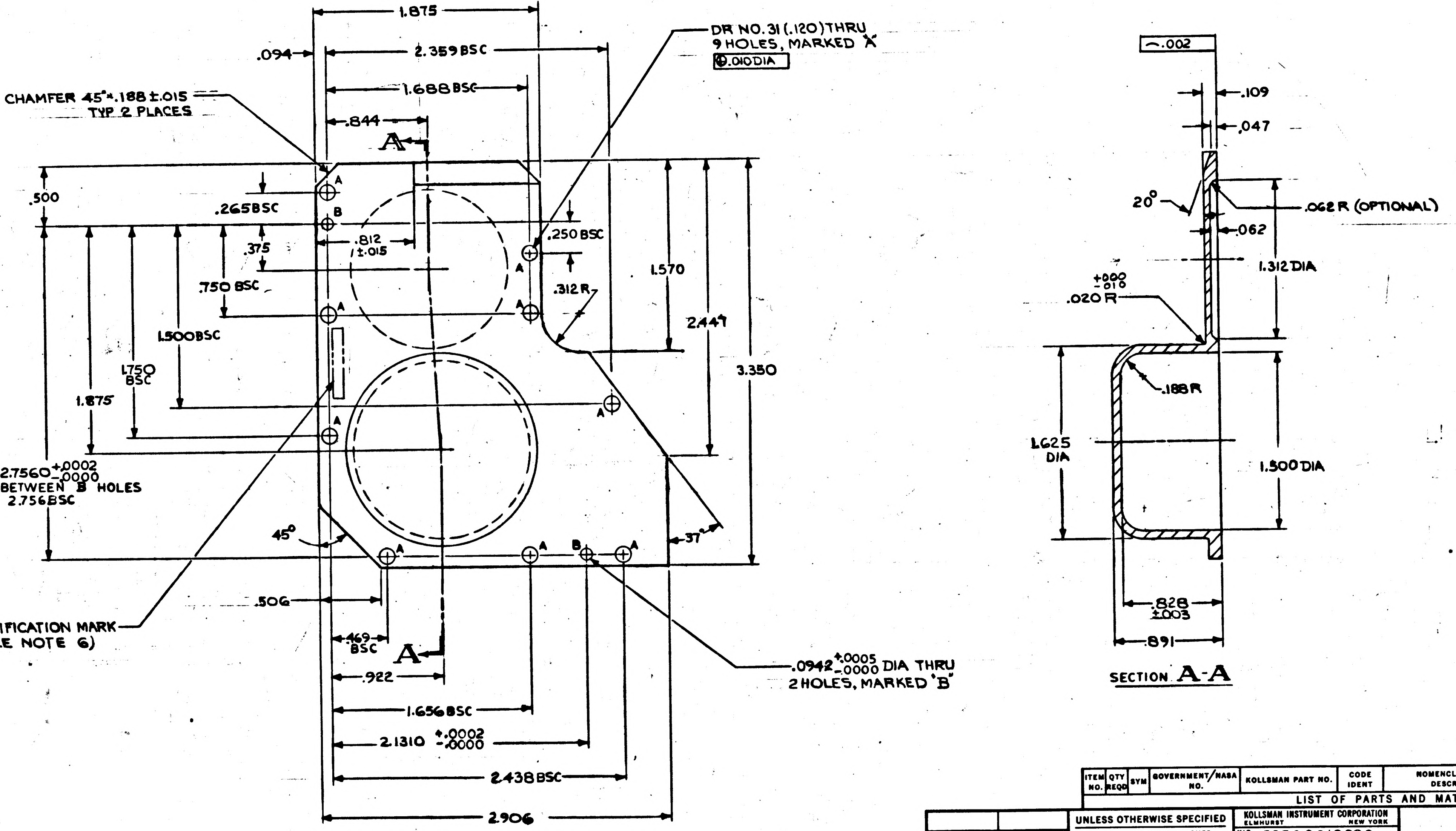
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011595
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

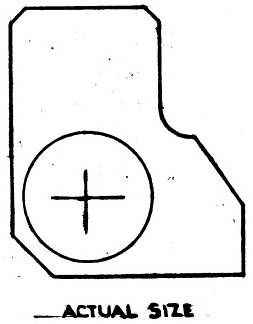
MASTER

2011595

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002079.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ALODINE 1200 PER MIL-C-5541 (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
7. THIS PART TO BE MATED WITH PART NO. 2011600.


1.875
.094
2.359 BSC
1.688 BSC
.844
CHAMFER 45° × .188 ± .015 TYP 2 PLACES
A
DR NO. 31 (.120) THRU 9 HOLES, MARKED 'A'
⊕ .010 DIA
.500
.265 BSC
B
.812 ±.015
.250 BSC
.375
.750 BSC
.312 R
1.570
2.447
3.350
1.500 BSC
1.750 BSC
1.875
2.7560 +.0002 -.0000 BETWEEN 'B' HOLES 2.756 BSC
45°
.37
.506
IDENTIFICATION MARK (SEE NOTE 6)
.469 BSC
.922
.0942 +.0005 -.0000 DIA THRU 2 HOLES, MARKED 'B'
1.656 BSC
2.1310 +.0002 -.0000
2.438 BSC
2.906
⌒ .002
.109
.047
20°
.062 R (OPTIONAL)
.062
1.312 DIA
+.000 -.010 .020 R
.188 R
1.625 DIA
1.500 DIA
.828 ±.003
.891
SECTION A-A



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910220

DRAWN [illegible] DATE 1-2-64
CHECKED J. SULLIVAN 3-27-64
APPROVAL [illegible] 6/1/64
APPROVAL [illegible] 6/22/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER, GEARBOX

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011595

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

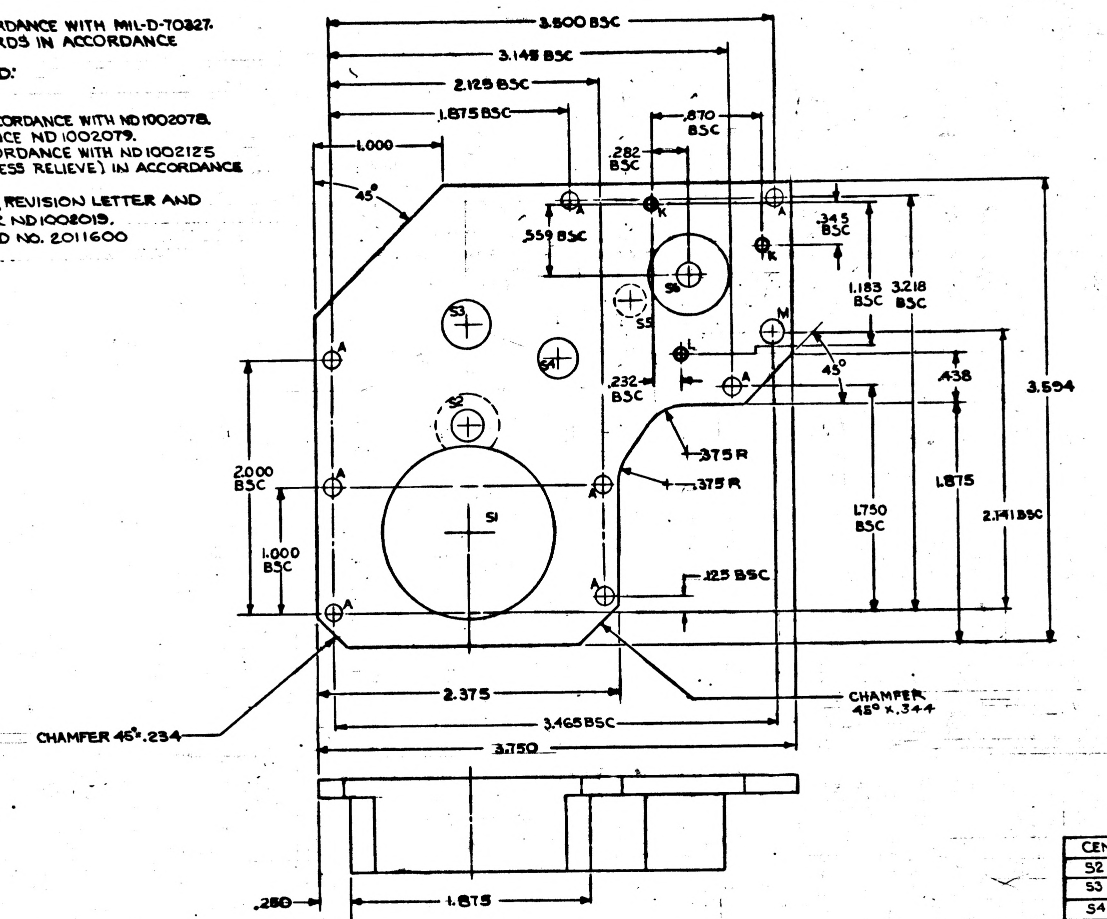
2011595

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

9651102

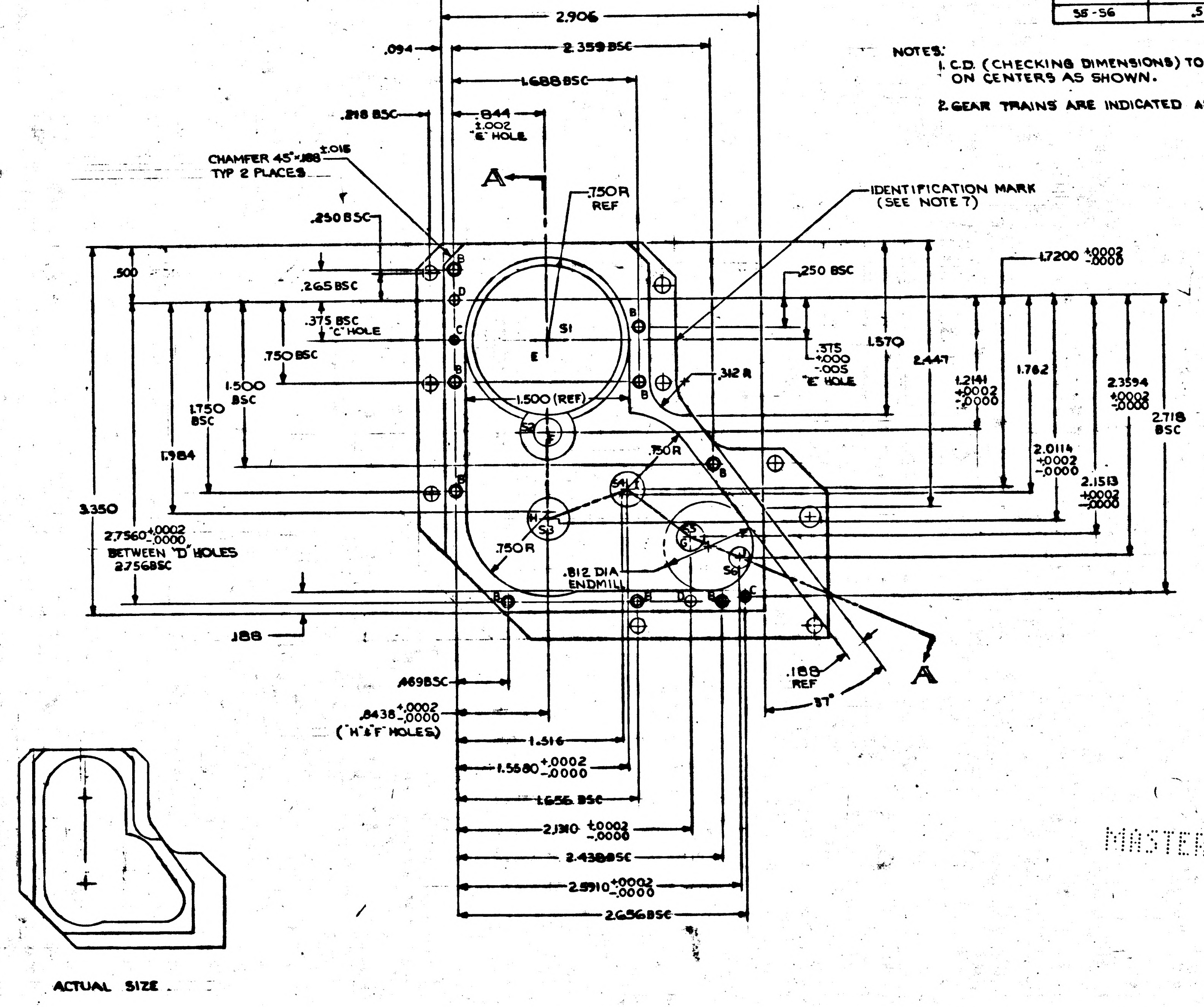
REVISIONS TDRR 10680				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14043		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE ND 1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
8. THIS PART TO BE MATED WITH ND NO. 2011600

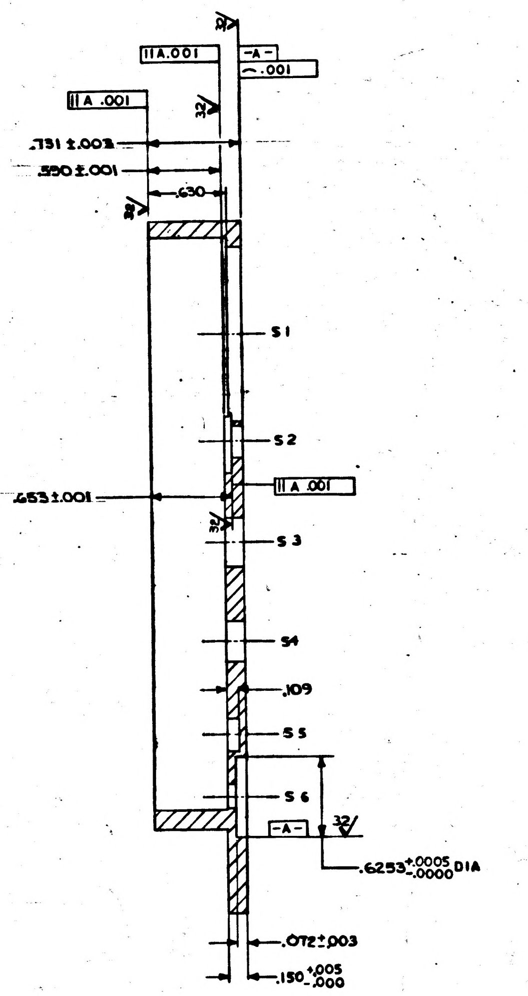

3.500 BSC
3.145 BSC
2.125 BSC
1.875 BSC
1.000
45°
.870 BSC
.282 BSC
.559 BSC
.345 BSC
1.183 BSC
3.218 BSC
3.594
.232 BSC
.438
.375 R
1.875
1.750 BSC
2.141 BSC
2.000 BSC
1.000 BSC
.125 BSC
S1
S2
S3
S4
S5
S6
2.375
3.465 BSC
3.750
CHAMFER 45°×.234
CHAMFER 45°×.344
.250

CENTER	(C.D.) CHECKING DIM
S2 - S3	.7971 - .7975
S3 - S4	.7710 - .7716
S4 - S5	.7169 - .7175
S5 - S6	.5046 - .5052

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE. ON CENTERS AS SHOWN.
2. GEAR TRAINS ARE INDICATED AS SHOWN.


1.875
2.906
.094
2.359 BSC
1.688 BSC
.218 BSC
.844 ±.002 "E" HOLE
CHAMFER 45°×.188 ±.015 TYP 2 PLACES
A
.750 R REF
IDENTIFICATION MARK (SEE NOTE 7)
.250 BSC
.500
.265 BSC
.375 BSC "C" HOLE
.750 BSC
1.500 BSC
1.750 BSC
1.984
3.350
1.500 (REF)
.250 BSC
.375 +.000 -.005 "E" HOLE
1.570
2.447
1.7200 +.0002 -.0000
1.2141 +.0002 -.0000
1.762
2.3594 +.0002 -.0000
2.718 BSC
2.0114 +.0002 -.0000
2.1513 +.0002 -.0000
.312 R
.750 R
2.7560 +.0002 -.0000 BETWEEN "D" HOLES
2.756 BSC
.812 DIA ENDMILL
.188
.188 REF
37°
.469 BSC
.8438 +.0002 -.0000 ("H" & "F" HOLES)
1.516
1.5680 +.0002 -.0000
1.656 BSC
2.1310 +.0002 -.0000
2.438 BSC
2.5910 +.0002 -.0000
2.656 BSC

ACTUAL SIZE


-A-
.001
.001
.731 ±.002
.550 ±.001
.630
S1
S2
.001
.453 ±.001
S3
S4
.109
S5
S6
-A-
32
.6253 +.0005 -.0000 DIA
.072 ±.003
.150 +.005 -.000

SECTION A-A

HOLE DATA				
HOLE	DESCRIPTION	FINISH	QTY	
A	DR NO. 29 (.136) THRU		8	⊕.010 DIA
B	DR NO. 44 (.086) × .375 DEEP CSK 90° ±0°/5° TO .120 DIA. 3-48NC-3B × .250 DEEP		9	⊕.010 DIA
C	DR. NO. 49 (.073) × .438 DEEP CSK 90° ±0°/5° TO .109 DIA 2-56NC-3B × .328 DEEP		2	⊕.004 DIA
D	.0942 +.0005 -.0000 DIA × .281 DEEP	32√	2	
E	1.360 +.003 -.000 DIA THRU CBORE 1.500 DIA TO DEPTH SHOWN IN SECTION A-A		1	
F	.2501 +.0003 -.0000 DIA THRU CBORE 1.000 DIA TO DEPTH SHOWN IN SECTION A-A	32√	1	
G	.2501 +.0003 -.0000 DIA TO DEPTH SHOWN	32√	1	
H	.3751 +.0003 -.0000 DIA THRU	32√	1	
I	.3126 +.0003 -.0000 DIA THRU	32√	1	
J	DR 3/16 (.1875) THRU CBORE OPPOSITE SIDE AS SHOWN IN SECTION A-A		1	
K	DR NO. 44 (.086) THRU CSK 90° ±0°/5° TO .120 DIA. 3-48 NC-3B THRU		2	⊕A.010 DIA
L	DR NO. 44 (.086) × .286 DEEP CSK 90° ±0°/5° TO .120 DIA. 3-48NC-3B × .160 DEEP		2	⊕A.010 DIA
M	DR 3/16 (.1875) THRU		1	⊕.010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910200
DRAWN E.DRABALA DATE 12-30-63
CHECKED T. Sullivan 3-30-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

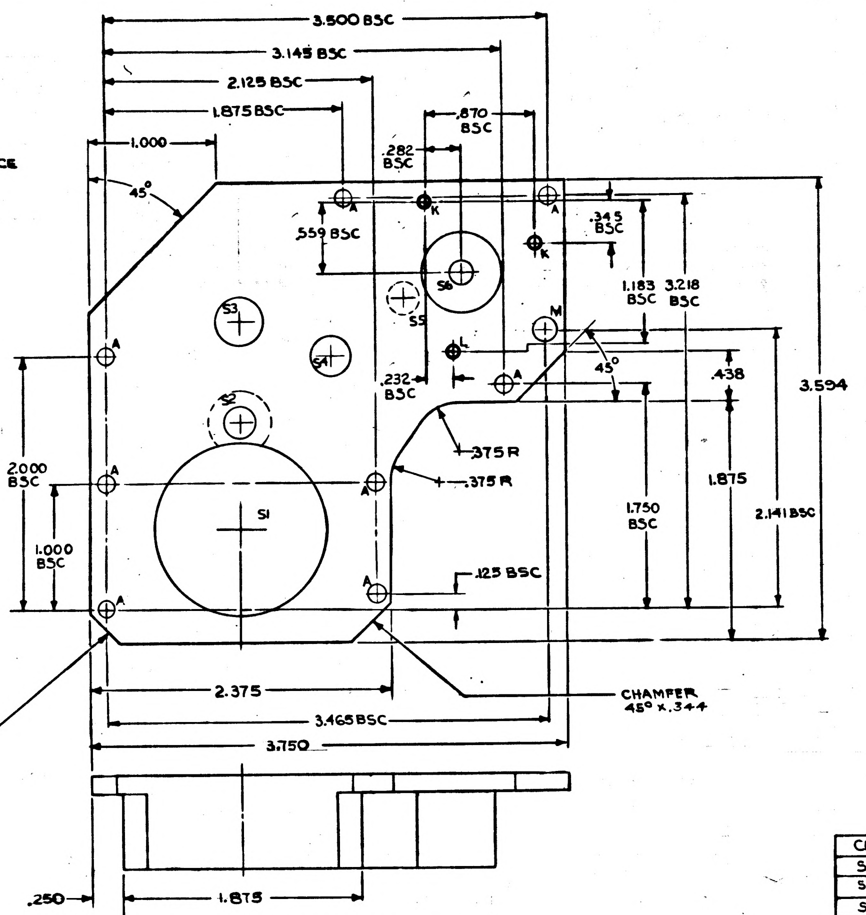
TITLE
HOUSING, GEAR
(SEXTANT TRUNNION DRIVE)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011596
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63/ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE ND 1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
8. THIS PART TO BE MATED WITH ND NO. 2011600

B | 2011596

REVISIONS TDRR 10680				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14043	4 Nov 64	WK
B		REVISED PER TDRR NO. 15172	1/6/65	WK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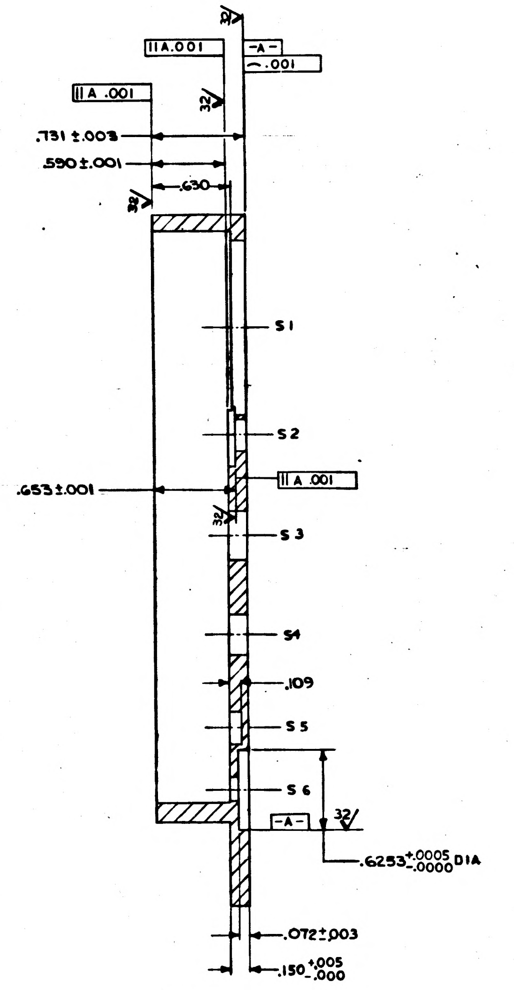
3.145 BSC
2.125 BSC
1.875 BSC
1.000
.870 BSC
.282 BSC
45°
.559 BSC
.345 BSC
1.183 BSC
3.218 BSC
3.594
.232 BSC
.438
.375 R
.375 R
2.000 BSC
1.000 BSC
1.750 BSC
1.875
2.141 BSC
.125 BSC
S1
S2
S3
S4
S5
S6
A
K
M
L
2.375
3.465 BSC
3.750
CHAMFER 45° x .344
CHAMFER 45° x .234
.250
1.875

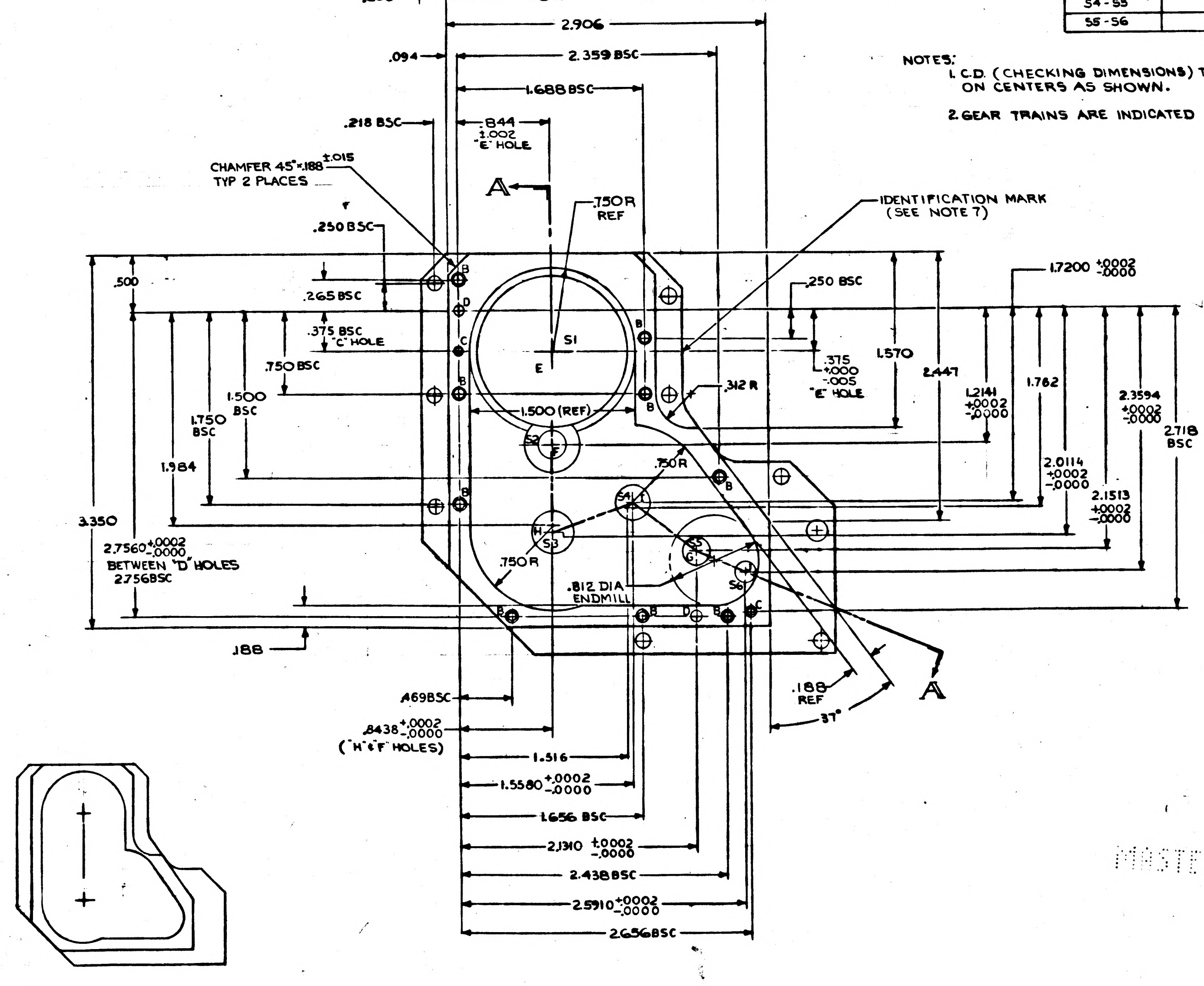
CENTER	(C.D.) CHECKING DIM
S2 - S3	.7971 - .7975
S3 - S4	.7710 - .7716
S4 - S5	.7169 - .7175
S5 - S6	.5046 - .5052

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE. ON CENTERS AS SHOWN.

2. GEAR TRAINS ARE INDICATED AS SHOWN — - - —.


IIA .001
-A-
.001
32/
IIA .001
.731 ± .003
.590 ± .001
.630
S1
S2
S3
S4
S5
S6
.653 ± .001
IIA .001
.109
-A-
.6253 +.0005 -.0000 DIA
.072 ± .003
.150 +.005 -.000

SECTION A-A


2.906
.094
2.359 BSC
1.688 BSC
.218 BSC
.844 ±.002 "E" HOLE
CHAMFER 45° x .188 ±.015 TYP 2 PLACES
A
.750 R REF
IDENTIFICATION MARK (SEE NOTE 7)
.250 BSC
.500
.265 BSC
.375 BSC "C" HOLE
.750 BSC
1.500 BSC
1.750 BSC
1.984
3.350
2.7560 +.0002 -.0000 BETWEEN "D" HOLES
2.756 BSC
.250 BSC
.375 +.000 -.005 "E" HOLE
1.570
2.447
1.7200 +.0002 -.0000
1.2141 +.0002 -.0000
1.762
2.3594 +.0002 -.0000
2.718 BSC
2.0114 +.0002 -.0000
2.1513 +.0002 -.0000
.312 R
1.500 (REF)
.750 R
.750 R
.812 DIA ENDMILL
S1
S2
S3
S4
S5
S6
E
.188
.469 BSC
.8438 +.0002 -.0000 ("H" & "F" HOLES)
1.516
1.5580 +.0002 -.0000
1.656 BSC
2.1310 +.0002 -.0000
2.438 BSC
2.5910 +.0002 -.0000
2.656 BSC
.188 REF
37°
A
ACTUAL SIZE

HOLE DATA				
HOLE	DESCRIPTION	FINISH	QTY	
A	DR NO. 29 (.136) THRU		8	⊕.010 DIA
B	DR NO. 44 (.086) x .375 DEEP CSK 90° +0° -5° TO .120 DIA. 3-48 NC-3B x .250 DEEP		9	⊕.010 DIA
C	DR. NO. 49 (.073) x .375 DEEP CSK 90° +0° -5° TO .109 DIA 2-56 NC-3B x .265 DEEP		2	⊕.004 DIA
D	.0942 +.0005 -.0000 DIA x .281 DEEP	32/	2	
E	1.360 +.003 -.000 DIA THRU C'BORE 1.500 DIA TO DEPTH SHOWN IN SECTION A-A		1	
F	.2501 +.0003 -.0000 DIA THRU CBORE .500 DIA TO DEPTH SHOWN IN SECTION A-A	32/	1	
G	.2501 +.0003 -.0000 DIA TO DEPTH SHOWN	32/	1	
H	.3751 +.0003 -.0000 DIA THRU	32/	1	
I	.3126 +.0003 -.0000 DIA THRU	32/	1	
J	DR 3/16 (.1875) THRU CBORE OPPOSITE SIDE AS SHOWN IN SECTION A-A		1	
K	DR NO. 44 (.086) THRU CSK 90° +0° -5° TO .120 DIA. 3-48 NC-3B THRU		2	⊕A.010 DIA
L	DR NO. 44 (.086) x .286 DEEP CSK 90° +0° -5° TO .120 DIA. 3-48 NC-3B x .160 DEEP		1	⊕A.010 DIA
M	DR 3/16 (.1875) THRU		1	⊕.010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910200
DRAWN E. DRAPALA DATE 12-30-63
CHECKED J. SULLIVAN 3-30-64
APPROVAL 6/1/64
APPROVAL 6/3/64
NASA APPROVAL
MIT APPROVAL

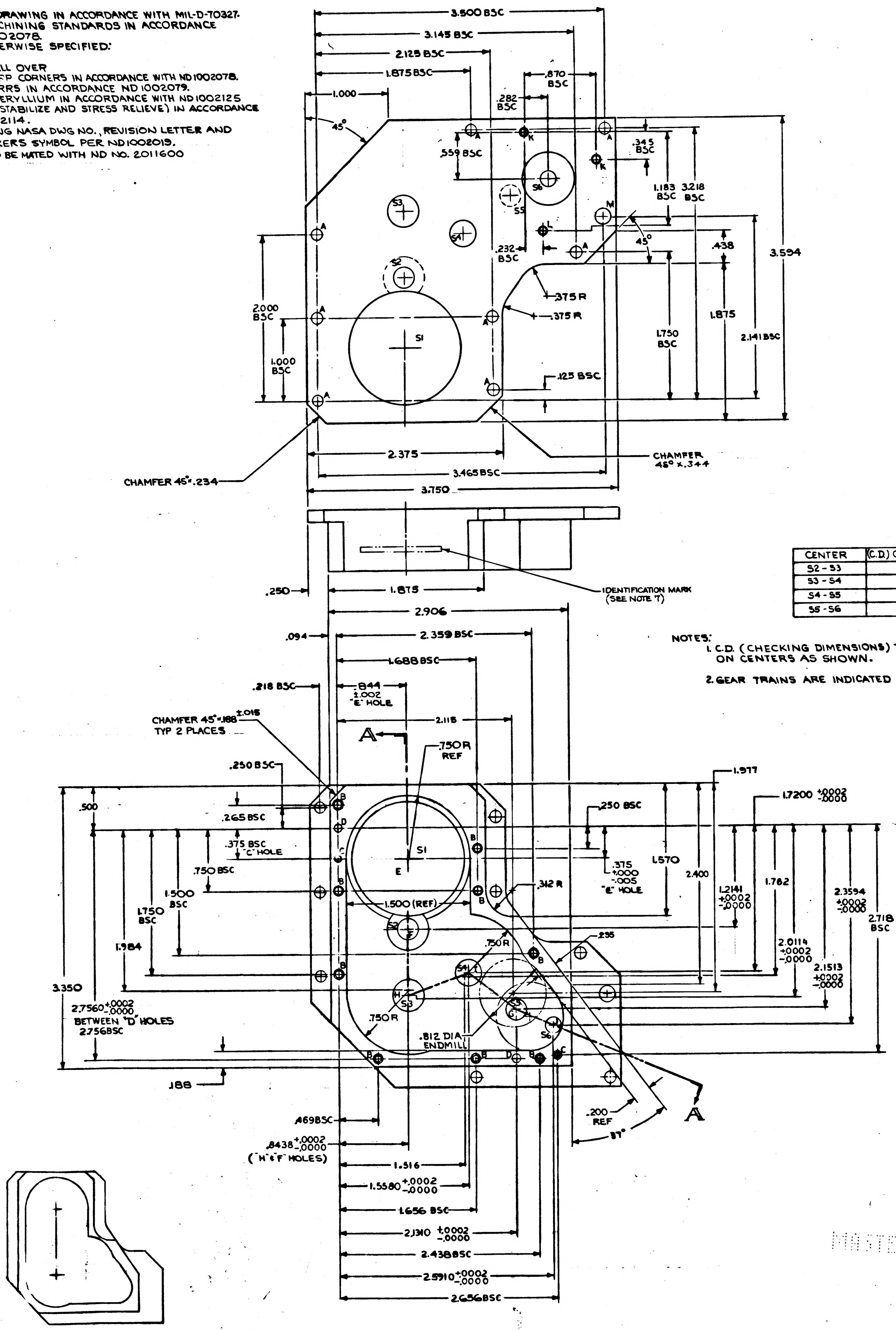
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
(SEXTANT TRUNNION DRIVE)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011596
SCALE 2/1
WEIGHT
CAL. ACTUAL
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 10680				
A		REVISED PER TDRR NO. 14043	4/Nov 64	WK
B		REVISED PER TDRR NO. 15372	1/14/65	WK.
C		REVISED PER TDRR NO. 15073	5/6/65	WK.

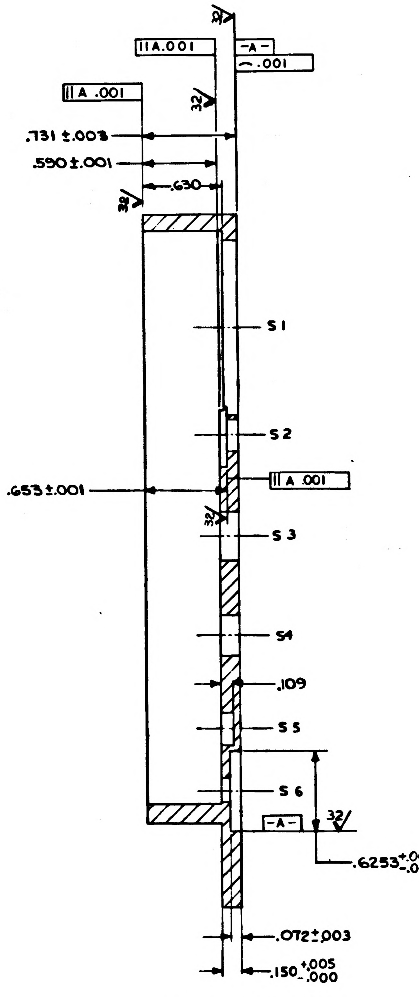
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) $\sqrt{}^{63}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE ND 1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
8. THIS PART TO BE MATED WITH ND NO. 2011600



3.500 BSC
3.145 BSC
2.125 BSC
1.875 BSC
1.000
45°
.870 BSC
.282 BSC
.559 BSC
.345 BSC
1.183 BSC
3.218 BSC
3.594
.438
45°
.232 BSC
.375 R
.375 R
1.750 BSC
1.875
2.141 BSC
2.000 BSC
1.000 BSC
.125 BSC
S1
S2
S3
S4
S5
S6
A
K
L
M
2.375
3.465 BSC
3.750
CHAMFER 45°×.234
CHAMFER 45°×.344
.250
1.875
IDENTIFICATION MARK (SEE NOTE 7)
2.906
.094
2.359 BSC
1.688 BSC
.218 BSC
.844 ±.002 "E" HOLE
2.115
CHAMFER 45°×.188 ±.015 TYP 2 PLACES
A
.750 R REF
.250 BSC
.500
.265 BSC
.375 BSC "C" HOLE
.750 BSC
1.500 BSC
1.750 BSC
1.984
3.350
2.7560 +.0002 -.0000 BETWEEN "D" HOLES 2.756BSC
.188
1.977
1.7200 +.0002 -.0000
.250 BSC
.375 +.000 -.005 "E" HOLE
1.570
2.400
1.2141 +.0002 -.0000
1.782
2.3594 +.0002 -.0000
2.718 BSC
2.0114 +.0002 -.0000
2.1513 +.0002 -.0000
.312 R
1.500 (REF)
.295
.750 R
.750 R
.812 DIA ENDMILL
B
C
D
E
F
G
H
J
.200 REF
37°
A
.469BSC
.8438 +.0002 -.0000 ("H" & "F" HOLES)
1.516
1.5580 +.0002 -.0000
1.656 BSC
2.1310 +.0002 -.0000
2.438BSC
2.5910 +.0002 -.0000
2.656BSC
ACTUAL SIZE

CENTER	(C.D.) CHECKING DIM
S2 - S3	.7971 - .7975
S3 - S4	.7710 - .7716
S4 - S5	.7169 - .7175
S5 - S6	.5046 - .5052

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE. ON CENTERS AS SHOWN.
2. GEAR TRAINS ARE INDICATED AS SHOWN ——-- ——.



32
A .001
-A-
.001
A .001
.731 ±.003
.590 ±.001
.630
S1
S2
A .001
.653 ±.001
S3
S4
.109
S5
S6
-A-
.6253 +.0005 -.0000 DIA
.072 ±.003
.150 +.005 -.000

SECTION A-A

HOLE DATA				
HOLE	DESCRIPTION	FINISH	QTY	
A	DR NO. 29 (.136) THRU		8	⊕.010 DIA
B	DR NO.44 (.086) × .375 DEEP CSK 90° +0° -5° TO .120 DIA. 3-48NC-3B × .250DEEP		9	⊕.010 DIA
C	DR. NO. 49 (.073) × .375 DEEP CSK 90° +0° -5° TO .109 DIA 2-56NC-3B × .265 DEEP		2	⊕.004 DIA
D	.0942 +.0005 -.0000 DIA × .281 DEEP	$\sqrt{}^{32}$	2	
E	1.360 +.005 -.000 DIA THRU CBORE 1.500 DIA TO DEPTH SHOWN IN SECTION A-A		1	
F	.2501 +.0003 -.0000 DIA THRU CBORE .500 DIA TO DEPTH SHOWN IN SECTION A-A	$\sqrt{}^{32}$	1	
G	.2501 +.0003 -.0000 DIA TO DEPTH SHOWN	$\sqrt{}^{32}$	1	
H	.3751 +.0003 -.0000 DIA THRU	$\sqrt{}^{32}$	1	
I	.3126 +.0003 -.0000 DIA THRU	$\sqrt{}^{32}$	1	
J	DR 3/16 (.1875) THRU CBORE OPPOSITE SIDE AS SHOWN IN SECTION A-A		1	
K	DR NO.44 (.086) THRU CSK 90° +0° -5° TO .120 DIA. 3-48 NC-3B THRU		2	⊕A.010 DIA
L	DR NO.44 (.086) × .286 DEEP CSK 90° +0° -5° TO .120 DIA. 3-48NC-3B × .160 DEEP		1	⊕A.010 DIA
M	DR 3/16 (.1875) THRU		1	⊕.010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910200

DRAWN E. DRAPALA DATE 12-30-63
CHECKED J. SULLIVAN 3-30-64
APPROVAL 6/1/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

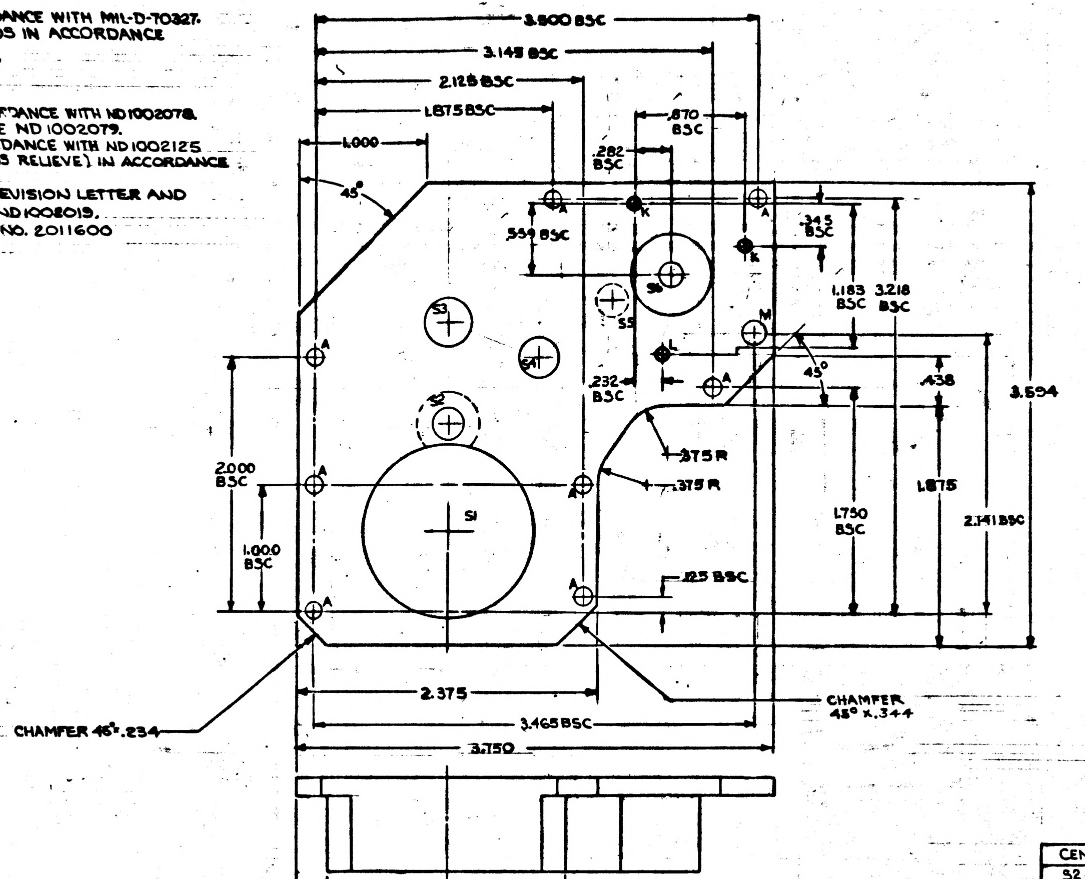
TITLE
HOUSING, GEAR
(SEXTANT TRUNNION DRIVE)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011596
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

9651103

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 10C2078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE ND 1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
8. THIS PART TO BE MATED WITH ND NO. 2011600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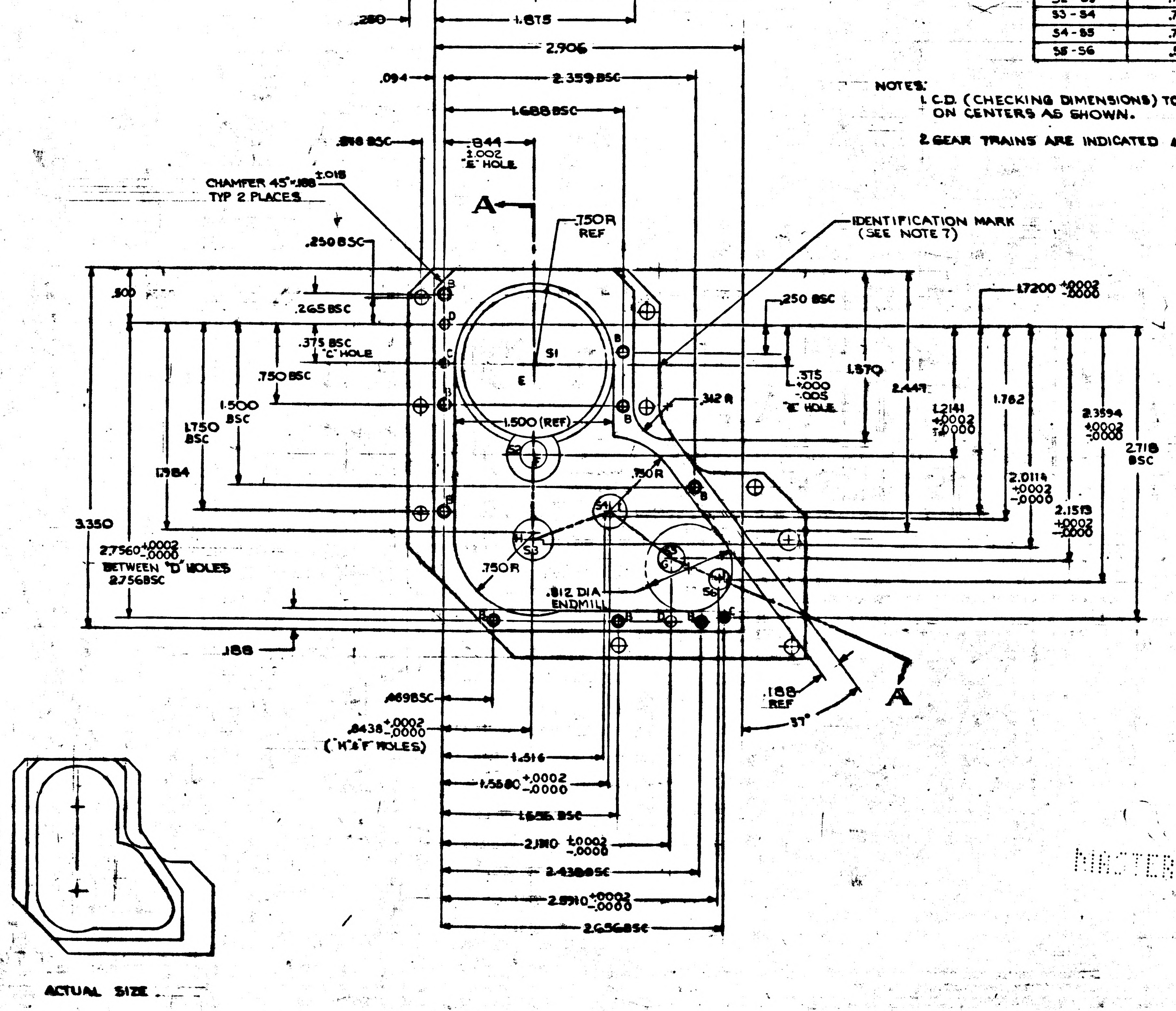
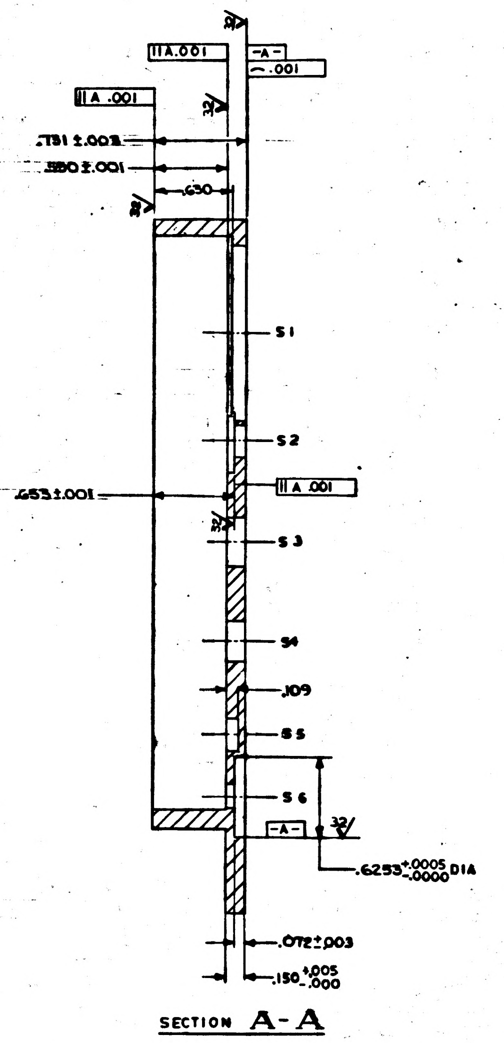
3.145 BSC
2.125 BSC
1.875 BSC
1.000
45°
.870 BSC
.282 BSC
.345 BSC
.359 BSC
1.183 BSC
3.218 BSC
3.594
.232 BSC
.438
45°
.375 R
.375 R
2.000 BSC
1.000 BSC
1.750 BSC
1.875
2.141 BSC
.125 BSC
S1
S2
S3
S4
S5
S6
CHAMFER 45° x .234
CHAMFER 45° x .344
2.375
3.465 BSC
3.750

CENTER	(C.D) CHECKING DIM
S2 - S3	.7971 - .7975
S3 - S4	.7710 - .7716
S4 - S5	.7169 - .7175
S5 - S6	.5046 - .5052

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS AS SHOWN.
2. GEAR TRAINS ARE INDICATED AS SHOWN ———.


.280
1.875
2.906
2.359 BSC
.094
1.688 BSC
.818 BSC
.844 ±.002 "E" HOLE
CHAMFER 45° x .188 2.018
TYP 2 PLACES
A
.750 R REF
IDENTIFICATION MARK (SEE NOTE 7)
.250 BSC
.265 BSC
.375 BSC "C" HOLE
.750 BSC
1.500 BSC
1.750 BSC
1.984
3.350
.500
2.7560 +.0002 -.0000 BETWEEN "D" HOLES 2.756 BSC
1.500 (REF)
S1
E
.250 BSC
.375 +.000 -.005 "E" HOLE
1.570
2.447
1.7200 +.0002 -.0000
1.2141 +.0002 -.0000
1.762
2.3594 +.0002 -.0000
2.718 BSC
2.0114 +.0002 -.0000
2.1513 +.0002 -.0000
.312 R
.750 R
.750 R
.812 DIA ENDMILL
.188
.188 REF
37°
A
.469 BSC
.8438 +.0002 -.0000 ("H" & "F" HOLES)
1.516
1.5880 +.0002 -.0000
1.656 BSC
2.1110 +.0002 -.0000
2.438 BSC
2.5910 +.0002 -.0000
2.656 BSC
ACTUAL SIZE


32
A .001
-A-
.001
A .001
.781 ±.002
.580 ±.001
.630
S1
S2
.653 ±.001
A .001
S3
S4
.109
S5
S6
-A-
.6253 +.0005 -.0000 DIA
.072 ±.003
.150 +.005 -.000

SECTION A-A

HOLE DATA				
HOLE	DESCRIPTION	FINISH	QTY	
A	DR NO. 29 (.136) THRU		8	⊕.010 DIA
B	DR NO. 44 (.086) x .375 DEEP REDRILL NO. 32 (.116) x .022 DEEP 3-48 NC-3B x .250 DEEP		9	⊕.010 DIA
C	DR. NO. 49 (.073) x .438 DEEP REDRILL NO. 38 (.1015) x .018 DEEP 2-56 NC-3B x .328 DEEP		2	⊕.004 DIA
D	.0942 +.0005 -.0000 DIA x .281 DEEP	32√	2	
E	1.360 +.003 -.000 DIA THRU CBORE 1.500 DIA TO DEPTH SHOWN IN SECTION A-A		1	
F	.2501 +.0003 -.0000 DIA THRU CBORE 1.000 DIA TO DEPTH SHOWN IN SECTION A-A	32√	1	
G	.2501 +.0003 -.0000 DIA TO DEPTH SHOWN	32√	1	
H	.3751 +.0003 -.0000 DIA THRU	32√	1	
I	.3126 +.0003 -.0000 DIA THRU	32√	1	
J	DR 3/16 (.1875) THRU CBORE OPPOSITE SIDE AS SHOWN IN SECTION A-A		1	
K	DR NO. 44 (.086) THRU REDRILL NO. 32 (.116) x .022 DEEP 3-48 NC-3B THRU		2	⊕A.010 DIA
L	DR NO. 44 (.086) x .286 DEEP REDRILL NO. 32 (.116) x .022 DEEP 3-48 NC-3B x .160 DEEP		1	⊕A.010 DIA
M	DR 3/16 (.1875) THRU		1	⊕.010 DIA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910200
DRAWN [illegible] DATE [illegible]
CHECKED J. Sullivan 3-30-64
APPROVAL [illegible] 4/1/64
APPROVAL [illegible] 4/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR
(SEXTANT TRUNNION DRIVE)

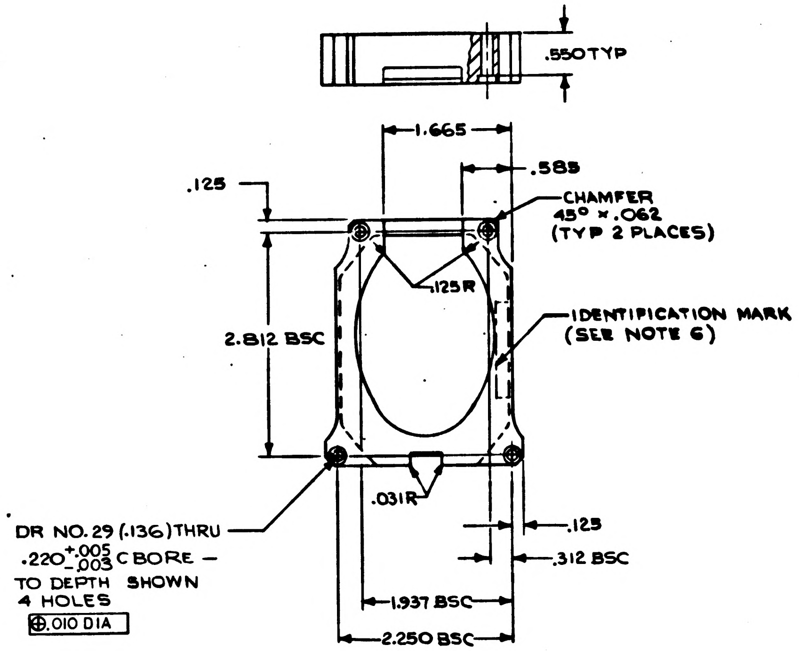
CODE IDENT NO.
SIZE E
NASA NUMBER 2011596
SCALE 2/1
WEIGHT
SHEET 1 OF 1

MASTER

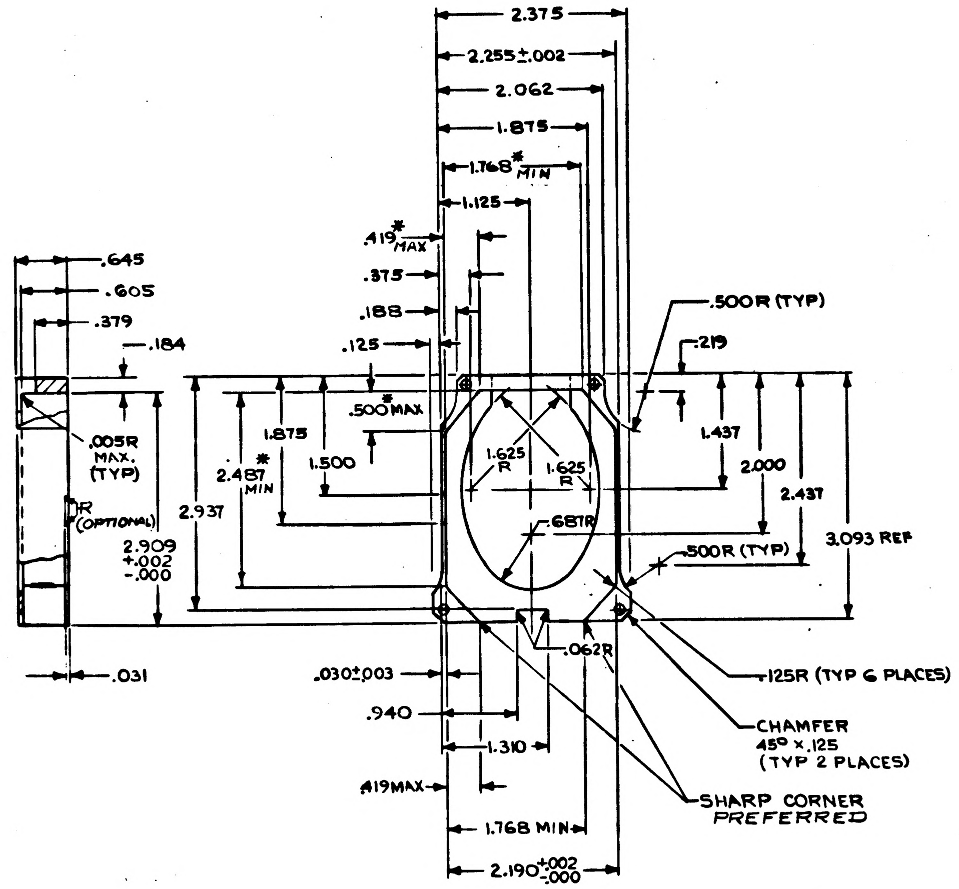
2011598

REVISIONS 10 420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE II CLASS 2 (K.P.S. 1005A.150)
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



.550 TYP
1.665
.585
.125
CHAMFER 45° × .062 (TYP 2 PLACES)
.125R
IDENTIFICATION MARK (SEE NOTE 6)
2.812 BSC
.031R
DR NO. 29 (.136) THRU .220 +.005 -.003 C BORE – TO DEPTH SHOWN 4 HOLES
⊕ .010 DIA
.125
.312 BSC
1.937 BSC
2.250 BSC



2.375
2.255±.002
2.062
1.875
1.768* MIN
1.125
.419* MAX
.375
.188
.125
.645
.605
.379
.184
.005R MAX. (TYP)
R (OPTIONAL)
2.909 +.002 -.000
.031
.500R (TYP)
.219
.500* MAX
1.875
1.500
2.487* MIN
2.937
1.625 R
1.625 R
.687R
1.437
2.000
2.437
3.093 REF
.500R (TYP)
.062R
.125R (TYP 6 PLACES)
CHAMFER 45° × .125 (TYP 2 PLACES)
SHARP CORNER PREFERRED
.030±.003
.940
1.310
.419 MAX
1.768 MIN
2.190 +.002 -.000

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910390

DRAWN J. Ruddow 4-2-64
CHECKED 4/1/64
APPROVAL 6/17/64
APPROVAL E. Thoring 6-17-64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, BEAM SPLITTER

CODE IDENT NO.
SIZE D
NASA NUMBER 2011598
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

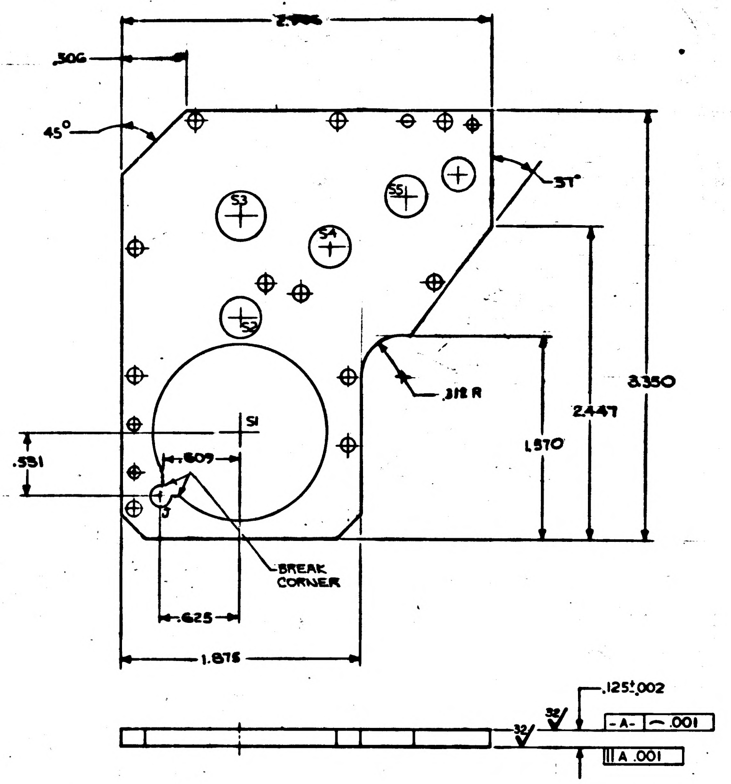
2011598

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

2011600

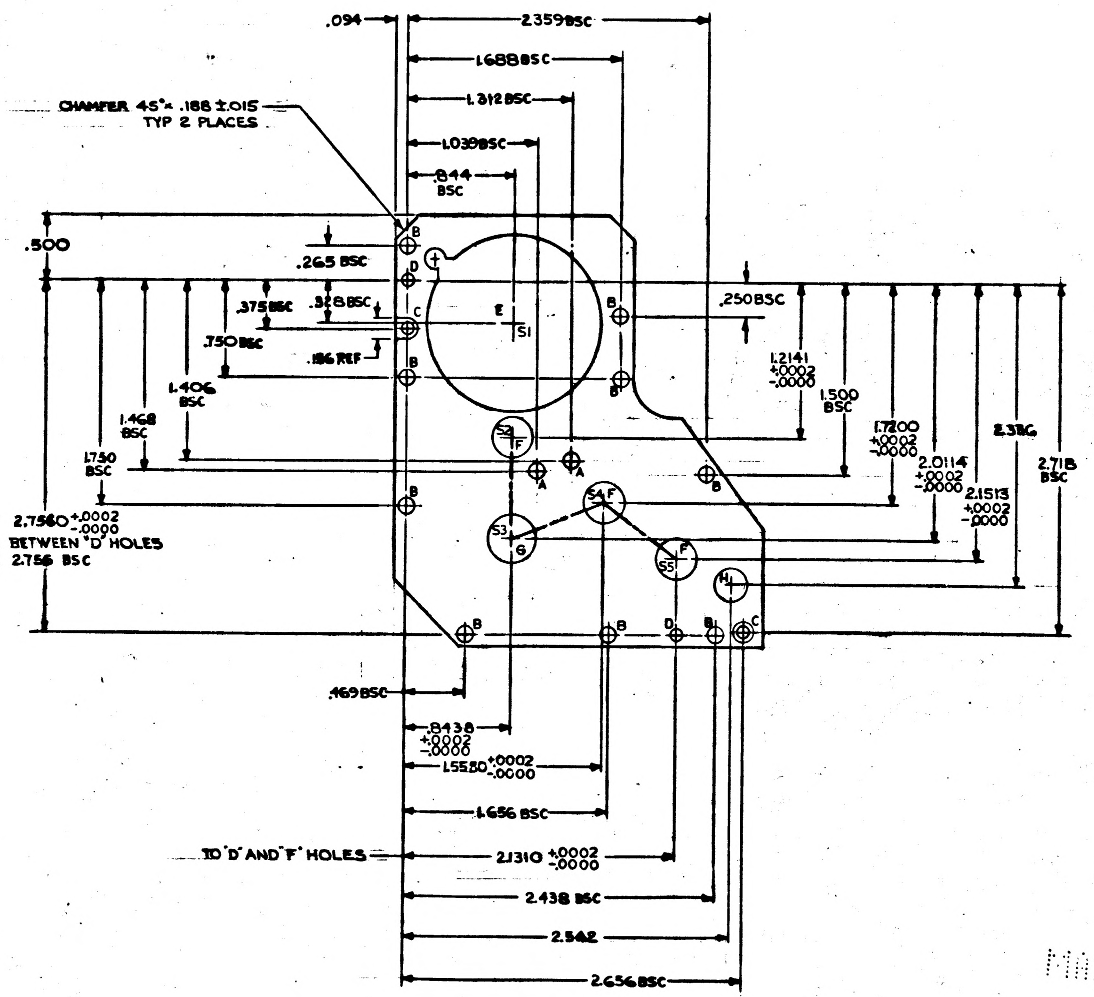
REVISIONS	DRR 10650			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE ND1002079.
5. MATERIAL: BERYLLIUM IN ACCORDANCE WITH ND1002125.
6. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114.
7. THIS PART TO BE MATED WITH PART NO. 2011595.
8. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

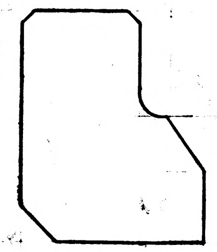

2.766
.506
45°
37°
S3
S5
S4
S2
S1
.312 R
3.350
2.447
1.570
.531
.609
J
BREAK CORNER
.625
1.875
.125±.002
32
-A-
⌒ .001
∥ A .001

CENTER	(C.D.) CHECKING DIM
S2-S3	.7971 - 7975
S3 - S4	.7710 - 7716
S4 - S5	.7169 - 7175

NOTES:
1. C.D. (CHECKING DIMENSIONS) TO HAVE TOLERANCE ON CENTERS AS SHOWN.
2. GEAR TRAINS ARE INDICATED AS SHOWN — - - —.


.094
2.359 BSC
1.688 BSC
1.312 BSC
1.039 BSC
.844 BSC
CHAMFER 45° × .188 ±.015 TYP 2 PLACES
.500
.265 BSC
.375 BSC
.328 BSC
.750 BSC
.186 REF
1.406 BSC
1.468 BSC
1.750 BSC
2.7560 +.0002 -.0000 BETWEEN 'D' HOLES
2.756 BSC
.250 BSC
1.2141 +.0002 -.0000
1.500 BSC
1.7200 +.0002 -.0000
2.0114 +.0002 -.0000
2.1513 +.0002 -.0000
2.336
2.718 BSC
A
B
C
D
E
F
G
H
S1
S2
S3
S4
S5
.469 BSC
.8438 +.0002 -.0000
1.5550 +.0002 -.0000
1.656 BSC
TO 'D' AND 'F' HOLES
2.1310 +.0002 -.0000
2.438 BSC
2.562
2.656 BSC

HOLE DATA				
HOLE	DESCRIPTION	FINISH	QTY	
A	.1247 +.0003 -.0000 DIA THRU	32√	2	⊕.010 DIA
B	DRILL NO. 31 (.120) THRU		9	⊕.010 DIA
C	DR NO. 41 (.096) THRU CBORE .156 DIA × .093 DEEP AS SHOWN		2	⊕.004 DIA
D	.0934 +.0003 -.0000 DIA THRU	32√	2	
E	1.375 DIA THRU			⊕.010 DIA
F	.3126 +.0003 -.0000 DIA THRU	32√	3	
G	.3751 +.0003 -.0000 DIA THRU	32√	1	
H	DR 'E' (.250) THRU		1	
J	DR NO. 19 (.166) THRU		1	



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011595	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 5
CONTRACT —

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910210
DRAWN E DRAPALA DATE 12-30-63
CHECKED J. SULLIVAN 4-27-64
APPROVAL 6/1/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

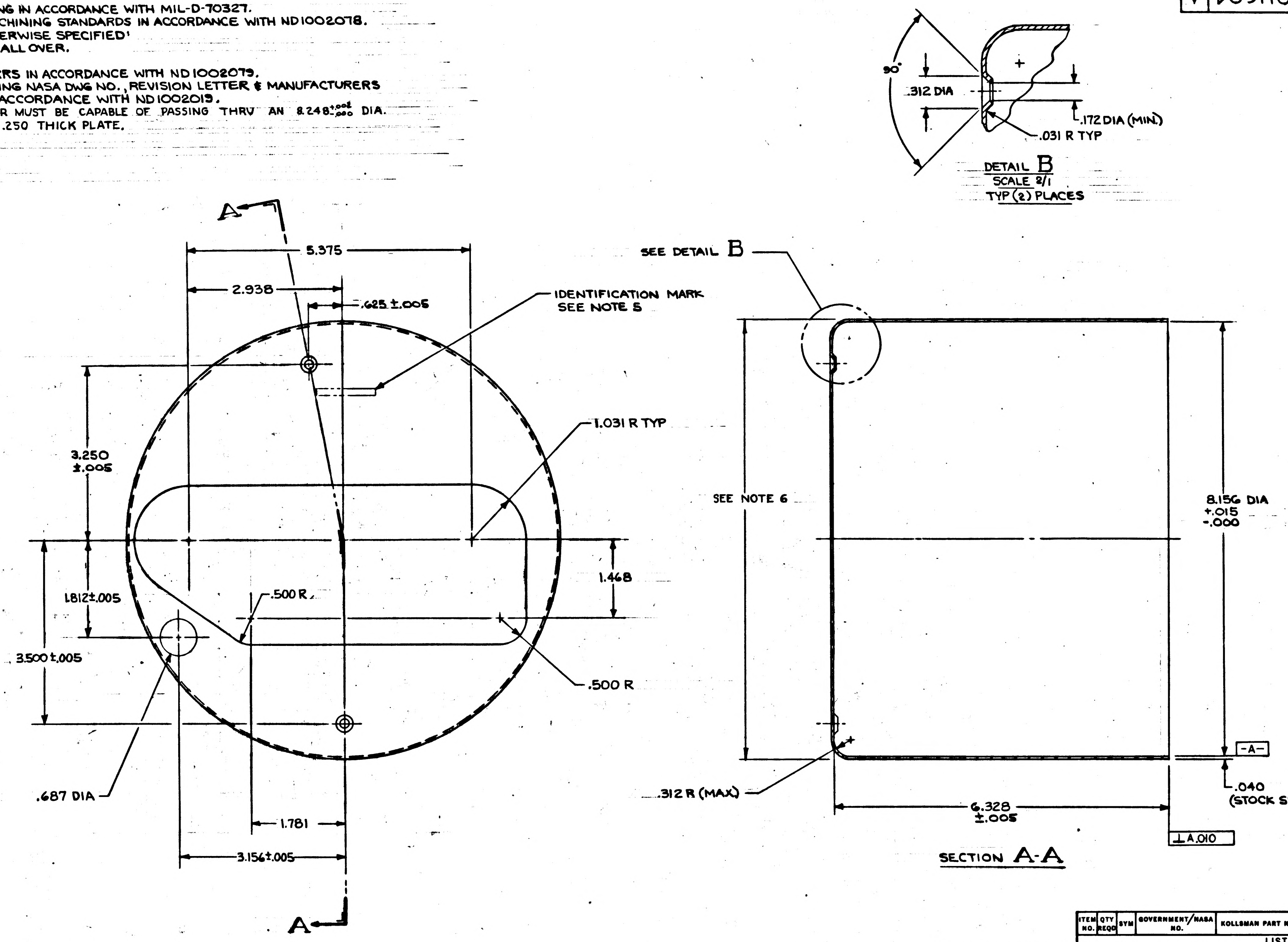
TITLE
PLATE, BEARING
(SEXTANT TRUNNION DRIVE)

CODE IDENT NO. | SIZE E | NASA NUMBER 2011600
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
63/ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
6. FINISHED COVER MUST BE CAPABLE OF PASSING THRU AN 8.248 $^{+.002}_{-.000}$ DIA. HOLE IN A .250 THICK PLATE.

2011604 A

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11240	7/27/64	



90°
.312 DIA
.172 DIA (MIN)
.031 R TYP
DETAIL B
SCALE 2/1
TYP (2) PLACES
A
5.375
2.938
.625 ±.005
IDENTIFICATION MARK
SEE NOTE 5
SEE DETAIL B
1.031 R TYP
3.250 ±.005
SEE NOTE 6
8.156 DIA +.015 -.000
1.468
1.812±.005
.500 R
3.500±.005
.500 R
.687 DIA
1.781
3.154±.005
A
.312 R (MAX)
-A-
.040 (STOCK SIZE)
6.328 ±.005
⊥ A .010
SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± ~ ; DECIMALS ± .015 ; ANGLES ± 1°	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 50386910010
DO NOT SCALE THIS DRAWING	DRAWN DATE 12-6-63 CHECKED 7/2/64 APPROVAL 7-2-64 APPROVAL E. Thomp 7-13-64
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-250/8 TEMPER O	NASA APPROVAL W. J. 7-14-64
CONTRACT	MIT APPROVAL

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER,
SEXTANT HEAD

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011604

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

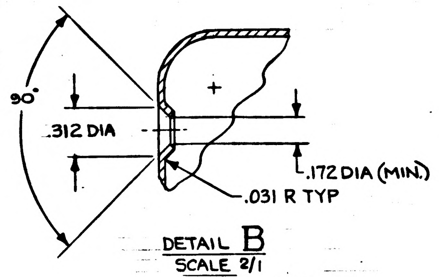
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE

B | 2011604

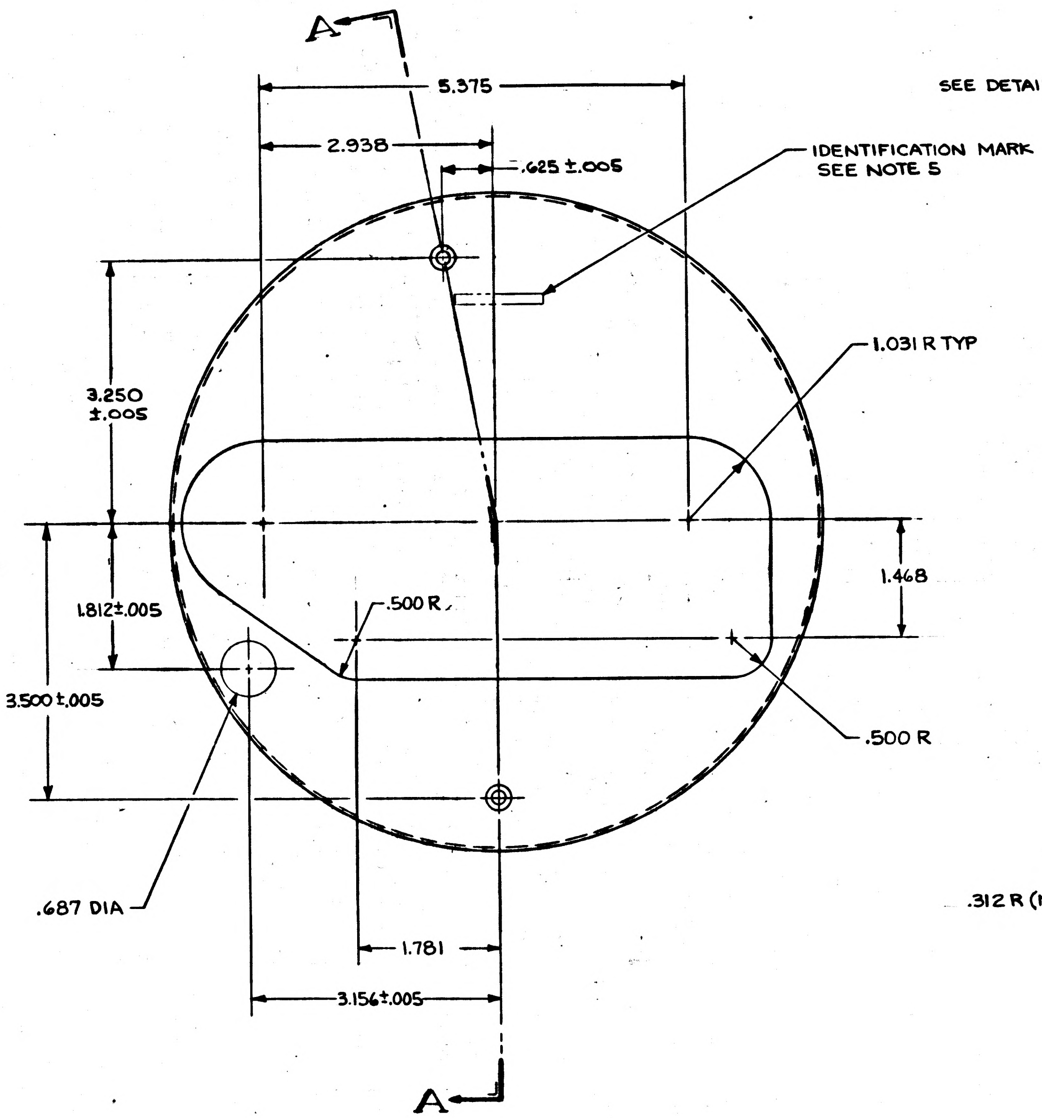
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11240	7/2/64	
B		REVISED PER TDRR NO. 5457	1/27/65	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63/ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

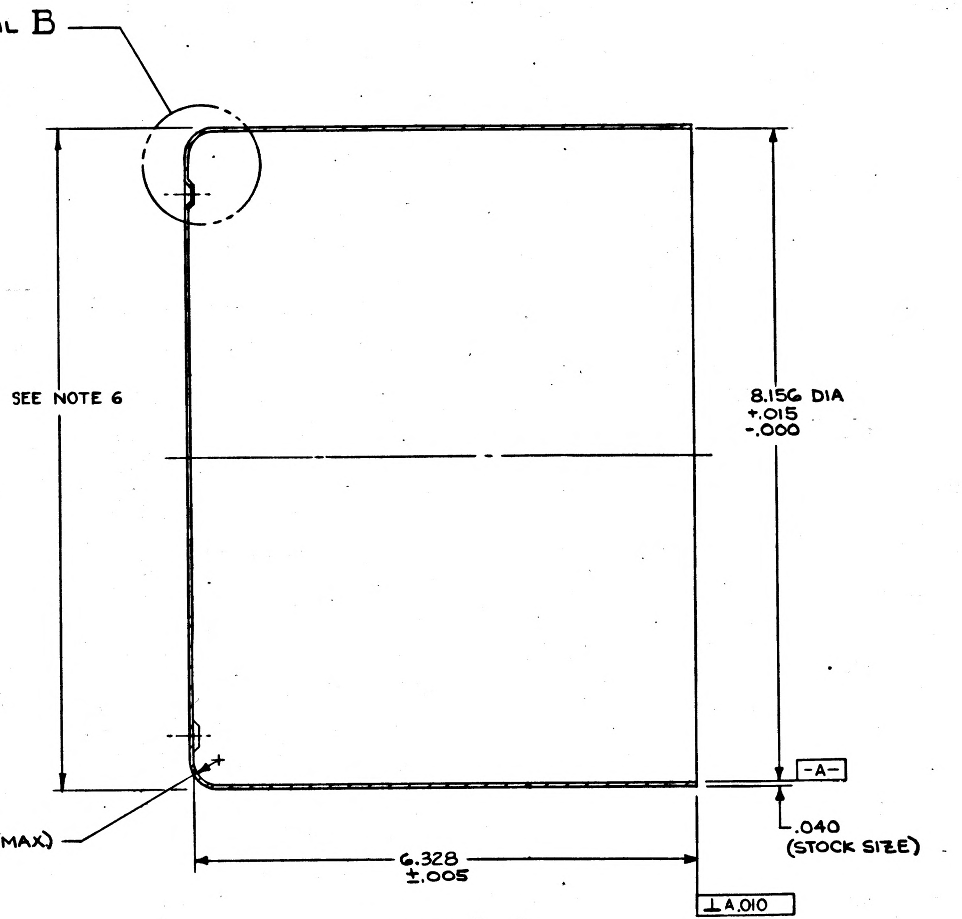


90°
.312 DIA
.172 DIA (MIN.)
.031 R TYP

DETAIL B
SCALE 2/1
TYP (2) PLACES



A
5.375
2.938
.625 ±.005
IDENTIFICATION MARK SEE NOTE 5
1.031 R TYP
3.250 ±.005
1.812±.005
.500 R
1.468
3.500±.005
.500 R
.687 DIA
1.781
3.156±.005
A



SEE DETAIL B
SEE NOTE 6
8.156 DIA +.015 -.000
-A-
.040 (STOCK SIZE)
.312 R (MAX)
6.328 ±.005
⊥ A .010

SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .015 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-250/8 TEMPER O
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910010
DRAWN DATE 12-6-63
CHECKED 7/2/64
APPROVAL 7-2-64
APPROVAL E. Thoruy 7-13-64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COVER,
SEXTANT HEAD

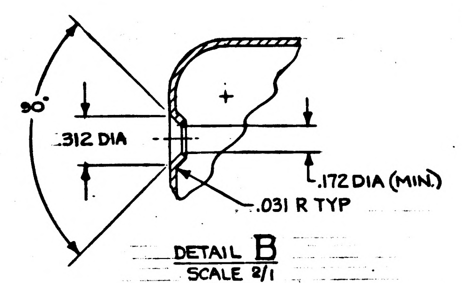
CODE IDENT NO.
SIZE D
NASA NUMBER 2011604
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

MASTER

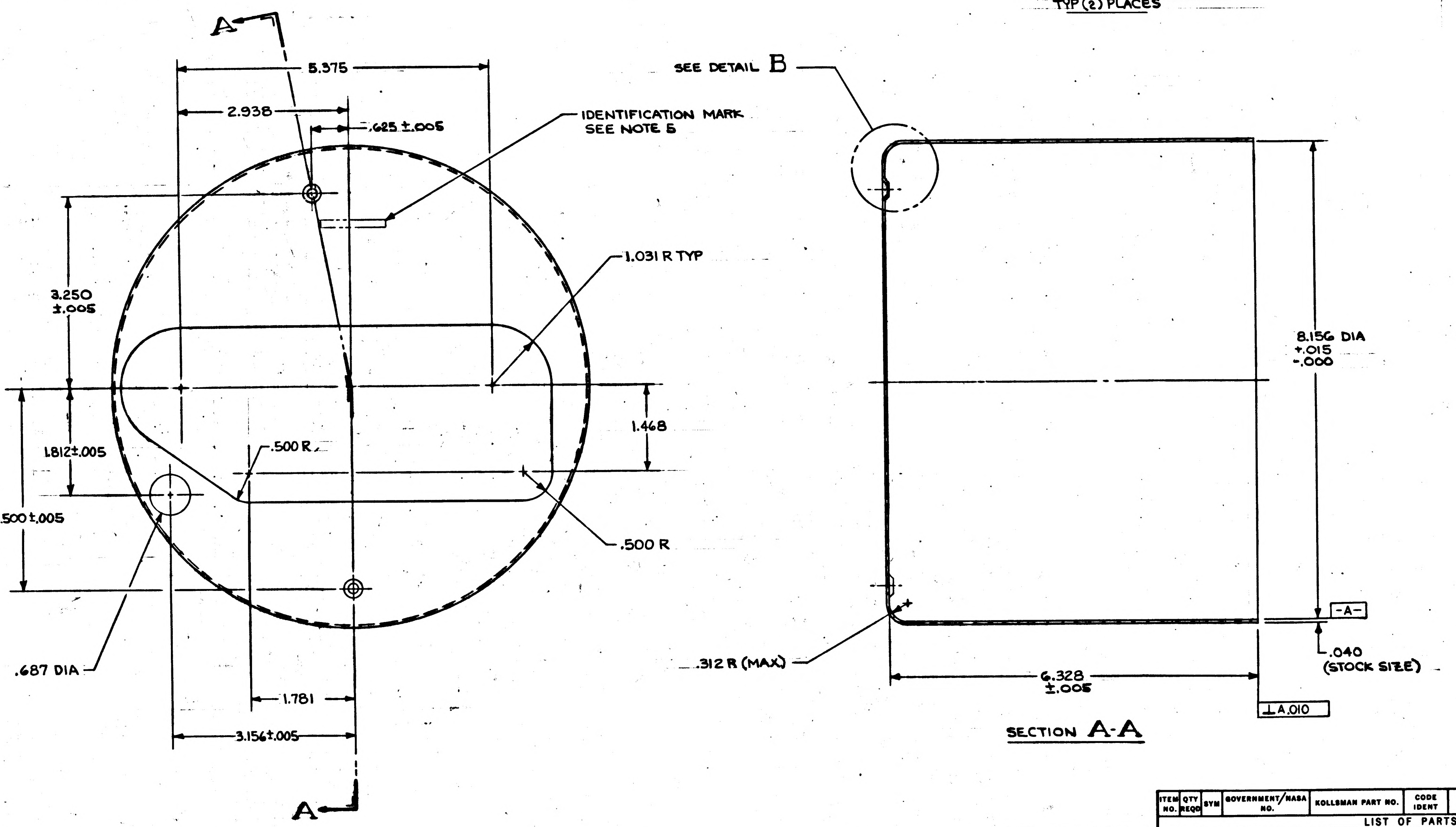
2011604

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED'
   63 FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.


90°
.312 DIA
.172 DIA (MIN)
.031 R TYP

DETAIL B
SCALE 2/1
TYP (2) PLACES


A
5.375
2.938
.625 ±.005
IDENTIFICATION MARK SEE NOTE 5
1.031 R TYP
3.250 ±.005
1.468
1.812±.005
.500 R
3.500±.005
.500 R
.687 DIA
1.781
3.156±.005
A
SEE DETAIL B
8.156 DIA +.015 -.000
-A-
.040 (STOCK SIZE)
.312 R (MAX)
6.328 ±.005
⊥A.010

SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.018	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-250/8 TEMPER O
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910010
DRAWN DATE 12-6-63
CHECKED 7/2/64
APPROVAL 7-2-64
APPROVAL 7-13-64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

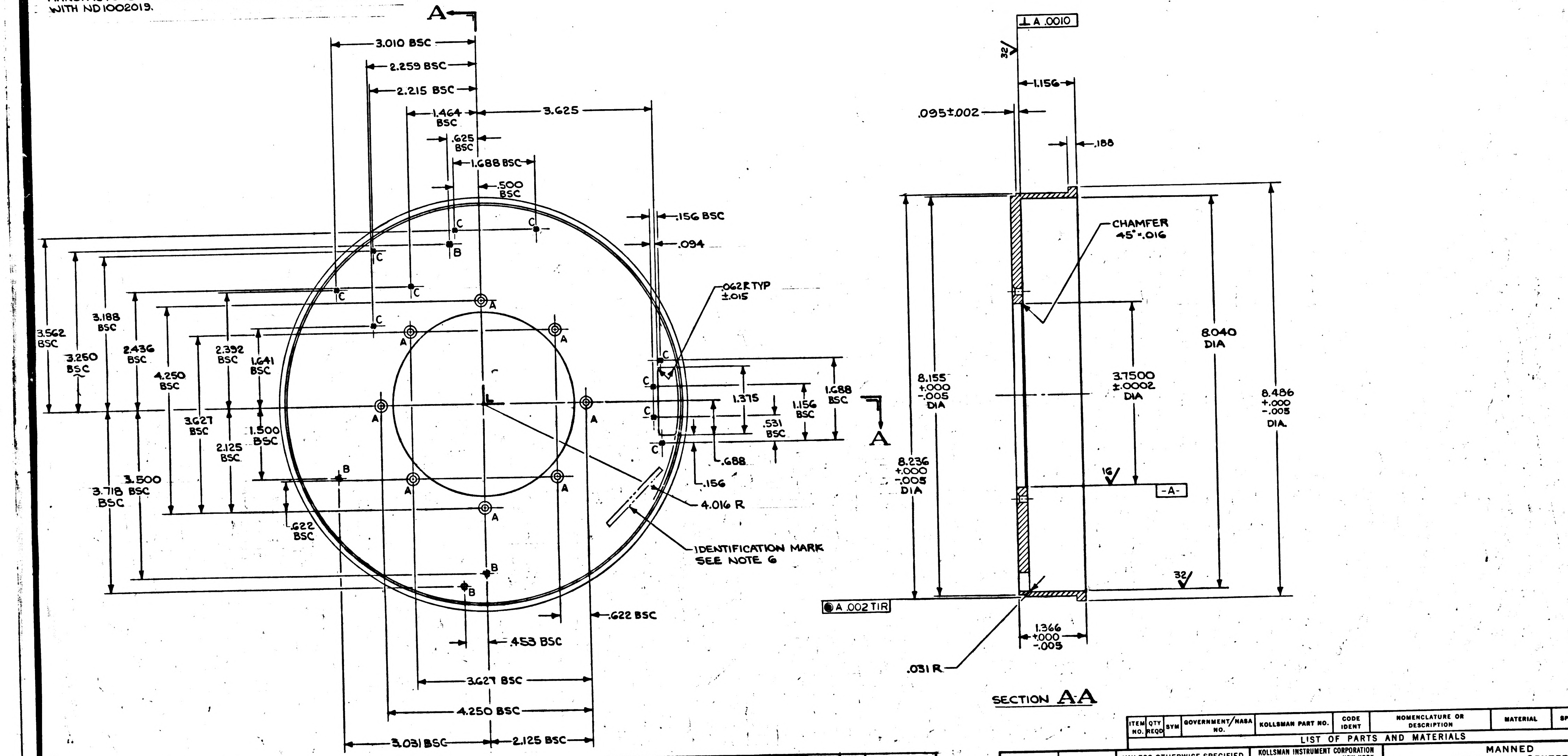
TITLE
COVER,
SEXTANT HEAD

CODE IDENT NO. | SIZE D | NASA NUMBER 2011604
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE-GRID

2011616	SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS 1429					

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. ✓ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT-TREAT (STABILIZE & STRESS RELIEVE) PER ND1002114.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.


A
3.010 BSC
2.259 BSC
2.215 BSC
1.464 BSC
3.625
.625 BSC
1.688 BSC
.500 BSC
.156 BSC
.094
.062 R TYP ±.015
3.562 BSC
3.188 BSC
3.250 BSC
2.436 BSC
4.250 BSC
2.392 BSC
1.641 BSC
3.627 BSC
2.125 BSC
1.500 BSC
3.500
3.718 BSC
.622 BSC
1.375
.531 BSC
1.156 BSC
1.688 BSC
.688
.156
4.016 R
IDENTIFICATION MARK SEE NOTE 6
.622 BSC
.453 BSC
3.627 BSC
4.250 BSC
3.031 BSC
2.125 BSC
A
B
C
⊥ A .0010
32/
1.156
.095±.002
.188
CHAMFER 45°×.016
8.155 +.000 -.005 DIA
8.236 +.000 -.005 DIA
3.7500 ±.0002 DIA
8.040 DIA
8.486 +.000 -.005 DIA
16/
-A-
32/
◎ A .002 TIR
1.366 +.000 -.005
.031 R

SECTION A-A

HOLE	DESCRIPTION	QTY	TRUE POSITION
C	DR NO. 49 (.073) THRU REDRILL NO 38 (.1015) x.018 DEEP 2-56 NC-3B THRU	10	⊕ .004 DIA
B	DR NO. 41 (.096) THRU REDRILL NO. 30 (.1285) x.025 DEEP 4-40 NC-3B THRU	4	⊕ .010 DIA
A	DR NO. 29 (.136) THRU 100° CSK TO .258 $^{+.005}_{-.000}$ DIA	8	⊕ A .010 DIA

HOLE DATA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: BERYLLIUM ND1002125 SEE NOTE 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910020
DRAWN F. Schiller DATE 12-12-63
CHECKED C. Kampf 7-2-64
APPROVAL G. Rushmore 7-2-64
APPROVAL E. Ohrnng 7-6-64
NASA APPROVAL W. J. Rhine 5-13-64
MIT APPROVAL W. Cuffe 13 Hoak

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, MOUNTING, COVER

CODE IDENT NO. | SIZE D | NASA NUMBER 2011616
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2

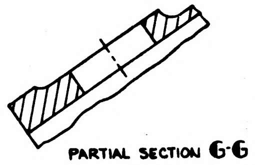
A	2011618

REVISIONS 10470

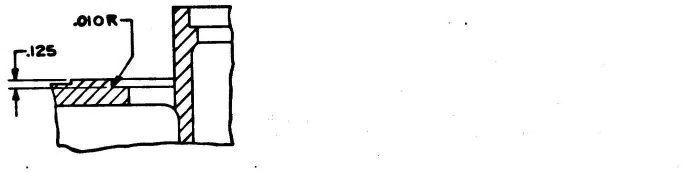
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64 C.B	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{125}{\vee}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. FILLETS TO BE .250±.015 R
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE & STABILIZE) PER ND1002114.
6. PART TO BE PENETRANT INSPECTED PER MIL-I-6866 METHOD II.

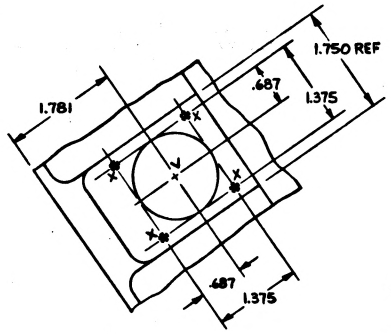
7. TRANSFER SERIAL NO. PER ND1002023.
8. USE BROACHING TOOL FOR HOLES "K" & "L" PER ND1002121.
9. 3 SURFACES MARKED "X" (SHEET 4) TO LIE IN A TOLERANCE ZONE OF .0004. THE TOLERANCE ZONE TO BE ⊥ TO THE AXIS DETERMINED BY $\boxed{\text{-A-}}$.
10. HOLES TO BE TAPPED PRIOR TO MACHINING OF RIBS. (SIX SPECIFIED HOLES, SHEET 4).
11. IDENTIFY USING NASA DWG NO., REV LETTER & MFR'S SYM PER ND1002019 (TAGGING)



PARTIAL SECTION G-G

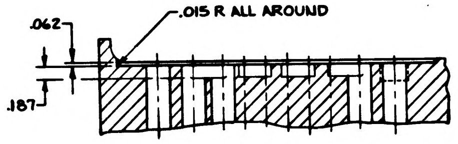


PARTIAL SECTION H-H



1.750 REF
1.781
.687
1.375
.687
1.375

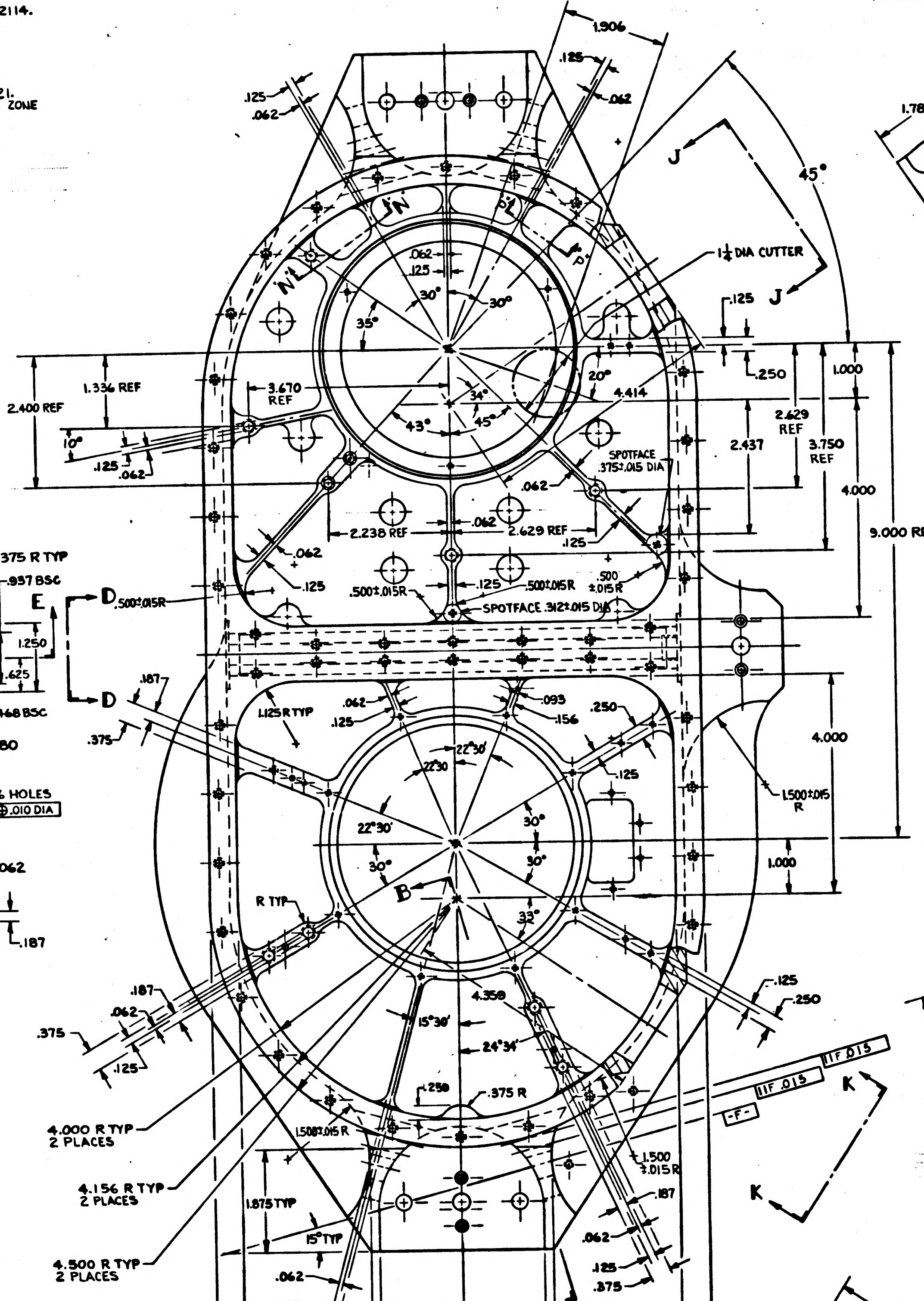
PARTIAL VIEW J-J



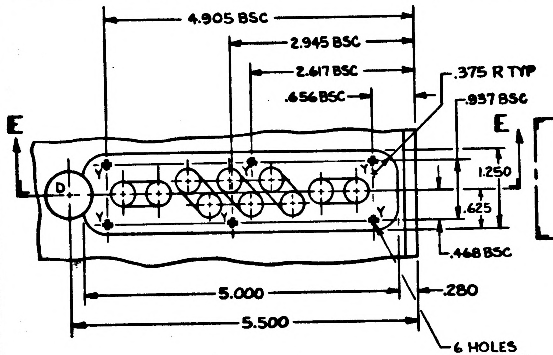
.062
.015 R ALL AROUND
.187

PARTIAL SECTION F-F

HOLE	DESCRIPTION	QTY
Y	DR NO. 32 (.116) x .438 DEEP NO. 6-32 (NC-3B) x .250 DEEP REDRILL NO.23 (.154) x .031 DEEP	11
Z	DR NO. 11 (.191) x .360 DEEP NO. 12-28 (UNF-2B) x .210 DEEP REDRILL $\frac{7}{32}$ (.218) x .036 DEEP	4
AA	DR NO.41 (.0960) DIA THRU NO. 4-40 (NC-3B) THRU REDRILL NO.30 (.1285) DIA X .025 DEEP	2

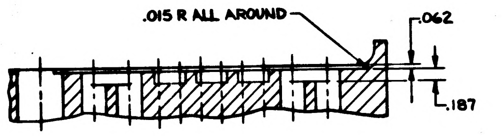


1.906
.125
.062
.125
.062
J
45°
1¼ DIA CUTTER
.125
J
.250
1.000
35°
30°
30°
20°
34°
43°
45°
4.414
1.336 REF
2.400 REF
3.670 REF
2.437
2.629 REF
3.750 REF
4.000
9.000 REF
10°
.125
.062
SPOTFACE .375±.015 DIA
.062
2.238 REF
.062
2.629 REF
.125
.062
.125
.500±.015R
.125
.500±.015R
.500 ±.015R
SPOTFACE .312±.015 DIA
D
.500±.015R
D
.187
1.125 R TYP
.062
.125
.093
.156
.250
.125
4.000
1.500±.015 R
1.000
.375
22°30'
22°30'
22°30'
30°
30°
30°
R TYP
32°
.187
.062
.375
.125
.125
.250
4.350
15°30'
24°34'
.250
.375 R
4.000 R TYP 2 PLACES
1.500±.015 R
1.500 ±.015R
.187
4.156 R TYP 2 PLACES
1.875 TYP
15° TYP
4.500 R TYP 2 PLACES
.062
.125
.062
.125
.375
-F-
IIF.015
IIF.015
K
K
B
B
1.656 TYP
1.500 TYP
3.000 TYP
3.312 TYP
8.000 REF
9.000 REF



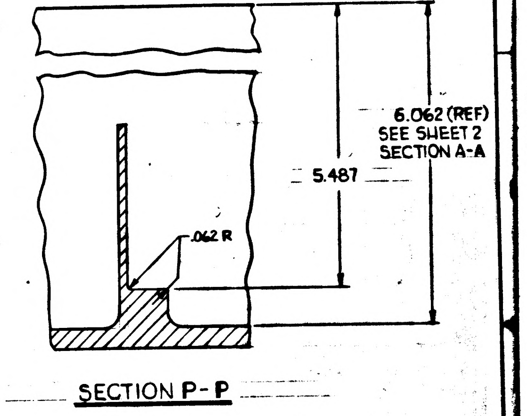
4.905 BSC
2.945 BSC
2.617 BSC
.656 BSC
.375 R TYP
.937 BSC
E
E
1.250
.625
.448 BSC
D
Y
5.000
5.500
.280
6 HOLES
⊕ .010 DIA

PARTIAL VIEW D-D



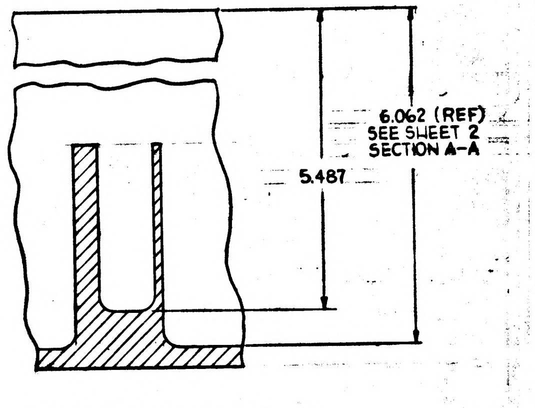
.015 R ALL AROUND
.062
.187

PARTIAL SECTION E-E



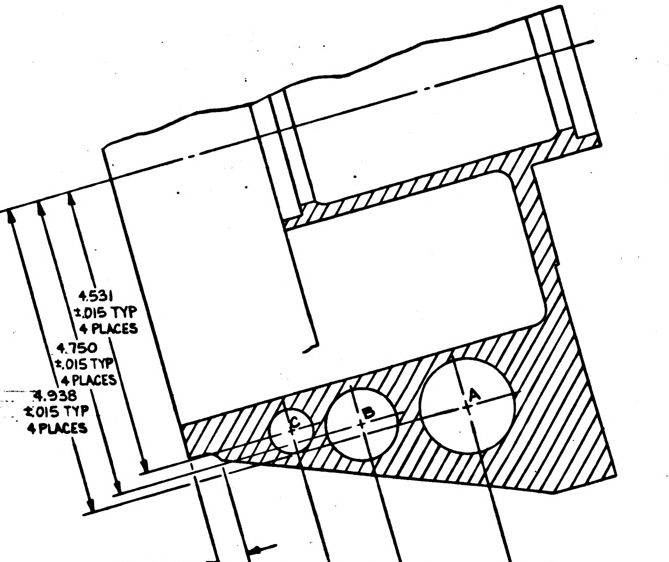
6.062 (REF) SEE SHEET 2 SECTION A-A
5.487
.062 R

SECTION P-P



6.062 (REF) SEE SHEET 2 SECTION A-A
5.487

SECTION N-N



4.531 ±.015 TYP 4 PLACES
4.750 ±.015 TYP 4 PLACES
4.938 ±.015 TYP 4 PLACES
A
B
F

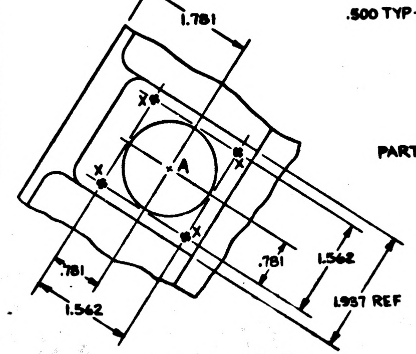
.500 TYP

1.688±.015 TYP 4 PLACES

2.750±.015 TYP 4 PLACES

4.438±.015 TYP 4 PLACES

PARTIAL SECTION B-B



1.781
A
.781
.781
1.562
1.562
1.937 REF

PARTIAL VIEW K-K

HOLE	DESCRIPTION	QTY
A	1.500 DIA THRU	5
B	1.125 DIA THRU	4
C	.687 DIA THRU	4
D	.750 DIA x 8.000 DEEP	1
E	DR $\frac{3}{8}$ (.375) DIA THRU	9
F	DR $\frac{3}{8}$ (.375) DIA THRU $\frac{7}{16}$-20 (NF-2B) x .281 DEEP	1
G	DR $\frac{5}{16}$ (.312) DIA THRU	3
H	DR $\frac{9}{32}$ (.281) DIA THRU CBORE .593 DIA x .625 DEEP	4
J	DR NO.30 (.1285) DIA THRU CBORE .218 DIA x .125 DEEP OPPOSITE SIDE	6
K	DR I (.272) DIA x .437 DEEP $\frac{5}{16}$-18 (NC-2B) x .437 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	9
L	DR I (.272) DIA x .734 DEEP $\frac{5}{16}$-18 (NC-2B) x .468 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	15
M	DR NO. 19 (.1660) DIA THRU NO. 10-32 (NF-2B) THRU REDRILL NO. 4 (.209) DIA x .031 DEEP	26
N	DR NO. 19 (.1660) DIA x .375 DEEP NO. 10-32 (NF-2B) x .254 DEEP REDRILL NO. 4 (.209) DIA x .031 DEEP	22
P	DR NO. 27 (.1440) DIA x .500 DEEP NO. 8-32 (NC-3B) x .328 DEEP REDRILL NO. 15 (.180) DIA x .031 DEEP	1
R	DR NO. 32 (.1160) DIA x .513 DEEP NO. 6-32 (NC-3B) x .375 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP	2

HOLE	DESCRIPTION	QTY
S	DR NO. 41 (.0960) DIA x .336 DEEP NO. 4-40 (NC-3B) x .224 DEEP REDRILL NO.30 (.1285) DIA x .025 DEEP	20
T	DR NO. 49 (.0730) DIA x .336 DEEP NO. 2-56 (NC-3B) x .250 DEEP REDRILL NO. 38 (.1015) DIA x .018 DEEP	2
U	$.1240^{+.0005}_{-.0000}$ DIA x .312 DEEP $\overset{32}{\vee}$	1
V	1.375 DIA THRU	1

HOLE	DESCRIPTION	QTY
W	DR NO. 3 (.213) DIA x .410 DEEP $\frac{1}{4}$-20 (NC-2B) x .310 DEEP REDRILL "H" (.266) x .041 DEEP	4
X	DR NO. 32 (.1160) DIA x .356 DEEP NO. 6-32 (NC-3B) x .231 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP DO NOT BREAK THRU ON TAP DRILL	8

*KIC PN-52386910520

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011228 *

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 4/64
APPROVAL 6/2/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 13 64

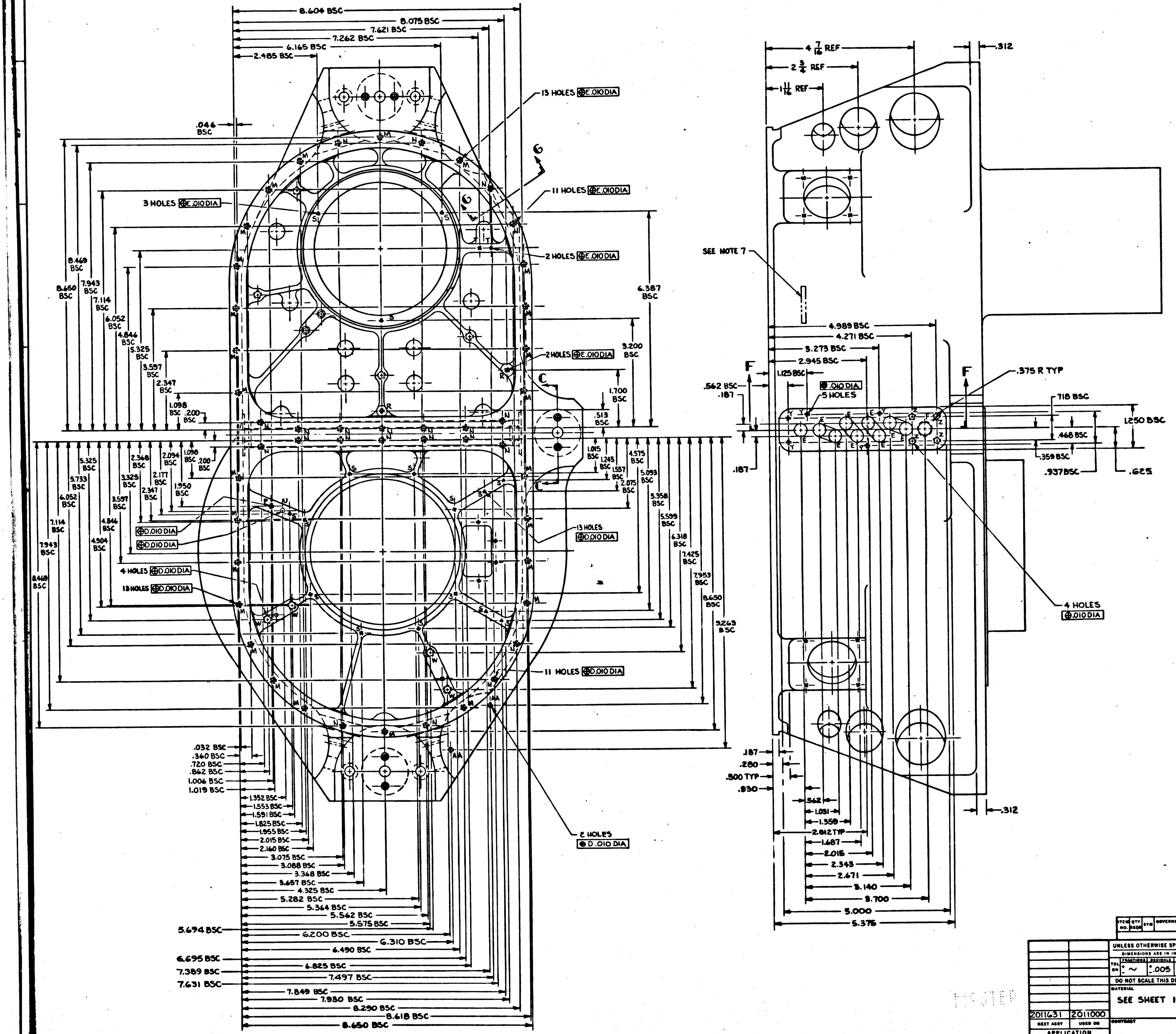
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO. | SIZE E | NASA NUMBER 2011618

SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET | OF 4

INCHES


13 HOLES ⊕E.010DIA
11 HOLES ⊕E.010DIA
3 HOLES ⊕E.010DIA
2 HOLES ⊕E.010DIA
2 HOLES ⊕E.010DIA
13 HOLES ⊕D.010DIA
11 HOLES ⊕D.010DIA
4 HOLES ⊕D.010DIA
13 HOLES ⊕D.010DIA
⊕D.010DIA
⊕D.010DIA
2 HOLES ⊕D.010DIA
G
C
SEE NOTE 7
F
F
5 HOLES ⊕.010DIA
4 HOLES ⊕.010DIA
.375 R TYP
4 7/16 REF
2 3/4 REF
1 1/16 REF
.312
8.604 BSC
8.075 BSC
7.621 BSC
7.262 BSC
6.165 BSC
2.485 BSC
.046 BSC
6.387 BSC
3.200 BSC
1.700 BSC
.513 BSC
4.989 BSC
4.271 BSC
3.273 BSC
2.945 BSC
1.125 BSC
.562 BSC
.187
.718 BSC
1.250 BSC
.468 BSC
.359 BSC
.937 BSC
.625
.500 TYP
.930
2.812 TYP
5.000
5.375
5.694 BSC
6.695 BSC
7.389 BSC
7.631 BSC
8.650 BSC

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	

2011618 A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/2/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO. SIZE E NASA NUMBER 2011618

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 3 OF 4

A 2011618

REVISIONS (042)				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
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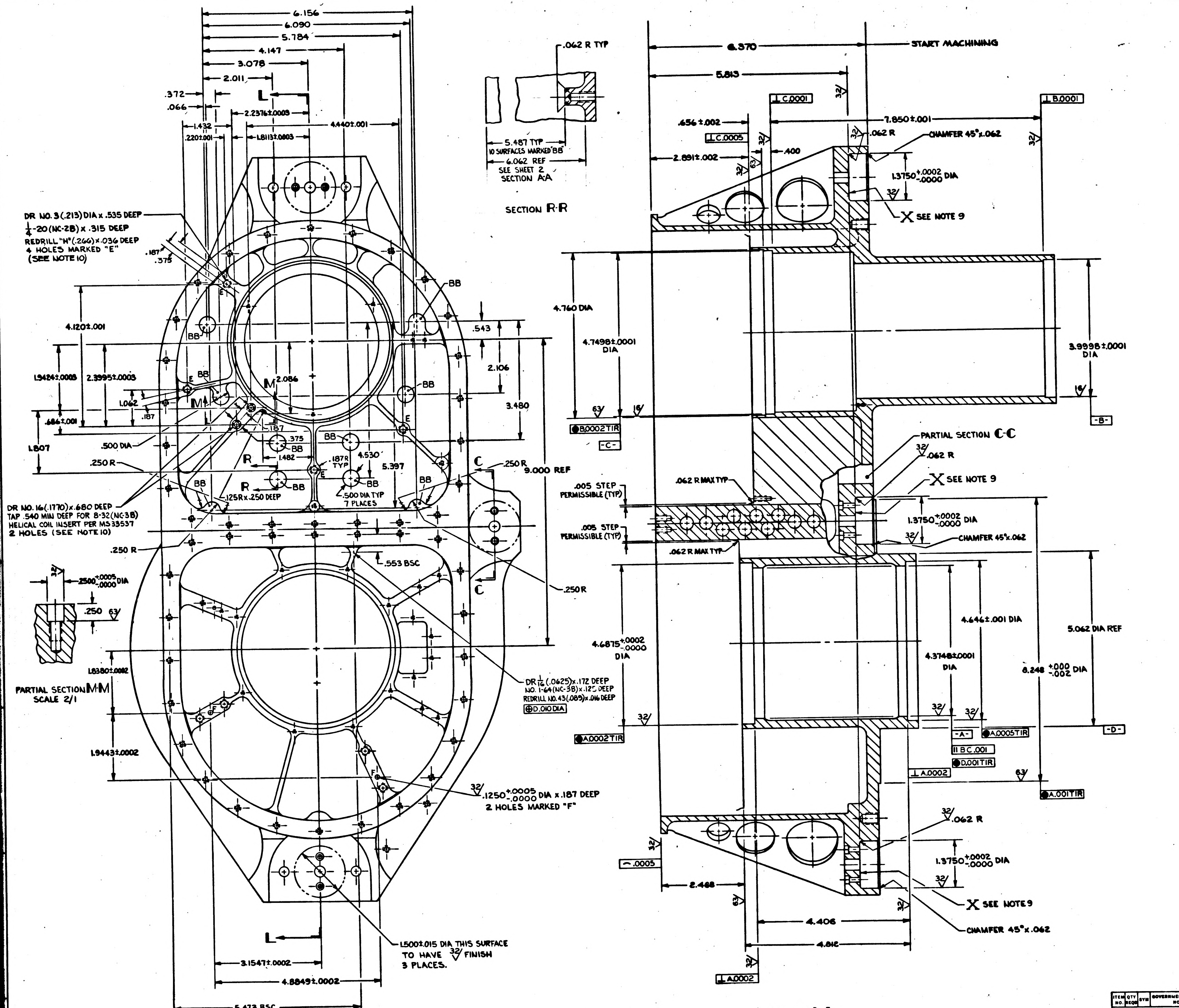


6.156
6.090
5.784
4.147
3.078
2.011
.372
.066
L
1.432
.220±.001
2.2376±.0003
1.8113±.0003
4.440±.001
DR NO. 3 (.213) DIA x .535 DEEP
1/4-20 (NC-2B) x .315 DEEP
REDRILL "H" (.266) x .036 DEEP
4 HOLES MARKED "E"
(SEE NOTE 10)
.187
.375
4.120±.001
1.9424±.0003
2.3995±.0003
1.062
.187
.686±.001
1.807
.500 DIA
.250 R
M
2.086
.375
1.482
R
BB
E
.125R x .250 DEEP
.187R TYP
4.530
.500 DIA TYP
7 PLACES
5.397
.543
2.106
3.480
9.000 REF
C
.250 R
DR NO. 16 (.1770) x .680 DEEP
TAP .540 MIN DEEP FOR 8-32 (NC-3B)
HELICAL COIL INSERT PER MS33537
2 HOLES (SEE NOTE 10)
.553 BSC
.2500 +.0005 -.0000 DIA
.250
PARTIAL SECTION M-M
SCALE 2/1
1.8380±.0002
1.9443±.0002
DR 1/16 (.0625) x .172 DEEP
NO. 1-64 (NC-3B) x .125 DEEP
REDRILL NO. 43 (.089) x .016 DEEP
D .010 DIA
.1250 +.0005 -.0000 DIA x .187 DEEP
2 HOLES MARKED "F"
F
1.500±.015 DIA THIS SURFACE
TO HAVE 32 FINISH
3 PLACES.
3.1547±.0002
4.8849±.0002
5.473 BSC
.062 R TYP
5.487 TYP
10 SURFACES MARKED "BB"
6.062 REF
SEE SHEET 2
SECTION A-A
SECTION R-R
6.370
START MACHINING
5.813
C .0001
B .0001
.656±.002
7.850±.001
.062 R
CHAMFER 45° x .062
C .0005
.400
2.891±.002
1.3750 +.0002 -.0000 DIA
X SEE NOTE 9
4.760 DIA
4.7498±.0001 DIA
3.9998±.0001 DIA
B .0002 TIR
-C-
-B-
PARTIAL SECTION C-C
.062 R MAX TYP
.005 STEP PERMISSIBLE (TYP)
4.6875 +.0002 -.0000 DIA
A .0002 TIR
4.646±.001 DIA
4.3748±.0001 DIA
5.062 DIA REF
8.248 +.000 -.002 DIA
-A-
A .0005 TIR
B C .001
D .001 TIR
A .0002
A .001 TIR
-D-
.0005
2.468
4.406
4.812
A .0002
SECTION L-L

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/2/64
APPROVAL E. 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

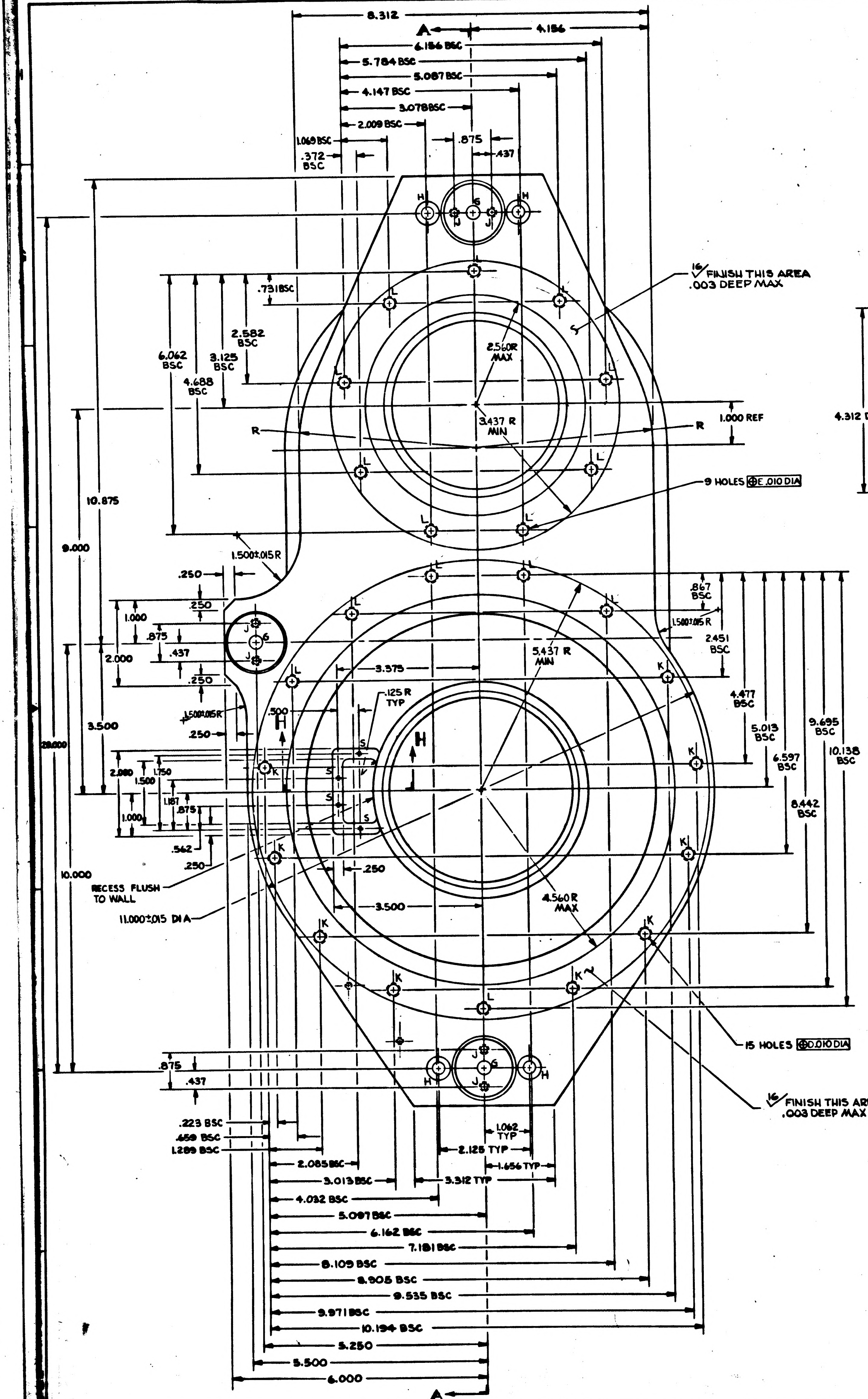
TITLE OPTICAL BASE

CODE IDENT NO. SIZE E NASA NUMBER 2011618
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 4 OF 4

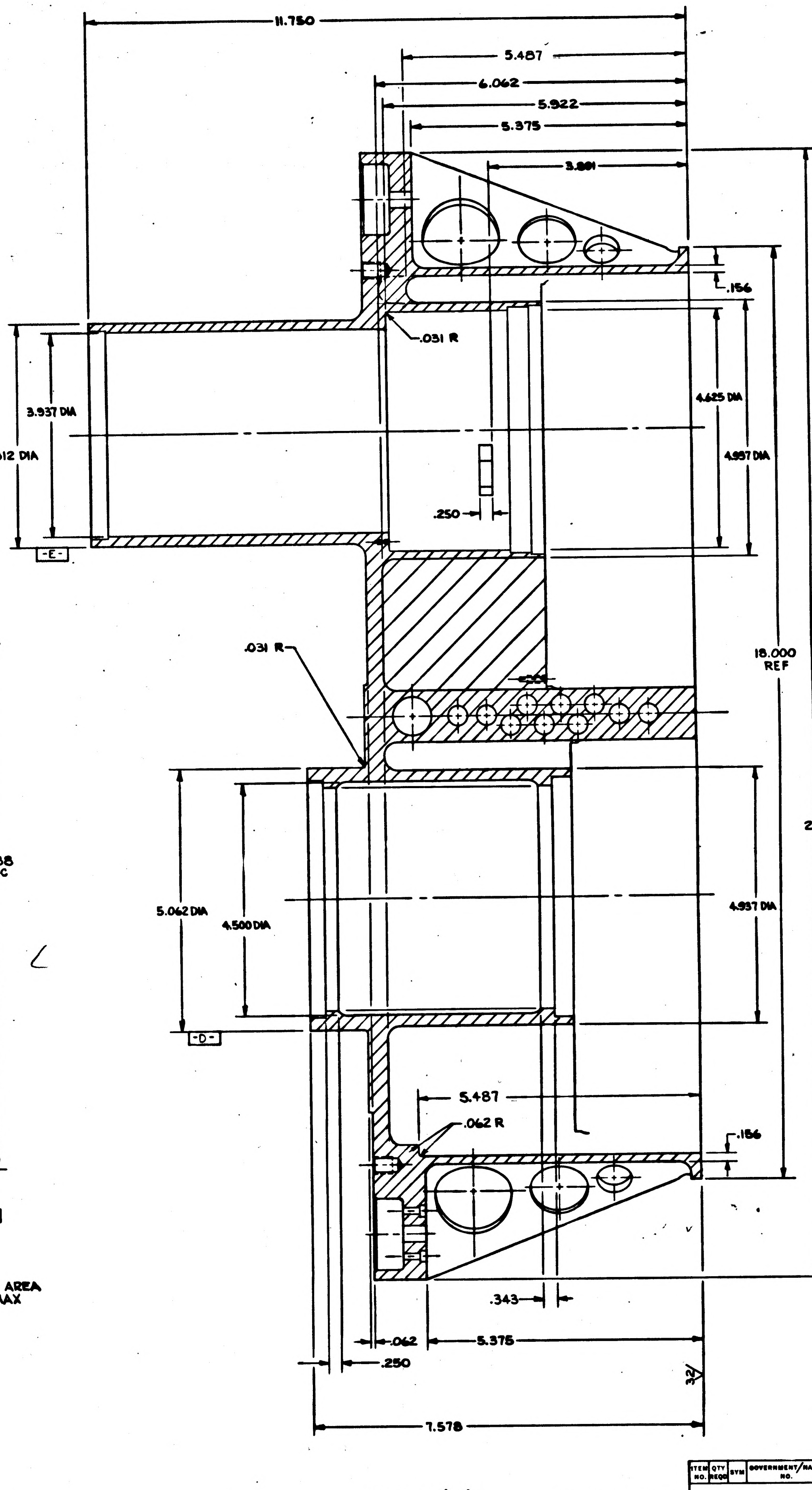
MASTER

A	2011618

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	WIL



8.312
4.156
6.156 BSC
5.784 BSC
5.087 BSC
4.147 BSC
3.078 BSC
2.009 BSC
1.069 BSC
.372 BSC
.875
.437
16/ FINISH THIS AREA .003 DEEP MAX
.731 BSC
2.582 BSC
3.125 BSC
6.062 BSC
4.688 BSC
2.560 R MAX
3.437 R MIN
1.000 REF
10.875
9.000
28.000
9 HOLES ⊕ .010 DIA
1.500±.015 R
.867 BSC
2.451 BSC
5.437 R MIN
3.375
.125 R TYP
4.477 BSC
5.013 BSC
6.597 BSC
9.695 BSC
10.138 BSC
8.442 BSC
2.000
3.500
10.000
RECESS FLUSH TO WALL
11.000±.015 DIA
4.560 R MAX
3.500
.250
15 HOLES ⊕ 0.010 DIA
16/ FINISH THIS AREA .003 DEEP MAX
.223 BSC
.659 BSC
1.289 BSC
1.062 TYP
2.125 TYP
1.656 TYP
3.312 TYP
2.085 BSC
3.013 BSC
4.032 BSC
5.097 BSC
6.162 BSC
7.181 BSC
8.109 BSC
8.905 BSC
9.535 BSC
9.971 BSC
10.194 BSC
5.250
5.500
6.000
A



11.750
5.487
6.062
5.922
5.375
3.881
.156
.031 R
3.937 DIA
4.312 DIA
4.625 DIA
4.937 DIA
.250
-E-
.031 R
18.000 REF
21.750 +.000 -.015
5.062 DIA
4.500 DIA
4.937 DIA
-D-
5.487
.062 R
.156
.343
.062
5.375
.250
7.578
32/

SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± 1°
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MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/64
APPROVAL 4/23/64
APPROVAL 4/23/64
NASA APPROVAL
MIT APPROVAL 23

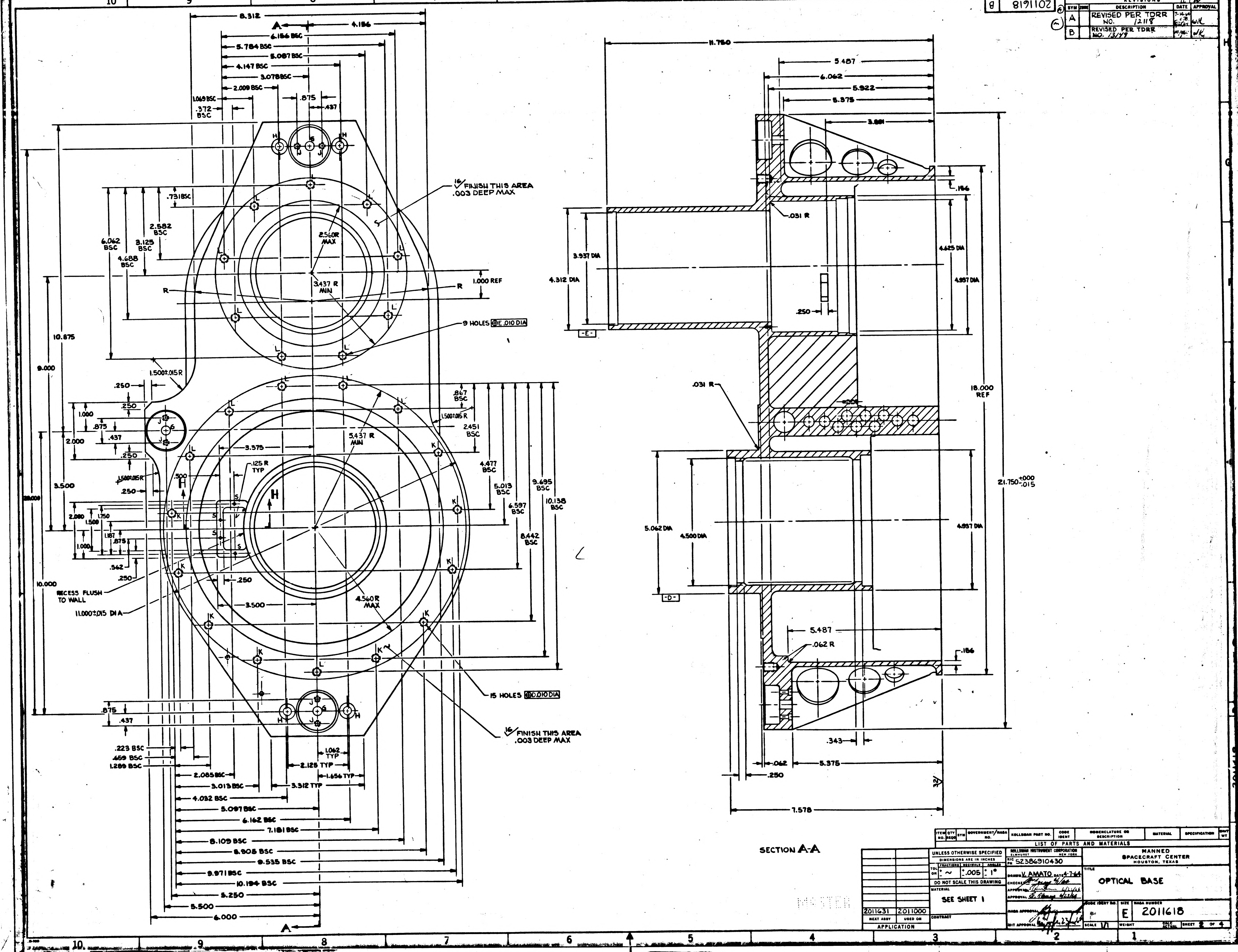
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: OPTICAL BASE

CODE IDENT NO.
SIZE: E
NASA NUMBER: 2011618
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 2 OF 4

B 2011618

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	WK
B		REVISED PER TDRR NO. 13149		WK



FINISH THIS AREA .003 DEEP MAX
9 HOLES ⊕E.010 DIA
15 HOLES ⊕D.010 DIA
RECESS FLUSH TO WALL
11.000±.015 DIA
1.500±.015 R
2.560R MAX
3.437 R MIN
5.437 R MIN
4.560R MAX
1.000 REF
18.000 REF
21.750 +.000 −.015
3.937 DIA
4.312 DIA
4.625 DIA
4.937 DIA
5.062 DIA
4.500 DIA
7.578
11.750
-E-
-D-
A
H
SECTION A-A

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/7/64
APPROVAL 4/23/64
APPROVAL E. Morang 4/23/64
NASA APPROVAL
MIT APPROVAL 23

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE OPTICAL BASE

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

CODE IDENT NO. | SIZE E | NASA NUMBER 2011618
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 2 OF 4

B	2011618

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
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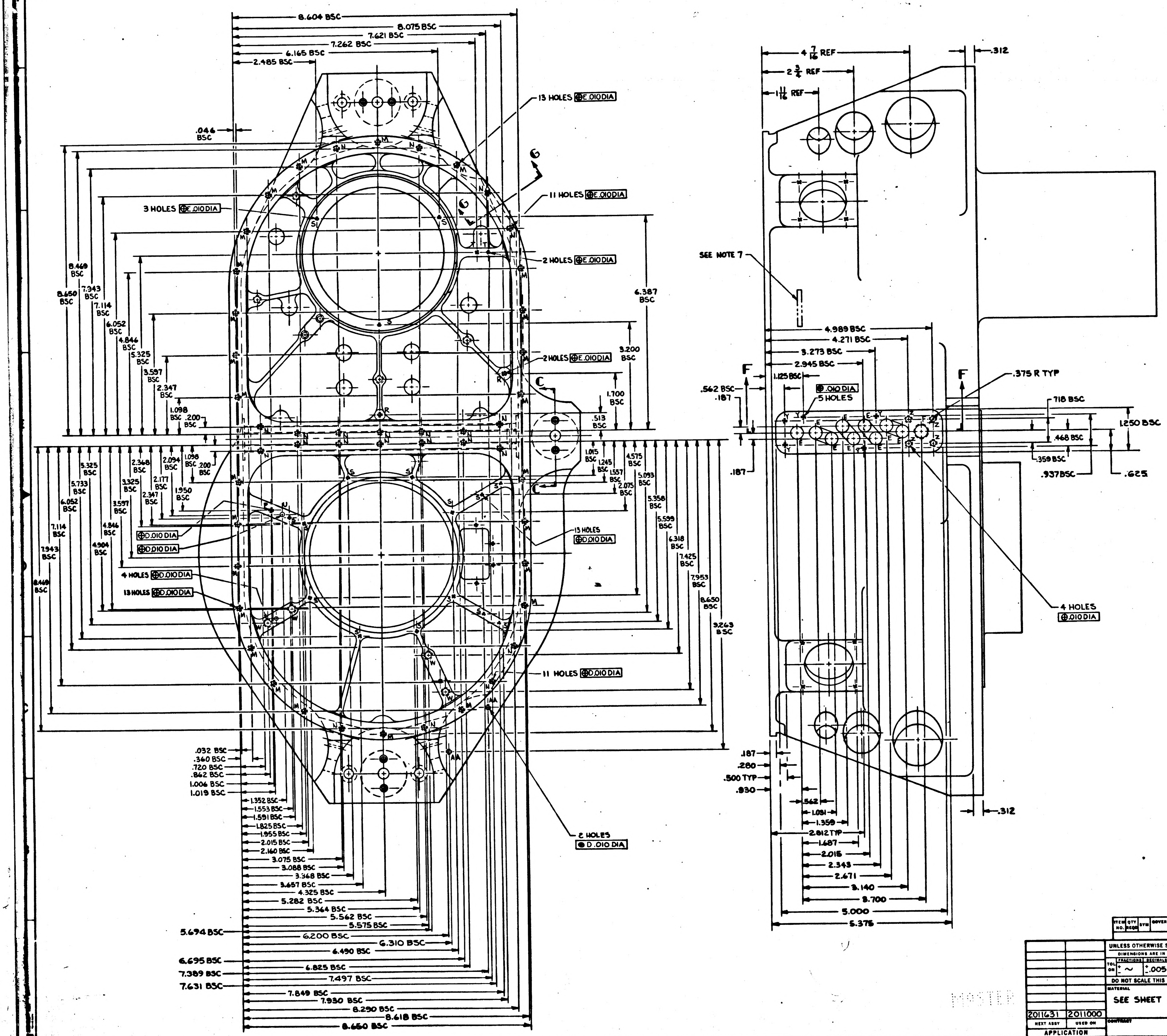
B		REVISED PER TDRR NO. 13149		WR



8.604 BSC
8.075 BSC
7.621 BSC
7.262 BSC
6.165 BSC
2.485 BSC
.046 BSC
13 HOLES ⊕E.010DIA
11 HOLES ⊕E.010DIA
3 HOLES ⊕E.010DIA
2 HOLES ⊕E.010DIA
2 HOLES ⊕E.010DIA
G
6.387 BSC
3.200 BSC
1.700 BSC
.513 BSC
8.469 BSC
8.650 BSC
7.343 BSC
7.114 BSC
6.052 BSC
4.846 BSC
5.325 BSC
3.597 BSC
2.347 BSC
1.098 BSC
.200 BSC
C
2.368 BSC
2.094 BSC
1.098 BSC
.200 BSC
3.325 BSC
2.177 BSC
2.347 BSC
1.950 BSC
5.733 BSC
1.015 BSC
1.245 BSC
1.557 BSC
2.075 BSC
4.575 BSC
5.093 BSC
5.358 BSC
5.599 BSC
6.318 BSC
7.425 BSC
7.953 BSC
8.650 BSC
9.263 BSC
7.943 BSC
4.904 BSC
⊕D.010 DIA
⊕D.010 DIA
4 HOLES ⊕D.010DIA
13 HOLES ⊕D.010DIA
13 HOLES ⊕D.010DIA
11 HOLES ⊕D.010DIA
2 HOLES ⊕D.010 DIA
.032 BSC
.360 BSC
.720 BSC
.842 BSC
1.006 BSC
1.019 BSC
1.352 BSC
1.553 BSC
1.591 BSC
1.825 BSC
1.955 BSC
2.015 BSC
2.160 BSC
3.075 BSC
3.088 BSC
3.368 BSC
3.657 BSC
4.325 BSC
5.282 BSC
5.364 BSC
5.562 BSC
5.575 BSC
5.694 BSC
6.200 BSC
6.310 BSC
6.490 BSC
6.695 BSC
6.825 BSC
7.389 BSC
7.497 BSC
7.631 BSC
7.849 BSC
7.930 BSC
8.290 BSC
8.618 BSC
8.650 BSC
4 7/16 REF
2 3/4 REF
1 11/16 REF
.312
SEE NOTE 7
4.989 BSC
4.271 BSC
3.273 BSC
2.945 BSC
1.125 BSC
F
F
.562 BSC
.187
⊕.010 DIA 5 HOLES
.375 R TYP
.718 BSC
1.250 BSC
.468 BSC
.359 BSC
.937 BSC
.625
.187
4 HOLES ⊕.010DIA
.187
.280
.500 TYP
.930
.562
1.081
1.359
2.812 TYP
1.687
2.015
2.343
2.671
3.140
3.700
5.000
5.375
.312

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V.AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/2/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 22 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

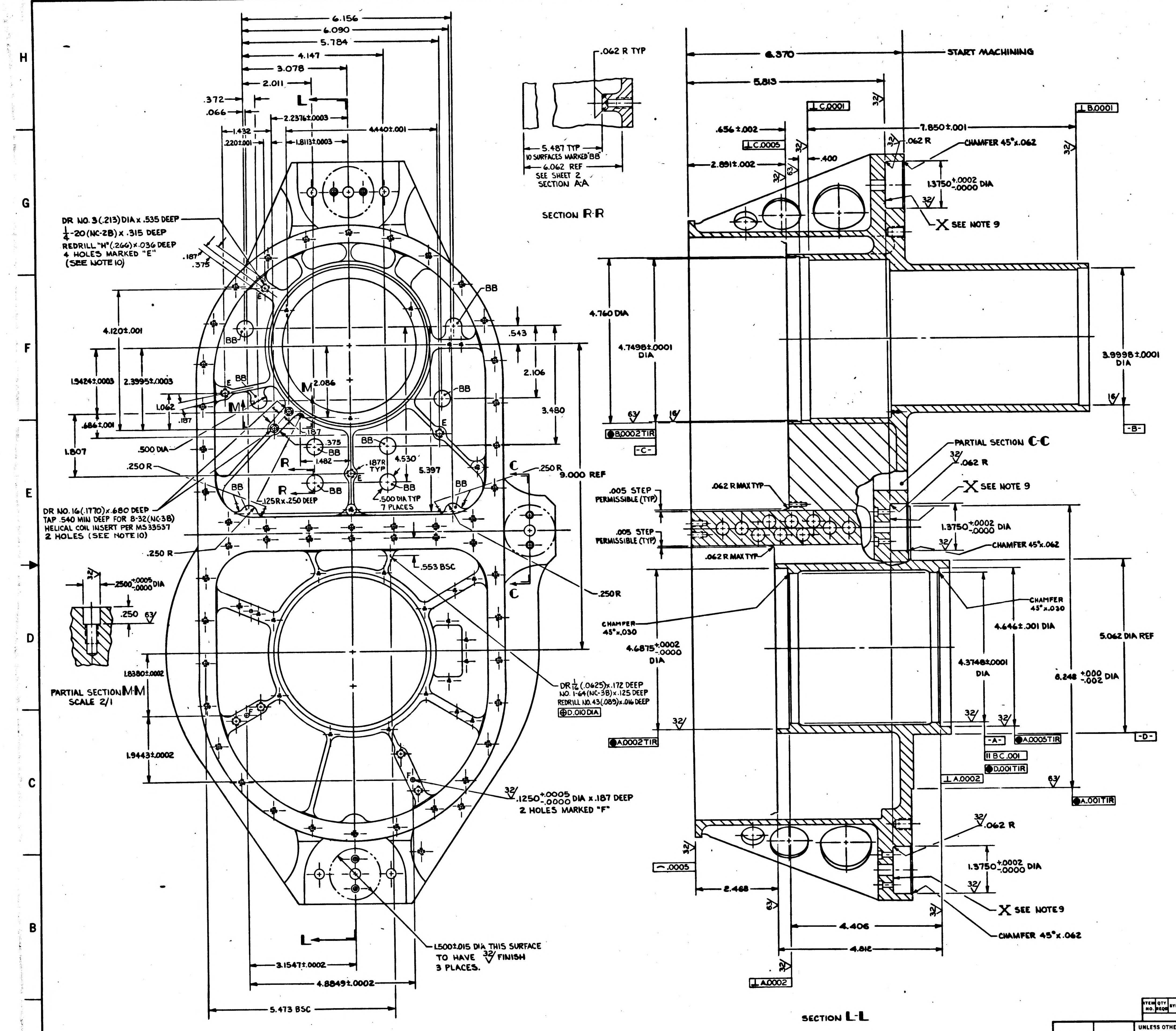
TITLE
OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 3 OF 4

2011618

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	
B		REVISED PER TDRR NO. 1314		UK

REVISIONS (0420)


6.156
6.090
5.784
4.147
3.078
2.011
.372
.066
L
2.2376±.0003
1.432
.220±.001
1.8113±.0003
4.440±.001
DR NO. 3 (.213) DIA x .535 DEEP
1/4-20 (NC-2B) x .315 DEEP
REDRILL "H" (.266) x .036 DEEP
4 HOLES MARKED "E"
(SEE NOTE 10)
.187
.375
BB
E
4.120±.001
1.9424±.0003
2.3995±.0003
1.062
.187
.686±.001
1.807
.500 DIA
.250 R
M
2.086
.543
2.106
3.480
.375
1.482
.187R TYP
4.530
5.397
R
.125R x .250 DEEP
.500 DIA TYP 7 PLACES
C
.250 R
9.000 REF
DR NO. 16 (.1770) x .680 DEEP
TAP .540 MIN DEEP FOR 8-32 (NC-3B)
HELICAL COIL INSERT PER MS33537
2 HOLES (SEE NOTE 10)
.553 BSC
.250R
.2500 +.0005 -.0000 DIA
.250
63
32
PARTIAL SECTION M-M
SCALE 2/1
1.8380±.0002
1.9443±.0002
DR 1/16 (.0625) x .172 DEEP
NO. 1-64 (NC-3B) x .125 DEEP
REDRILL NO. 43 (.089) x .016 DEEP
⊕D.010 DIA
.1250 +.0005 -.0000 DIA x .187 DEEP
2 HOLES MARKED "F"
F
1.500±.015 DIA THIS SURFACE
TO HAVE 32 FINISH
3 PLACES.
3.1547±.0002
4.8849±.0002
5.473 BSC
.062 R TYP
5.487 TYP
10 SURFACES MARKED "BB"
6.062 REF
SEE SHEET 2
SECTION A-A
SECTION R-R
6.370
START MACHINING
5.813
⊥C.0001
⊥B.0001
.656±.002
⊥C.0005
2.891±.002
.400
7.850±.001
.062 R
CHAMFER 45° x .062
1.3750 +.0002 -.0000 DIA
X SEE NOTE 9
4.760 DIA
4.7498±.0001 DIA
3.9998±.0001 DIA
16
●B.0002 TIR
-C-
-B-
PARTIAL SECTION C-C
.062 R MAX TYP
.005 STEP PERMISSIBLE (TYP)
CHAMFER 45° x .030
4.6875 +.0002 -.0000 DIA
4.646±.001 DIA
4.3748±.0001 DIA
5.062 DIA REF
8.248 +.000 -.002 DIA
●A.0002 TIR
-A-
●A.0005 TIR
∥B C.001
●D.001 TIR
⊥A.0002
-D-
●A.001 TIR
⌒.0005
2.468
4.406
4.812
SECTION L-L

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

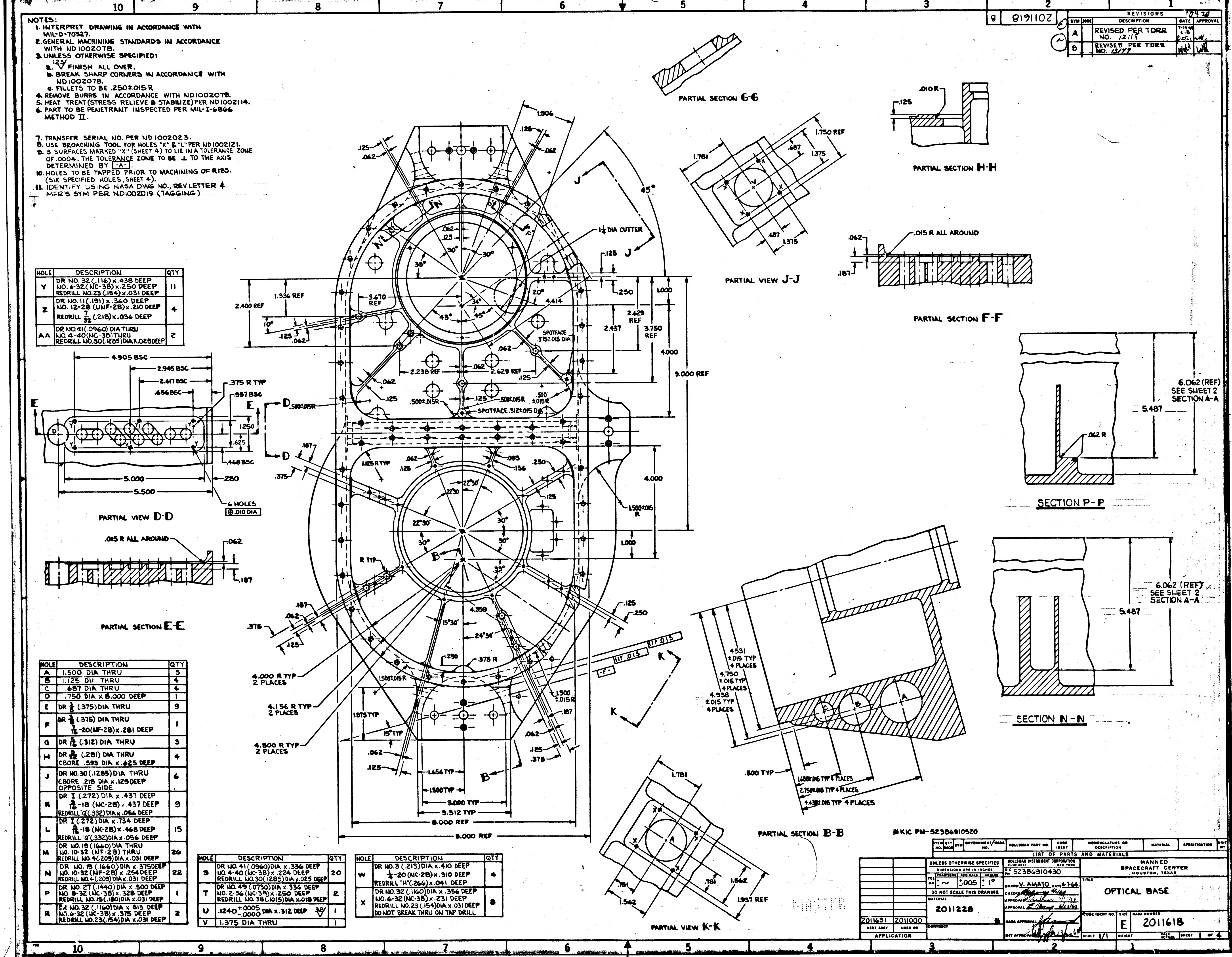
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/2/64
APPROVAL E. [illegible] 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: OPTICAL BASE

CODE IDENT NO.: | SIZE: E | NASA NUMBER: 2011618
SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 4 OF 4


PARTIAL SECTION G-G
PARTIAL VIEW J-J
PARTIAL SECTION H-H
PARTIAL SECTION F-F
SECTION P-P
SECTION N-N
PARTIAL SECTION B-B
PARTIAL VIEW K-K
PARTIAL VIEW D-D
PARTIAL SECTION E-E
6.062 (REF) SEE SHEET 2 SECTION A-A
5.487
1½ DIA CUTTER
45°
SPOTFACE .375±.015 DIA
SPOTFACE .312±.015 DIA
4.905 BSC
2.945 BSC
2.617 BSC
.656 BSC
.937 BSC
.375 R TYP
5.000
5.500
6 HOLES ⊕ .010 DIA
.015 R ALL AROUND
9.000 REF
8.000 REF
3.312 TYP
3.000 TYP
4.000 R TYP 2 PLACES
4.156 R TYP 2 PLACES
4.500 R TYP 2 PLACES
.500 TYP
4.531 ±.015 TYP 4 PLACES
4.750 ±.015 TYP 4 PLACES
4.938 ±.015 TYP 4 PLACES
1.781
1.562
1.937 REF
1.750 REF
MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{125}{\vee}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. FILLETS TO BE .250±.015 R
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE & STABILIZE) PER ND1002114.
6. PART TO BE PENETRANT INSPECTED PER MIL-I-6866 METHOD II.

7. TRANSFER SERIAL NO. PER ND1002023.
8. USE BROACHING TOOL FOR HOLES "K" & "L" PER ND1002121.
9. 3 SURFACES MARKED "X" (SHEET 4) TO LIE IN A TOLERANCE ZONE OF .0004. THE TOLERANCE ZONE TO BE ⊥ TO THE AXIS DETERMINED BY $\boxed{\text{-A-}}$.
10. HOLES TO BE TAPPED PRIOR TO MACHINING OF RIBS. (SIX SPECIFIED HOLES, SHEET 4).
11. IDENTIFY USING NASA DWG NO., REV LETTER & MFR'S SYM PER ND1002019 (TAGGING)

HOLE	DESCRIPTION	QTY
Y	DR NO. 32 (.116) x .438 DEEP NO. 6-32 (NC-3B) x .250 DEEP REDRILL NO. 23 (.154) x .031 DEEP	11
Z	DR NO. 11 (.191) x .360 DEEP NO. 12-28 (UNF-2B) x .210 DEEP REDRILL $\frac{7}{32}$ (.218) x .036 DEEP	4
AA	DR NO. 41 (.0960) DIA THRU NO. 4-40 (NC-3B) THRU REDRILL NO. 30 (.1285) DIA X .025 DEEP	2

HOLE	DESCRIPTION	QTY
A	1.500 DIA THRU	5
B	1.125 DIA THRU	4
C	.687 DIA THRU	4
D	.750 DIA x 8.000 DEEP	1
E	DR $\frac{3}{8}$ (.375) DIA THRU	9
F	DR $\frac{3}{8}$ (.375) DIA THRU $\frac{7}{16}$-20 (NF-2B) x .281 DEEP	1
G	DR $\frac{5}{16}$ (.312) DIA THRU	3
H	DR $\frac{9}{32}$ (.281) DIA THRU CBORE .593 DIA x .625 DEEP	4
J	DR NO. 30 (.1285) DIA THRU CBORE .218 DIA x .125 DEEP OPPOSITE SIDE	6
K	DR I (.272) DIA x .437 DEEP $\frac{5}{16}$-18 (NC-2B) x .437 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	9
L	DR I (.272) DIA x .734 DEEP $\frac{5}{16}$-18 (NC-2B) x .468 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	15
M	DR NO. 19 (.1660) DIA THRU NO. 10-32 (NF-2B) THRU REDRILL NO. 4 (.209) DIA x .031 DEEP	26
N	DR NO. 19 (.1660) DIA x .375 DEEP NO. 10-32 (NF-2B) x .254 DEEP REDRILL NO. 4 (.209) DIA x .031 DEEP	22
P	DR NO. 27 (.1440) DIA x .500 DEEP NO. 8-32 (NC-3B) x .328 DEEP REDRILL NO. 15 (.180) DIA x .031 DEEP	1
R	DR NO. 32 (.1160) DIA x .513 DEEP NO. 6-32 (NC-3B) x .375 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP	2

HOLE	DESCRIPTION	QTY
S	DR NO. 41 (.0960) DIA x .336 DEEP NO. 4-40 (NC-3B) x .224 DEEP REDRILL NO. 30 (.1285) DIA x .025 DEEP	20
T	DR NO. 49 (.0730) DIA x .336 DEEP NO. 2-56 (NC-3B) x .250 DEEP REDRILL NO. 38 (.1015) DIA x .018 DEEP	2
U	$.1240^{+.0005}_{-.0000}$ DIA x .312 DEEP $\overset{32}{\vee}$	1
V	1.375 DIA THRU	1

HOLE	DESCRIPTION	QTY
W	DR NO. 3 (.213) DIA x .410 DEEP $\frac{1}{4}$-20 (NC-2B) x .310 DEEP REDRILL "H" (.266) x .041 DEEP	4
X	DR NO. 32 (.1160) DIA x .356 DEEP NO. 6-32 (NC-3B) x .231 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP DO NOT BREAK THRU ON TAP DRILL	8

B 2011618

REVISIONS				10474
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12115	7-14-64 C.B.	
B		REVISED PER TDRR NO. 13149		

✱ KIC PN-52386910520

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011228 ✱

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 4/64
APPROVAL 6/23/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

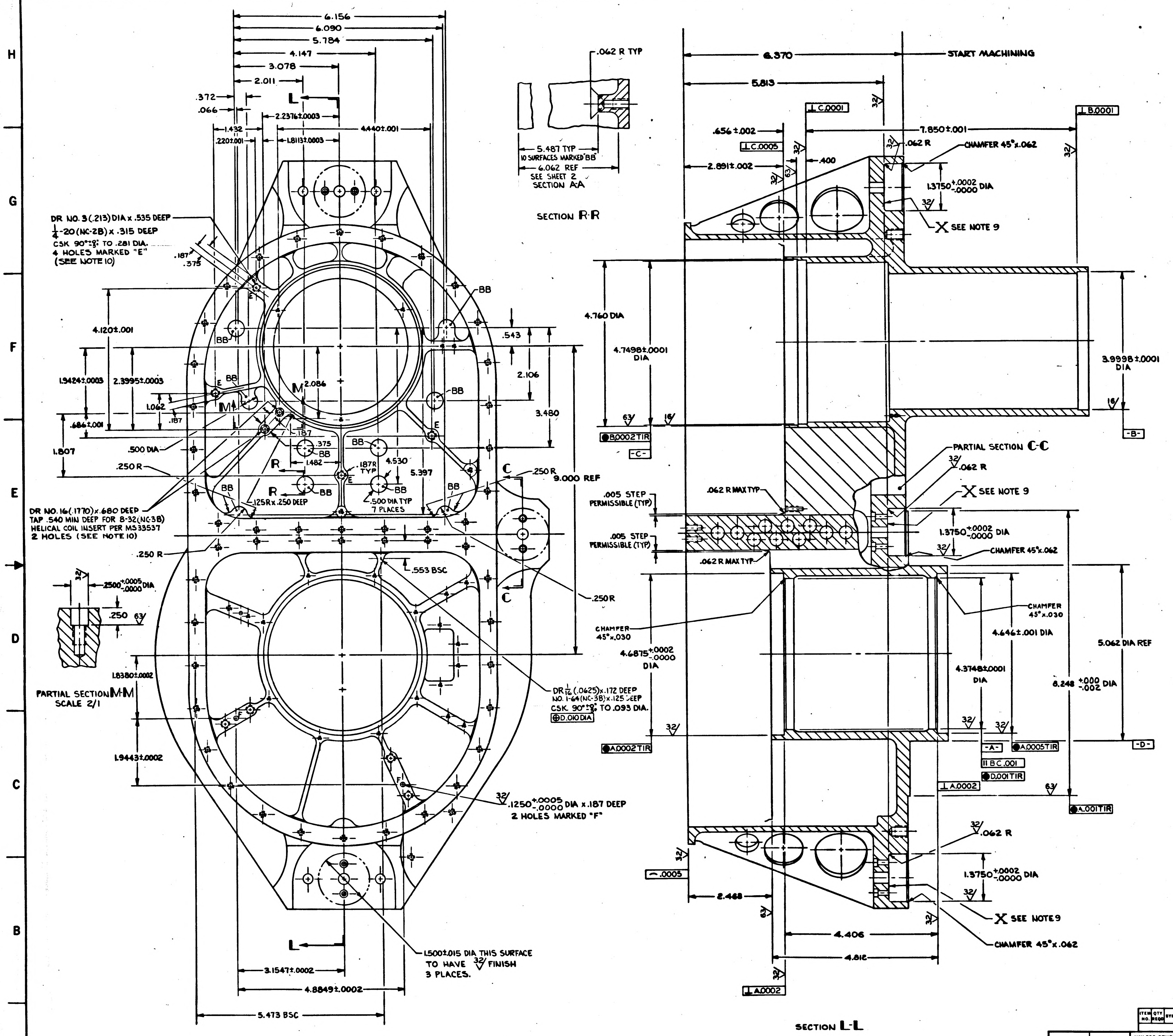
TITLE OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 4

C	2011618

REVISIONS (0420)

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	
B		REVISED PER TDRR NO. 13149	9-28-64	
C		REVISED PER TDRR NO. 14044		



6.156
6.090
5.784
4.147
3.078
2.011
L
.372
.066
2.2376±.0003
1.432
.220±.001
1.8113±.0003
4.440±.001
DR NO. 3(.213) DIA x .535 DEEP
1/4-20(NC-2B) x .315 DEEP
CSK 90°+8° TO .281 DIA.
4 HOLES MARKED "E"
(SEE NOTE 10)
.187
.375
4.120±.001
1.9424±.0003
2.3995±.0003
1.062
.187
.684±.001
1.807
.500 DIA
.250 R
M
2.086
BB
E
.543
2.106
3.480
.375
.187
1.482
4.530
5.397
.187R TYP
.500 DIA TYP 7 PLACES
.125R x .250 DEEP
R
9.000 REF
.250 R
C
DR NO.16(.1770) x .680 DEEP
TAP .540 MIN DEEP FOR 8-32(NC-3B)
HELICAL COIL INSERT PER MS33537
2 HOLES (SEE NOTE 10)
.250 R
.553 BSC
.2500+.0005 -.0000 DIA
.250
1.8380±.0002
PARTIAL SECTION M-M
SCALE 2/1
DR 1/16(.0625) x .172 DEEP
NO. 1-64(NC-3B) x .125 DEEP
CSK 90°+8° TO .093 DIA.
D .010 DIA
1.9443±.0002
.1250+.0005 -.0000 DIA x .187 DEEP
2 HOLES MARKED "F"
F
1.500±.015 DIA THIS SURFACE
TO HAVE 32 FINISH
3 PLACES.
3.1547±.0002
4.8849±.0002
5.473 BSC
.062 R TYP
5.487 TYP
10 SURFACES MARKED 'BB'
6.062 REF
SEE SHEET 2
SECTION A-A
SECTION R-R
6.370
START MACHINING
5.813
C .0001
B .0001
.656±.002
C .0005
7.850±.001
.062 R
CHAMFER 45° x .062
2.891±.002
.400
1.3750+.0002 -.0000 DIA
X SEE NOTE 9
4.760 DIA
4.7498±.0001 DIA
3.9998±.0001 DIA
B .0002 TIR
-C-
-B-
PARTIAL SECTION C-C
.062 R
X SEE NOTE 9
.005 STEP PERMISSIBLE (TYP)
.062 R MAX TYP
1.3750+.0002 -.0000 DIA
CHAMFER 45° x .062
CHAMFER 45° x .030
4.646±.001 DIA
5.062 DIA REF
4.6875+.0002 -.0000 DIA
4.3748±.0001 DIA
8.248+.000 -.002 DIA
-A-
A .0005 TIR
-D-
A .0002 TIR
B C .001
D .001 TIR
A .0002
A .001 TIR
.062 R
1.3750+.0002 -.0000 DIA
X SEE NOTE 9
CHAMFER 45° x .062
.0005
2.468
4.406
4.812
A .0002
SECTION L-L

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/2/64
APPROVAL E. 6/23/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

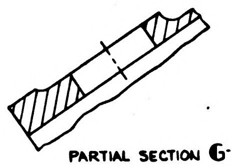
CODE IDENT NO. | SIZE E | NASA NUMBER 2011618
SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 4 OF 4

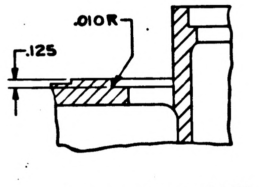
2011618

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	
B		REVISED PER TDRR NO 13149		WK
C		REVISED PER TDRR NO. 14044		WK

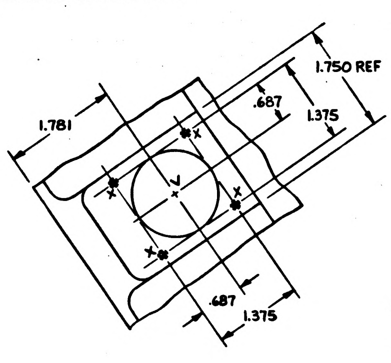
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 125√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. FILLETS TO BE .250±.015 R
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE & STABILIZE) PER ND1002114.
6. PART TO BE PENETRANT INSPECTED PER MIL-I-6866 METHOD II.

7. TRANSFER SERIAL NO. PER ND1002023.
8. USE BROACHING TOOL FOR HOLES "K" & "L" PER ND1002121.
9. 3 SURFACES MARKED "X" (SHEET 4) TO LIE IN A TOLERANCE ZONE OF .0004. THE TOLERANCE ZONE TO BE ⊥ TO THE AXIS DETERMINED BY -A-.
10. HOLES TO BE TAPPED PRIOR TO MACHINING OF RIBS. (SIX SPECIFIED HOLES, SHEET 4).
11. IDENTIFY USING NASA DWG NO., REV LETTER & MFR'S SYM PER ND1002019 (TAGGING)


PARTIAL SECTION G-G



PARTIAL SECTION H-H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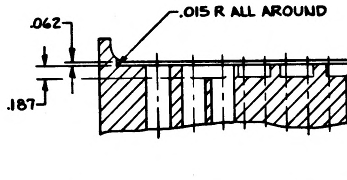
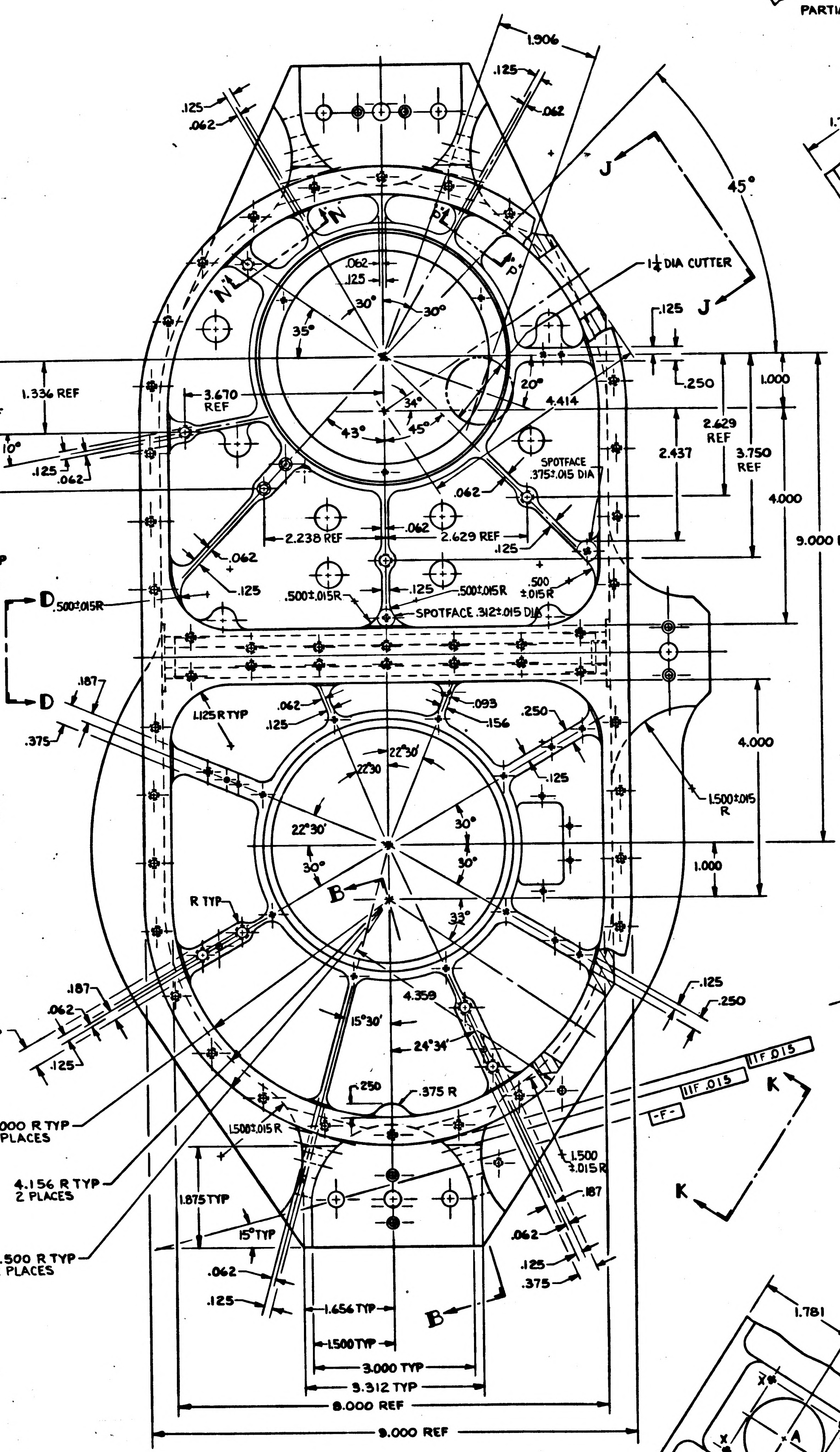
1.781
.687
1.375
PARTIAL VIEW J-J


.062
.015 R ALL AROUND
.187
PARTIAL SECTION F-F

HOLE	DESCRIPTION	QTY
Y	DR NO. 32 (.116) x .438 DEEP NO. 6-32 (NC-3B) x .250 DEEP CSK 90° +0° -5° TO .156 DIA	11
Z	DR NO. 11 (.191) x .360 DEEP NO. 12-28 (UNF-2B) x .210 DEEP CSK 90° +0° -5° TO .236 DIA	4
AA	DR NO. 41 (.0960) DIA THRU NO. 4-40 (NC-3B) THRU CSK 90° +0° -5° TO .140 DIA	2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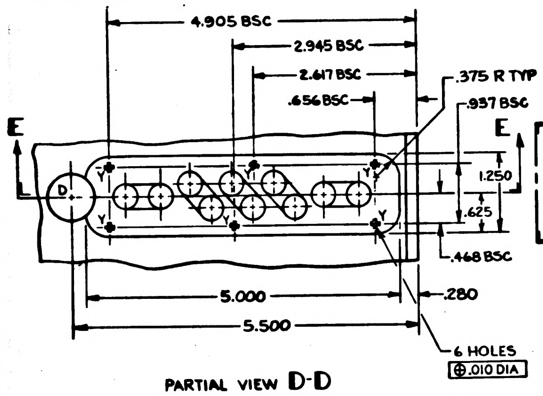
.062
J
45°
1¼ DIA CUTTER
.125
J
.250
1.000
2.400 REF
1.334 REF
3.670 REF
10°
.125
.062
4.414
2.629 REF
2.437
3.750 REF
4.000
9.000 REF
SPOTFACE .375±.015 DIA
2.238 REF
2.629 REF
.500±.015R
SPOTFACE .312±.015 DIA
D
D
.187
.375
1.125 R TYP
.093
.156
.250
4.000
1.500±.015 R
1.000
R TYP
B
4.359
15°30'
24°34'
.375 R
11F.015
-F-
K
K
1.500 ±.015
4.000 R TYP 2 PLACES
4.156 R TYP 2 PLACES
4.500 R TYP 2 PLACES
1.875 TYP
15° TYP
1.654 TYP
1.500 TYP
3.000 TYP
3.312 TYP
8.000 REF
9.000 REF
B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2.945 BSC
2.617 BSC
.656 BSC
.375 R TYP
.937 BSC
E
E
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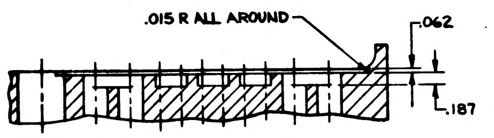
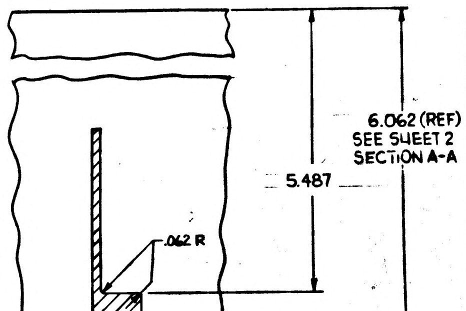
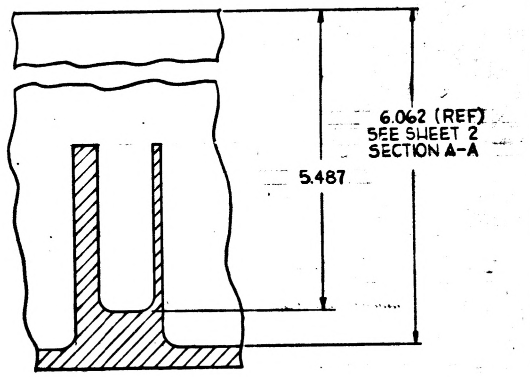
.625
.468 BSC
5.000
5.500
.280
6 HOLES
⊕ .010 DIA
PARTIAL VIEW D-D


.015 R ALL AROUND
.062
.187
PARTIAL SECTION E-E


6.062 (REF) SEE SHEET 2 SECTION A-A
5.487
.062 R
SECTION P-P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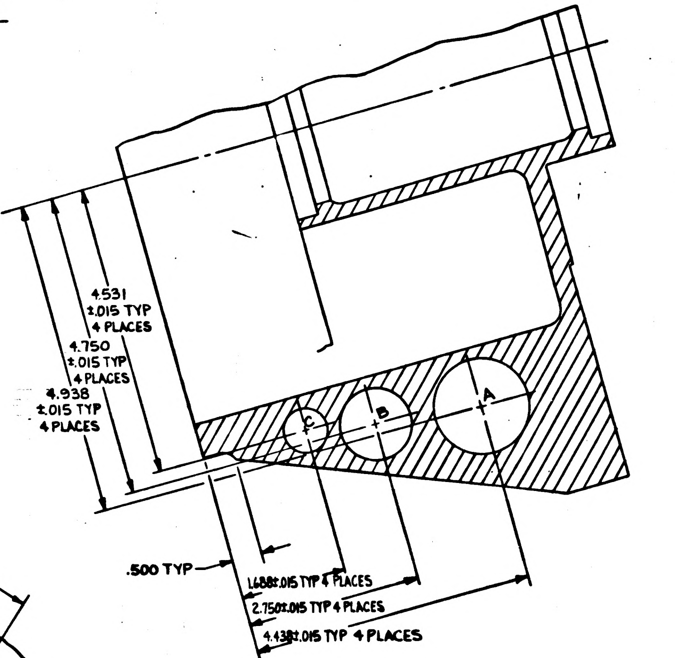
5.487
SECTION N-N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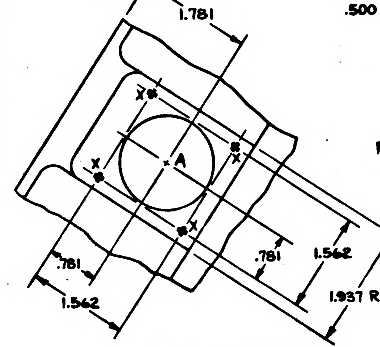
4.750 ±.015 TYP 4 PLACES
4.938 ±.015 TYP 4 PLACES
.500 TYP
1.688±.015 TYP 4 PLACES
2.750±.015 TYP 4 PLACES
4.438±.015 TYP 4 PLACES
A
B
C
PARTIAL SECTION B-B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.781
1.562
.781
1.562
1.937 REF
A
PARTIAL VIEW K-K

HOLE	DESCRIPTION	QTY
A	1.500 DIA THRU	5
B	1.125 DIA THRU	4
C	.687 DIA THRU	4
D	.750 DIA x 8.000 DEEP	1
E	DR 3/8 (.375) DIA THRU	9
F	DR 3/8 (.375) DIA THRU 7/16-20 (NF-2B) x .281 DEEP	1
G	DR 5/16 (.312) DIA THRU	3
H	DR 9/32 (.281) DIA THRU CBORE .593 DIA x .625 DEEP	4
J	DR NO. 30 (.1285) DIA THRU CBORE .218 DIA x .125 DEEP OPPOSITE SIDE	6
K	DR I (.272) DIA x .437 DEEP 5/16-18 (NC-2B) x .437 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	9
L	DR I (.272) DIA x .734 DEEP 5/16-18 (NC-2B) x .468 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	15
M	DR NO. 19 (.1660) DIA THRU NO. 10-32 (NF-2B) THRU CSK 90° +0° -5° TO .218 DIA	26
N	DR NO. 19 (.1660) DIA x .375 DEEP NO. 10-32 (NF-2B) x .254 DEEP CSK 90° +0° -5° TO .218 DIA	22
P	DR NO. 27 (.1440) DIA x .500 DEEP NO. 8-32 (NC-3B) x .328 DEEP CSK 90° +0° -5° TO .187 DIA	1
R	DR NO. 32 (.1160) DIA x .513 DEEP NO. 6-32 (NC-3B) x .375 DEEP CSK 90° +0° -5° TO .156 DIA	2

HOLE	DESCRIPTION	QTY
S	DR NO. 41 (.0960) DIA x .336 DEEP NO. 4-40 (NC-3B) x .224 DEEP CSK 90° +0° -5° TO .140 DIA	20
T	DR NO. 49 (.0730) DIA x .336 DEEP NO. 2-56 (NC-3B) x .250 DEEP CSK 90° +0° -5° TO .109 DIA	2
U	$.1240^{+.0005}_{-.0000}$ DIA x .312 DEEP 32√	1
V	1.375 DIA THRU	1

HOLE	DESCRIPTION	QTY
W	DR NO. 3 (.213) DIA x .410 DEEP 1/4-20 (NC-2B) x .310 DEEP CSK 90° +0° -5° TO .281 DIA	4
X	DR NO. 32 (.1160) DIA x .356 DEEP NO. 6-32 (NC-3B) x .231 DEEP CSK 90° +0° -5° TO .156 DIA. DO NOT BREAK THRU ON TAP DRILL	8

*KIC PN-52386910520

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL 2011228 *
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN Y. AMATO DATE 4-7-64
CHECKED 4/6/64
APPROVAL 6/23/64
APPROVAL E. Thomas 6/23/64
NASA APPROVAL
MIT APPROVAL 23 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

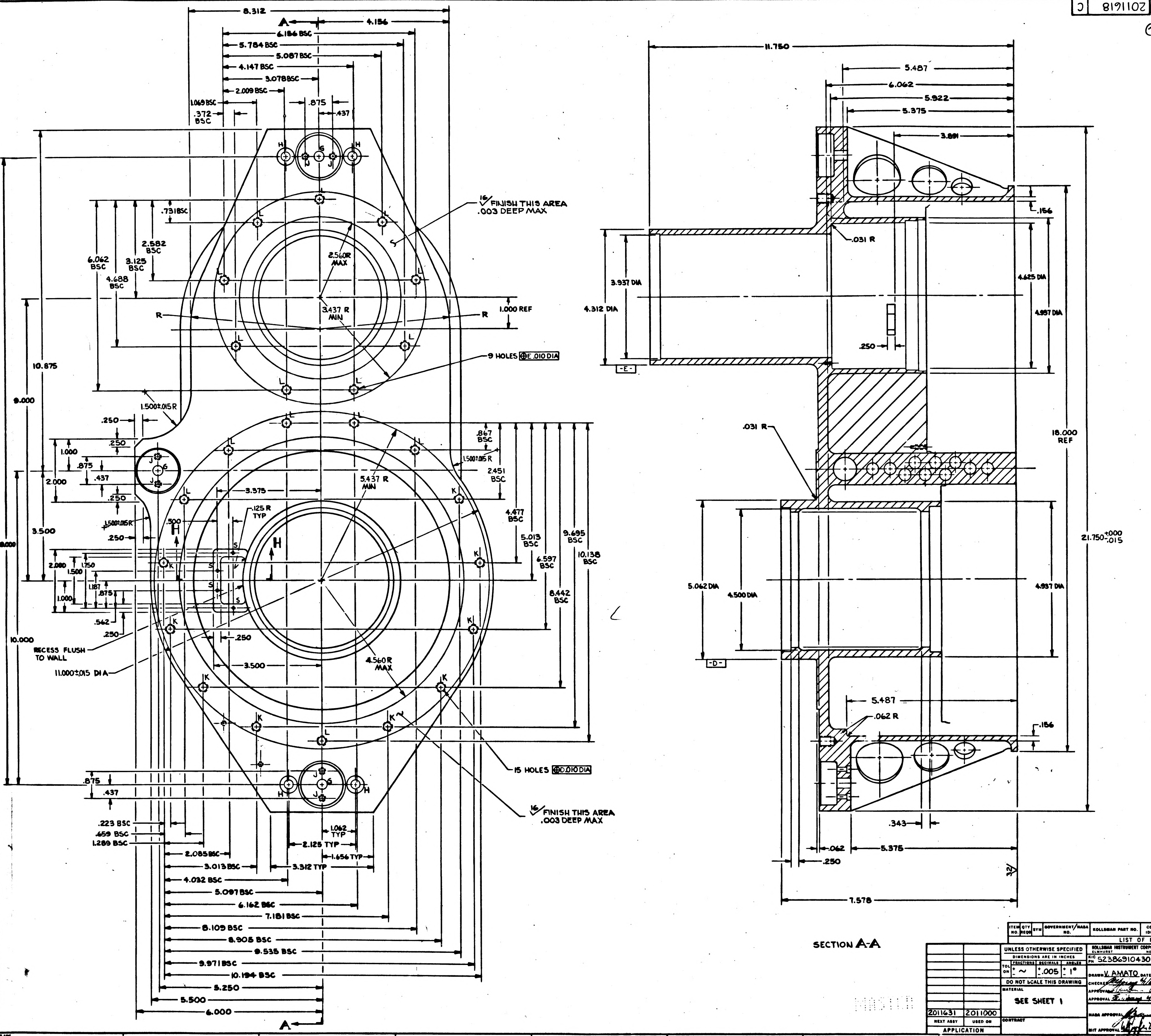
CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1 WEIGHT CALC ACTUAL SHEET OF 4

2011618 C

C	2011618

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	wR
B		REVISED PER TDRR NO. 13149	[illegible]	JK
C		REVISED PER TDRR NO. 4044	[illegible]	wR

REVISIONS 1C42



8.312
4.156
6.186 BSC
5.784 BSC
5.087 BSC
4.147 BSC
3.078 BSC
2.009 BSC
1.069 BSC
.372 BSC
.875
.437
FINISH THIS AREA .003 DEEP MAX
.731 BSC
6.062 BSC
3.125 BSC
2.582 BSC
4.688 BSC
2.560 R MAX
3.437 R MIN
R
1.000 REF
9 HOLES ⊕E .010 DIA
10.875
9.000
1.500±.015 R
.250
1.000
.875
.437
2.000
.867 BSC
2.451 BSC
1.500±.015 R
5.437 R MIN
3.375
.125 R TYP
.500
H
3.500
28.000
4.477 BSC
5.013 BSC
6.597 BSC
8.442 BSC
9.695 BSC
10.138 BSC
2.080
1.750
1.500
1.187
.875
1.000
.562
.250
10.000
RECESS FLUSH TO WALL
11.000±.015 DIA
3.500
4.560 R MAX
15 HOLES ⊕D .010 DIA
FINISH THIS AREA .003 DEEP MAX
.223 BSC
.659 BSC
1.289 BSC
2.085 BSC
3.013 BSC
4.032 BSC
5.097 BSC
6.162 BSC
7.181 BSC
8.109 BSC
8.905 BSC
9.535 BSC
9.971 BSC
10.194 BSC
5.250
5.500
6.000
1.062 TYP
2.125 TYP
1.656 TYP
3.312 TYP
A
11.750
5.487
6.062
5.922
5.375
3.891
.156
.031 R
3.937 DIA
4.312 DIA
4.625 DIA
4.937 DIA
.250
-E-
.031 R
18.000 REF
21.750 +.000 -.015
5.062 DIA
4.500 DIA
4.937 DIA
-D-
5.487
.062 R
.156
.343
.062
.250
5.375
7.578
SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED [illegible] 4/64
APPROVAL [illegible] 4/23/64
APPROVAL [illegible] 4/23/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 4/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

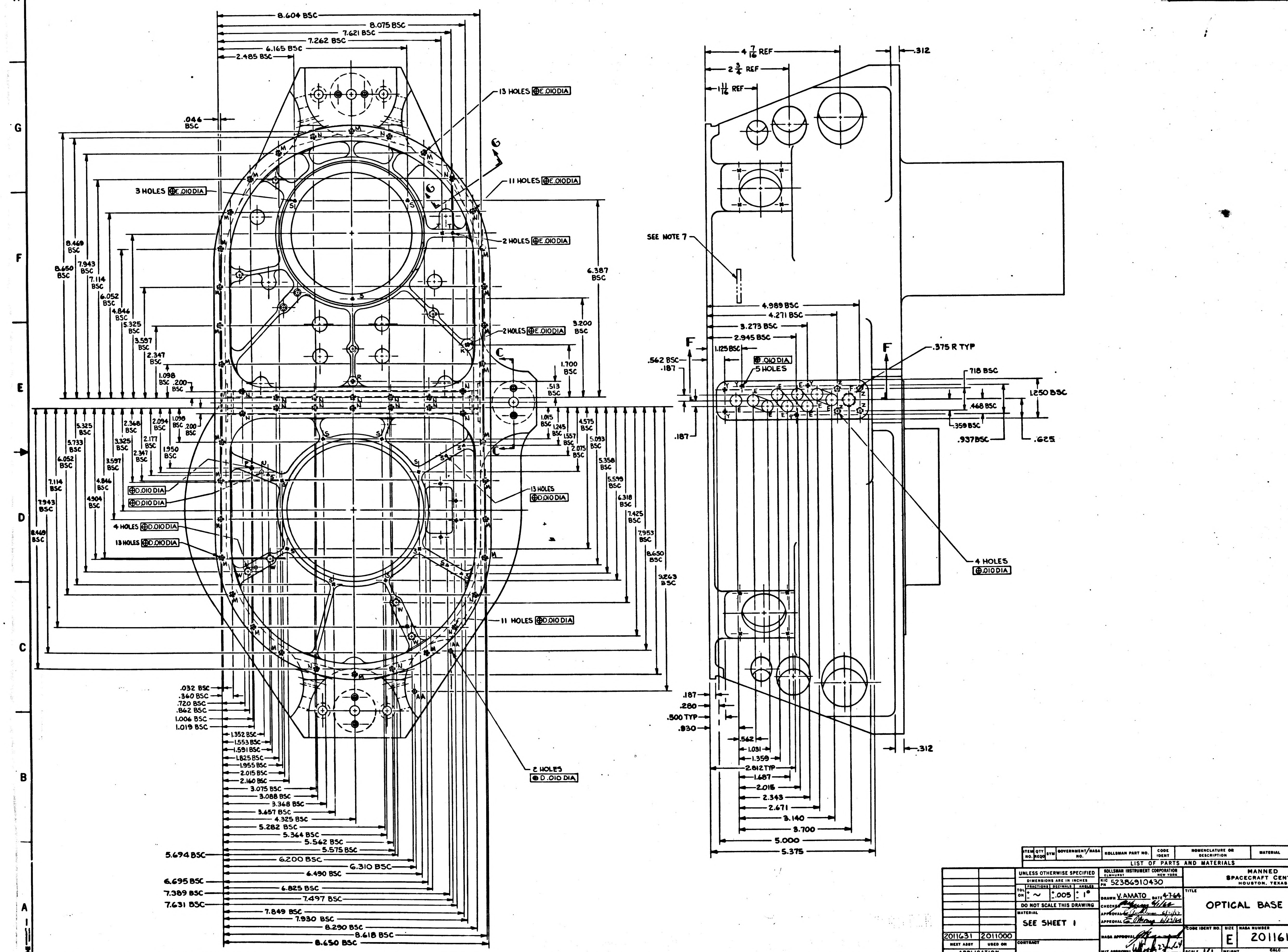
TITLE
OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 2 OF 4

2011618 C

2011618 C

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12119	7-14-64	
B		REVISED PER TDRR NO. 13149		
C		REVISED PER TDRR NO. 14044		



8.604 BSC
8.075 BSC
7.621 BSC
7.262 BSC
6.165 BSC
2.485 BSC
13 HOLES ⊕ E .010 DIA
.046 BSC
3 HOLES ⊕ E .010 DIA
11 HOLES ⊕ E .010 DIA
2 HOLES ⊕ E .010 DIA
2 HOLES ⊕ E .010 DIA
G
G
C
C
8.469 BSC
8.650 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
5.325 BSC
3.597 BSC
2.347 BSC
1.098 BSC
.200 BSC
6.387 BSC
3.200 BSC
1.700 BSC
.513 BSC
1.015 BSC
1.245 BSC
1.557 BSC
2.075 BSC
4.575 BSC
5.093 BSC
5.358 BSC
5.599 BSC
6.318 BSC
7.425 BSC
7.953 BSC
8.650 BSC
9.263 BSC
5.325 BSC
5.733 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
2.348 BSC
2.094 BSC
1.098 BSC
.200 BSC
3.325 BSC
2.177 BSC
2.347 BSC
1.950 BSC
3.597 BSC
4.846 BSC
4.904 BSC
⊕ D .010 DIA
⊕ D .010 DIA
4 HOLES ⊕ D .010 DIA
13 HOLES ⊕ D .010 DIA
13 HOLES ⊕ D .010 DIA
11 HOLES ⊕ D .010 DIA
2 HOLES ⊕ D .010 DIA
.032 BSC
.340 BSC
.720 BSC
.842 BSC
1.006 BSC
1.019 BSC
1.352 BSC
1.553 BSC
1.591 BSC
1.825 BSC
1.955 BSC
2.015 BSC
2.160 BSC
3.075 BSC
3.088 BSC
3.368 BSC
3.657 BSC
4.325 BSC
5.282 BSC
5.364 BSC
5.562 BSC
5.575 BSC
5.694 BSC
6.200 BSC
6.310 BSC
6.490 BSC
6.695 BSC
6.825 BSC
7.389 BSC
7.497 BSC
7.631 BSC
7.849 BSC
7.930 BSC
8.290 BSC
8.618 BSC
8.650 BSC
4 7/16 REF
2 3/4 REF
1 1/16 REF
.312
SEE NOTE 7
4.989 BSC
4.271 BSC
3.273 BSC
2.945 BSC
1.125 BSC
F
F
.562 BSC
.187
⊕ .010 DIA
5 HOLES
.375 R TYP
.718 BSC
1.250 BSC
.468 BSC
.359 BSC
.937 BSC
.625
.187
4 HOLES
⊕ .010 DIA
.187
.280
.500 TYP
.930
.562
1.031
1.359
2.812 TYP
1.687
2.015
2.343
2.671
3.140
3.700
5.000
5.375
.312

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/2/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 23 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO. SIZE E NASA NUMBER 2011618

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 3 OF 4

2011618 C

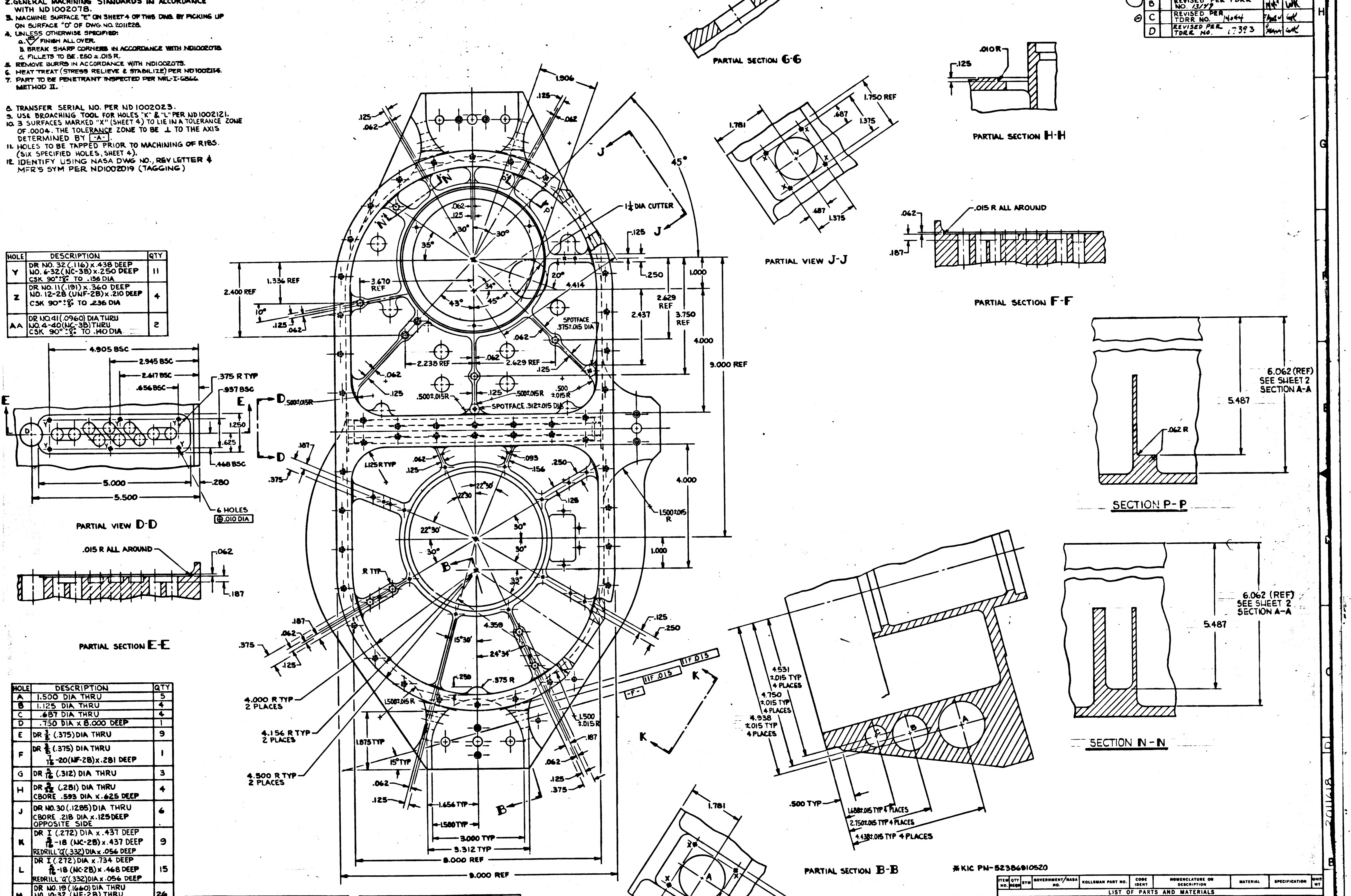
D 2011618

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 10470		
A		REVISED PER TDRR NO. 12118	7-14-64 C.B	WK
B		REVISED PER TDRR NO. 13149		WK
C		REVISED PER TDRR NO. 14044		WK
D		REVISED PER TDRR NO. 17393		WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. MACHINE SURFACE "E" ON SHEET 4 OF THIS DWG. BY PICKING UP ON SURFACE "D" OF DWG. NO. 2011228.
4. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{125}{\surd}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. FILLETS TO BE .250 ± .015 R.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002073.
6. HEAT TREAT (STRESS RELIEVE & STABILIZE) PER ND1002114.
7. PART TO BE PENETRANT INSPECTED PER MIL-I-6866 METHOD II.
8. TRANSFER SERIAL NO. PER ND 1002023.
9. USE BROACHING TOOL FOR HOLES "K" & "L" PER ND 1002121.
10. 3 SURFACES MARKED "X" (SHEET 4) TO LIE IN A TOLERANCE ZONE OF .0004. THE TOLERANCE ZONE TO BE ⊥ TO THE AXIS DETERMINED BY $\boxed{\text{-A-}}$.
11. HOLES TO BE TAPPED PRIOR TO MACHINING OF RIBS. (SIX SPECIFIED HOLES, SHEET 4).
12. IDENTIFY USING NASA DWG NO., REV LETTER & MFR'S SYM PER ND1002019 (TAGGING)

HOLE	DESCRIPTION	QTY
Y	DR NO. 32 (.116) x .438 DEEP NO. 6-32 (NC-3B) x .250 DEEP CSK 90° $^{+0°}_{-5°}$ TO .156 DIA	11
Z	DR NO. 11 (.191) x .360 DEEP NO. 12-28 (UNF-2B) x .210 DEEP CSK 90° $^{+0°}_{-5°}$ TO .236 DIA	4
AA	DR NO. 41 (.0960) DIA THRU NO. 4-40 (NC-3B) THRU CSK 90° $^{+0°}_{-5°}$ TO .140 DIA	2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PARTIAL SECTION H-H
PARTIAL VIEW J-J
PARTIAL SECTION F-F
SECTION P-P
SECTION N-N
PARTIAL SECTION B-B
PARTIAL VIEW K-K
PARTIAL VIEW D-D
PARTIAL SECTION E-E
1½ DIA CUTTER
SPOTFACE .375±.015 DIA
SPOTFACE .312±.015 DIA
.015 R ALL AROUND
6.062 (REF) SEE SHEET 2 SECTION A-A
5.487
4.905 BSC
2.945 BSC
2.617 BSC
.656 BSC
.937 BSC
.375 R TYP
5.000
5.500
6 HOLES
⊕ .010 DIA
9.000 REF
8.000 REF
3.312 TYP
3.000 TYP
1.656 TYP
1.500 TYP
4.000 R TYP 2 PLACES
4.156 R TYP 2 PLACES
4.500 R TYP 2 PLACES
4.531 ±.015 TYP 4 PLACES
4.750 ±.015 TYP 4 PLACES
4.938 ±.015 TYP 4 PLACES
1.688±.015 TYP 4 PLACES
2.750±.015 TYP 4 PLACES
4.438±.015 TYP 4 PLACES
.500 TYP
1.750 REF
1.781
1.562
1.937 REF
45°

HOLE	DESCRIPTION	QTY
A	1.500 DIA THRU	5
B	1.125 DIA THRU	4
C	.687 DIA THRU	4
D	.750 DIA x 8.000 DEEP	1
E	DR $\frac{3}{8}$ (.375) DIA THRU	9
F	DR $\frac{3}{8}$ (.375) DIA THRU $\frac{7}{16}$-20 (NF-2B) x .281 DEEP	1
G	DR $\frac{5}{16}$ (.312) DIA THRU	3
H	DR $\frac{9}{32}$ (.281) DIA THRU CBORE .593 DIA x .625 DEEP	4
J	DR NO. 30 (.1285) DIA THRU CBORE .218 DIA x .125 DEEP OPPOSITE SIDE	6
K	DR I (.272) DIA x .437 DEEP $\frac{5}{16}$-18 (NC-2B) x .437 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	9
L	DR I (.272) DIA x .734 DEEP $\frac{5}{16}$-18 (NC-2B) x .468 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	15
M	DR NO. 19 (.1660) DIA THRU NO. 10-32 (NF-2B) THRU CSK 90° $^{+0°}_{-5°}$ TO .218 DIA	26
N	DR NO. 19 (.1660) DIA x .375 DEEP NO. 10-32 (NF-2B) x .254 DEEP CSK 90° $^{+0°}_{-5°}$ TO .218 DIA	22
P	DR NO. 27 (.1440) DIA x .500 DEEP NO. 8-32 (NC-3B) x .328 DEEP CSK 90° $^{+0°}_{-5°}$ TO .187 DIA	1
R	DR NO. 32 (.1160) DIA x .513 DEEP NO. 6-32 (NC-3B) x .375 DEEP CSK 90° $^{+0°}_{-5°}$ TO .156 DIA	2

HOLE	DESCRIPTION	QTY
S	DR NO. 41 (.0960) DIA x .336 DEEP NO. 4-40 (NC-3B) x .224 DEEP CSK 90° $^{+0°}_{-5°}$ TO .140 DIA	20
T	DR NO. 49 (.0730) DIA x .336 DEEP NO. 2-56 (NC-3B) x .250 DEEP CSK 90° $^{+0°}_{-5°}$ TO .109 DIA	2
U	$.1240^{+.0005}_{-.0000}$ DIA x .312 DEEP $\overset{32}{\surd}$	1
V	1.375 DIA THRU	1

HOLE	DESCRIPTION	QTY
W	DR NO. 3 (.213) DIA x .410 DEEP $\frac{1}{4}$-20 (NC-2B) x .310 DEEP REDRILL H (.266) x .041 DEEP	4
X	DR NO. 32 (.1160) DIA x .356 DEEP NO. 6-32 (NC-3B) x .231 DEEP CSK 90° $^{+0°}_{-5°}$ TO .156 DIA DO NOT BREAK THRU ON TAP DRILL	8

*KIC PN-52386910520

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011228 *

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN Y. AMATO DATE 4-7-64
CHECKED 4/6/64
APPROVAL
APPROVAL 3/23/64
NASA APPROVAL
MIT APPROVAL 23 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

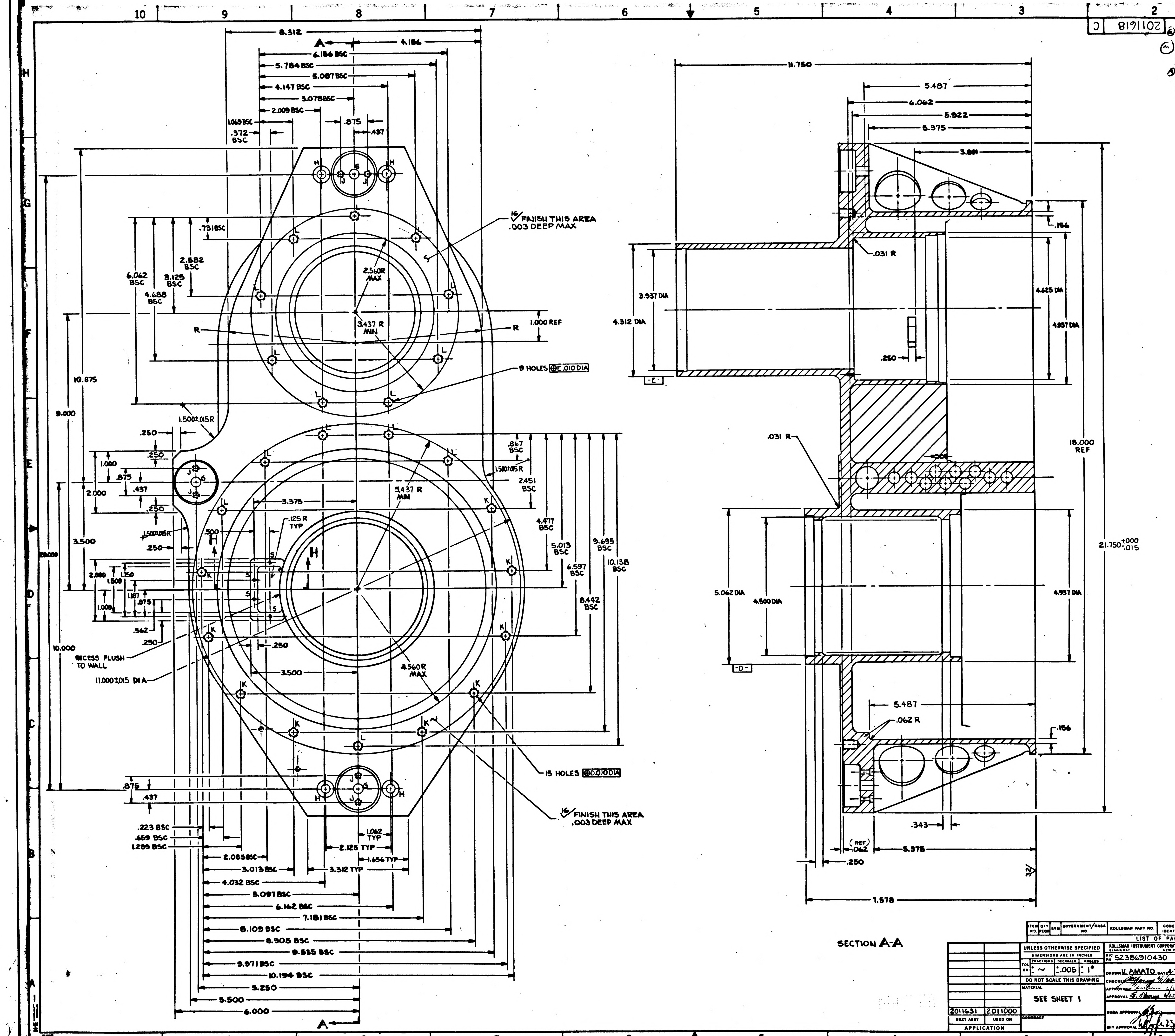
TITLE OPTICAL BASE

CODE IDENT NO. | SIZE E | NASA NUMBER 2011618

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET | OF 4

C	2011618

REVISIONS				1042
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64 C.B.	WK
B		REVISED PER TDRR NO. 13149		WK
C		REVISED PER TDRR NO. 4044		WK
D		REVISED PER TDRR NO. 17353		WK



8.312
A
4.156
6.156 BSC
5.784 BSC
5.087 BSC
4.147 BSC
3.078 BSC
2.009 BSC
1.069 BSC
.372 BSC
.875
.437
16/ FINISH THIS AREA .003 DEEP MAX
.731 BSC
2.582 BSC
6.062 BSC
3.125 BSC
4.688 BSC
2.560 R MAX
3.437 R MIN
1.000 REF
R
9 HOLES ⌖E .010 DIA
10.875
9.000
1.500±.015 R
.250
1.000
.875
.437
2.000
.867 BSC
1.500±.015 R
2.451 BSC
5.437 R MIN
3.375
.125 R TYP
.500
4.477 BSC
5.013 BSC
4.597 BSC
9.695 BSC
10.138 BSC
8.442 BSC
3.500
20.000
2.000
1.750
1.500
1.187
1.000
.875
.562
.250
10.000
RECESS FLUSH TO WALL
11.000±.015 DIA
4.560 R MAX
15 HOLES ⌖D .010 DIA
16/ FINISH THIS AREA .003 DEEP MAX
.223 BSC
.659 BSC
1.289 BSC
1.062 TYP
2.125 TYP
1.656 TYP
2.085 BSC
3.013 BSC
3.312 TYP
4.032 BSC
5.097 BSC
6.162 BSC
7.181 BSC
8.109 BSC
8.905 BSC
9.535 BSC
9.971 BSC
10.194 BSC
5.250
5.500
6.000
H
J
G
L
K
S
11.750
5.487
6.062
5.922
5.375
3.891
.156
.031 R
3.937 DIA
4.312 DIA
-E-
4.625 DIA
4.937 DIA
.250
.031 R
18.000 REF
21.750 +.000 -.015
5.062 DIA
4.500 DIA
4.937 DIA
-D-
5.487
.062 R
.156
.343
(REF) .062
.250
5.375
7.578
32/

SECTION A-A

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/22/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

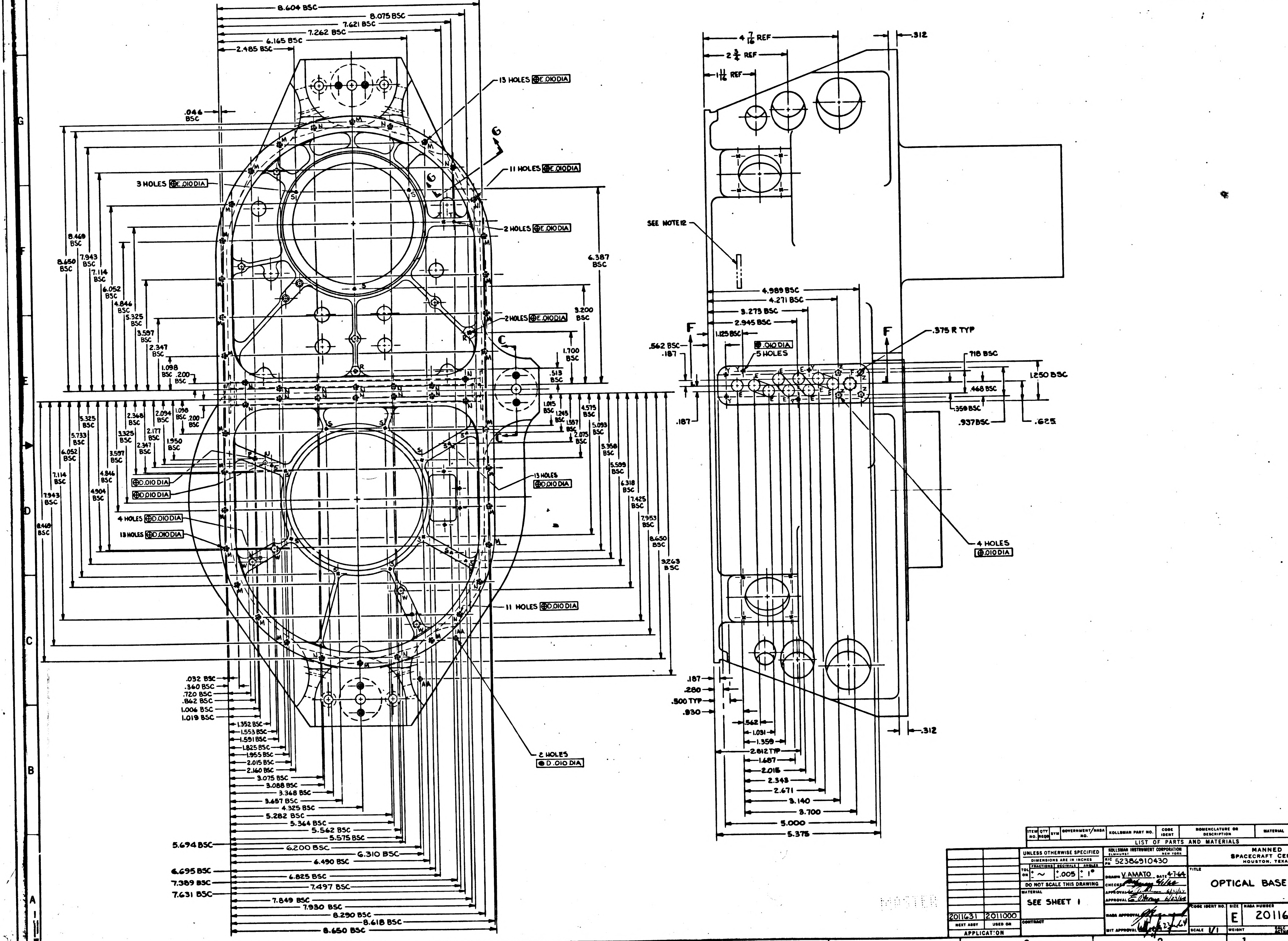
CODE IDENT NO.
SIZE E
NASA NUMBER 2011618

SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 4

2011618

2011618 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-17-64	WK
B		REVISED PER TDRR NO. 13149	[illegible]	WK
C		REVISED PER TDRR NO. 14044	[illegible]	WK
D		REVISED PER TDRR NO 17393	[illegible]	WK



8.604 BSC
8.075 BSC
7.621 BSC
7.262 BSC
6.165 BSC
2.485 BSC
13 HOLES ⊕E.010 DIA
11 HOLES ⊕E.010 DIA
3 HOLES ⊕E.010 DIA
2 HOLES ⊕E.010 DIA
2 HOLES ⊕E.010 DIA
.046 BSC
G
G
C
C
8.469 BSC
8.650 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
5.325 BSC
3.597 BSC
2.347 BSC
1.098 BSC
.200 BSC
6.387 BSC
3.200 BSC
1.700 BSC
.513 BSC
1.015 BSC
1.245 BSC
1.557 BSC
2.075 BSC
4.575 BSC
5.093 BSC
5.358 BSC
5.599 BSC
6.318 BSC
7.425 BSC
7.953 BSC
8.650 BSC
9.263 BSC
13 HOLES ⊕D.010 DIA
⊕D.010 DIA
⊕D.010 DIA
4 HOLES ⊕D.010 DIA
13 HOLES ⊕D.010 DIA
11 HOLES ⊕D.010 DIA
2 HOLES ⊕D.010 DIA
.032 BSC
.360 BSC
.720 BSC
.842 BSC
1.006 BSC
1.019 BSC
1.352 BSC
1.553 BSC
1.591 BSC
1.825 BSC
1.955 BSC
2.015 BSC
2.160 BSC
3.075 BSC
3.088 BSC
3.348 BSC
3.457 BSC
4.325 BSC
5.282 BSC
5.364 BSC
5.562 BSC
5.575 BSC
5.694 BSC
6.200 BSC
6.310 BSC
6.490 BSC
6.695 BSC
6.825 BSC
7.389 BSC
7.497 BSC
7.631 BSC
7.849 BSC
7.930 BSC
8.290 BSC
8.618 BSC
8.650 BSC
4 7/16 REF
2 3/4 REF
1 1/16 REF
.312
SEE NOTE 12
4.989 BSC
4.271 BSC
3.273 BSC
2.945 BSC
1.125 BSC
F
F
⊕.010 DIA 5 HOLES
.375 R TYP
.562 BSC
.187
.187
.718 BSC
1.250 BSC
.468 BSC
.359 BSC
.937 BSC
.625
4 HOLES ⊕.010 DIA
.187
.280
.500 TYP
.930
.562
1.031
1.359
2.812 TYP
1.687
2.015
2.343
2.671
3.140
3.700
5.000
5.375
.312

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED [illegible] 6/1/64
APPROVAL [illegible] 6/4/64
APPROVAL E. [illegible] 6/23/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 22 [illegible] 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

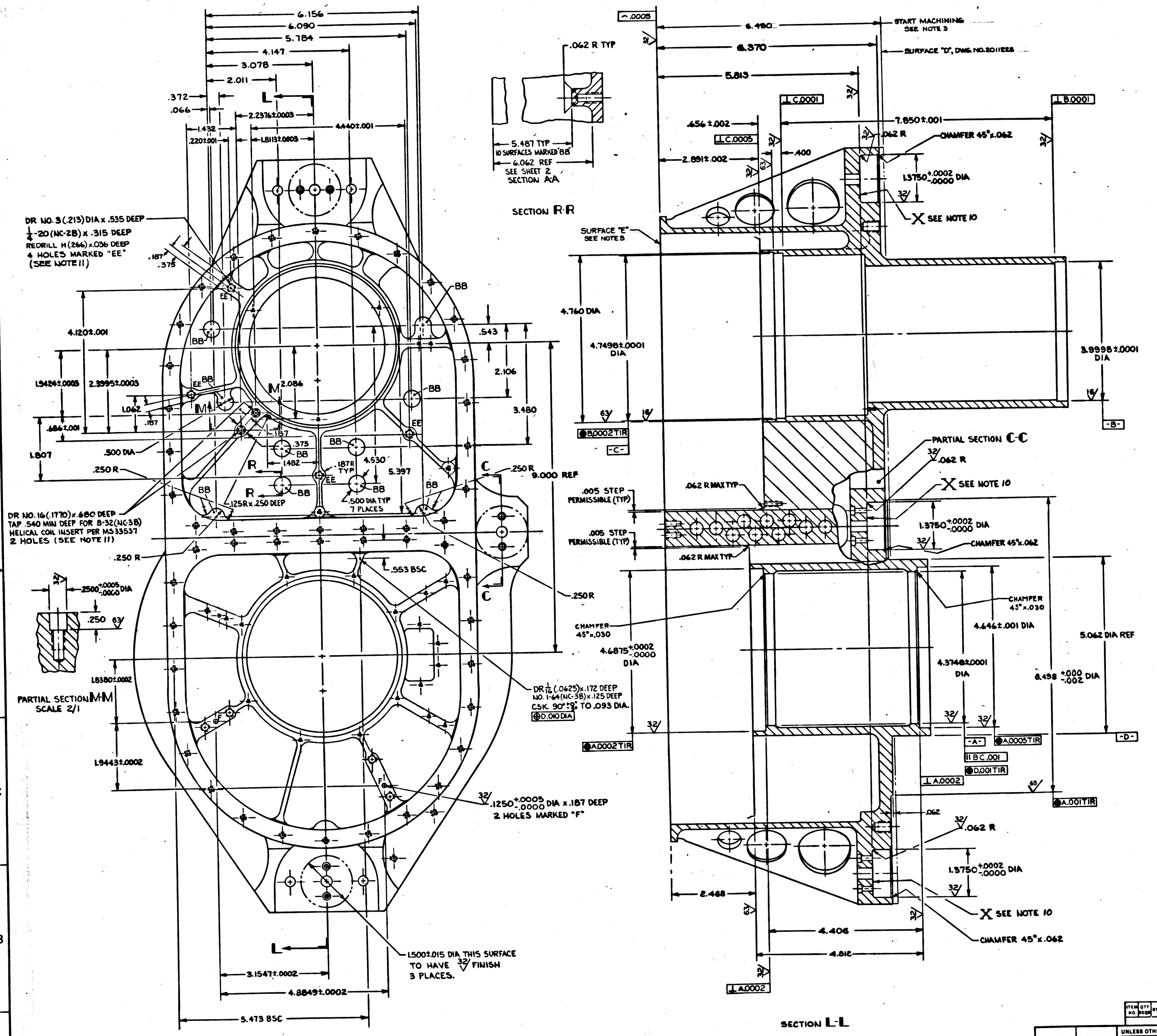
TITLE
OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 3 OF 4

2011618

D 2011618

SYM	ZONE	REVISIONS DESCRIPTION (0420)	DATE	APPROVAL
A		REVISED PER TDRR NO. 12118	7-14-64	WK
B		REVISED PER TDRR NO. 13149	9-28-64	WK
C		REVISED PER TDRR NO. 14044	4 Mar 65	WK.
D		REVISED PER TDRR NO. 17353	5 Mar 65	WK.



6.156
6.090
5.784
4.147
3.078
2.011
L
.372
.066
2.2374±.0003
4.440±.001
1.432
.220±.001
1.8113±.0003
DR NO. 3 (.213) DIA x .535 DEEP
¼-20 (NC-2B) x .315 DEEP
REDRILL H (.266) x .036 DEEP
4 HOLES MARKED "EE"
(SEE NOTE 11)
.187
.375
4.120±.001
1.9424±.0003
2.3995±.0003
1.062
.187
.686±.001
1.807
.500 DIA
.250 R
M
2.084
.375
.187
1.482
R
BB
EE
.187R TYP
4.530
5.397
.500 DIA TYP 7 PLACES
.125R x .250 DEEP
DR NO. 16 (.1770) x .680 DEEP
TAP .540 MIN DEEP FOR 8-32 (NC-3B)
HELICAL COIL INSERT PER MS33537
2 HOLES (SEE NOTE 11)
.250 R
.543
2.106
3.480
C
.250 R
9.000 REF
.553 BSC
.250R
.2500 +.0005 -.0000 DIA
.250
PARTIAL SECTION M-M
SCALE 2/1
1.8380±.0002
1.9443±.0002
DR 1/16 (.0625) x .172 DEEP
NO. 1-64 (NC-3B) x .125 DEEP
CSK. 90°±2° TO .093 DIA.
⊕ D.010 DIA
.1250 +.0005 -.0000 DIA x .187 DEEP
2 HOLES MARKED "F"
F
1.500±.015 DIA THIS SURFACE
TO HAVE 32 FINISH
3 PLACES.
3.1547±.0002
4.8849±.0002
5.473 BSC
.062 R TYP
5.487 TYP
10 SURFACES MARKED "BB"
4.062 REF
SEE SHEET 2
SECTION AA
SECTION R-R
⌒ .0005
6.490
6.370
5.813
START MACHINING
SEE NOTE 3
SURFACE "D", DWG. NO. 2011228
⊥ C.0001
⊥ B.0001
.656±.002
7.850±.001
⊥ C.0005
.062 R
CHAMFER 45° x .062
2.891±.002
.400
1.3750 +.0002 -.0000 DIA
X SEE NOTE 10
SURFACE "E"
SEE NOTE 3
4.760 DIA
4.7498±.0001 DIA
3.9998±.0001 DIA
◎ B.0002 TIR
-C-
-B-
PARTIAL SECTION C-C
.062 R
X SEE NOTE 10
.062 R MAX TYP
.005 STEP PERMISSIBLE (TYP)
.005 STEP PERMISSIBLE (TYP)
1.3750 +.0002 -.0000 DIA
CHAMFER 45° x .062
.062 R MAX TYP
CHAMFER 45° x .030
CHAMFER 45° x .030
4.646±.001 DIA
5.062 DIA REF
4.6875 +.0002 -.0000 DIA
4.3748±.0001 DIA
8.498 +.000 -.002 DIA
-A-
◎ A.0005 TIR
-D-
◎ A.0002 TIR
∥ B C .001
◎ .001 TIR
⊥ A.0002
◎ A.001 TIR
.062
.062 R
1.3750 +.0002 -.0000 DIA
X SEE NOTE 10
CHAMFER 45° x .062
2.468
4.406
4.812
⊥ A.0002
SECTION L-L

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE SHEET 1
CONTRACT

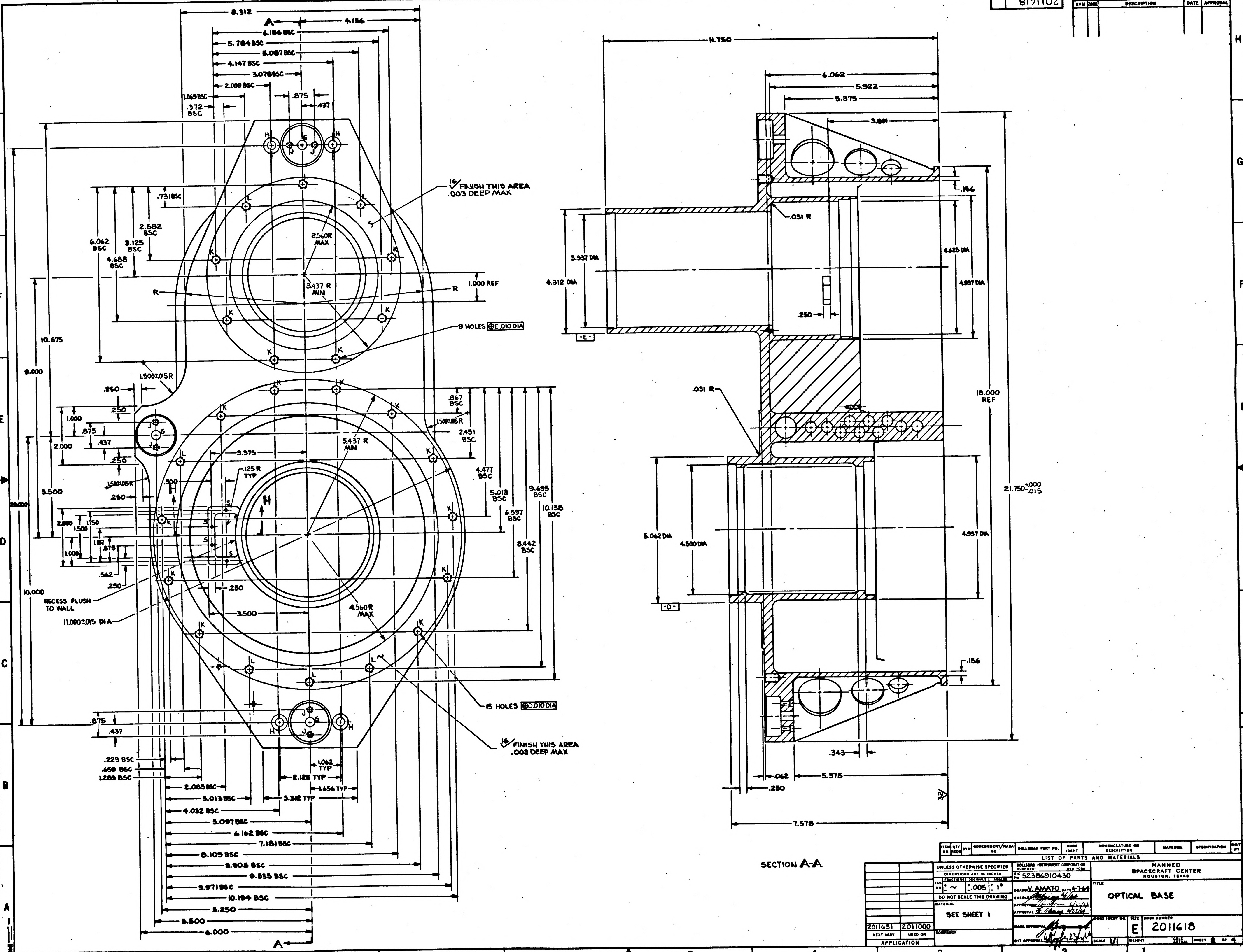
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/1/64
APPROVAL E. Baum 6/23/64
NASA APPROVAL
MIT APPROVAL 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO. | SIZE E | NASA NUMBER 2011618
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 4 OF 4

2011618


2011618
A
8.312
4.156
6.156 BSC
5.784 BSC
5.087 BSC
4.147 BSC
3.078 BSC
2.009 BSC
1.069 BSC
.372 BSC
.875
.437
16/ FINISH THIS AREA .003 DEEP MAX
.731 BSC
2.582 BSC
6.062 BSC
3.125 BSC
4.688 BSC
2.560 R MAX
3.437 R MIN
1.000 REF
R
10.875
9.000
9 HOLES ⊕E .010 DIA
1.500±.015 R
.250
1.000
2.000
3.500
28.000
5.437 R MIN
.867 BSC
1.500±.015 R
2.451 BSC
4.477 BSC
5.013 BSC
6.597 BSC
8.442 BSC
9.695 BSC
10.138 BSC
3.375
.125 R TYP
.500
H
2.080
1.750
1.500
1.187
1.000
.875
.562
10.000
RECESS FLUSH TO WALL
11.000±.015 DIA
3.500
4.560 R MAX
15 HOLES ⊕D .010 DIA
16/ FINISH THIS AREA .003 DEEP MAX
.223 BSC
.659 BSC
1.289 BSC
1.062 TYP
2.125 TYP
2.065 BSC
3.013 BSC
3.312 TYP
1.656 TYP
4.032 BSC
5.097 BSC
6.162 BSC
7.181 BSC
8.109 BSC
8.905 BSC
9.535 BSC
9.971 BSC
10.194 BSC
5.250
5.500
6.000
K
L
J
G
S
11.750
6.062
5.922
5.375
3.881
.156
.031 R
3.937 DIA
4.312 DIA
4.625 DIA
4.937 DIA
.250
-E-
.031 R
18.000 REF
21.750 +.000 -.015
5.062 DIA
4.500 DIA
4.937 DIA
-D-
.156
.343
.062
5.375
.250
7.578
32/
SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
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	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN V. AMATO DATE 4-7-64
CHECKED 4/64
APPROVAL 4/22/64
APPROVAL F. 4/23/64
NASA APPROVAL
UNIT APPROVAL 23 64

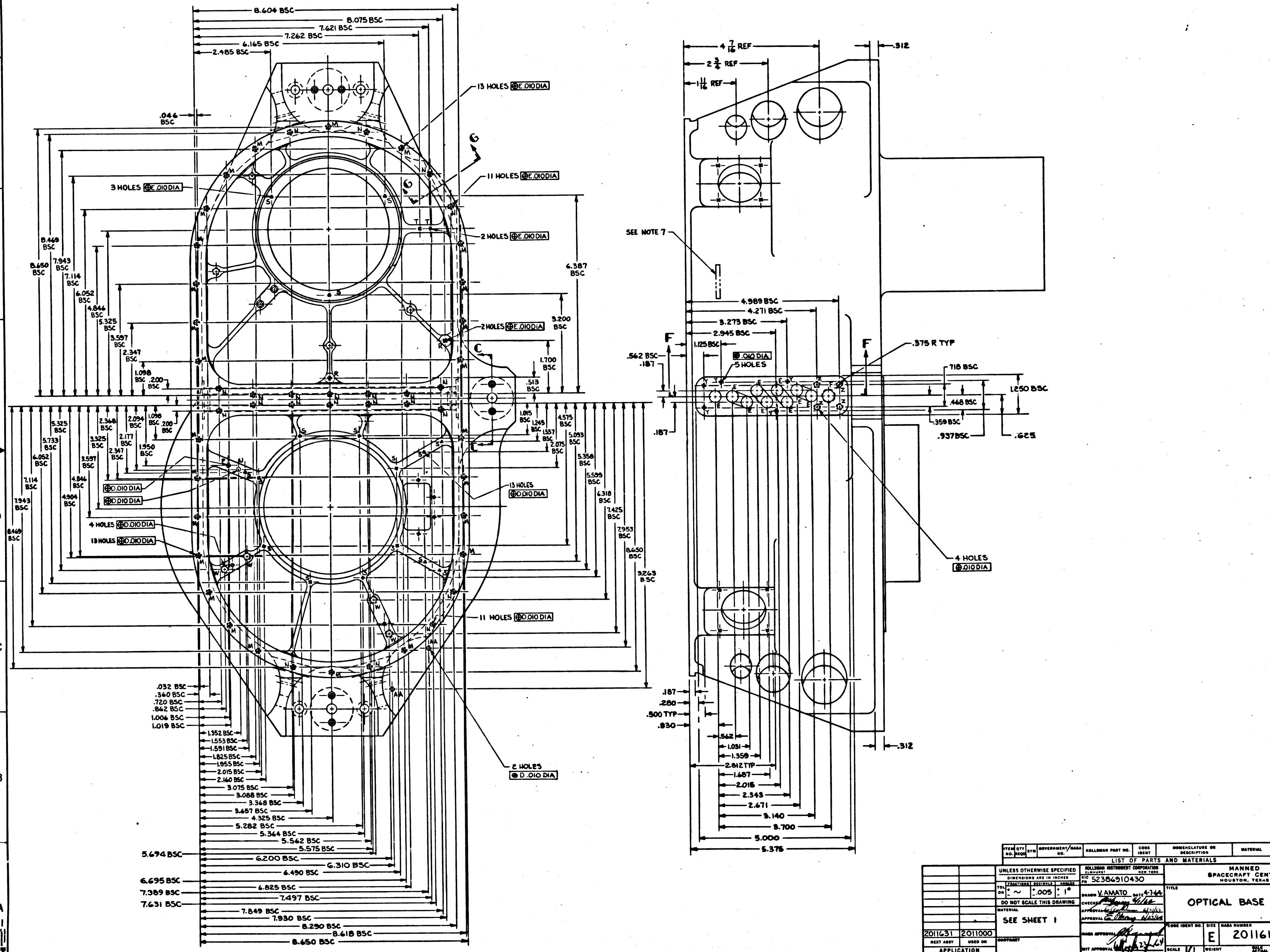
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 4

2011618

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



8.604 BSC
8.075 BSC
7.621 BSC
7.262 BSC
6.165 BSC
2.485 BSC
13 HOLES ⊕E.010 DIA
.046 BSC
G
3 HOLES ⊕E.010 DIA
11 HOLES ⊕E.010 DIA
2 HOLES ⊕E.010 DIA
2 HOLES ⊕E.010 DIA
8.469 BSC
8.650 BSC
7.943 BSC
7.114 BSC
6.052 BSC
4.846 BSC
5.325 BSC
3.597 BSC
2.347 BSC
1.098 BSC
.200 BSC
6.387 BSC
3.200 BSC
1.700 BSC
.513 BSC
C
C
5.325 BSC
5.733 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
3.325 BSC
3.597 BSC
4.846 BSC
4.904 BSC
2.368 BSC
2.347 BSC
2.177 BSC
2.094 BSC
1.098 BSC
.200 BSC
1.950 BSC
1.015 BSC
1.243 BSC
1.557 BSC
2.075 BSC
4.575 BSC
5.093 BSC
5.358 BSC
5.599 BSC
6.318 BSC
7.425 BSC
7.953 BSC
8.650 BSC
9.263 BSC
⊕D.010 DIA
⊕D.010 DIA
4 HOLES ⊕D.010 DIA
13 HOLES ⊕D.010 DIA
13 HOLES ⊕D.010 DIA
11 HOLES ⊕D.010 DIA
2 HOLES ⊕D.010 DIA
.032 BSC
.340 BSC
.720 BSC
.842 BSC
1.006 BSC
1.019 BSC
1.352 BSC
1.553 BSC
1.591 BSC
1.825 BSC
1.955 BSC
2.015 BSC
2.160 BSC
3.075 BSC
3.088 BSC
3.368 BSC
3.657 BSC
4.325 BSC
5.282 BSC
5.344 BSC
5.562 BSC
5.575 BSC
5.694 BSC
6.200 BSC
6.310 BSC
6.490 BSC
6.695 BSC
7.389 BSC
7.631 BSC
4.825 BSC
7.497 BSC
7.849 BSC
7.930 BSC
8.290 BSC
8.618 BSC
8.650 BSC
4 7/16 REF
2 3/4 REF
1 1/16 REF
.312
SEE NOTE 7
4.989 BSC
4.271 BSC
3.273 BSC
2.945 BSC
1.125 BSC
⊕.010 DIA
5 HOLES
F
F
.562 BSC
.187
.375 R TYP
.718 BSC
1.250 BSC
.468 BSC
.359 BSC
.937 BSC
.625
.187
4 HOLES ⊕.010 DIA
.187
.280
.500 TYP
.830
.562
1.031
1.359
2.812 TYP
1.687
2.015
2.343
2.671
3.140
3.700
5.000
5.375
.312

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011631	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ | DECIMALS ± .005 | ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/2/64
APPROVAL 6/23/64
NASA APPROVAL
MIT APPROVAL 23 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO. | SIZE E | NASA NUMBER 2011618
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 3 OF 4

INCHES

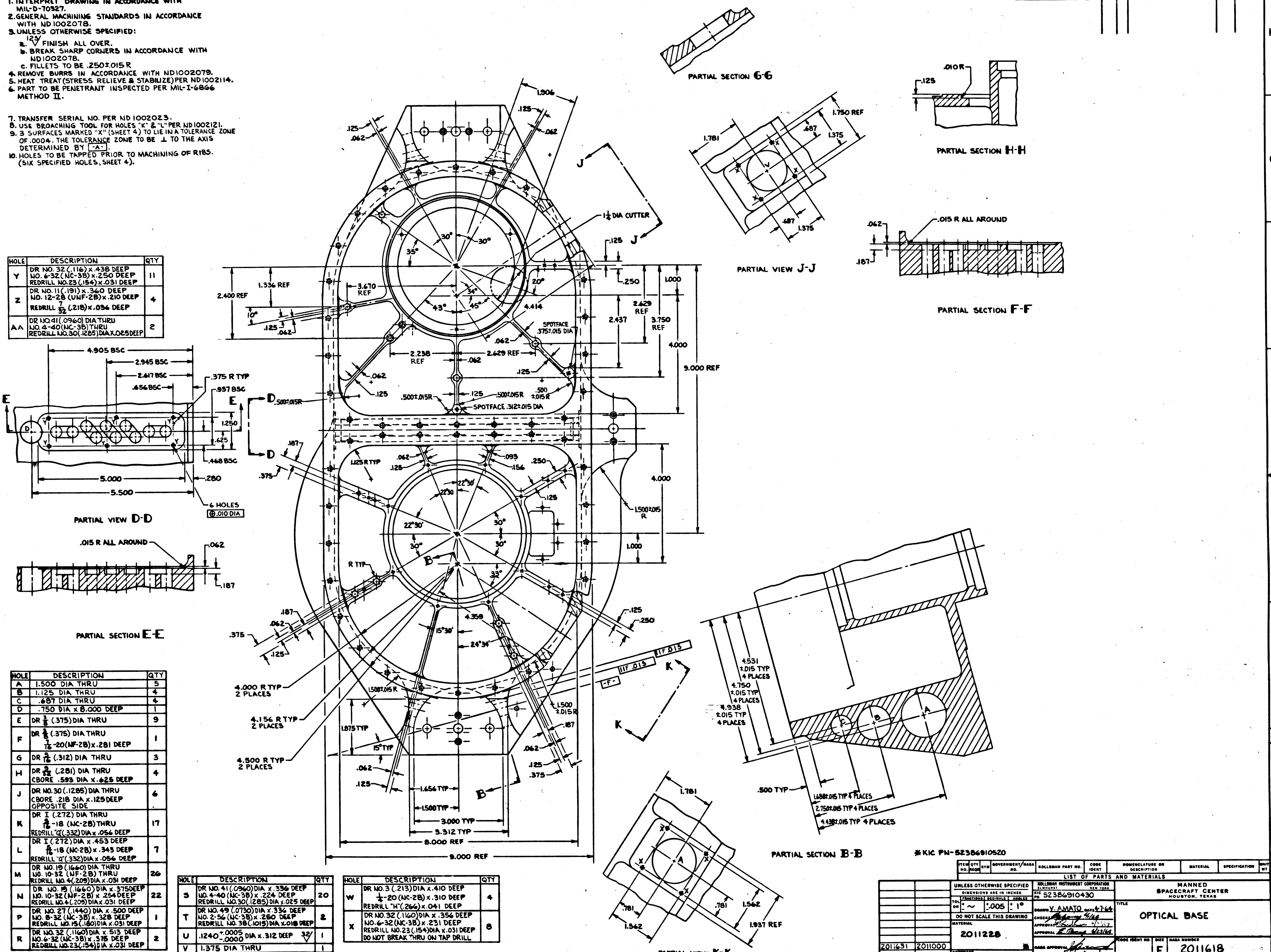
2011618

REVISIONS				12432
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{125}{\checkmark}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. FILLETS TO BE .250±.015 R
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE & STABILIZE) PER ND1002114.
6. PART TO BE PENETRANT INSPECTED PER MIL-I-6866 METHOD II.

7. TRANSFER SERIAL NO. PER ND1002023.
8. USE BROACHING TOOL FOR HOLES "K" & "L" PER ND1002121.
9. 3 SURFACES MARKED "X" (SHEET 4) TO LIE IN A TOLERANCE ZONE OF .0004. THE TOLERANCE ZONE TO BE ⊥ TO THE AXIS DETERMINED BY $\boxed{-A-}$.
10. HOLES TO BE TAPPED PRIOR TO MACHINING OF RIBS. (SIX SPECIFIED HOLES, SHEET 4).

HOLE	DESCRIPTION	QTY
Y	DR NO. 32 (.116) x .438 DEEP NO. 6-32 (NC-3B) x .250 DEEP REDRILL NO. 23 (.154) x .031 DEEP	11
Z	DR NO. 11 (.191) x .360 DEEP NO. 12-28 (UNF-2B) x .210 DEEP REDRILL $\frac{7}{32}$ (.218) x .036 DEEP	4
AA	DR NO. 41 (.0960) DIA THRU NO. 4-40 (NC-3B) THRU REDRILL NO. 30 (.1285) DIA X .025 DEEP	2


PARTIAL VIEW D-D
PARTIAL SECTION E-E
PARTIAL SECTION G-G
PARTIAL VIEW J-J
PARTIAL SECTION H-H
PARTIAL SECTION F-F
PARTIAL SECTION B-B
PARTIAL VIEW K-K
4.905 BSC
2.945 BSC
2.617 BSC
.656 BSC
.375 R TYP
.937 BSC
1.250
.625
.468 BSC
5.000
5.500
.280
6 HOLES
⊕ .010 DIA
.015 R ALL AROUND
.062
.187
1.906
.125
.062
1½ DIA CUTTER
.125
1.336 REF
3.670 REF
2.400 REF
10°
.125
.062
30°
30°
35°
34°
43°
45°
20°
4.414
SPOTFACE .375±.015 DIA
.250
1.000
2.629 REF
2.437
3.750 REF
4.000
9.000 REF
2.238 REF
.062
2.629 REF
.125
.500±.015R
.125
.500±.015R
.500 ±.015R
SPOTFACE .312±.015 DIA
D
E
.500±.015R
.187
.375
1.125 R TYP
.062
.093
.156
.250
.125
22°30'
22°30'
22°30'
30°
30°
30°
30°
33°
R TYP
1.500±.015 R
1.000
4.000
15°30'
24°34'
4.359
.187
.062
.375
.125
.125
.250
4.000 R TYP 2 PLACES
4.156 R TYP 2 PLACES
4.500 R TYP 2 PLACES
1.508±.015 R
1.500 ±.015 R
1.875 TYP
15° TYP
.062
.125
1.654 TYP
1.500 TYP
3.000 TYP
3.312 TYP
8.000 REF
9.000 REF
.062
.125
.375
.187
IIF.015
-F-
K
B
.010 R
.125
1.750 REF
.687
1.375
1.781
.687
1.375
.062
.015 R ALL AROUND
.187
4.531 ±.015 TYP 4 PLACES
4.750 ±.015 TYP 4 PLACES
4.938 ±.015 TYP 4 PLACES
.500 TYP
1.688±.015 TYP 4 PLACES
2.750±.015 TYP 4 PLACES
4.438±.015 TYP 4 PLACES
A
B
C
1.781
.781
1.562
.781
1.562
1.937 REF
X
A

HOLE	DESCRIPTION	QTY
A	1.500 DIA THRU	5
B	1.125 DIA THRU	4
C	.687 DIA THRU	4
D	.750 DIA x 8.000 DEEP	1
E	DR $\frac{3}{8}$ (.375) DIA THRU	9
F	DR $\frac{3}{8}$ (.375) DIA THRU $\frac{7}{16}$-20 (NF-2B) x .281 DEEP	1
G	DR $\frac{5}{16}$ (.312) DIA THRU	3
H	DR $\frac{9}{32}$ (.281) DIA THRU CBORE .593 DIA x .625 DEEP	4
J	DR NO. 30 (.1285) DIA THRU CBORE .218 DIA x .125 DEEP OPPOSITE SIDE	6
K	DR I (.272) DIA THRU $\frac{5}{16}$-18 (NC-2B) THRU REDRILL "Q" (.332) DIA x .056 DEEP	17
L	DR I (.272) DIA x .453 DEEP $\frac{5}{16}$-18 (NC-2B) x .343 DEEP REDRILL "Q" (.332) DIA x .056 DEEP	7
M	DR NO. 19 (.1660) DIA THRU NO. 10-32 (NF-2B) THRU REDRILL NO. 4 (.209) DIA x .031 DEEP	26
N	DR NO. 19 (.1660) DIA x .375 DEEP NO. 10-32 (NF-2B) x .254 DEEP REDRILL NO. 4 (.209) DIA x .031 DEEP	22
P	DR NO. 27 (.1440) DIA x .500 DEEP NO. 8-32 (NC-3B) x .328 DEEP REDRILL NO. 15 (.180) DIA x .031 DEEP	1
R	DR NO. 32 (.1160) DIA x .513 DEEP NO. 6-32 (NC-3B) x .375 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP	2

HOLE	DESCRIPTION	QTY
S	DR NO. 41 (.0960) DIA x .336 DEEP NO. 4-40 (NC-3B) x .224 DEEP REDRILL NO. 30 (.1285) DIA x .025 DEEP	20
T	DR NO. 49 (.0730) DIA x .336 DEEP NO. 2-56 (NC-3B) x .250 DEEP REDRILL NO. 38 (.1015) DIA x .018 DEEP	2
U	$.1240^{+.0005}_{-.0000}$ DIA x .312 DEEP $\overset{32}{\checkmark}$	1
V	1.375 DIA THRU	1

HOLE	DESCRIPTION	QTY
W	DR NO. 3 (.213) DIA x .410 DEEP $\frac{1}{4}$-20 (NC-2B) x .310 DEEP REDRILL "H" (.266) x .041 DEEP	4
X	DR NO. 32 (.1160) DIA x .356 DEEP NO. 6-32 (NC-3B) x .231 DEEP REDRILL NO. 23 (.154) DIA x .031 DEEP DO NOT BREAK THRU ON TAP DRILL	8

✱KIC PN-52386910520

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
2011228 ✱

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910430

DRAWN Y. AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/23/64
APPROVAL E. Means 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011618

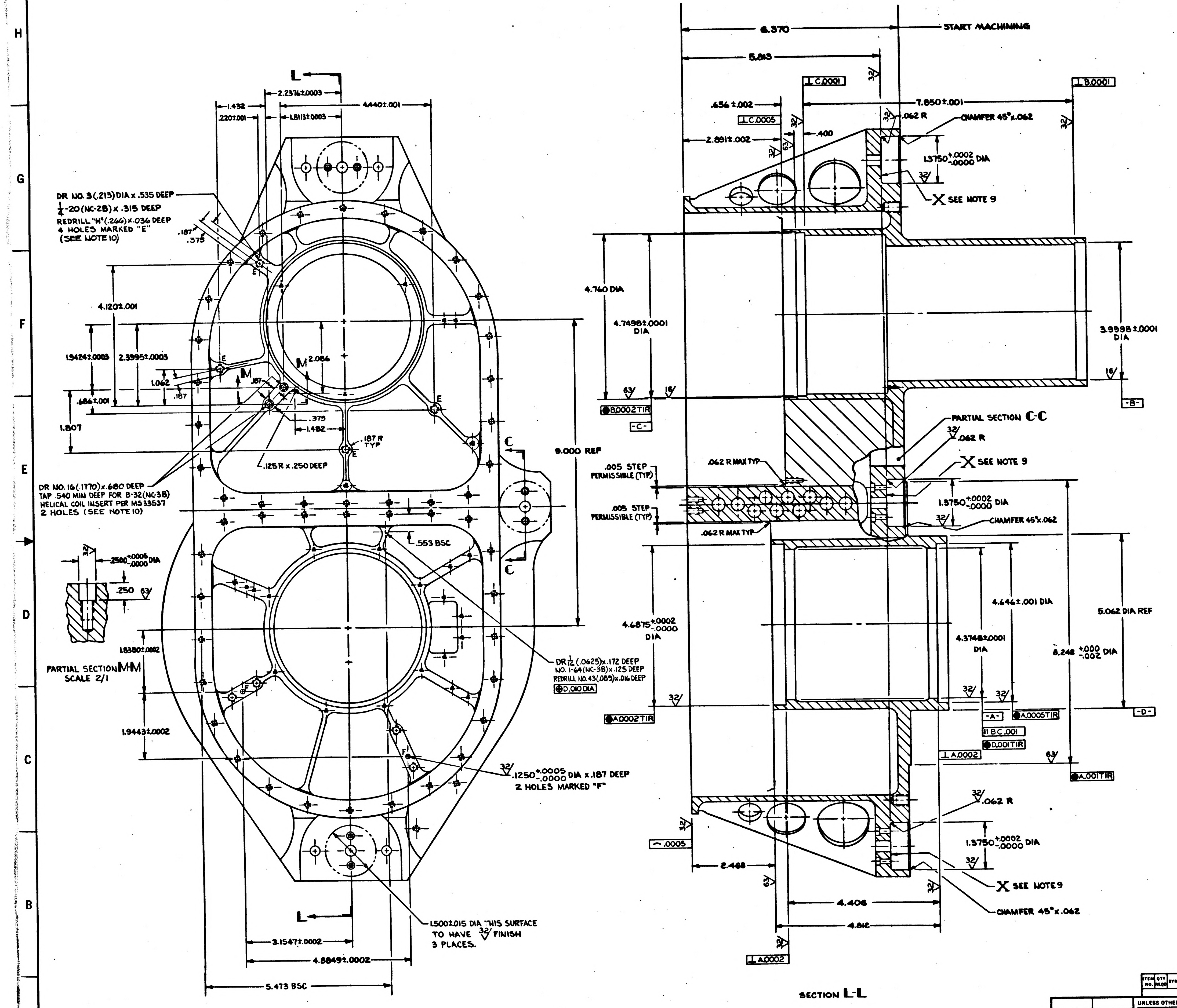
SCALE 1/1 WEIGHT CALC ACTUAL SHEET OF 4

2011618

2011618

REVISIONS (0924)

SYM	ZONE	DESCRIPTION	DATE	APPROVAL


L
2.2376±.0003
1.432
4.440±.001
.220±.001
1.8113±.0003
DR NO. 3 (.213) DIA x .535 DEEP
1/4-20 (NC-2B) x .315 DEEP
REDRILL "H" (.266) x .036 DEEP
4 HOLES MARKED "E"
(SEE NOTE 10)
.187
.375
E
4.120±.001
1.9424±.0003
2.3995±.0003
1.062
.187
.686±.001
1.807
M
2.086
.187
.375
1.482
.187 R TYP
.125 R x .250 DEEP
DR NO. 16 (.1770) x .680 DEEP
TAP .540 MIN DEEP FOR 8-32 (NC-3B)
HELICAL COIL INSERT PER MS33537
2 HOLES (SEE NOTE 10)
C
.553 BSC
32
.2500 +.0005 -.0000 DIA
.250
63
PARTIAL SECTION M-M
SCALE 2/1
1.8380±.0002
1.9443±.0002
F
DR 1/16 (.0625) x .172 DEEP
NO. 1-64 (NC-3B) x .125 DEEP
REDRILL NO. 43 (.089) x .016 DEEP
⊕ D .010 DIA
.1250 +.0005 -.0000 DIA x .187 DEEP
2 HOLES MARKED "F"
1.500±.015 DIA THIS SURFACE
TO HAVE 32 FINISH
3 PLACES.
3.1547±.0002
4.8849±.0002
5.473 BSC
9.000 REF
6.370
START MACHINING
5.813
⊥ C .0001
⊥ B .0001
.656±.002
⊥ C .0005
7.850±.001
.062 R
CHAMFER 45° x .062
2.891±.002
.400
1.3750 +.0002 -.0000 DIA
X SEE NOTE 9
4.760 DIA
4.7498±.0001 DIA
3.9998±.0001 DIA
16
● B .0002 TIR
-C-
-B-
PARTIAL SECTION C-C
.062 R MAX TYP
.005 STEP PERMISSIBLE (TYP)
.005 STEP PERMISSIBLE (TYP)
4.646±.001 DIA
5.062 DIA REF
4.6875 +.0002 -.0000 DIA
4.3748±.0001 DIA
8.248 +.000 -.002 DIA
● A .0002 TIR
-A-
● A .0005 TIR
-D-
∥ B C .001
● D .001 TIR
⊥ A .0002
● A .001 TIR
⌒ .0005
2.468
4.406
4.812
⊥ A .0002

SECTION L-L

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011631	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52384910430
DRAWN V. AMATO DATE 4-7-64
CHECKED 4/1/64
APPROVAL 6/2/64
APPROVAL E. 6/23/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

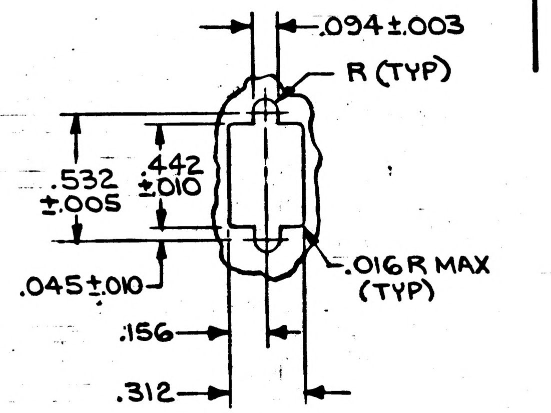
TITLE
OPTICAL BASE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011618
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 4 OF 4

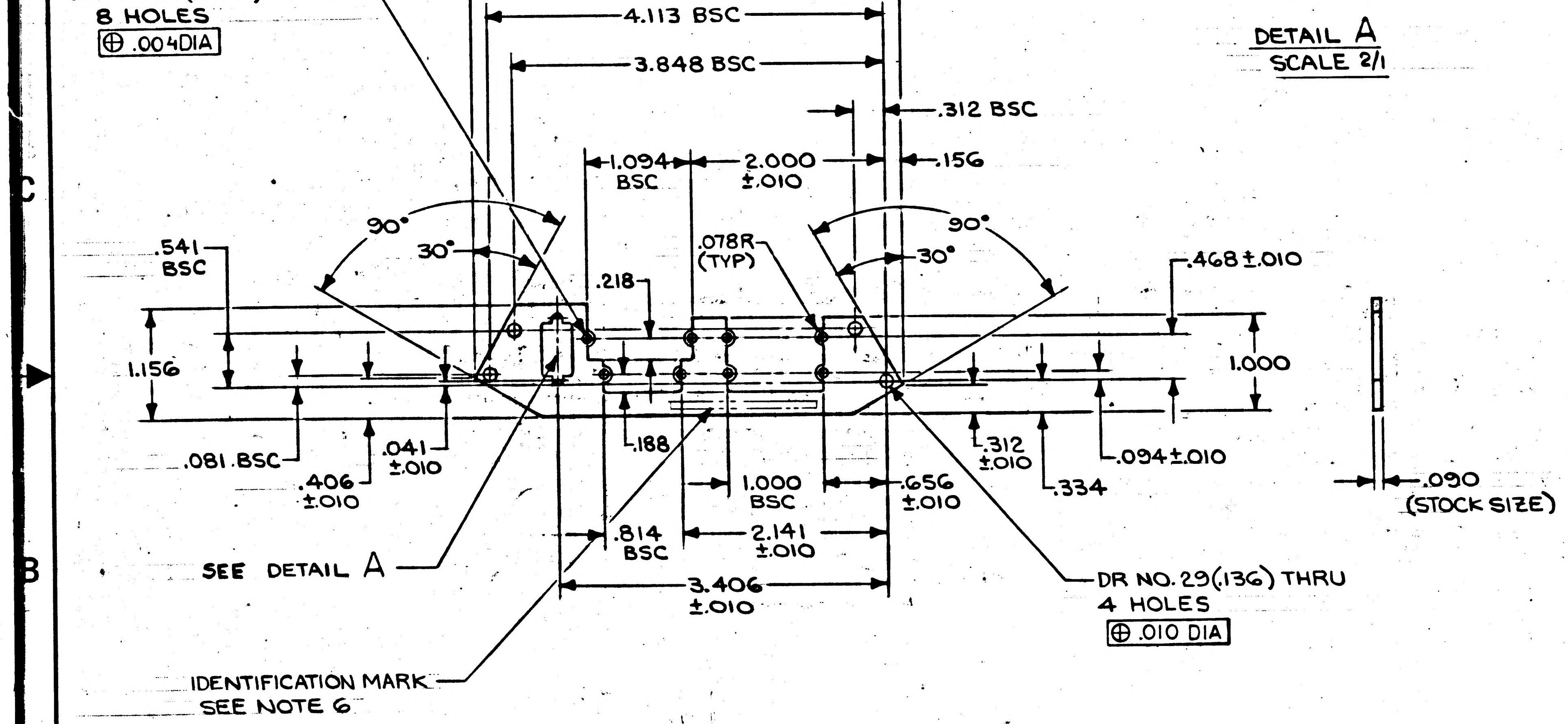
2011622

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

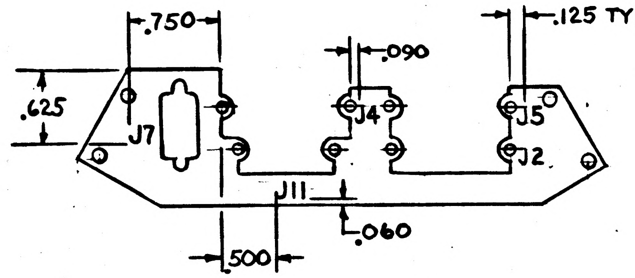
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63/ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II, CLASS 2, (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.
7. MARK CHARACTERS .125 HIGH IN LOCATION SHOWN PER ND1002019


.094±.003
R (TYP)
.532 ±.005
.442 ±.010
.016 R MAX (TYP)
.045±.010
.156
.312

DETAIL A
SCALE 2/1


4.438
DR NO. 41 (.096) THRU
8 HOLES
⊕ .004 DIA
4.113 BSC
3.848 BSC
.312 BSC
1.094 BSC
2.000 ±.010
.156
90°
30°
90°
30°
.541 BSC
.078R (TYP)
.218
.468±.010
1.156
1.000
.081 BSC
.041 ±.010
.406 ±.010
.188
.312 ±.010
.094±.010
.334
1.000 BSC
.656 ±.010
.090 (STOCK SIZE)
.814 BSC
2.141 ±.010
3.406 ±.010
SEE DETAIL A
DR NO. 29 (.136) THRU
4 HOLES
⊕ .010 DIA
IDENTIFICATION MARK
SEE NOTE 6

MASTER


.750
.090
.125 TYP
.625
J7
J4
J5
J2
J11
.060
.500

MARKING VIEW
SEE NOTE 7

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.015	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-250/4 TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910290

DRAWN J. Laidlaw DATE 6-15-64
CHECKED C. Lanzetta 7-13-64
APPROVAL J. Rosslman 7/27/64
APPROVAL E. Thorup 8/14/64

NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, MOUNTING, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2011622
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

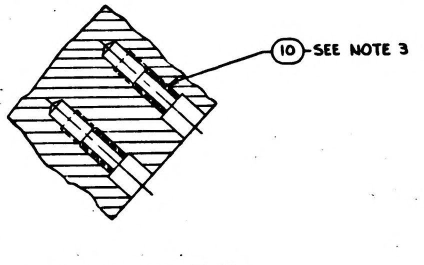
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A	2011631

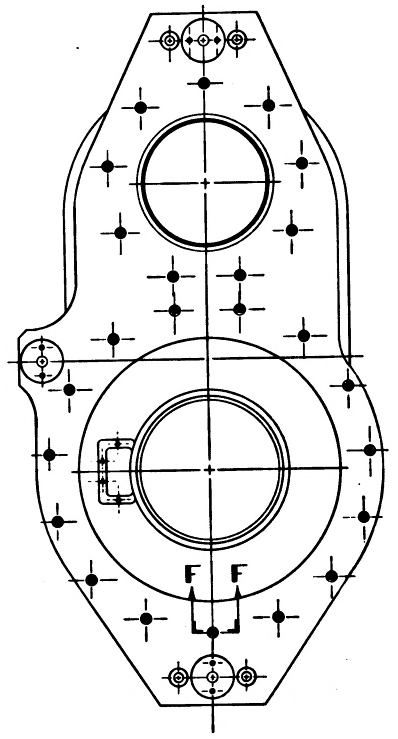
REVISIONS 10952

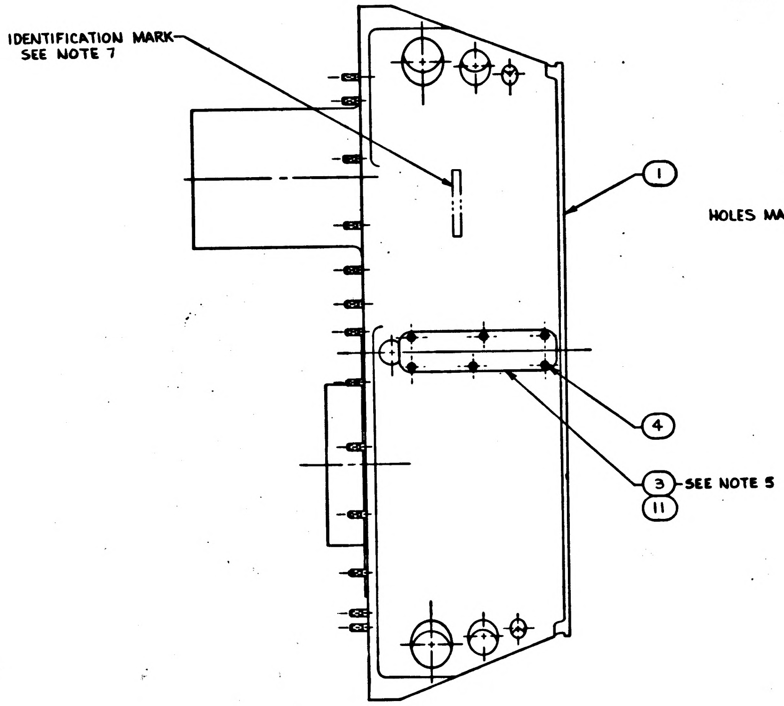
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 2224	9/1/64	WK

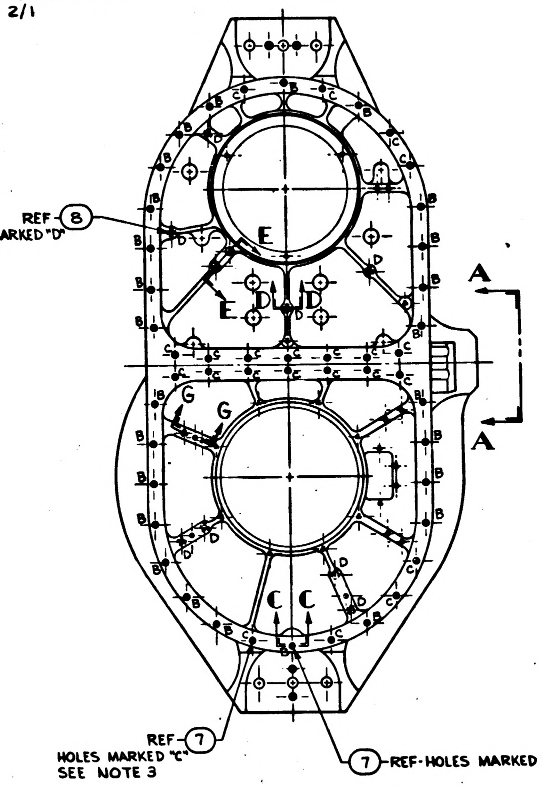
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. HEAT EXCHANGER LEAK TEST AS FOLLOWS:
   1) STATIC AIR PRESSURE PROOF TEST HEAT EXCHANGER PASSAGES AND FITTINGS AT 90 PSI PRESSURE DIFFERENTIAL FROM BASE TO AMBIENT.
   2) HELIUM LEAK RATE TEST NOT TO EXCEED 5×10^{-8} CC/SEC AT 77.5 PSI PRESSURE DIFFERENTIAL FROM BASE TO AMBIENT.
3. INSTALL FROM .010 TO .030 BELOW SURFACE
4. INSTALL FROM .010 TO .030 BELOW SURFACE AND WITH LOOP TOWARDS WALL.
5. CEMENT AS PER ND1002004 USING ITEM 11 EXCEPT FOR TP 3.2.1. WHEREIN THE MATERIAL PROPORTIONS SHALL BE AS FOLLOWS:
   100 PARTS EPOXY
   125 PARTS CATALYST
6. PROTECTIVE COVER SUPPLIED WITH COUPLING (ITEM 15) SHALL BE SECURED & WIRED IN PLACE WHEN COUPLING IS NOT IN USE.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

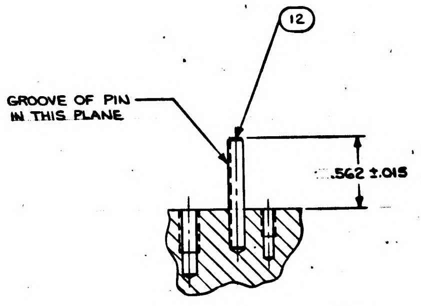


PARTIAL SECTION E-E
SCALE 2/1

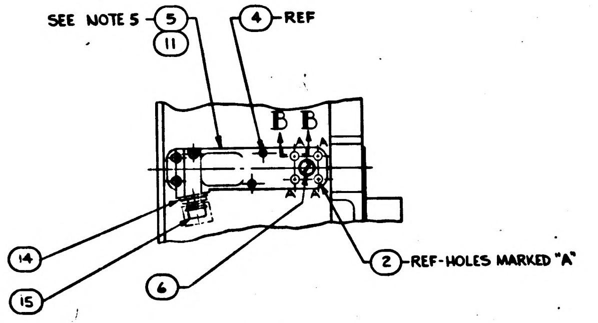




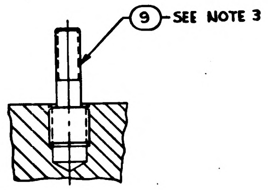




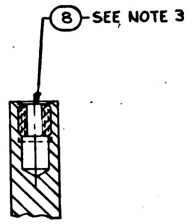
PARTIAL SECTION G-G
SCALE 2/1



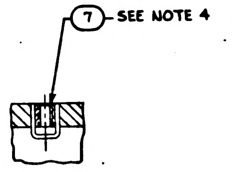
PARTIAL VIEW A-A



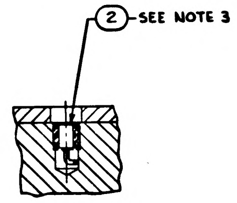
PARTIAL SECTION F-F
SCALE 2/1



PARTIAL SECTION D-D
SCALE 2/1



PARTIAL SECTION C-C
SCALE 2/1



PARTIAL SECTION B-B
SCALE 2/1

*PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	HOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	1	*	1000135	—		COUPLING, HALF, QUICK DISCONNECT			
14	1	*	1011597-13	74453033013		PACKING, PREFORMED, RETAINED			
13	AR	*	1011541	74471435001		ADHESIVE, EPOXY			
12	1		2011958	39386910010		PIN, STRAIGHT HEADLESS			
11	AR	*	1010657	—		ADHESIVE			
10	2		MS122159	—		INSERT-CRES HELICAL COIL			
9	24	*	1011765	74464020001		STUD, LOCKED IN			
8	8		NAS1394-08	—		INSERT-THREADED METAL			
7	48	*	1000115-2	—		INSERT-THREADED SELF LOCKING			
6	1		2011573	57386910370		PLUG (FOR SHIPPING PURPOSES ONLY)			
5	1		2011336	52386910410		COVER, FLUID PASSAGE			
4	11	*	1011625-39	74455151040		SCREW, CAP, HEX SOC HD, SELF LOCKING			
3	1		2011337	52386910420		COVER, FLUID PASSAGE			
2	4	*	1000115-3	—		INSERT-THREADED SELF LOCKING			
1	1		2011618	52386910430		OPTICAL BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

HOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910350

DRAWN V. AMATO DATE 4-3-64
CHECKED C. Lenz (CRX) 7/13/64
APPROVAL E. R[illegible] 7/13/64
APPROVAL E. [illegible]
NASA APPROVAL W. G. [illegible] 7-14-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE
ASSEMBLY OF

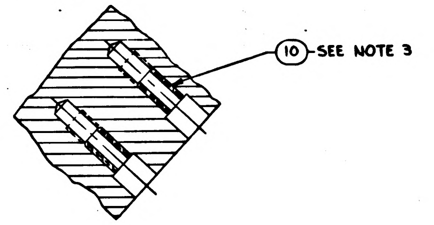
CODE IDENT NO. | SIZE E | NASA NUMBER 2011631
SCALE 1/2 | WEIGHT | CALC ACTUAL | SHEET | OF

2011631

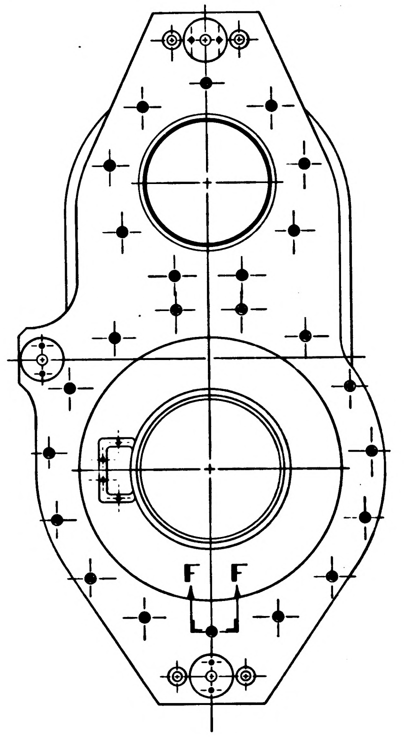
B | 2011631

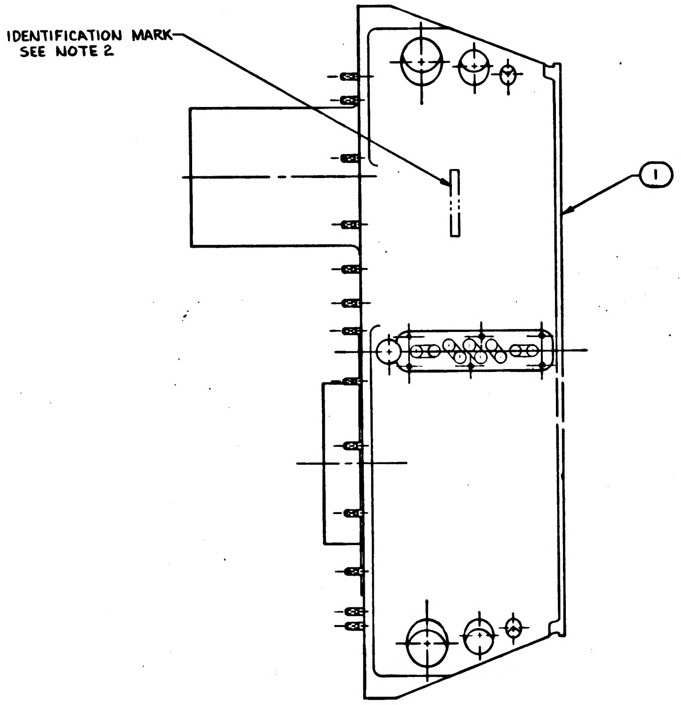
REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 2229	[illegible]	wk
B		REVISED PER TDRR 15358	1/6/65	wk

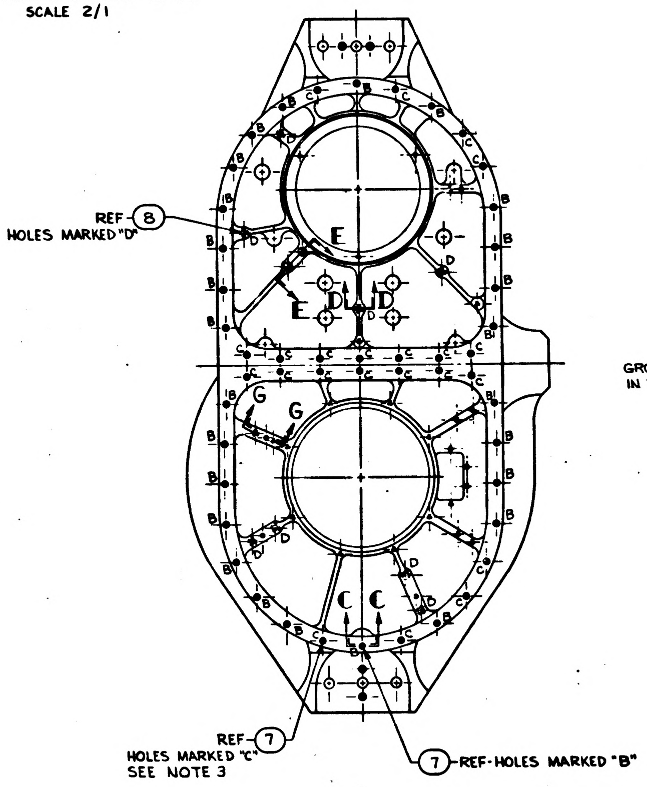
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.
3. INSTALL FROM .010 TO .030 BELOW SURFACE.
4. INSTALL FROM .010 TO .030 BELOW SURFACE AND WITH LOOP TOWARDS WALL.

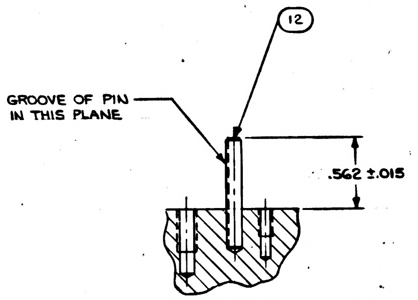


PARTIAL SECTION E-E
SCALE 2/1

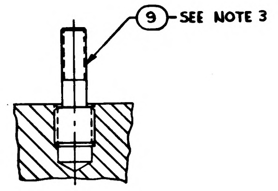



IDENTIFICATION MARK SEE NOTE 2
①

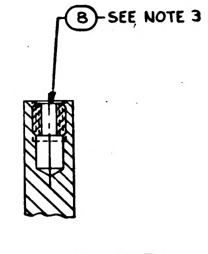

REF ⑧ HOLES MARKED "D"
E
E
D D
G
G
C C
B
REF ⑦ HOLES MARKED "C" SEE NOTE 3
⑦ REF-HOLES MARKED "B"


⑫
GROOVE OF PIN IN THIS PLANE
.562 ±.015

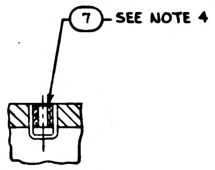
PARTIAL SECTION G-G
SCALE 2/1



PARTIAL SECTION F-F
SCALE 2/1



PARTIAL SECTION D-D
SCALE 2/1



PARTIAL SECTION C-C
SCALE 2/1

✱ PURCHASE ITEM — SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15									
14									
13									
12	1		2011958	39386910010		PIN, STRAIGHT HEADLESS			
11									
10	2		MS122159	—		INSERT-CRES HELICAL COIL			
9	24	✱	1011765	74464020001		STUD, LOCKED IN			
8	8		NAS1394-08	—		INSERT-THREADED METAL			
7	48	✱	1000115-2	—		INSERT-THREADED SELF LOCKING			
6									
5									
4									
3									
2									
1	1		2011618	52386910430		OPTICAL BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910350

DRAWN V. AMATO DATE 4-3-64
CHECKED C. Lenz (CRL) 7/13/64
APPROVAL E. Kirschmann 7/13/64
APPROVAL
NASA APPROVAL W. G. Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE
ASSEMBLY OF

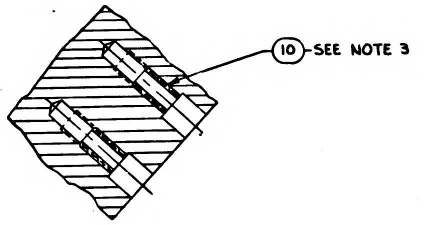
CODE IDENT NO. | SIZE E | NASA NUMBER 2011631
SCALE 1/2 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011631

C | 2011631

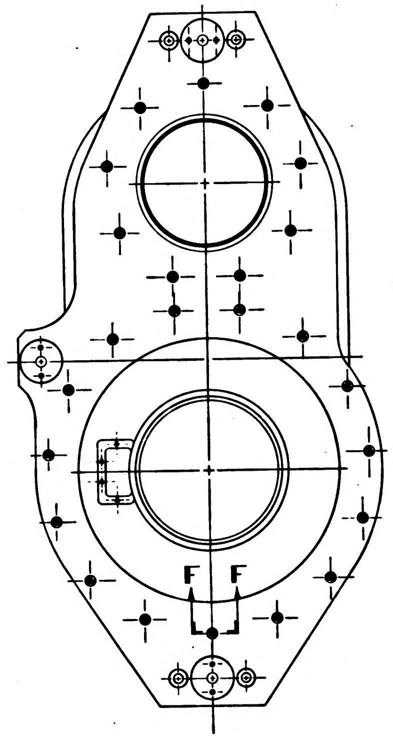
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 10952		
A		REVISED PER TDRR 2224	9/1/64	
B		REVISED PER TDRR 15358	1/6/65	WK
C		REVISED PER TDRR 19854		

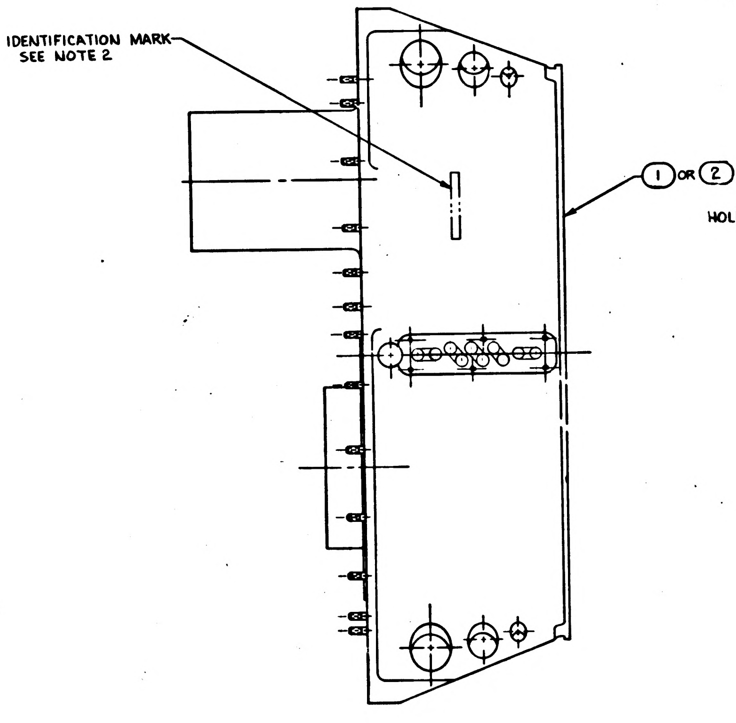
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019
3. INSTALL FROM .010 TO .030 BELOW SURFACE.
4. INSTALL FROM .010 TO .030 BELOW SURFACE AND WITH LOOP TOWARDS WALL.



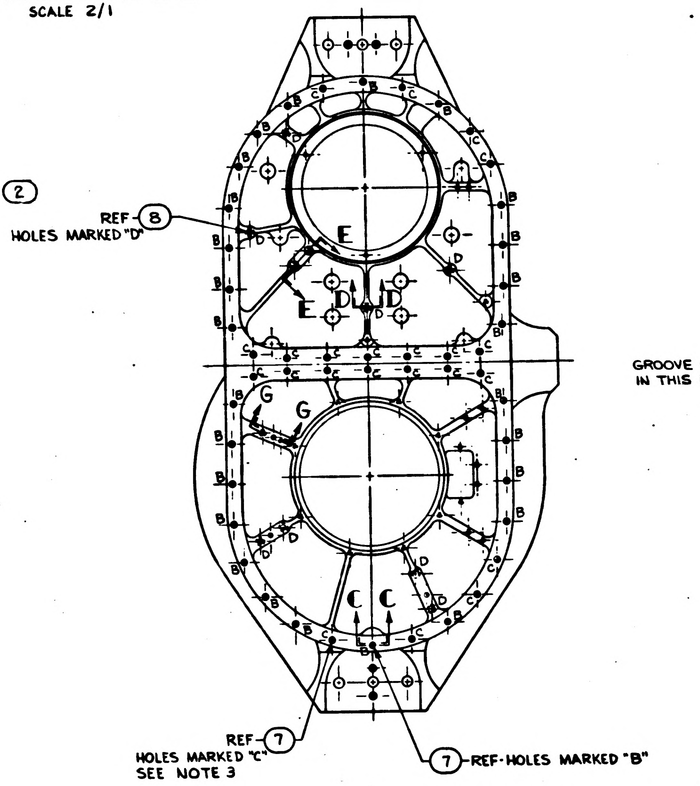
10 - SEE NOTE 3

PARTIAL SECTION E-E
SCALE 2/1

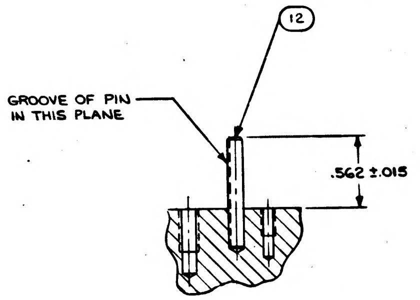




IDENTIFICATION MARK - SEE NOTE 2
1 OR 2

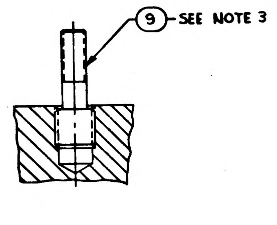


REF - 8
HOLES MARKED "D"
E
D
D
E
G
G
C
C
REF - 7
HOLES MARKED "C"
SEE NOTE 3
7 - REF - HOLES MARKED "B"

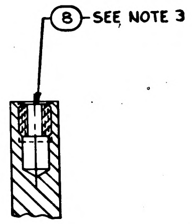


12
GROOVE OF PIN IN THIS PLANE
.562 ±.015

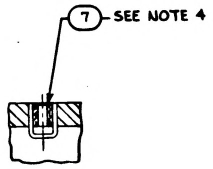
PARTIAL SECTION G-G
SCALE 2/1



PARTIAL SECTION F-F
SCALE 2/1



PARTIAL SECTION D-D
SCALE 2/1



PARTIAL SECTION C-C
SCALE 2/1

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

✱ PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

1	1	12			2011958	39386910010		PIN, STRAIGHT HEADLESS			
		11									
2	2	10			MS122159	—		INSERT-CRES HELICAL COIL			
24	24	9		✱	1011765	74464020001		STUD, LOCKED IN			
8	8	8			NAS1394-08	—		INSERT-THREADED METAL			
48	48	7		✱	1000115-2	—		INSERT-THREADED SELF LOCKING			
		6									
		5									
		4									
		3									
1	0	2			2012620	52386910980		OPTICAL BASE			
0	1	1			2011618	52386910430		OPTICAL BASE			
011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
QTY REQD		LIST OF PARTS AND MATERIALS									

2011889	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910350

DRAWN V. AMATO DATE 4-3-64
CHECKED C. Lenz (CRL) 7/13/64
APPROVAL F. Kirschmann 7/13/64
APPROVAL E. Murray
NASA APPROVAL W. G. Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL BASE
ASSEMBLY OF

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011631

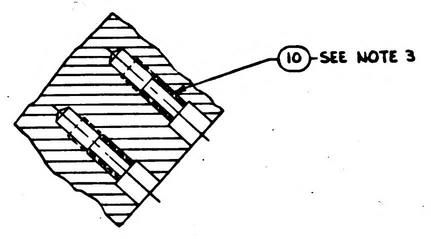
SCALE 1/2 WEIGHT CALC ACTUAL SHEET OF

2011631

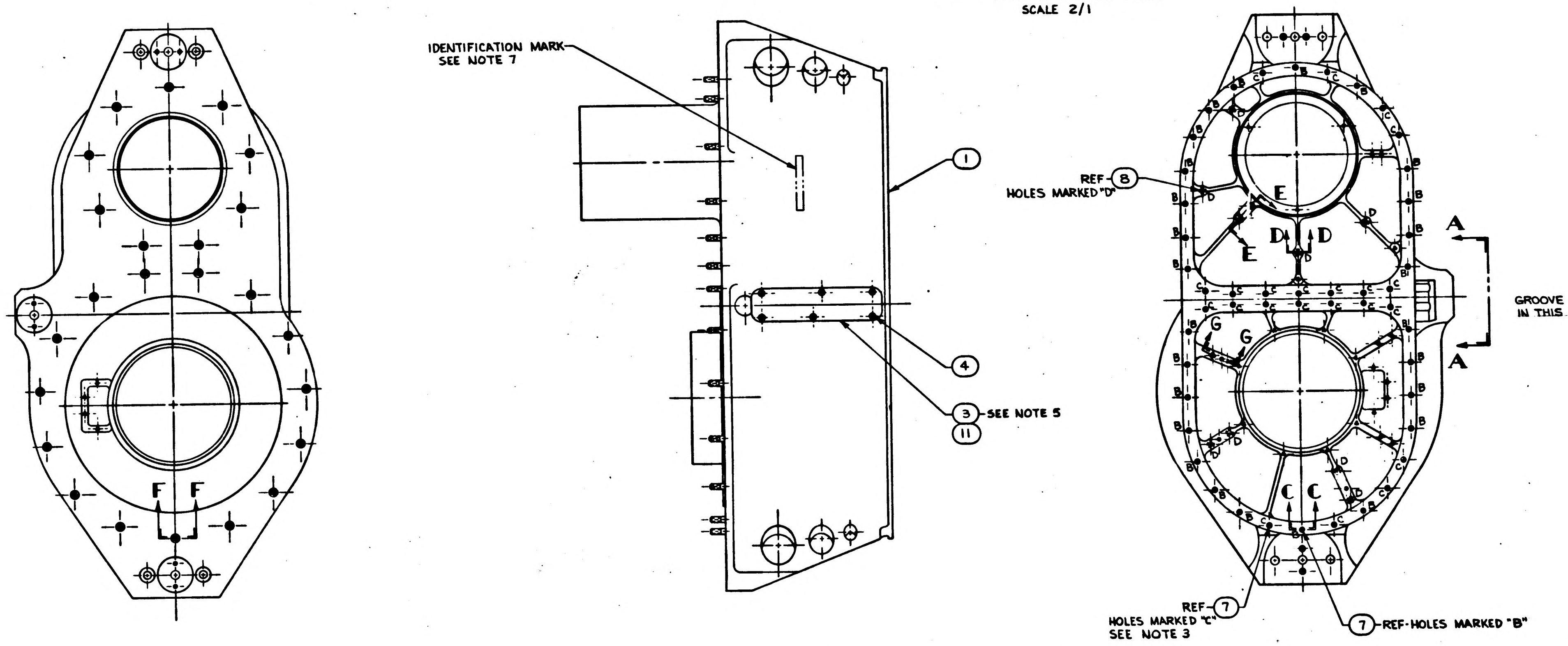
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. HEAT EXCHANGER LEAK TEST AS FOLLOWS:
   1) STATIC AIR PRESSURE PROOF TEST HEAT EXCHANGER PASSAGES AND FITTINGS AT 90 PSI PRESSURE DIFFERENTIAL FROM BASE TO AMBIENT.
   2) HELIUM LEAK RATE TEST NOT TO EXCEED 5×10^{-8} CC/SEC AT 77.5 PSI PRESSURE DIFFERENTIAL FROM BASE TO AMBIENT.
3. INSTALL FROM .010 TO .030 BELOW SURFACE. APPLY ITEM 13 (1011541) PER ND1002219 TO ALL TAPPED STUD HOLES WHICH BREAK THRU TO INSIDE OF BASE AS FOLLOWS: THREAD STUD INTO HOLE, STOPPING WHEN STUD IS TWO THREADS SHORT OF EXITING THRU BOTTOM OF HOLE. APPLY A CONTINUED THIN FILM OF EPOXY (ITEM 13) ON THE TWO EXPOSED THREADS (IN HOLE). THREAD STUD TO DIMENSION ABOVE.
   NOTE: STUD SHALL BE IN TENSION DURING EPOXY CURING.
4. INSTALL FROM .010 TO .030 BELOW SURFACE AND WITH LOOP TOWARDS WALL.
5. CEMENT AS PER ND1002004 USING ITEM 11 EXCEPT FOR IP 3.2.1. WHEREIN THE MATERIAL PROPORTIONS SHALL BE AS FOLLOWS:
   100 PARTS EPOXY
   125 PARTS CATALYST
6. PROTECTIVE COVER SUPPLIED WITH COUPLING (ITEM 15) SHALL BE SECURED & WIRED IN PLACE WHEN COUPLING IS NOT IN USE.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

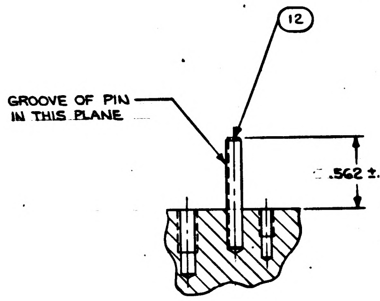
2011631

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

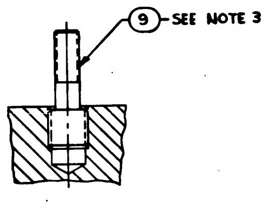


PARTIAL SECTION E-E
SCALE 2/1

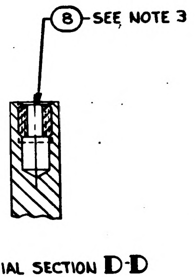

F F
IDENTIFICATION MARK SEE NOTE 7
1
4
3 - SEE NOTE 5
11
REF - 8 HOLES MARKED "D"
E
D D
E
B
C
G G
C C
A
A
REF - 7 HOLES MARKED "C" SEE NOTE 3
7 - REF - HOLES MARKED "B"



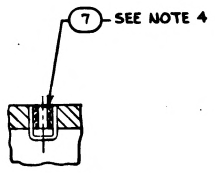
PARTIAL SECTION G-G
SCALE 2/1



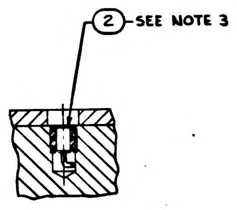
PARTIAL SECTION F-F
SCALE 2/1



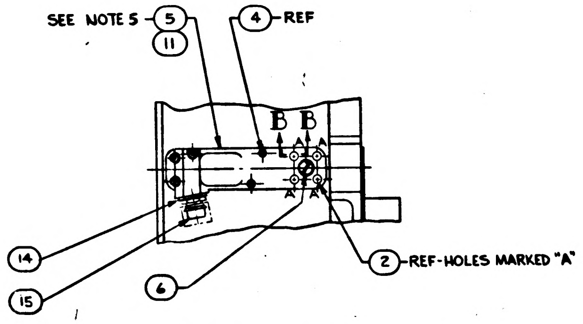
PARTIAL SECTION D-D
SCALE 2/1



PARTIAL SECTION C-C
SCALE 2/1



PARTIAL SECTION B-B
SCALE 2/1



PARTIAL VIEW A-A

*PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	1	*	1000135	—		COUPLING, HALF, QUICK DISCONNECT			
14	1	*	1011597-13	74453033013		PACKING, PREFORMED, RETAINED			
13	AR	*	1011541	74471435001		ADHESIVE, EPOXY			
12	1		2011958	39386910010		PIN, STRAIGHT HEADLESS			
11	AR	*	1010657	—		ADHESIVE			
10	2		MS122159	—		INSERT-CRES HELICAL COIL			
9	24	*	1011765	74464020001		STUD, LOCKED IN			
8	8		NAS1394-08	—		INSERT THREADED METAL			
7	48	*	1000115-2	—		INSERT-THREADED SELF LOCKING			
6	1		2011573	57386910370		PLUG (FOR SHIPPING PURPOSES ONLY)			
5	1		2011336	52386910410		COVER, FLUID PASSAGE			
4	11	*	1011625-39	74455151040		SCREW, CAP, HEX SOC HD, SELF LOCKING			
3	1		2011337	52386910420		COVER, FLUID PASSAGE			
2	4	*	1000115-3	—		INSERT-THREADED SELF LOCKING			
1	1		2011618	52386910430		OPTICAL BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910350
DRAWN V. AMATO DATE 4-3-64
CHECKED C. Lenz (CRC) 7/13/64
APPROVAL E. Ruschmann 7/14/64
APPROVAL E. Monaco
7-14-64
NASA APPROVAL W. J. [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

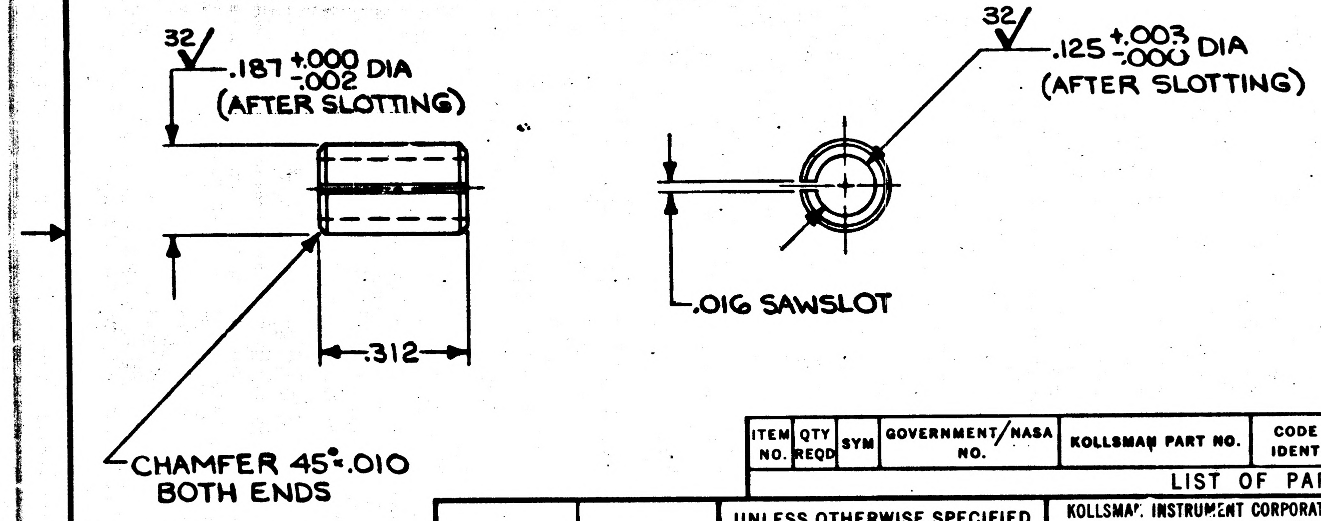
TITLE
OPTICAL BASE
ASSEMBLY OF

CODE IDENT NO.
SIZE E
NASA NUMBER 2011631
SCALE 1/2
WEIGHT
CALC ACTUAL
SHEET OF

2011633

REVISIONS 10048			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE ~~PER MIL-STD-171~~ TABLE V-A
   FINISH NO. 5.4.1 (KPS-10051.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011797	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910240

DRAWN F. Schill DATE 4-2-64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL E. Thomp 6-5-64
NASA APPROVAL
MIT APPROVAL 9-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SLEEVE, SPLIT, ILLUMINATING ROD

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011633

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-183

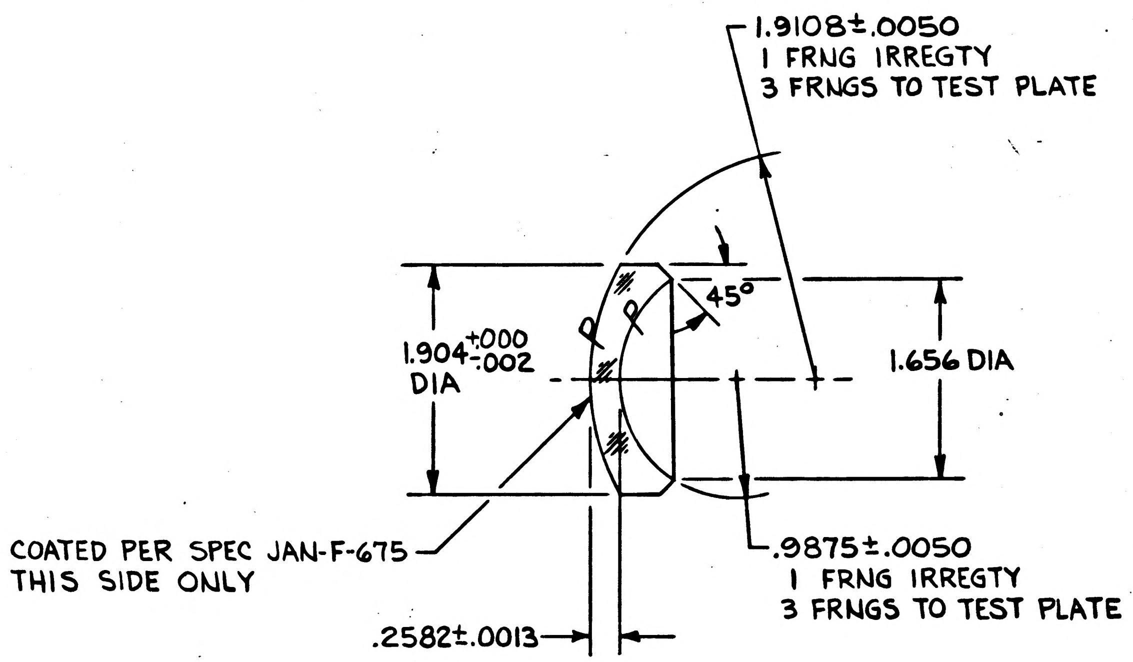
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011637

REVISIONS TORR 09890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
GRADE B-FINE ANNEALED
TYPE 721-292
4. CA: ENT=1.798 EXIT=1.600
SURF. QUAL: 60-40
CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POLISHED, ALL OTHERS GROUND.
~~6. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)~~



1.9108±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
45°
1.904 +.000 -.002 DIA
P
P
1.656 DIA
COATED PER SPEC JAN-F-675 THIS SIDE ONLY
.9875±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
.2582±.0013

2011637

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011707	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910100

DRAWN R. BRUNELLE DATE 4-6-64
CHECKED [illegible] 5/28/64
APPROVAL F. Ruhlman 5/28/64
APPROVAL E. Morris 6/1/64
NASA APPROVAL [illegible] 6/3/64
MIT APPROVAL [illegible] 6/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE
(TELESCOPE OBJECTIVE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011637
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

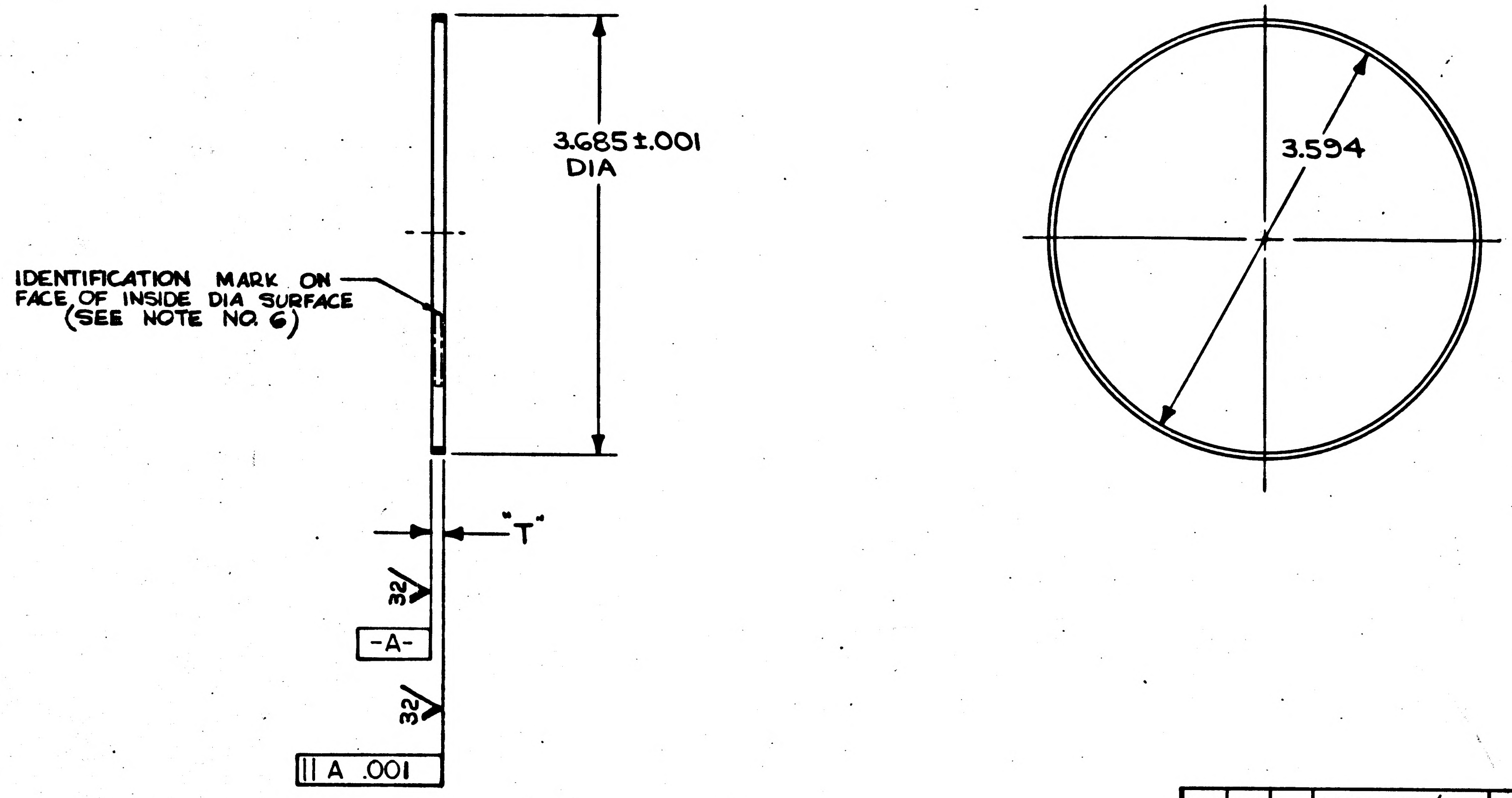
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011638

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORD WITH MIL-STD-171 TABLE VA FINISH NO. 5.4.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019


3.685±.001 DIA
IDENTIFICATION MARK ON FACE OF INSIDE DIA SURFACE (SEE NOTE NO. 6)
"T"
32√
-A-
32√
‖ A .001
3.594

DIM. "T"	NASA PART NO.	KIC PART NO.
.094	2011638-1	57386911200
.109	2011638-2	57386911210
.125	2011638-3	57386911220

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 CLASS 440C, COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5738691 1200 THRU 1220
DRAWN DATE 4-7-64
CHECKED 6/1/64
APPROVAL 6/5/64
APPROVAL 6/12/64
NASA APPROVAL
MIT APPROVAL 6/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER, STATOR
(16 SPEED RESOLVER)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011638
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011638

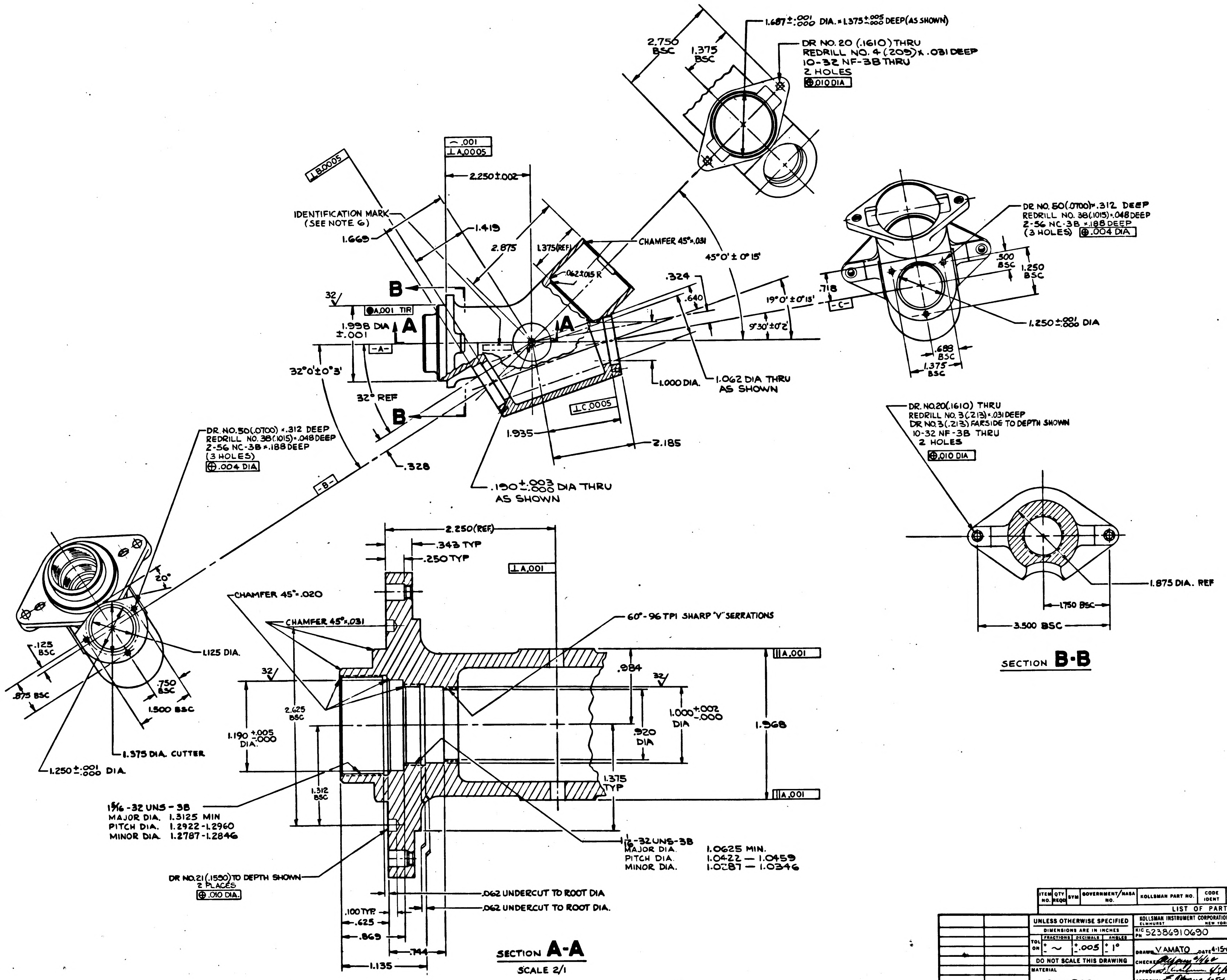
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-184

2011640 A

REVISIONS 10045				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20024	6/15/65	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63 FINISH ON ALL MACHINED SURFACES
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019



1.687 +.001 -.000 DIA. × 1.375 +.005 -.000 DEEP (AS SHOWN)
2.750 BSC
1.375 BSC
DR NO. 20 (.1610) THRU
REDRILL NO. 4 (.209) × .031 DEEP
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
B .0005
⌒ .001
⊥ A .0005
2.250 ±.002
IDENTIFICATION MARK (SEE NOTE 6)
1.669
1.419
2.875
1.375 (REF)
CHAMFER 45° × .031
.062 ±.015 R
45° 0' ± 0° 15'
.324
.640
19° 0' ± 0° 15'
9° 30' ± 0° 2'
.718
-C-
B
A
A
32
◎ A .001 TIR
1.998 DIA ±.001
-A-
32° 0' ± 0° 3'
32° REF
B
1.000 DIA.
1.062 DIA THRU AS SHOWN
⊥ C .0005
1.935
2.185
.328
.190 +.003 -.000 DIA THRU AS SHOWN
-B-
DR. NO. 50 (.0700) × .312 DEEP
REDRILL NO. 38 (.1015) × .048 DEEP
2-56 NC-3B × .188 DEEP
(3 HOLES)
⊕ .004 DIA
DR NO. 50 (.0700) × .312 DEEP
REDRILL NO. 38 (.1015) × .048 DEEP
2-56 NC-3B × .188 DEEP
(3 HOLES) ⊕ .004 DIA
.500 BSC
1.250 BSC
1.250 +.001 -.000 DIA
.688 BSC
1.375 BSC
DR. NO. 20 (.1610) THRU
REDRILL NO. 3 (.213) × .031 DEEP
DR NO. 3 (.213) FARSIDE TO DEPTH SHOWN
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
1.875 DIA. REF
1.750 BSC
3.500 BSC
SECTION B-B
20°
.125 BSC
.875 BSC
1.125 DIA.
.750 BSC
1.500 BSC
1.375 DIA. CUTTER
1.250 +.001 -.000 DIA.
2.250 (REF)
.343 TYP
.250 TYP
⊥ A .001
CHAMFER 45° × .020
CHAMFER 45° × .031
60° - 96 TPI SHARP 'V' SERRATIONS
∥ A .001
.984
32
32
2.625 BSC
1.190 +.005 -.000 DIA.
1.000 +.002 -.000 DIA
.920 DIA
1.968
1.375 TYP
∥ A .001
1.312 BSC
1 5/16 - 32 UNS - 3B
MAJOR DIA. 1.3125 MIN
PITCH DIA. 1.2922 - 1.2960
MINOR DIA. 1.2787 - 1.2846
1 1/16 - 32 UNS - 3B
MAJOR DIA. 1.0625 MIN.
PITCH DIA. 1.0422 — 1.0459
MINOR DIA. 1.0287 — 1.0346
DR NO. 21 (.1590) TO DEPTH SHOWN
2 PLACES
⊕ .010 DIA.
.062 UNDERCUT TO ROOT DIA
.062 UNDERCUT TO ROOT DIA.
.100 TYP.
.625
.869
.744
1.135
SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011848

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910690

DRAWN V. AMATO DATE 4-15-64
CHECKED 6/4/64
APPROVAL 6/5/64
APPROVAL E. Morris 6-5-64
NASA APPROVAL
MIT APPROVAL 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, MIRROR
(SEXTANT EYEPIECE)

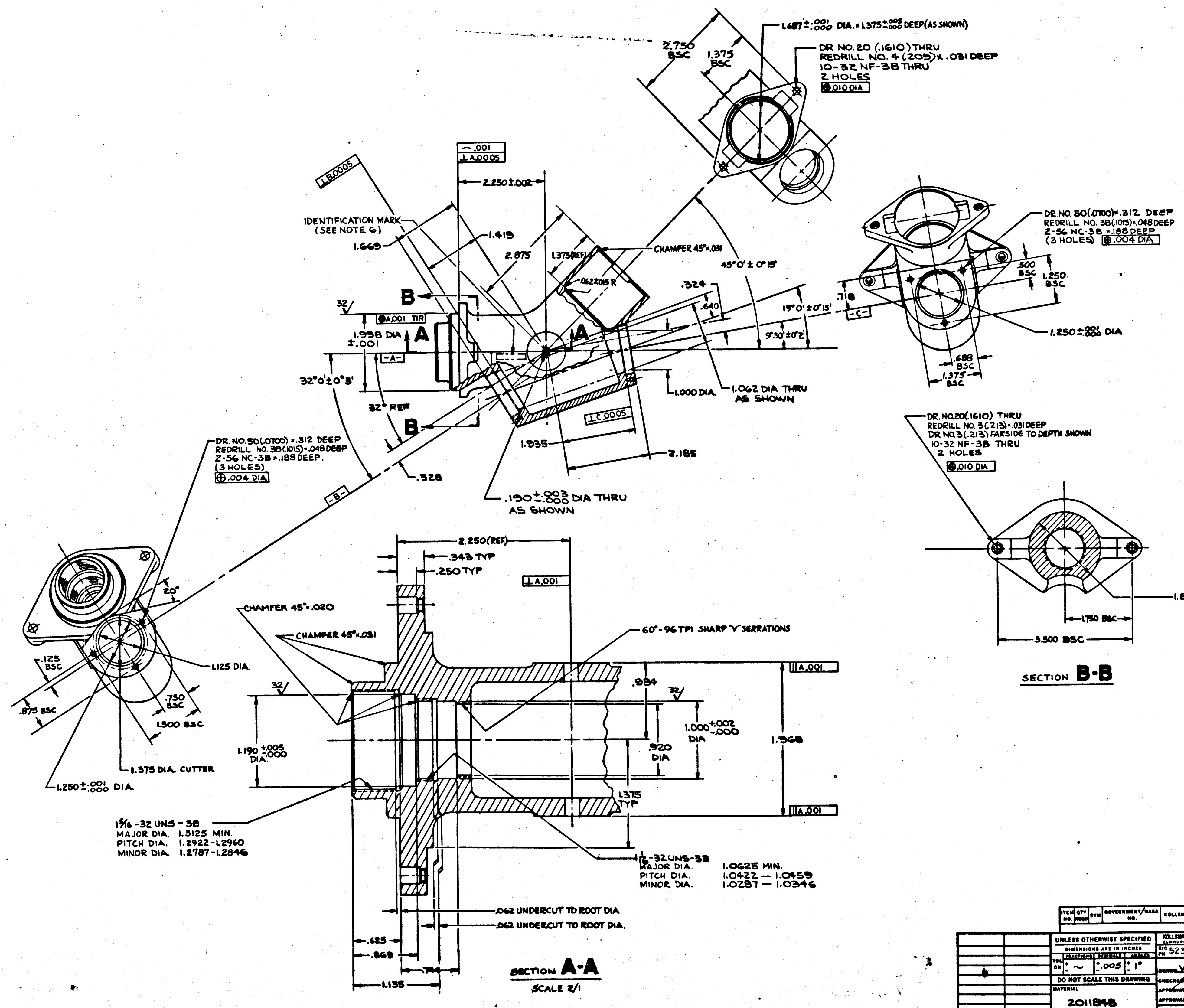
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011640
SCALE 1/1 & 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011640 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011640

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63 FINISH ON ALL MACHINED SURFACES
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1008A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019


1.687 +.001 -.000 DIA. × 1.375 +.005 -.000 DEEP (AS SHOWN)
2.750 BSC
1.375 BSC
DR NO. 20 (.1610) THRU
REDRILL NO. 4 (.205) × .031 DEEP
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
⊥ B .0005
⌒ .001
⊥ A .0005
2.250 ±.002
IDENTIFICATION MARK (SEE NOTE 6)
1.669
1.419
2.875
1.375 (REF)
CHAMFER 45° × .031
.062 ±.015 R
45°0' ± 0°15'
.324
.640
19°0' ± 0°15'
9°30' ± 0°2'
.718
-C-
B
A
A
B
32
⊕ A .001 TIR
1.998 DIA ±.001
-A-
32°0' ± 0°3'
32° REF
1.000 DIA.
1.062 DIA THRU AS SHOWN
⊥ C .0005
1.935
2.185
.150 +.003 -.000 DIA THRU AS SHOWN
DR. NO. 50 (.0700) × .312 DEEP
REDRILL NO. 38 (.1015) × .048 DEEP
2-56 NC-3B × .188 DEEP.
(3 HOLES)
⊕ .004 DIA
-B-
.328
DR. NO. 50 (.0700) × .312 DEEP
REDRILL NO. 38 (.1015) × .048 DEEP
2-56 NC-3B × .188 DEEP
(3 HOLES) ⊕ .004 DIA
.500 BSC
1.250 BSC
1.250 +.001 -.000 DIA
.688 BSC
1.375 BSC
DR. NO. 20 (.1610) THRU
REDRILL NO. 3 (.213) × .031 DEEP
DR NO. 3 (.213) FARSIDE TO DEPTH SHOWN
10-32 NF-3B THRU
2 HOLES
⊕ .010 DIA
1.875 DIA. REF
1.750 BSC
3.500 BSC
SECTION B-B
20°
.125 BSC
.875 BSC
.750 BSC
1.500 BSC
1.125 DIA.
1.375 DIA. CUTTER
1.250 +.001 -.000 DIA.
2.250 (REF)
.343 TYP
.250 TYP
⊥ A .001
CHAMFER 45° × .020
CHAMFER 45° × .031
60° - 96 TPI SHARP 'V' SERRATIONS
∥ A .001
32
.984
1.000 +.002 -.000 DIA
1.190 +.005 -.000 DIA.
.920 DIA
1.968
1.375 TYP
∥ A .001
1 5/16 - 32 UNS - 3B
MAJOR DIA. 1.3125 MIN
PITCH DIA. 1.2922 - 1.2960
MINOR DIA. 1.2787 - 1.2846
1 1/16 - 32 UNS - 3B
MAJOR DIA. 1.0625 MIN.
PITCH DIA. 1.0422 — 1.0459
MINOR DIA. 1.0287 — 1.0346
.062 UNDERCUT TO ROOT DIA.
.062 UNDERCUT TO ROOT DIA.
.625
.869
.744
1.135
SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL 2011848
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 52386910690
DRAWN V. AMATO DATE 4-15-64
CHECKED 4/6/64
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, MIRROR
(SEXTANT EYEPIECE)

CODE IDENT NO. | SIZE E | NASA NUMBER 2011640
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET | OF

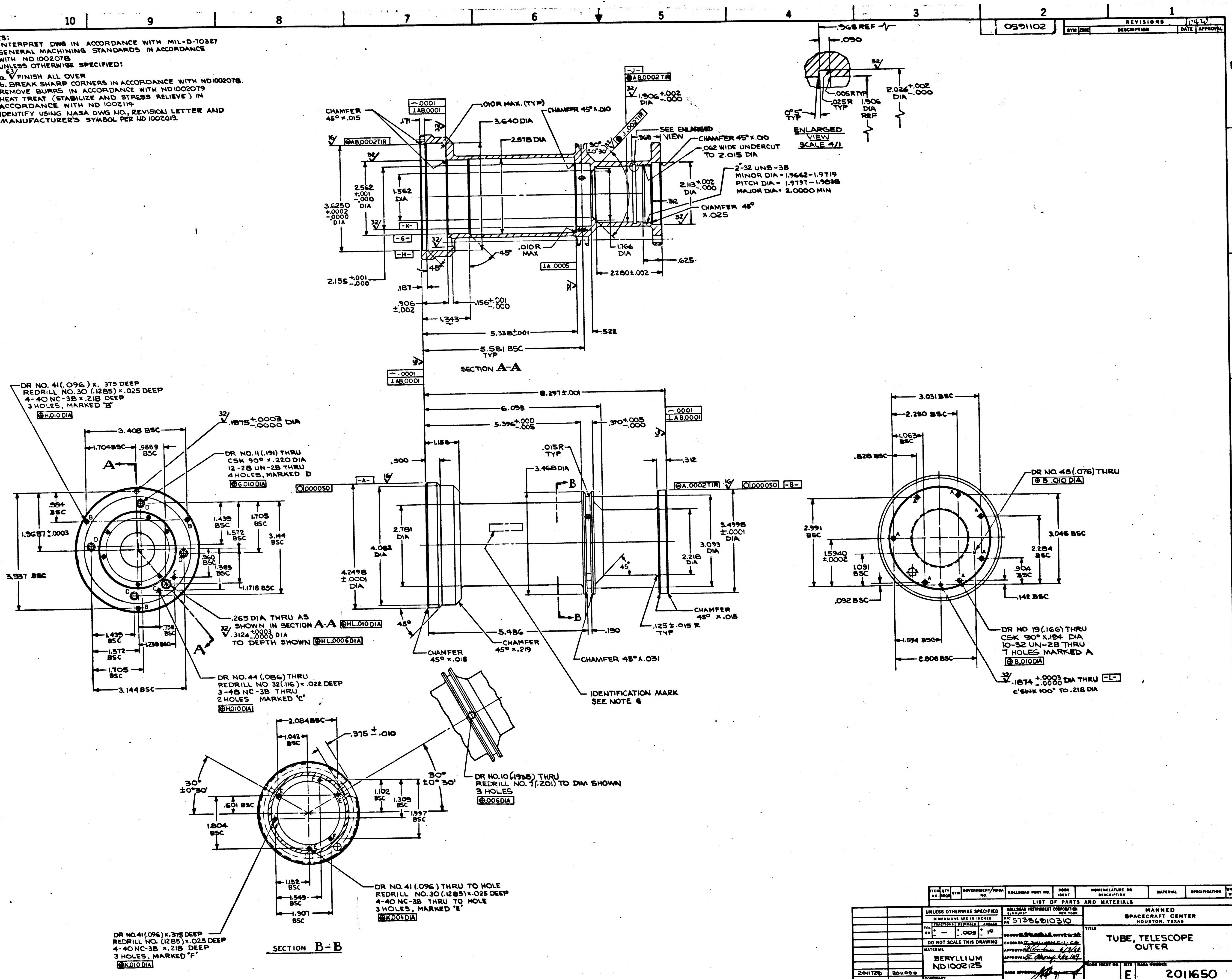
NEXT ASSY	USED ON
2011786	2011000

APPLICATION

MASTER

2011640

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND 1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.


10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
CHAMFER 45° x.015
.0001
⊥AB.0001
.171
32/
.010R MAX. (TYP)
3.640 DIA
2.578 DIA
CHAMFER 45° x.010
-J-
AB.0002 TIR
1.906 +.002 -.000 DIA
J .002 TIR
90° ±0°30'
SEE ENLARGED VIEW
.968
CHAMFER 45° x.010
.062 WIDE UNDERCUT TO 2.015 DIA
2-32 UNS-3B
MINOR DIA = 1.9662-1.9719
PITCH DIA = 1.9797-1.9838
MAJOR DIA = 2.0000 MIN
16/
AB.0002TIR
2.562 +.001 -.000 DIA
1.562 DIA
3.6250 +.0002 -.0000 DIA
2.113 +.002 -.000 DIA
.312
CHAMFER 45° x.025
-K-
-G-
-H-
45°
.010R MAX
1.766 DIA
.625
A .0005
2.280±.002
2.155 +.001 -.000
.187
.906 ±.002
.156 +.001 -.000
1.343
5.338±.001
.522
5.581 BSC TYP
SECTION A-A
.968 REF
.090
32/
.005R TYP
.025R TYP
0°5' TYP
1.906 DIA REF
2.026 +.002 -.000 DIA
ENLARGED VIEW
SCALE 4/1
0591102
REVISIONS
SYM
ZONE
DESCRIPTION
DATE
APPROVAL
.0001
⊥AB.0001
8.297±.001
6.093
5.396 +.000 -.005
.370 +.005 -.000
.0001
⊥AB.0001
1.156
.500
.015R TYP
3.468 DIA
.312
-A-
000050
A.0002TIR
000050
-B-
B
2.781 DIA
4.062 DIA
4.2498 ±.0001 DIA
3.4998 ±.0001 DIA
3.093 DIA
2.218 DIA
45°
CHAMFER 45° x.015
5.486
.190
.125±.015 R TYP
CHAMFER 45° x.219
CHAMFER 45° x.015
CHAMFER 45° x.031
IDENTIFICATION MARK SEE NOTE 6
3.408 BSC
1.704 BSC
.9889 BSC
A
.984 BSC
1.9687±.0003
3.937 BSC
1.439 BSC
1.572 BSC
1.705 BSC
3.144 BSC
.960 BSC
1.383 BSC
1.1718 BSC
.738 BSC
1.239 BSC
1.439 BSC
1.572 BSC
1.705 BSC
3.144 BSC
B
C
D
3.031 BSC
2.250 BSC
1.063 BSC
.828 BSC
2.991 BSC
1.5940 ±.0002
1.091 BSC
.092 BSC
3.046 BSC
2.284 BSC
.904 BSC
.142 BSC
1.594 BSC
2.806 BSC
2.084 BSC
1.042 BSC
.375 ±.010
30° ±0°30'
30° ±0°30'
.601 BSC
1.804 BSC
1.102 BSC
1.309 BSC
1.997 BSC
1.152 BSC
1.549 BSC
1.907 BSC
E
F
SECTION B-B

DR NO. 41 (.096) x .375 DEEP
REDRILL NO. 30 (.1285) x .025 DEEP
4-40 NC-3B x .218 DEEP
3 HOLES, MARKED "B"
⊕ H .010 DIA

32/ .1875 +.0003 -.0000 DIA

DR NO. 11 (.191) THRU
CSK 90° x .220 DIA
12-28 UN-2B THRU
4 HOLES, MARKED D
⊕ G .010 DIA

.265 DIA THRU AS SHOWN IN SECTION A-A ⊕ HL .010 DIA
32/ .3124 +.0003 -.0000 DIA
TO DEPTH SHOWN ⊕ HL .0006 DIA

DR NO. 44 (.086) THRU
REDRILL NO 32 (.116) x .022 DEEP
3-48 NC-3B THRU
2 HOLES MARKED "C"
⊕ H .010 DIA

DR NO. 48 (.076) THRU
⊕ B .010 DIA

DR NO 19 (.166) THRU
CSK 90° x .194 DIA
10-32 UN-2B THRU
7 HOLES MARKED A
⊕ B .010 DIA

32/ .1874 +.0003 -.0000 DIA THRU -L-
C'SINK 100° TO .218 DIA

DR NO. 10 (.1935) THRU
REDRILL NO. 7 (.201) TO DIM SHOWN
3 HOLES
⊕ .006 DIA

DR NO. 41 (.096) THRU TO HOLE
REDRILL NO. 30 (.1285) x .025 DEEP
4-40 NC-3B THRU TO HOLE
3 HOLES, MARKED "E"
⊕ K .004 DIA

DR NO. 41 (.096) x .375 DEEP
REDRILL NO. (.1285) x .025 DEEP
4-40 NC-3B x .218 DEEP
3 HOLES, MARKED "F"
⊕ K .010 DIA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011729	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386810310
DRAWN
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

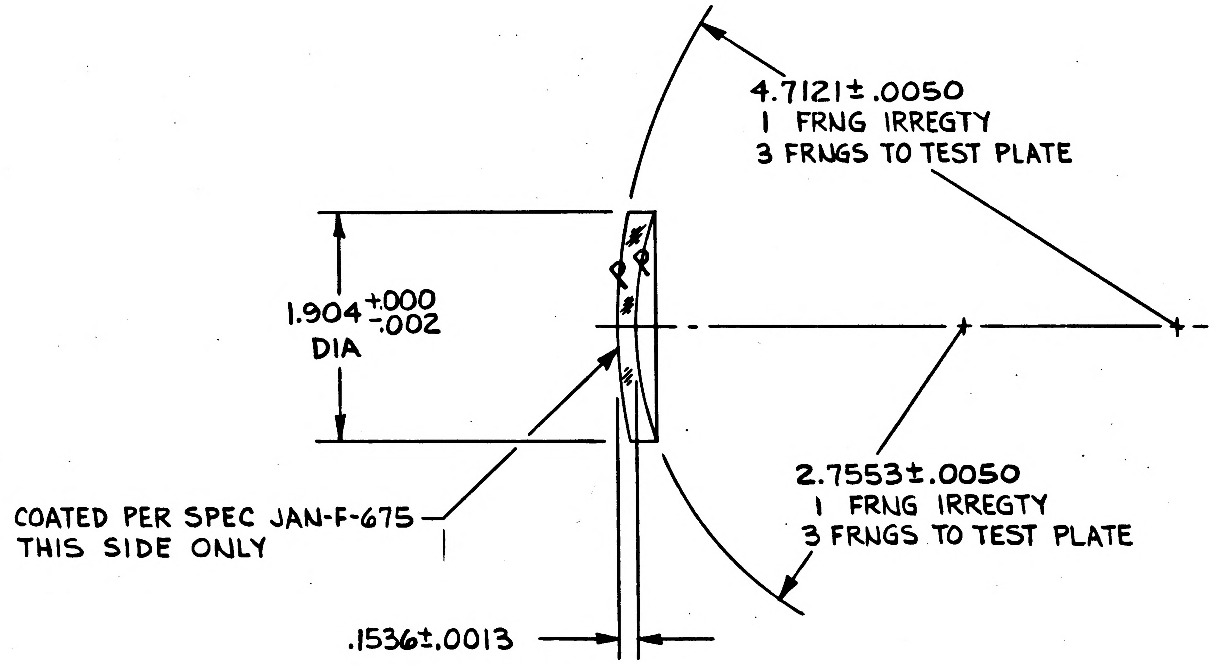
TITLE
TUBE, TELESCOPE
OUTER

CODE IDENT NO.
SIZE E
NASA NUMBER 2011650
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET
OF 1

2011651

REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 721-292
4. CA: ENT= 1.736 EXIT= 1.772
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES.
5. SURFACES MARKED "P" POLISHED, ALL OTHERS GROUND.
6. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING).


4.7121±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
1.904 +.000 -.002 DIA
P
P
COATED PER SPEC JAN-F-675
THIS SIDE ONLY
2.7553±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
.1536±.0013

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011708	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910130

DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE (TELESCOPE OBJECTIVE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011651
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

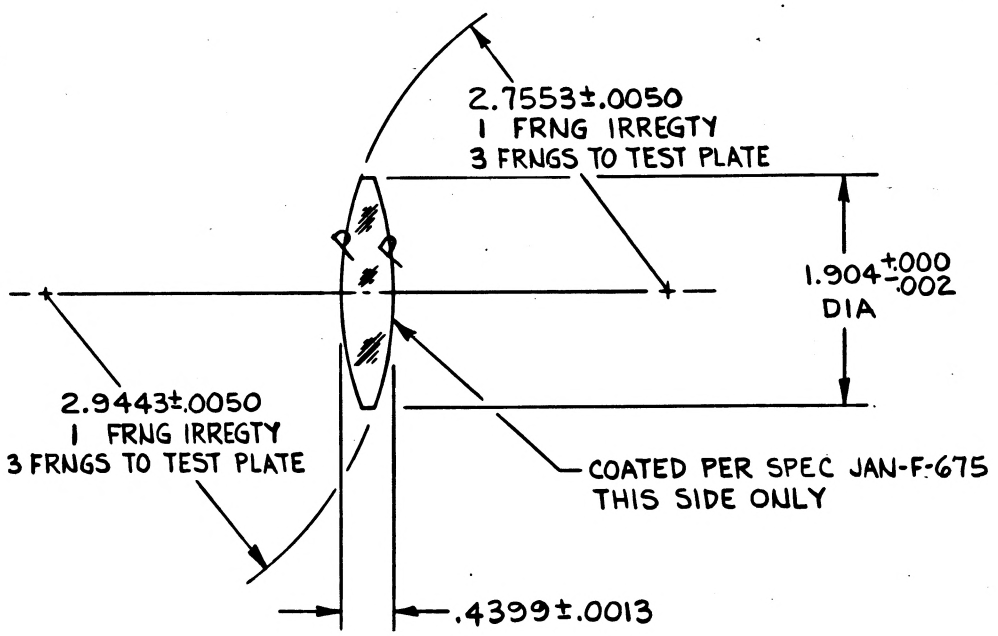
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011651

2011652

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 612-585
4. CA: ENT=1.772 EXIT=1.806
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES.
5. SURFACES MARKED "P" POLISHED, ALL OTHERS GROUND.
6. IDENTIFY USING NASA PART NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING).


2.7553±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
P
P
1.904 +.000 -.002
DIA
2.9443±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
COATED PER SPEC JAN-F-675
THIS SIDE ONLY
.4399±.0013

2011652

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011708	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910140

DRAWN R. BRUNELLE DATE 4-6-64
CHECKED Aubeing 5/28/64
APPROVAL T. Ruelle 5/29/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(TELESCOPE OBJECTIVE)

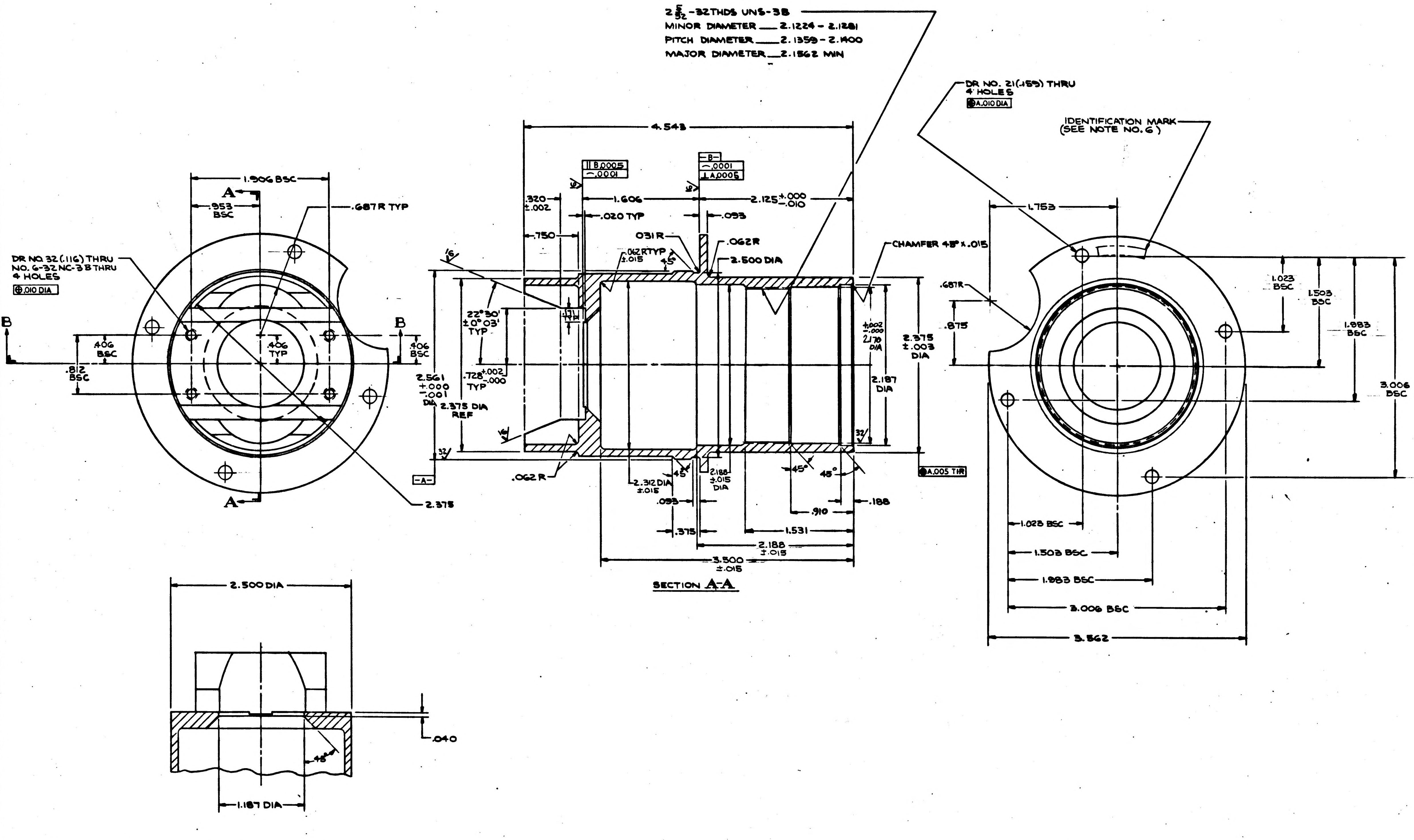
CODE IDENT NO.
SIZE C
NASA NUMBER 2011652
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011653

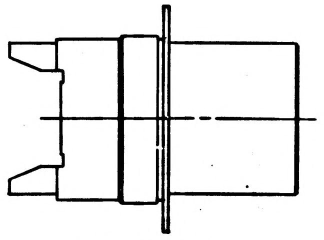
REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND 1002114
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019



2 5/32-32THDS UNS-3B
MINOR DIAMETER 2.1224 - 2.1281
PITCH DIAMETER 2.1359 - 2.1400
MAJOR DIAMETER 2.1562 MIN
DR NO. 21(.159) THRU 4 HOLES
A .010 DIA
IDENTIFICATION MARK (SEE NOTE NO. 6)
1.906 BSC
A
.953 BSC
.687R TYP
DR NO.32 (.116) THRU NO. 6-32NC-3B THRU 4 HOLES
.010 DIA
B
.406 BSC
.406 TYP
.812 BSC
2.375
4.543
B .0005
.0001
-B-
.0001
A .0005
.320 ±.002
1.606
2.125 +.000 -.010
.020 TYP
.093
.750
031R
.062R
.062R TYP ±.015
45°
2.500 DIA
CHAMFER 45° x .015
22°30' ±0°03' TYP
.171 TYP
.728 +.002 -.000 TYP
2.561 +.000 -.001 DIA
2.375 DIA REF
+.002 -.000 2.170 DIA
2.375 ±.003 DIA
2.187 DIA
-A-
.062 R
2.312 DIA ±.015
2.188 ±.015 DIA
.093
.375
.910
.188
1.531
2.188 ±.015
3.500 ±.015
A .005 TIR
SECTION A-A
.687R
.875
1.753
1.023 BSC
1.503 BSC
1.883 BSC
3.006 BSC
1.023 BSC
1.503 BSC
1.883 BSC
3.006 BSC
3.562
2.500 DIA
.040
45°
1.187 DIA

PARTIAL SECTION B-B



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011724	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 5)
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910470
DRAWN E. BRUNDLE DATE 2-7-64
CHECKED
APPROVAL 6/8/64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TUBE, TELESCOPE, INNER

CODE IDENT NO.
SIZE E
NASA NUMBER 2011653
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

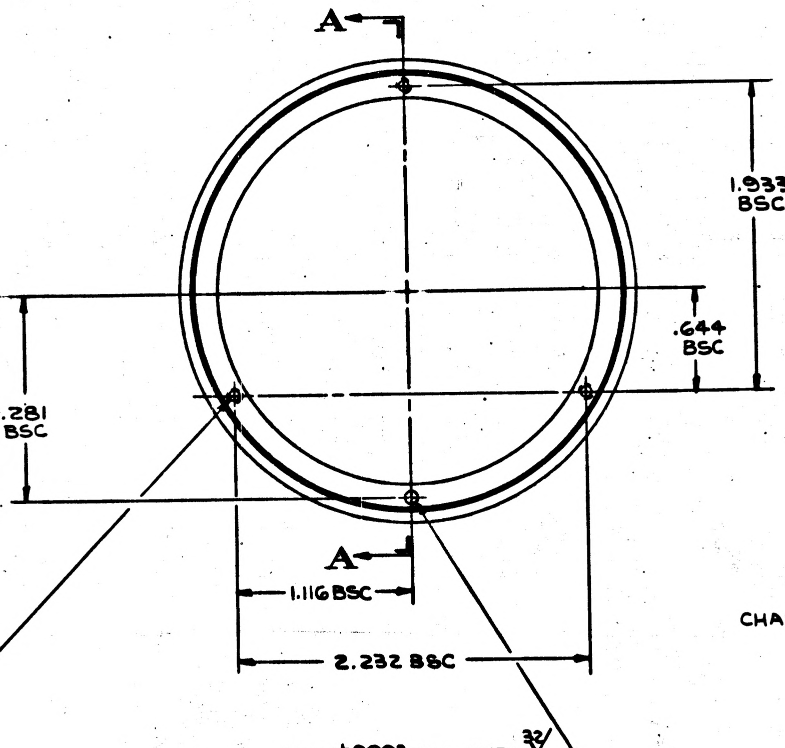
2011654

REVISIONS 0049				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		Revised per TDRR No. 12671	8-25-64	

SPUR GEAR DATA

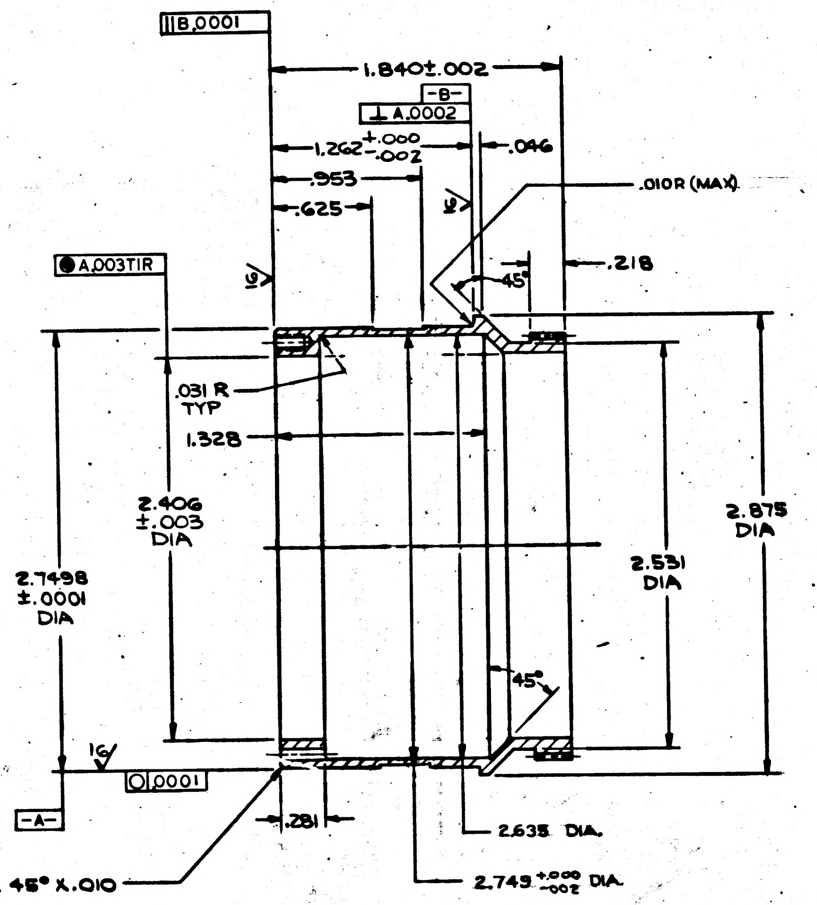
NO. OF TEETH	252
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	2.62500
OUTSIDE DIAMETER	2.6458 $^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETER MARKED -A-



A
A
1.933 BSC
.644 BSC
1.281 BSC
1.116 BSC
2.232 BSC

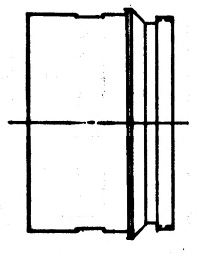
.0622 $^{+.0003}_{-.0000}$ DIA THRU 32√
⊕A .004 DIA



B .0001
1.840±.002
-B-
⊥ A .0002
1.262 $^{+.000}_{-.002}$
.046
.953
.625
16√
.010R (MAX)
⊕ A .003TIR
16√
.218
45°
.031 R TYP
1.328
2.406 ±.003 DIA
2.7498 ±.0001 DIA
2.531 DIA
2.875 DIA
45°
16√
○ .0001
-A-
.281
2.635 DIA
2.749 $^{+.000}_{-.002}$ DIA
CHAMFER 45° X .010

SECTION A-A

DR NO. 50 (.070) X .219 DEEP
(DO NOT BREAK THRU)
REDRILL NO. 38 (.1015) X .018 DEEP
BOTTOM TAP NO. 2-56 NC-3B X .190 DEEP
3 HOLES
⊕A .004 DIA



ACTUAL SIZE

6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS PER ND 1002079
3. UNLESS OTHERWISE SPECIFIED:-
63√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011719	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 RC-28-32
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910240
DRAWN E. BRUNELLE DATE 4-10-64
CHECKED
APPROVAL
APPROVAL E. 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, TRUNNION DRIVE
(252T-96P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011654
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

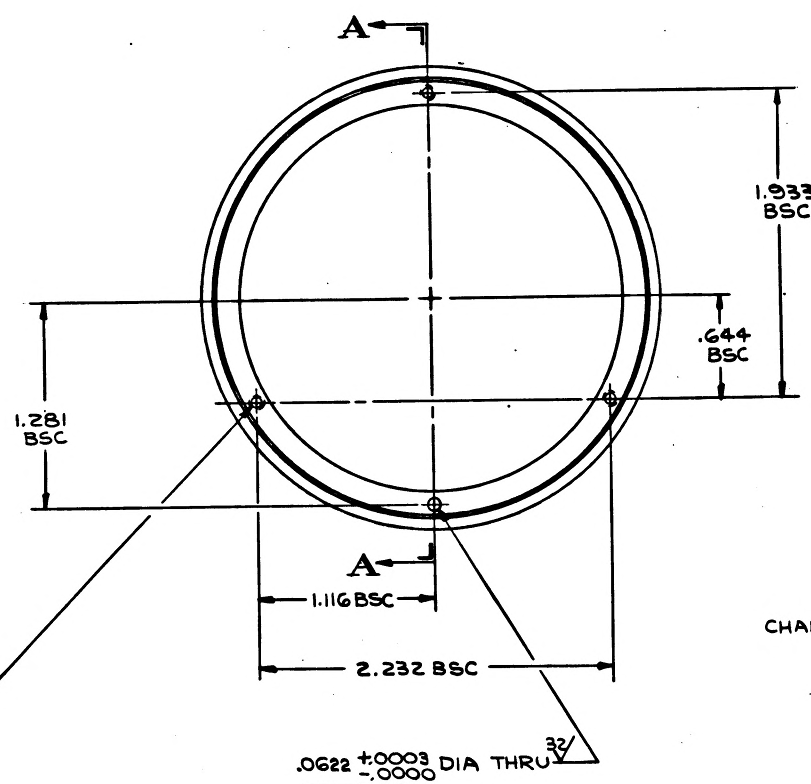
B	2011654

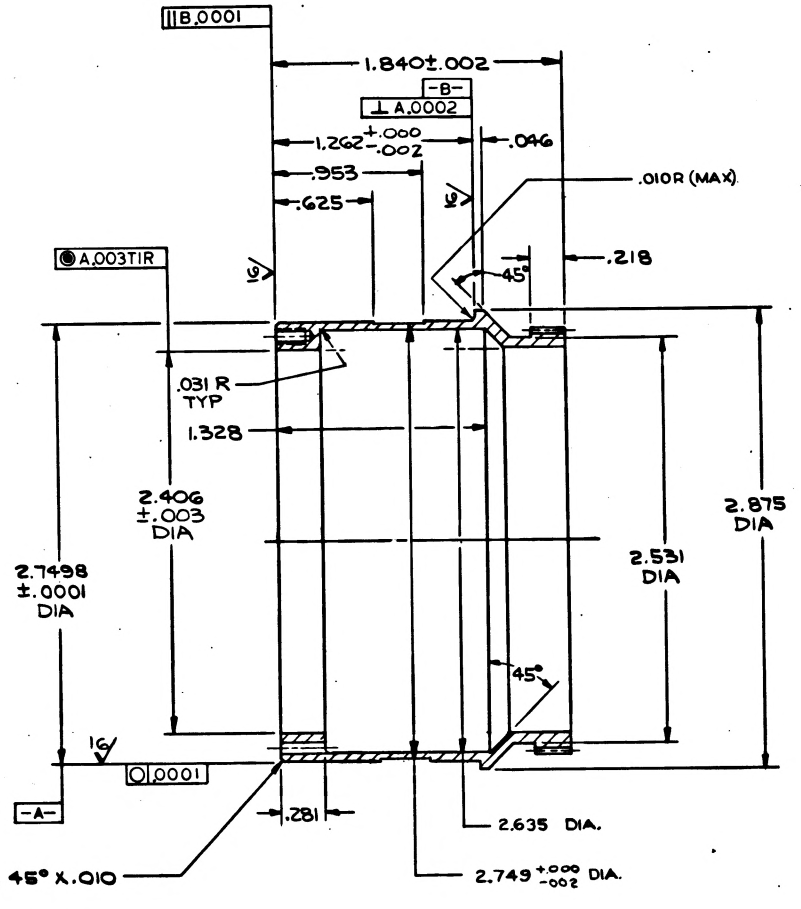
REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 12671	8-25-64	
B		REVISED PER TDRR 19051	5/[illegible]	

SPUR GEAR DATA

NO. OF TEETH	252
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	2.62500
OUTSIDE DIAMETER	$2.6458^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\overset{32}{\vee}$

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETER MARKED -A-

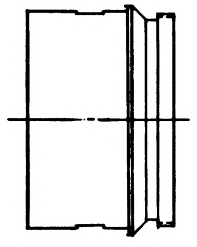

A
A
1.933 BSC
.644 BSC
1.281 BSC
1.116 BSC
2.232 BSC
32


B.0001
1.840±.002
-B-
A.0002
1.262 +.000 -.002
.046
.953
.625
16
.010R (MAX)
A.003TIR
16
.218
45°
.031 R TYP
1.328
2.406 ±.003 DIA
2.7498 ±.0001 DIA
2.531 DIA
2.875 DIA
45°
16
.0001
-A-
.281
2.635 DIA.
CHAMFER 45° X.010
2.749 +.000 -.002 DIA.

SECTION A-A

$.0622^{+.0003}_{-.0000}$ DIA THRU $\overset{32}{\vee}$
⊕A.004DIA

DR NO. 50(.070) x .. 3 DEEP
(DO NOT BREAK THRU)
REDRILL NO. 38 (.1015) x .018 DEEP
BOTTOM TAP NO. 2-56 NC-3B x .190 DEEP
3 HOLES
⊕A.004 DIA



ACTUAL SIZE

6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS PER ND 1002079
3. UNLESS OTHERWISE SPECIFIED:-
$\overset{63}{\vee}$ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011719	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 RC-28-36

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910240

DRAWN R. BRUNELLE DATE 4-10-64
CHECKED [illegible] 5/28/64
APPROVAL [illegible] 5/27/64
APPROVAL E. Mong 6-5-64
NASA APPROVAL
MIT APPROVAL [illegible] 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, TRUNNION DRIVE
(252T-96P)

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011654

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

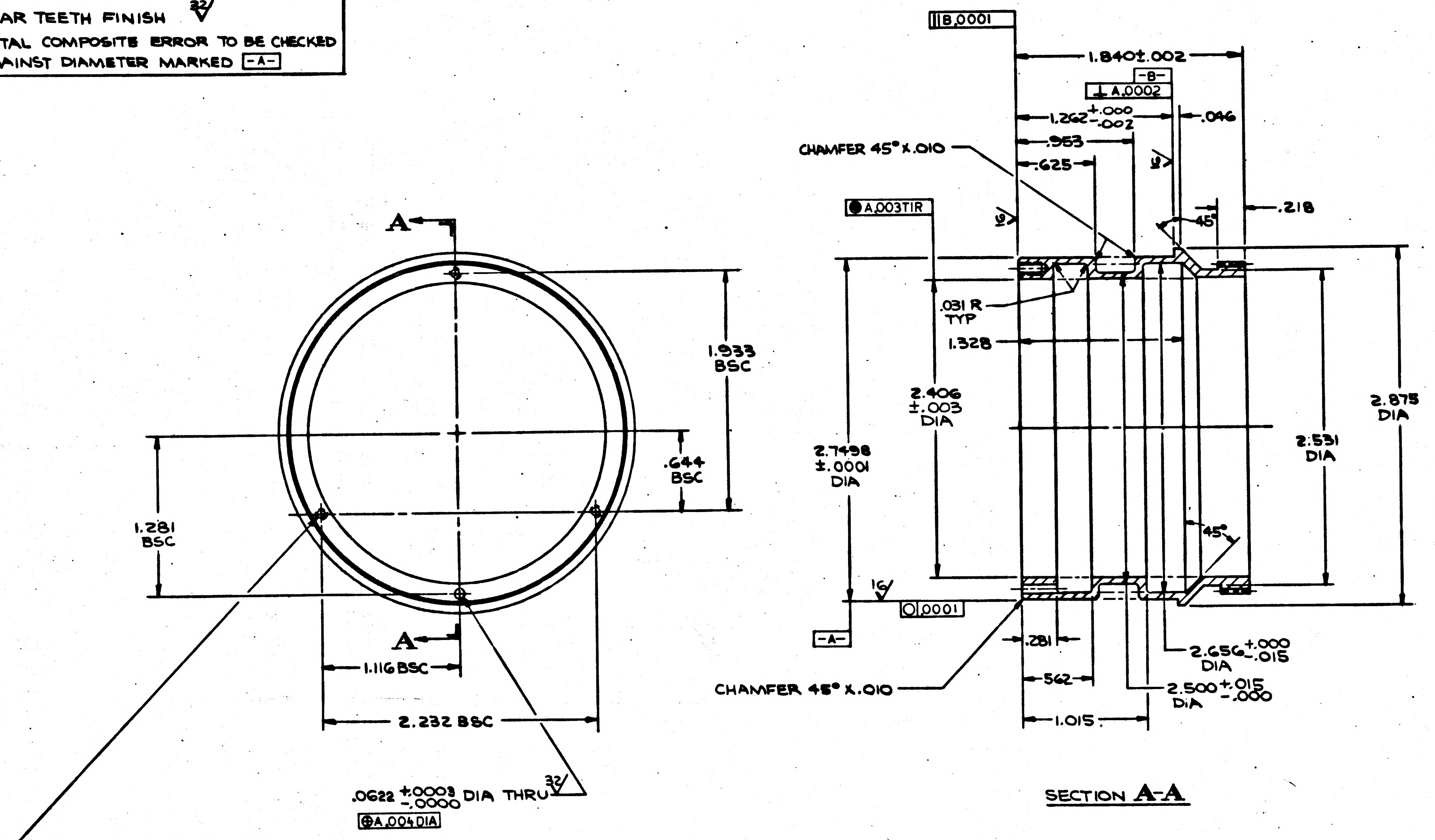
2011654

REVISIONS 0048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

NO. OF TEETH	252
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	2.62500
OUTSIDE DIAMETER	$2.6458^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\overset{32}{\vee}$

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETER MARKED -A-



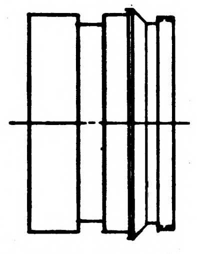
A
A
1.933 BSC
.644 BSC
1.281 BSC
1.116 BSC
2.232 BSC
B.0001
1.840±.002
-B-
A.0002
$1.262^{+.000}_{-.002}$
.046
.953
.625
CHAMFER 45° X.010
16
A.003TIR
.218
45°
.031 R TYP
1.328
2.406 ±.003 DIA
2.7498 ±.0001 DIA
2.531 DIA
2.875 DIA
45°
16
.0001
-A-
.281
.562
1.015
$2.656^{+.000}_{-.015}$ DIA
$2.500^{+.015}_{-.000}$ DIA
CHAMFER 45° X.010

$.0622^{+.0003}_{-.0000}$ DIA THRU $\overset{32}{\vee}$

A.004 DIA

SECTION A-A

DR NO. 50(.070) X.219 DEEP
(DO NOT BREAK THRU)
REDRILL NO. 38(.1015) X.018 DEEP
BOTTOM TAP NO. 2-56 NC-3B X.190 DEEP
3 HOLES
A.004 DIA



ACTUAL SIZE

6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
4. REMOVE BURRS PER ND 1002079
3. UNLESS OTHERWISE SPECIFIED:-
$\overset{63}{\vee}$ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011719	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910240

DRAWN E. BRUNELLE DATE 4-10-64
CHECKED 5-21-64
APPROVAL 5/23/64
APPROVAL E. Maury 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, TRUNNION DRIVE
(252T-96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011654

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF

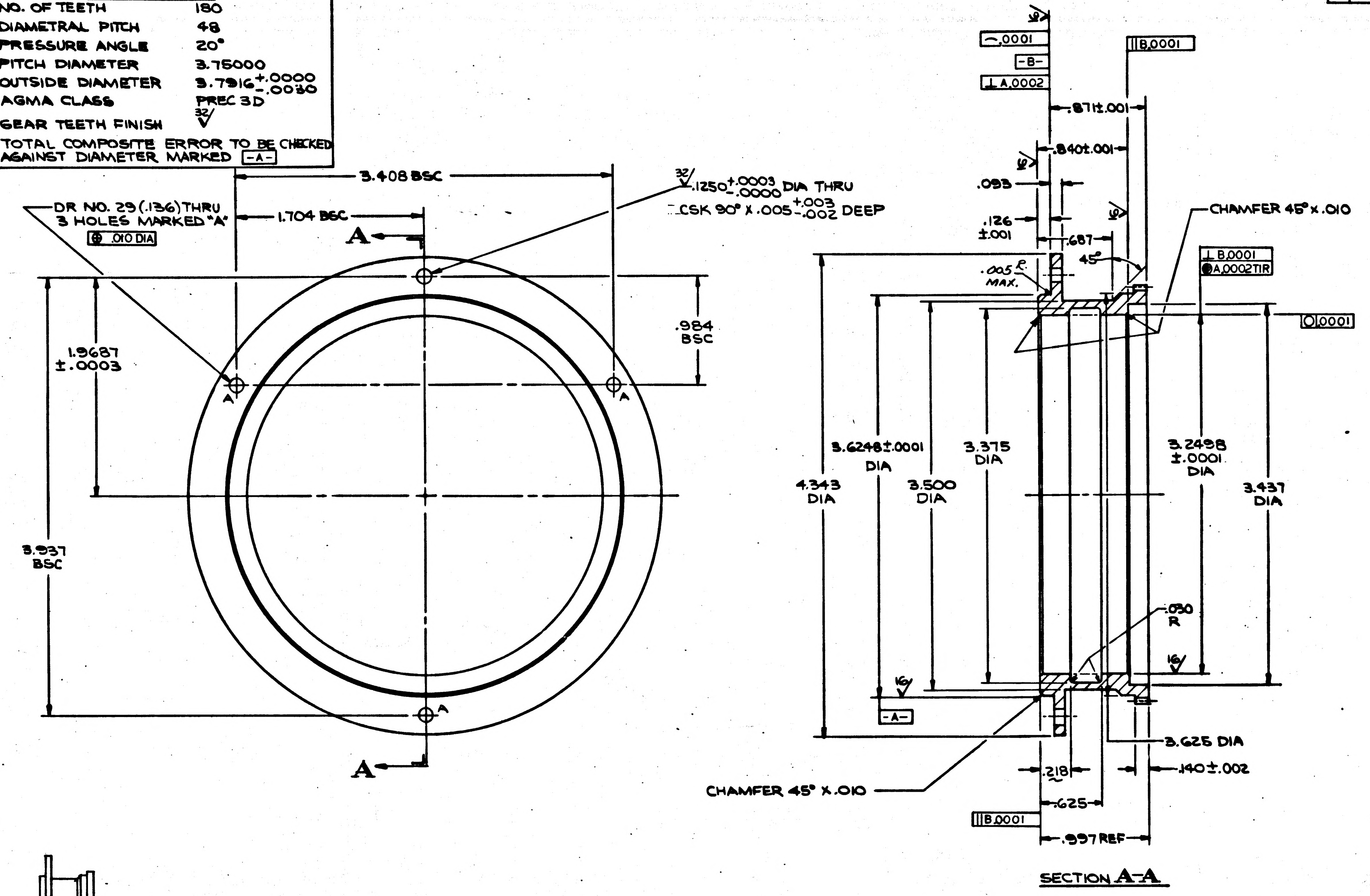
	2011655	

REVISIONS			100 48	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

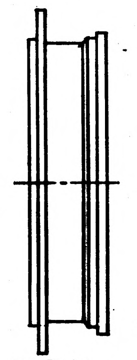
SPUR GEAR DATA

NO. OF TEETH	180
DIAMETRAL PITCH	48
PRESSURE ANGLE	20°
PITCH DIAMETER	3.75000
OUTSIDE DIAMETER	$3.7916^{+.0000}_{-.0030}$
AGMA CLASS	PREC 3D
GEAR TEETH FINISH	32√

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETER MARKED -A-


DR NO. 29 (.136) THRU
3 HOLES MARKED "A"
⊕ .010 DIA
3.408 BSC
1.704 BSC
32√ $.1250^{+.0003}_{-.0000}$ DIA THRU
CSK 90° X $.005^{+.003}_{-.002}$ DEEP
A
.984 BSC
1.9687 ±.0003
3.937 BSC
A
⌒ .0001
-B-
⊥ A .0002
|| B .0001
.871±.001
.840±.001
.093
.126 ±.001
.687
45°
.005 R. MAX.
CHAMFER 45° X .010
⊥ B .0001
A .0002 TIR
○ .0001
16√
4.343 DIA
3.6248±.0001 DIA
3.500 DIA
3.375 DIA
3.2498 ±.0001 DIA
3.437 DIA
.030 R
-A-
3.625 DIA
.218
.140±.002
.625
|| B .0001
.997 REF
CHAMFER 45° X .010

SECTION A-A



ACTUAL SIZE

6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200)
4. REMOVE BURRS PER ND 1002079
3. UNLESS OTHERWISE SPECIFIED:-
   63√ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011718	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL, FED. SPEC. QQ-S-763 CLASS 416 COND. H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910250

DRAWN R. BRUNELLE DATE 5-10-49
CHECKED 9/20/61
APPROVAL 8/29/61
APPROVAL 6-5-69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SHAFT DRIVE
(180T-48P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011655

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

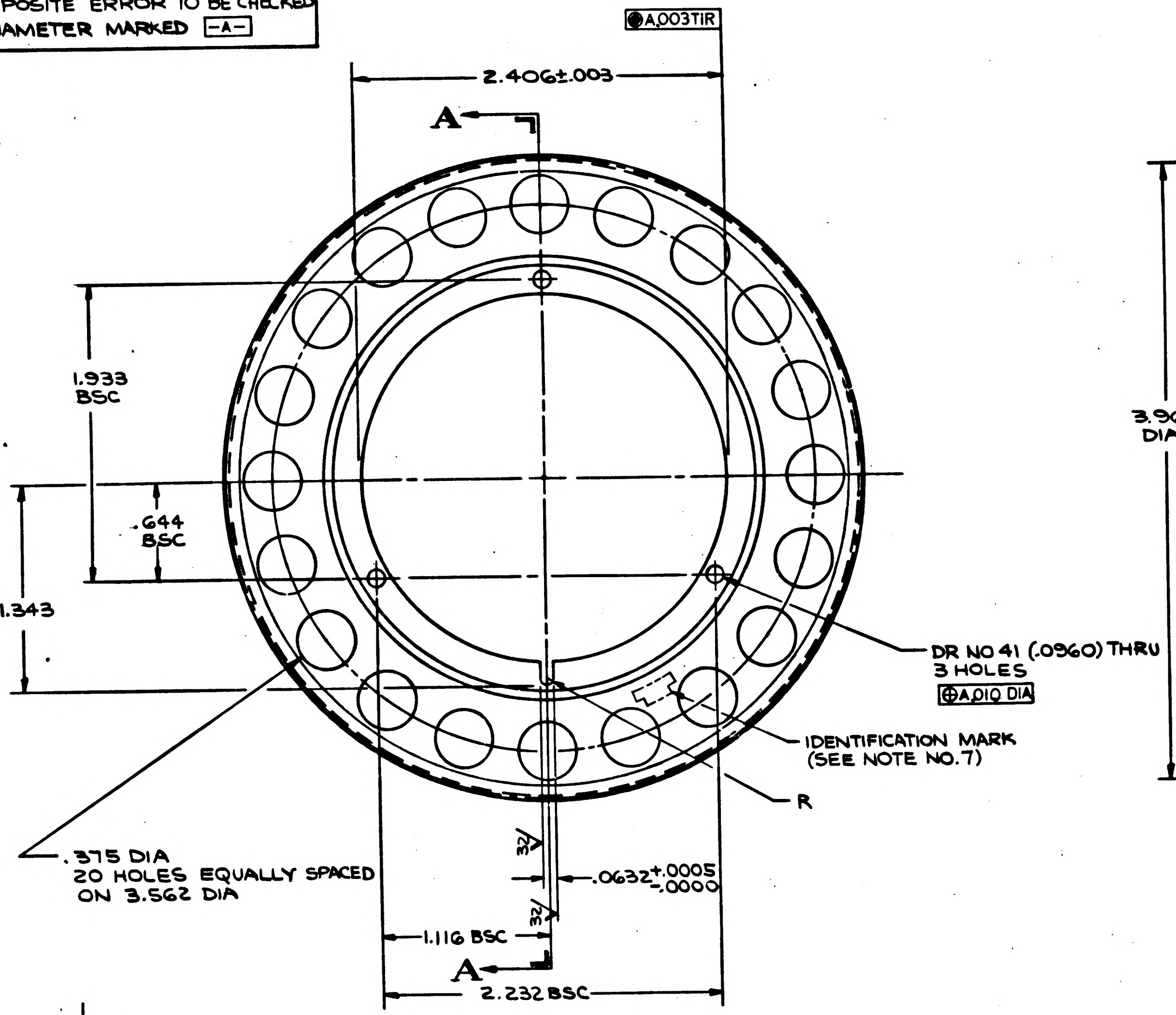
2011656

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

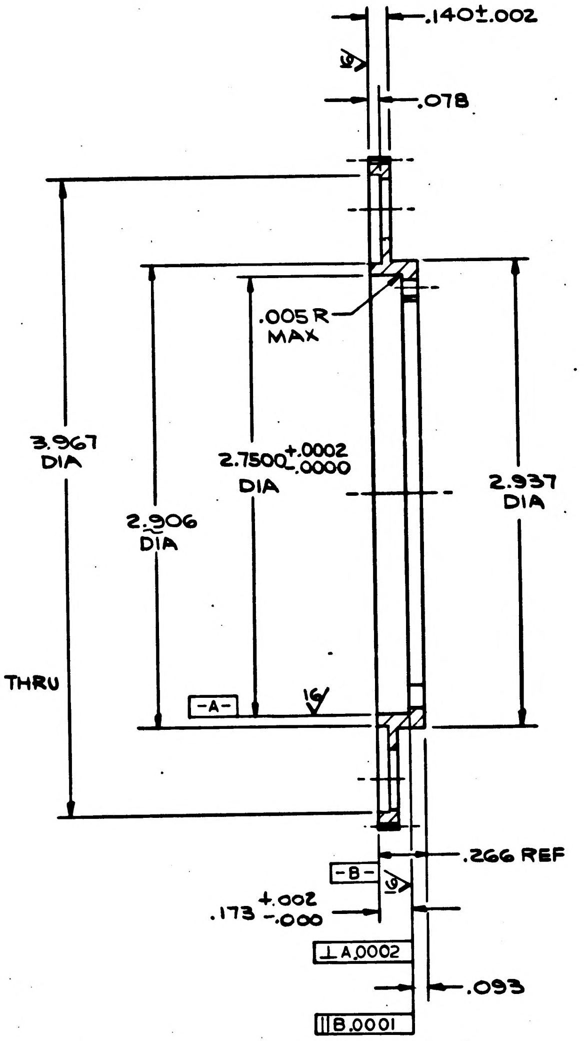
SPUR GEAR DATA

NO. OF TEETH	400
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	4.16666
OUTSIDE DIAMETER	$4.1875^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32/

TOTAL COMPOSITE ERROR TO BE CHECKED AGAINST DIAMETER MARKED -A-

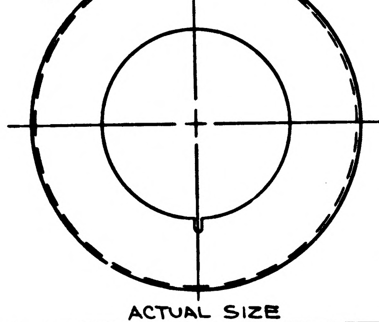


◉A.003TIR
2.406±.003
A
1.933 BSC
.644 BSC
1.343
DR NO 41 (.0960) THRU 3 HOLES
⊕A.010 DIA
IDENTIFICATION MARK (SEE NOTE NO.7)
R
.375 DIA 20 HOLES EQUALLY SPACED ON 3.562 DIA
32/
$.0632^{+.0005}_{-.0000}$
1.116 BSC
A
2.232 BSC



.140±.002
16/
.078
.005 R MAX
3.967 DIA
$2.7500^{+.0002}_{-.0000}$ DIA
2.906 DIA
2.937 DIA
-A-
16/
.266 REF
-B-
16/
$.173^{+.002}_{-.000}$
⊥A.0002
.093
∥B.0001

SECTION A-A



ACTUAL SIZE

7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURES SYMBOL PER ND1002019
6. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
5. HEAT TREAT PER ND1002114 PARA. 3.7.4b TO Rc. 30-34. GEAR CUTTING TO BE PERFORMED AFTER STABILIZATION. NO FURTHER HEAT TREATMENT REQUIRED
4. REMOVE BURRS PER ND 1002079
3. UNLESS OTHERWISE SPECIFIED:- 63/ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES:-

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011723	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL. CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910260

DRAWN R. BRUNELLE DATE 4-10-6[illegible]
CHECKED 4/1/6[illegible]
APPROVAL 6/17/64
APPROVAL E. [illegible] 6/19/64
NASA APPROVAL
MIT APPROVAL 23 [illegible] 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, TRUNNION DRIVE
(400T-96P)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011656
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011656

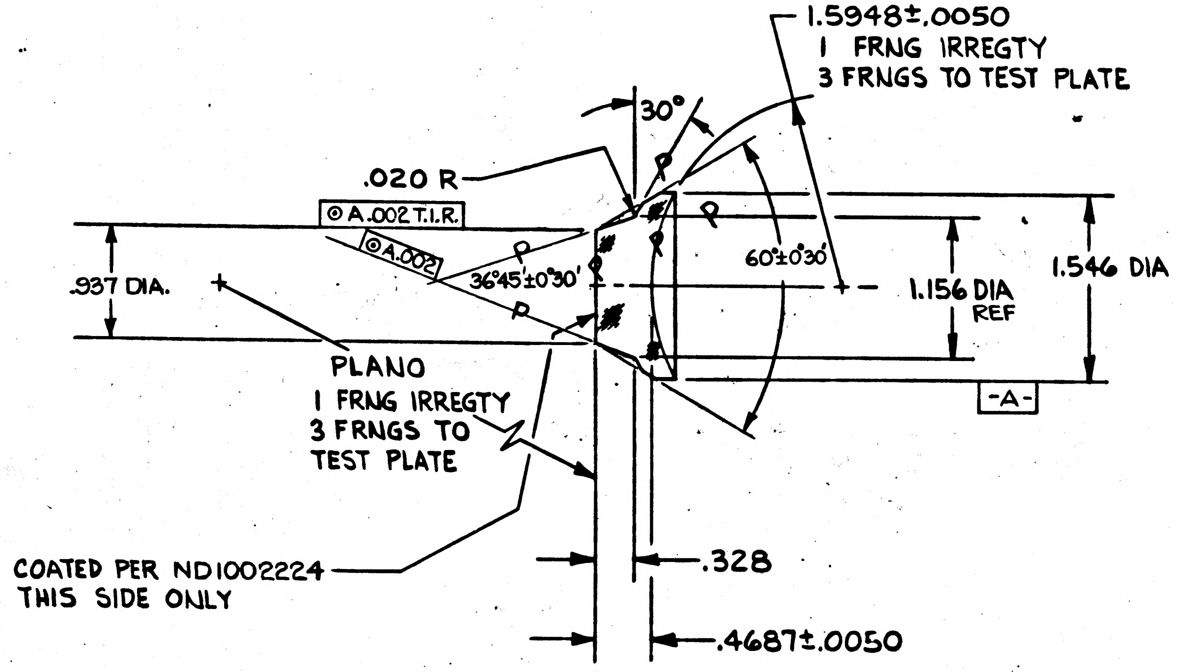
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011657

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 10232	6-12-69	

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 648-337
4. CA: ENT= .924 EXIT= 1.302
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACE MARKED "P" POL ALL OTHERS GRD.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



1.5948±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
30°
.020 R
P
⊚A.002 T.I.R.
⊚A.002
36°45'±0°30'
60°±0°30'
.937 DIA.
1.156 DIA REF
1.546 DIA
-A-
PLANO
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
COATED PER ND1002224 THIS SIDE ONLY
.328
.4687±.0050

2011657

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2011709	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910110

DRAWN R. BRUNELLE DATE 4-6-69
CHECKED 5/29/69
APPROVED G. Kuhlm 5/29/69
APPROVAL E. Moreny 6/1/69
NASA APPROVAL 6/3/69
MIT APPROVAL 6/3/69

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE
(TELESCOPE OBJECTIVE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011657
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

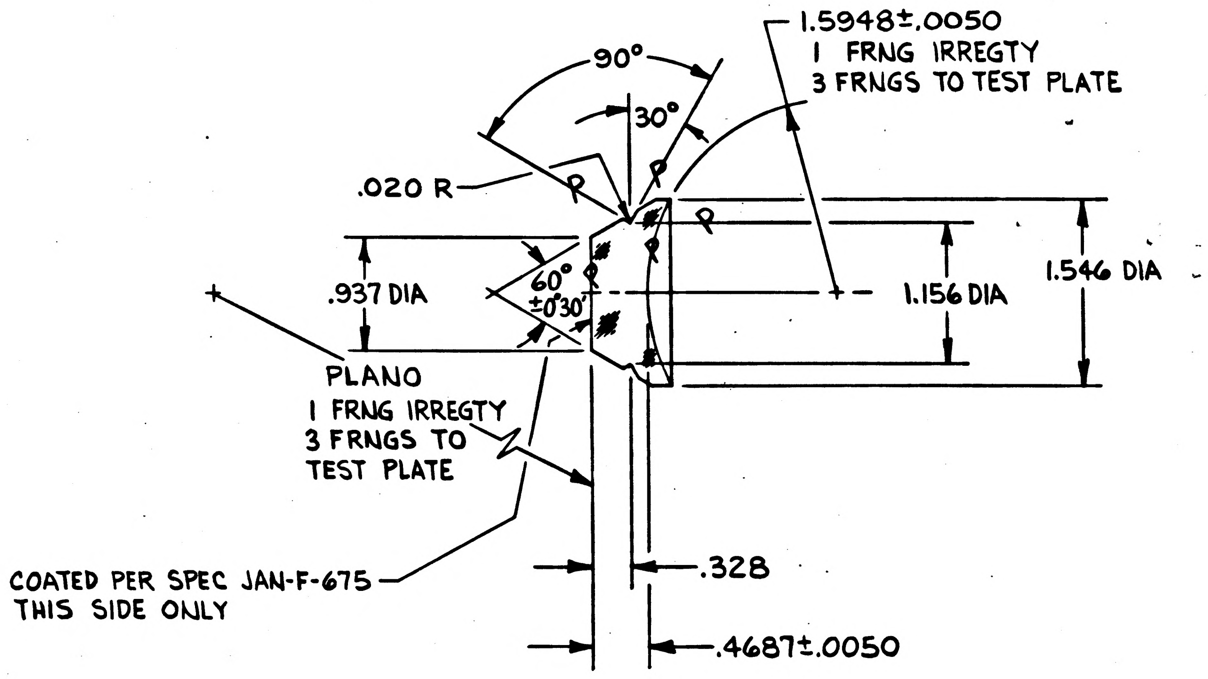
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011657

SYM	ZONE	REVISIONS TORR 09890 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 648-337
4. CA: ENT= .924 EXIT= 1.302
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACE MARKED "P" POL ALL OTHERS GRD.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



90°
30°
.020 R
P
1.5948±.0050
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
.937 DIA
60° ±0°30'
1.156 DIA
1.546 DIA
PLANO
1 FRNG IRREGTY
3 FRNGS TO TEST PLATE
COATED PER SPEC JAN-F-675 THIS SIDE ONLY
.328
.4687±.0050

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011709	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910110

DRAWN R. BRUNELLE DATE 4-6-69
CHECKED 5/27/69
APPROVED 5/29/69
APPROVAL 6/1/69
NASA APPROVAL 6/3/69
MIT APPROVAL 6/3/69

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE (TELESCOPE OBJECTIVE)

CODE IDENT NO. | SIZE C | NASA NUMBER 2011657

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011657

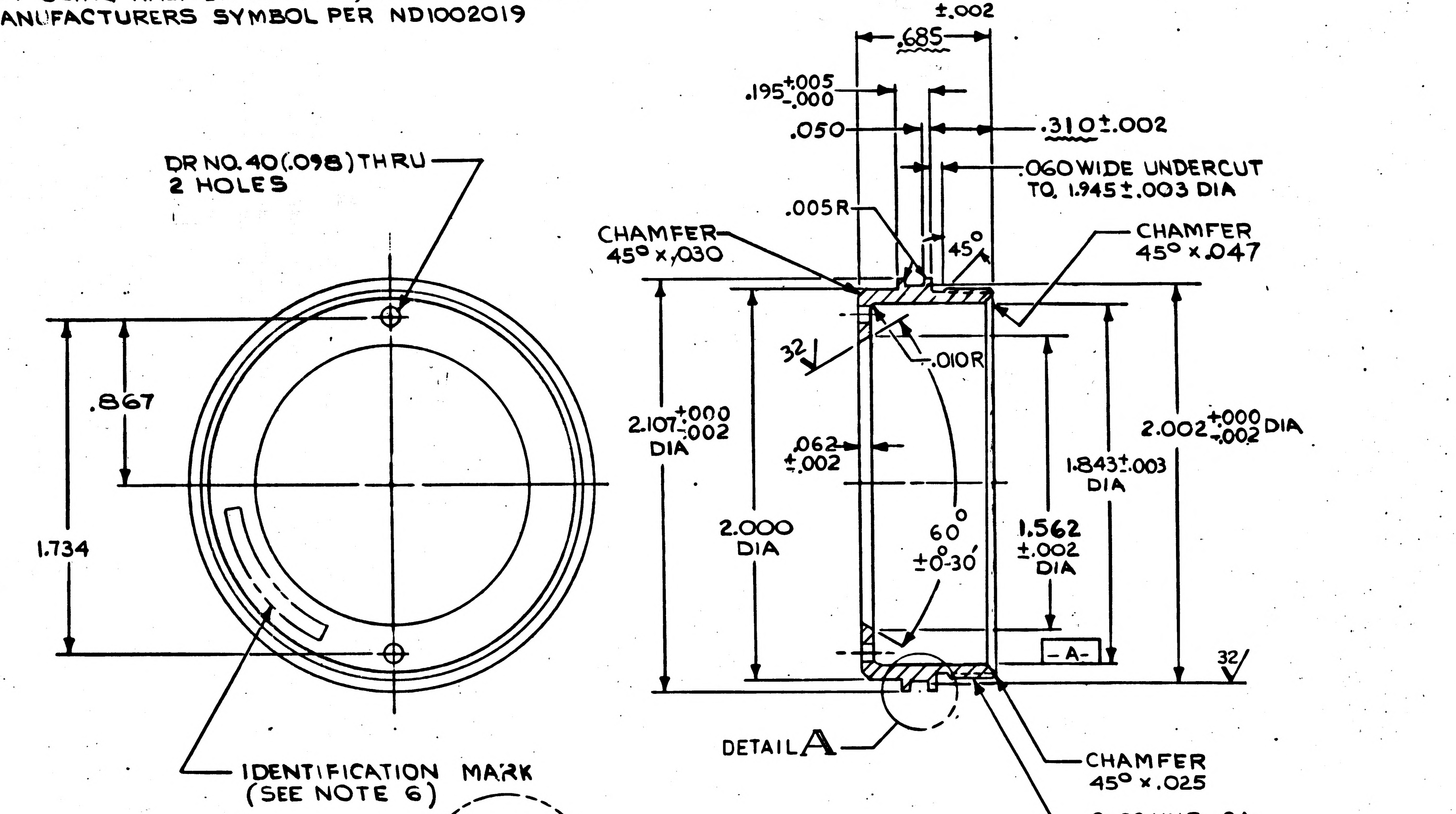
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

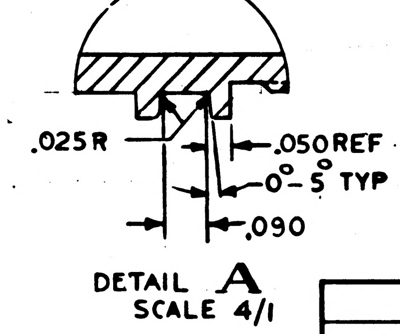
2011659

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 10231	6-12-64	JM 6/16/64

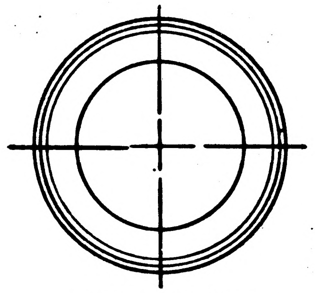
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. BLACKEN PER MIL-C-13924, CLASS 3 (KPS.1005B.100)
6. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


DR NO. 40 (.098) THRU
2 HOLES
.867
1.734
IDENTIFICATION MARK
(SEE NOTE 6)
±.002
.685
.195 +.005 -.000
.050
.310 ±.002
.060 WIDE UNDERCUT
TO 1.945 ±.003 DIA
.005R
CHAMFER
45° x .030
45°
CHAMFER
45° x .047
32
.010R
2.107 +.000 -.002 DIA
.062 ±.002
2.000 DIA
60° ±0°30'
1.562 ±.002 DIA
1.843 ±.003 DIA
2.002 +.000 -.002 DIA
-A-
32
DETAIL A
CHAMFER
45° x .025

2-32 UNS-2A
MAJOR DIA = 1.9987 – 1.9927
PITCH DIA = 1.9784 – 1.9742
MINOR DIA = 1.9604 REF


.025R
.050 REF
0°-5° TYP
.090

DETAIL A
SCALE 4/1



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011722	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND. H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910280

DRAWN R. BRUNELLE DATE 4-2-64
CHECKED 5/27/64
APPROVAL E. Kullman 5/29/64
APPROVAL E. Mourey 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL L. Hazel 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING LENS

CODE IDENT NO. | SIZE C | NASA NUMBER 2011659

SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

E-184

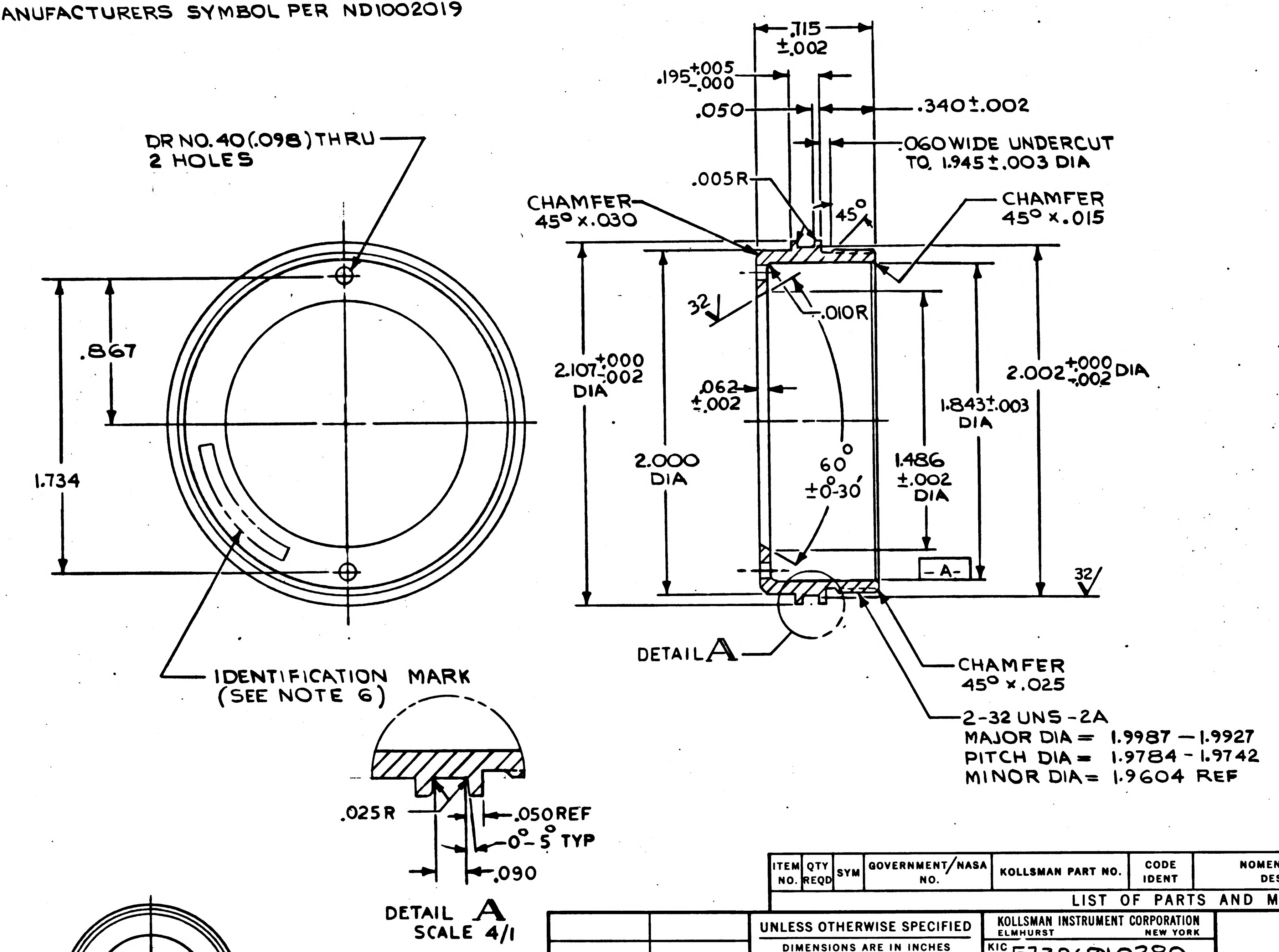
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011659

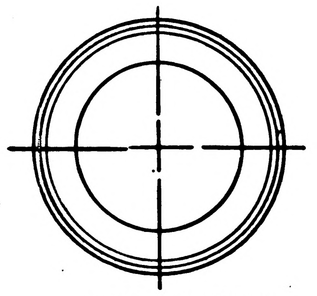
6S91102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TORR 09890				

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. BLACKEN PER MIL-C-13924, CLASS 3 (KPS.1005B.100)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019



DR NO. 40 (.098) THRU
2 HOLES
.867
1.734
IDENTIFICATION MARK
(SEE NOTE 6)
.715
±.002
.195 +.005 -.000
.050
.340±.002
.060 WIDE UNDERCUT
TO 1.945±.003 DIA
.005R
45°
CHAMFER
45° x .030
CHAMFER
45° x .015
32
.010R
2.107 +.000 -.002
DIA
.062
±.002
2.000
DIA
60°
±0°30′
1.486
±.002
DIA
1.843±.003
DIA
2.002 +.000 -.002 DIA
-A-
32
DETAIL A
CHAMFER
45° x .025
2-32 UNS-2A
MAJOR DIA = 1.9987 - 1.9927
PITCH DIA = 1.9784 - 1.9742
MINOR DIA = 1.9604 REF
.025R
.050 REF
0°-5° TYP
.090
DETAIL A
SCALE 4/1



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011722	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND. H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910280

DRAWN R. BRUNELLE DATE 4-2-64
CHECKED 5/29/64 FS
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING LENS

CODE IDENT NO. | SIZE C | NASA NUMBER 2011659

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011659

K+E E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

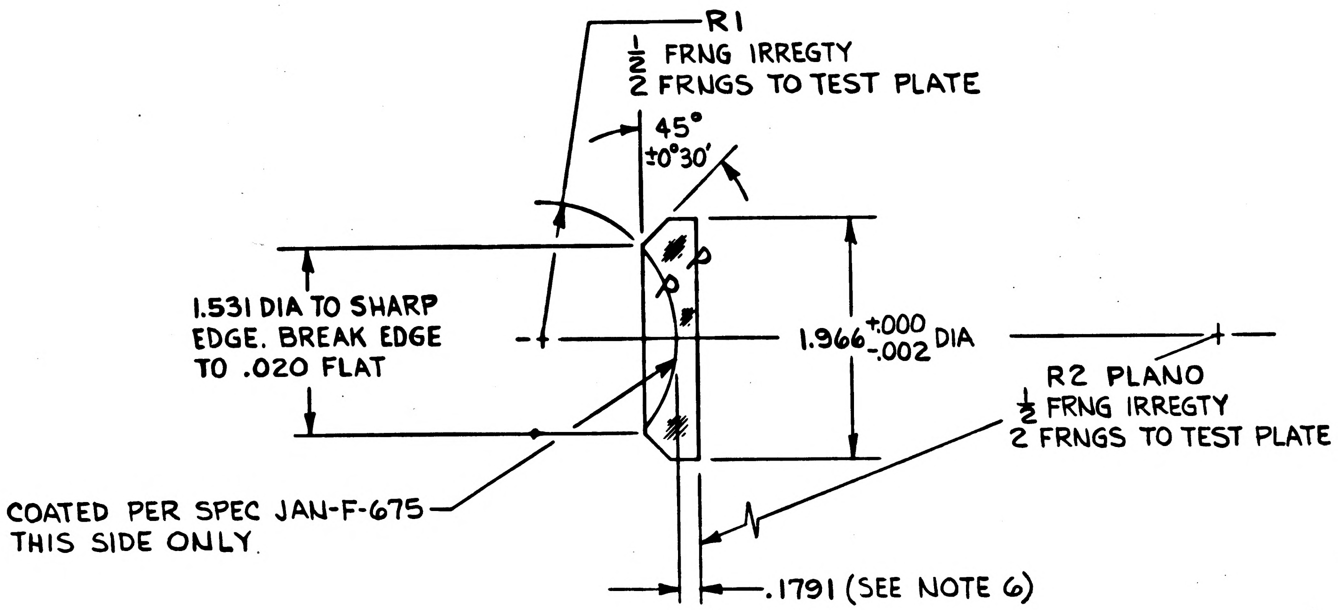
2011664

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 09890

ND	R1	R2
1.60396	-1.1278±.0002	PLANO

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B- FINE ANNEALED
   TYPE 603-380
4. CA: ENT=1.473 EXIT=1.741
   SURF. QUAL: 60-40
   CTRG ERROR 1 MINUTE
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. SEE DWG 2011710 FOR THICKNESS TOLERANCE.
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)


R1
½ FRNG IRREGTY
2 FRNGS TO TEST PLATE
45°
±0°30'
P
P
1.531 DIA TO SHARP
EDGE. BREAK EDGE
TO .020 FLAT
1.966 +.000 -.002 DIA
R2 PLANO
½ FRNG IRREGTY
2 FRNGS TO TEST PLATE
COATED PER SPEC JAN-F-675
THIS SIDE ONLY
.1791 (SEE NOTE 6)

2011664

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011710	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910320
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/30/64 J.S.
APPROVAL 5/27/64
APPROVAL E. Mowry 6/1/64
NASA APPROVAL 6/4/64
MIT APPROVAL 6/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE
(TELESCOPE RELAY)

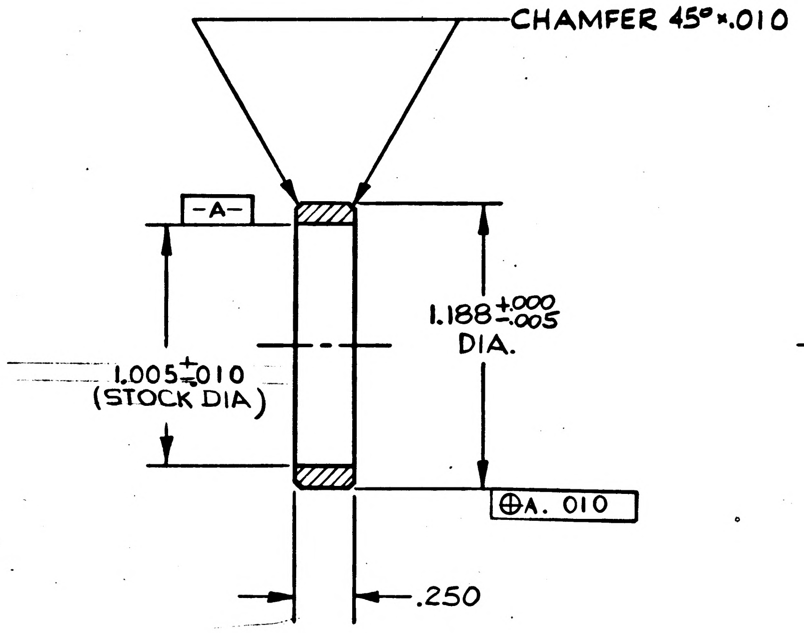
CODE IDENT NO.
SIZE C
NASA NUMBER 2011664
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

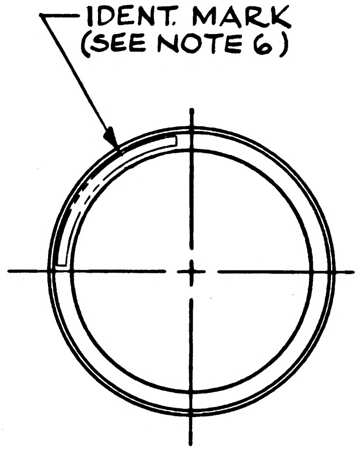
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

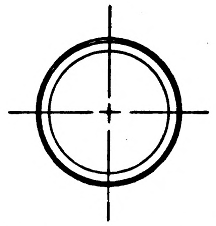
2011665 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 09890				
A		REVISED PER TDRR 20198		wk

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS-1005A.201).
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019.






ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012611	
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY TUBE, 1 1/4 O.D. X .120 WALL
FED SPEC WW-T-785, TYPE I TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910970

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL E. Mowry 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL A. Nalgel 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, SPACER

CODE IDENT NO 80230
SIZE C
NASA NUMBER 2011665
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

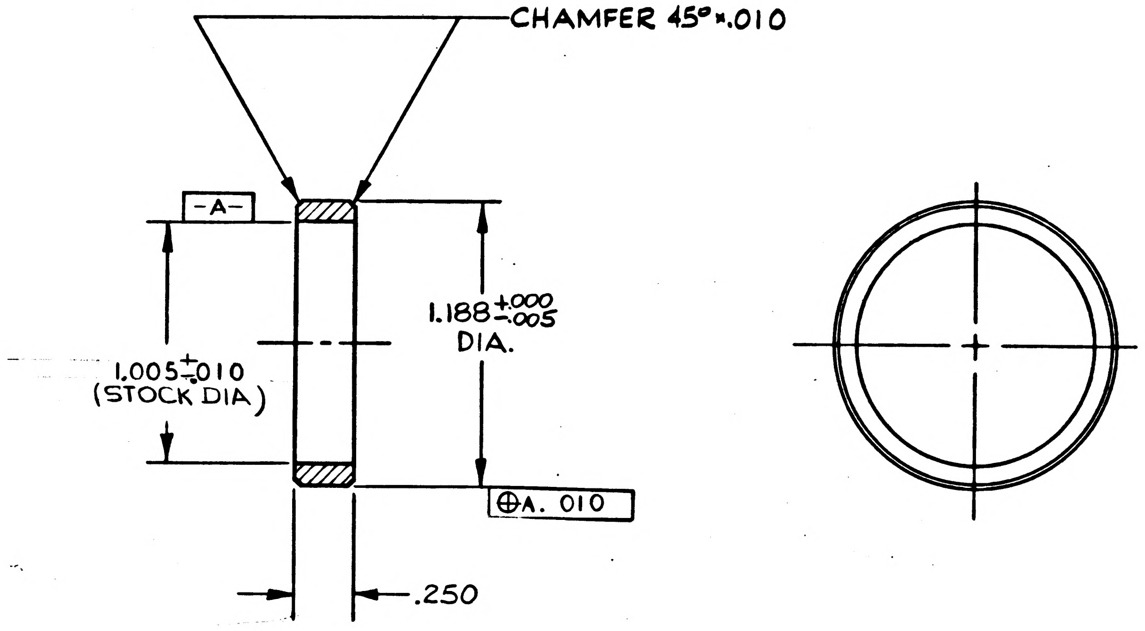
2011665 A

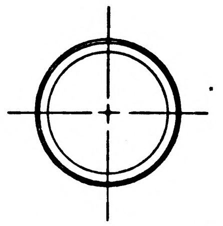
2011665 B

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019 (BAGGING).

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20198	[illegible]	[illegible]
B		REVISED PER TDRR 25074	1/11/66	WR.




ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012611	
2011786	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY TUBE, 1 1/4 O.D. X .120 WALL
FED SPEC WW-T-785, TYPE I
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910970

DRAWN V. AMATO DATE 4-16-64
CHECKED [illegible] 5/28/64
APPROVAL [illegible] 5/23/64
APPROVAL E. [illegible] 6/1/64
NASA APPROVAL [illegible] 6/3/64
MIT APPROVAL [illegible] 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, SPACER

CODE IDENT NO 80230
SIZE C
NASA NUMBER 2011665
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

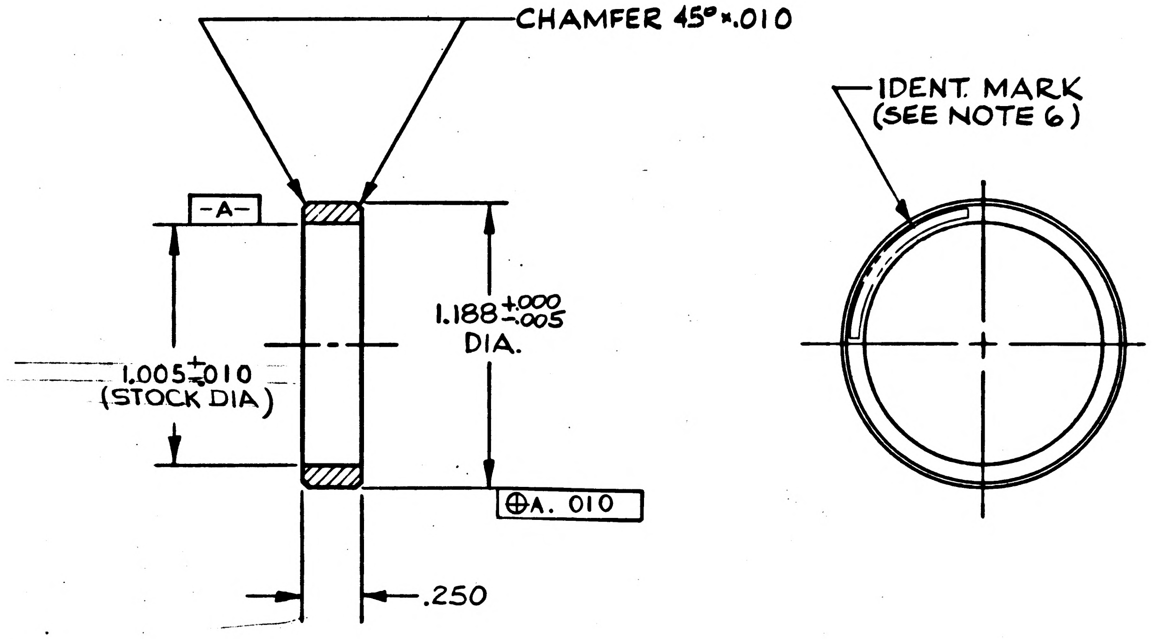
K+E E-154

2011665

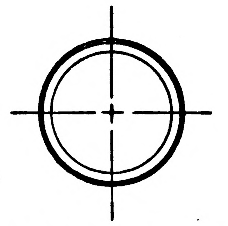
REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS-1005A.201).
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019.



2011665



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
LIST OF PARTS AND MATERIALS									

NEXT ASSY	USED ON
2011786	2011000
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY TUBE, 1 1/4 O.D. X .120 WALL FED SPEC WW-T-785, TYPE I TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K/C PN 57386910970

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/28/64
APPROVAL 5/23/64
APPROVAL E. Mong 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, SPACER

CODE IDENT NO
SIZE C
NASA NUMBER 2011665
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

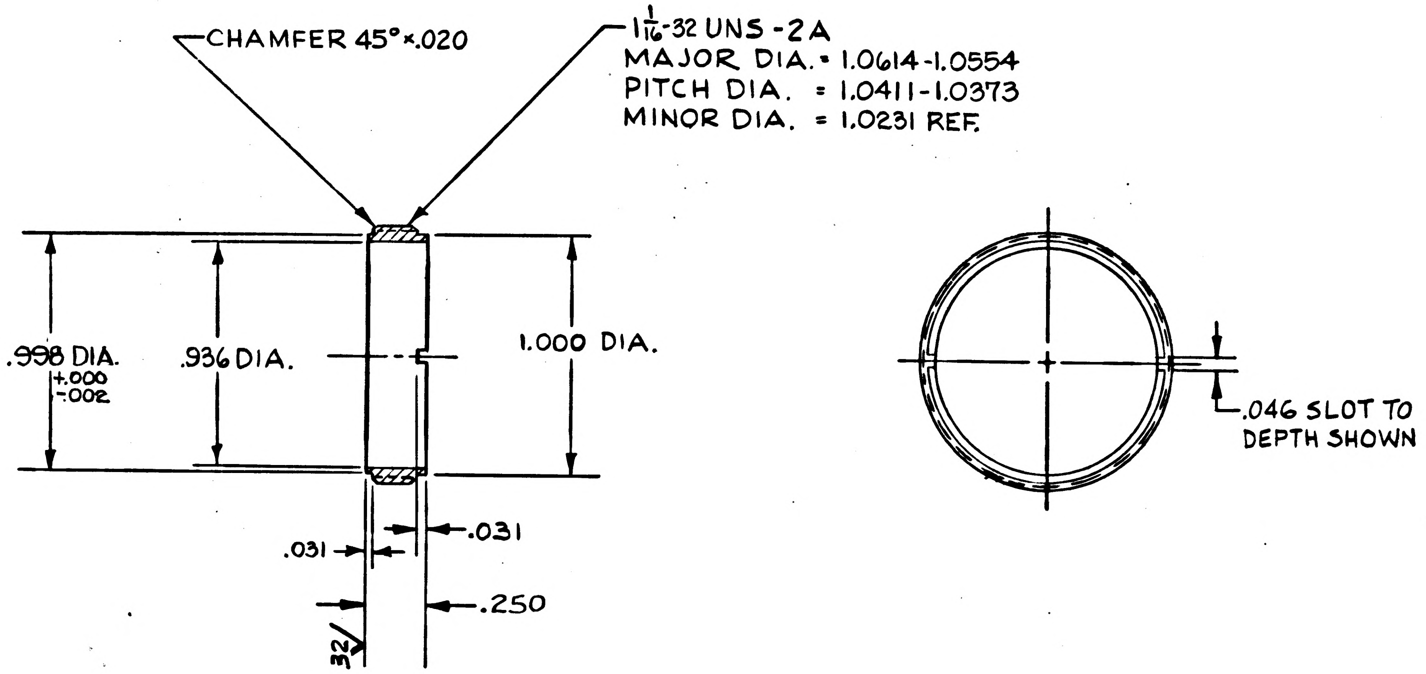
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011667 | A

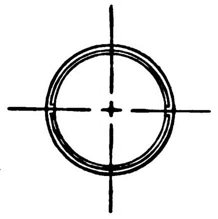
REVISIONS TDRR 09890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20198	1/22/65	WK

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019. (TAGGING)



CHAMFER 45°×.020
1 1/16-32 UNS-2A
MAJOR DIA. = 1.0614-1.0554
PITCH DIA. = 1.0411-1.0373
MINOR DIA. = 1.0231 REF.
.998 DIA. +.000 -.002
.936 DIA.
1.000 DIA.
.031
.031
.250
32/
.046 SLOT TO DEPTH SHOWN



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012611	
2011794	2011000
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM. ALLOY
FED. SPEC. QQ-A-268.
COND. T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910980

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011667

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

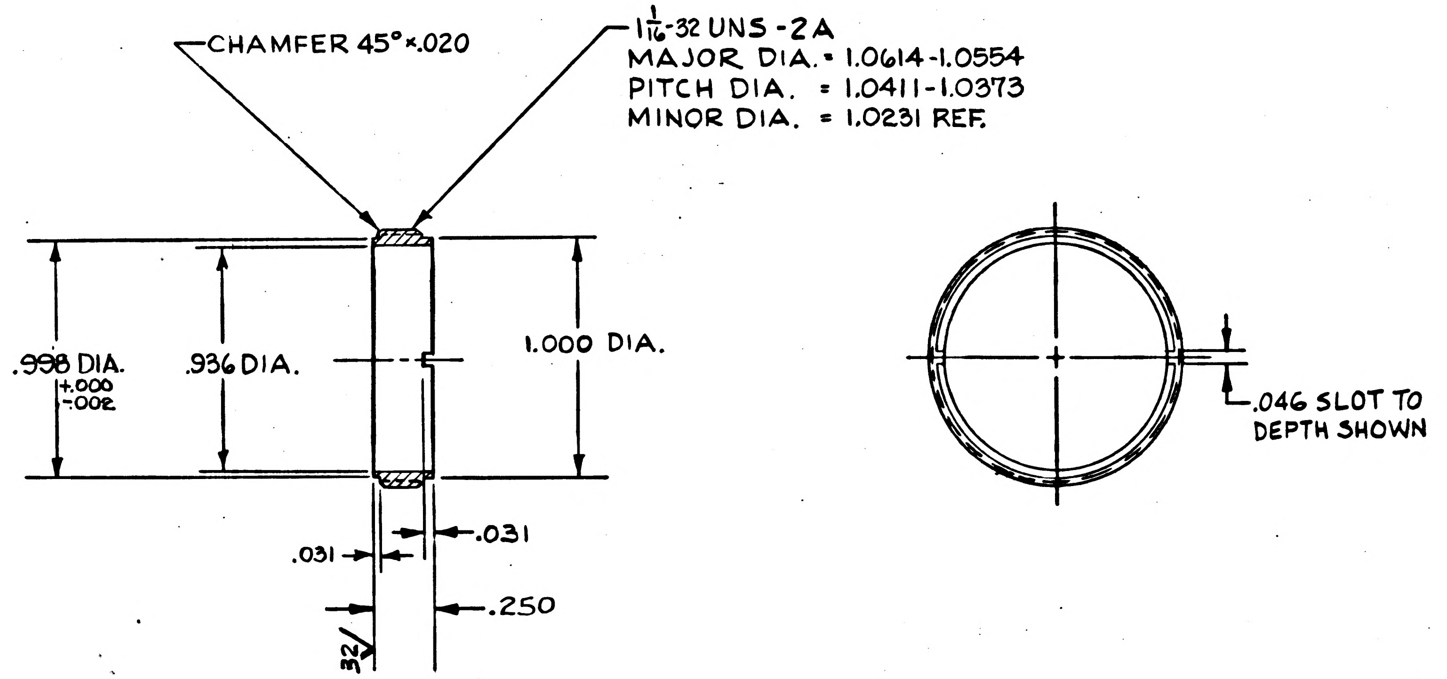
E-154

	2011667

REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

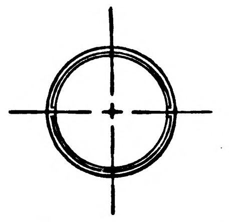
NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63✓ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019. (TAGGING)



CHAMFER 45°×.020
1 1/16-32 UNS-2A
MAJOR DIA. = 1.0614-1.0554
PITCH DIA. = 1.0411-1.0373
MINOR DIA. = 1.0231 REF.
.998 DIA. +.000 -.002
.936 DIA.
1.000 DIA.
.031
.031
.250
32✓
.046 SLOT TO DEPTH SHOWN

2011667



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011794	2011000
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM. ALLOY
FED. SPEC. QQ-A-268
COND. T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910980

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL E. 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011667

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

K+E
E-154

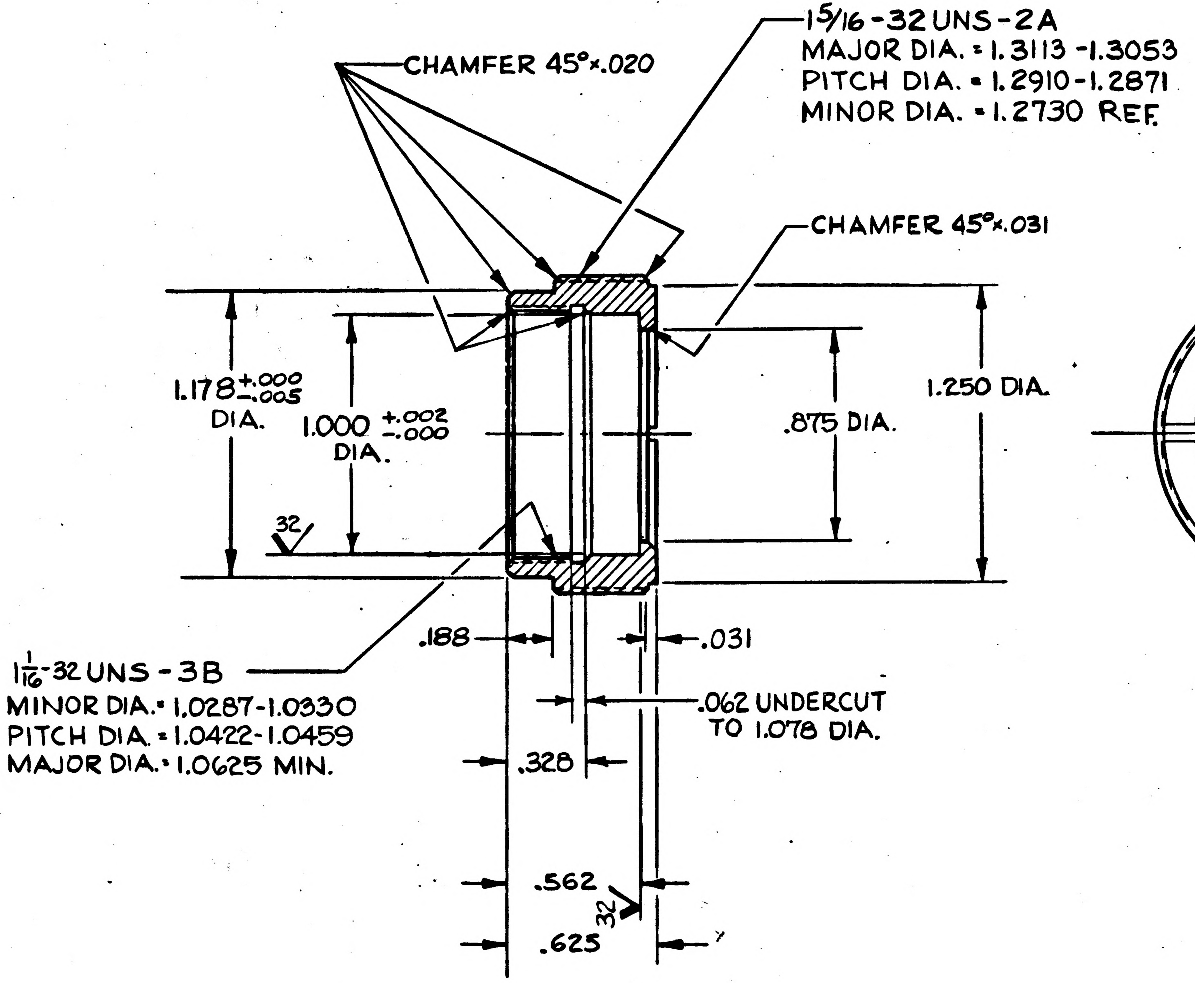
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011668 A

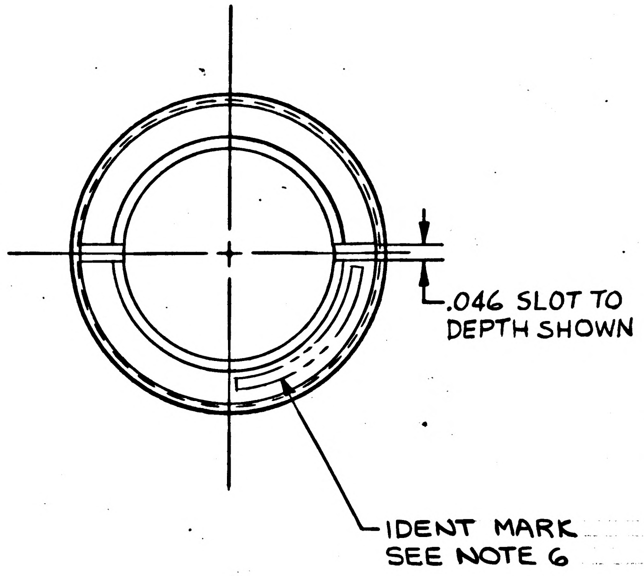
REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16673	2/24/65	WK

NOTES:

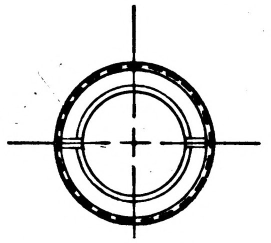
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II DYED BLACK (KPS-1005A.150 TYPE II CLASS 3).
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.



CHAMFER 45°×.020
1 5/16-32 UNS-2A
MAJOR DIA. = 1.3113-1.3053
PITCH DIA. = 1.2910-1.2871
MINOR DIA. = 1.2730 REF.
CHAMFER 45°×.031
1.178 +.000 -.005 DIA.
1.000 +.002 -.000 DIA.
.875 DIA.
1.250 DIA.
32
.188
.031
1 1/16-32 UNS-3B
MINOR DIA. = 1.0287-1.0330
PITCH DIA. = 1.0422-1.0459
MAJOR DIA. = 1.0625 MIN.
.062 UNDERCUT TO 1.078 DIA.
.328
.562
32
.625



.046 SLOT TO DEPTH SHOWN
IDENT MARK SEE NOTE 6



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011794	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ✗	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUM. ALLOY FED. SPEC. QQ-A-225/6 COND T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910990

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/27/64
APPROVAL G. Rulm 5/29/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL J. Halzel 6/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE HOLDER, LENS

CODE IDENT NO.
SIZE C
NASA NUMBER 2011668
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

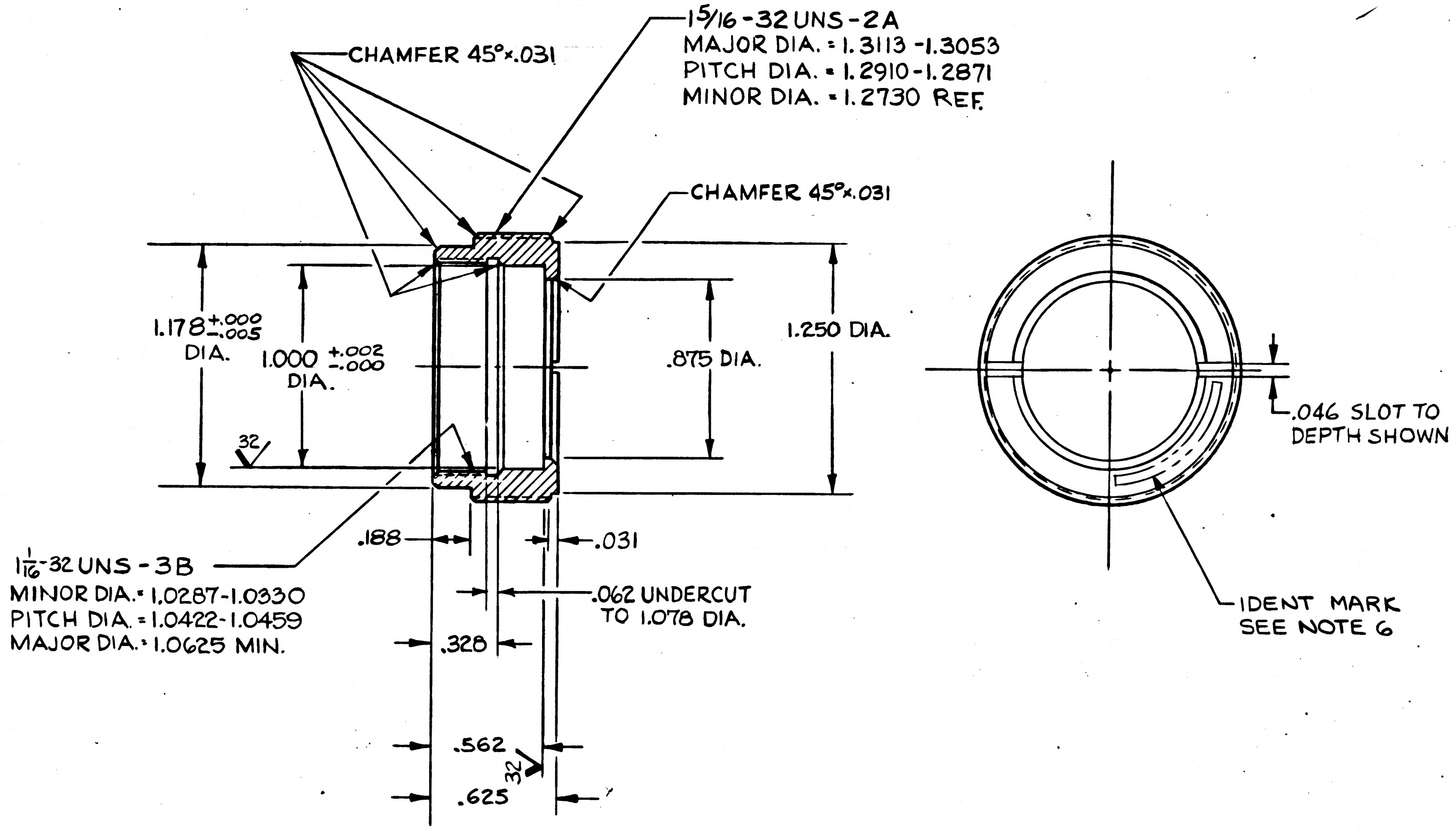
2011668 A

B 2011668

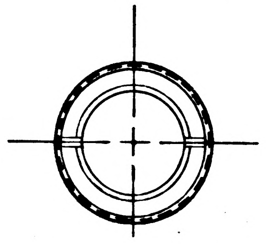
REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16673	2/26/65	WK
B		REVISED PER TDRR 21071	7/28/65	WK

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II DYED BLACK (KPS-1005A.150 TYPE II CLASS 3).
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.



CHAMFER 45°×.031
1 5/16-32 UNS-2A
MAJOR DIA. = 1.3113-1.3053
PITCH DIA. = 1.2910-1.2871
MINOR DIA. = 1.2730 REF
CHAMFER 45°×.031
1.178 +.000 -.005 DIA.
1.000 +.002 -.000 DIA.
.875 DIA.
1.250 DIA.
32
1 1/16-32 UNS-3B
MINOR DIA. = 1.0287-1.0330
PITCH DIA. = 1.0422-1.0459
MAJOR DIA. = 1.0625 MIN.
.188
.031
.062 UNDERCUT TO 1.078 DIA.
.328
.562
32
.625
.046 SLOT TO DEPTH SHOWN
IDENT MARK SEE NOTE 6



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011794	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± #	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM. ALLOY
FED. SPEC. QQ-A-225/6
COND T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910990

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL E. Thorup 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, LENS

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011668
SCALE 2/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

2011668 B

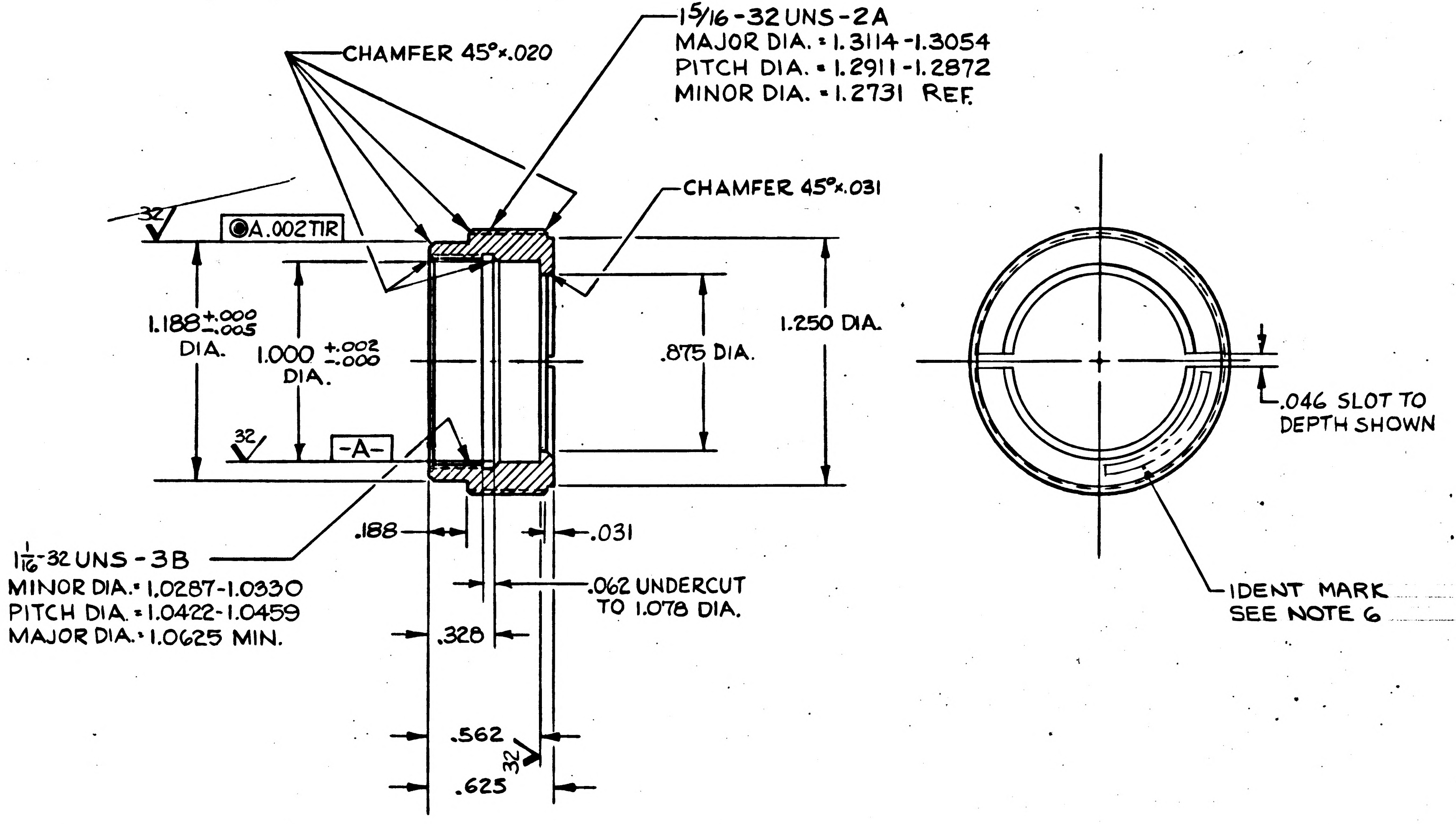
K+E E-154

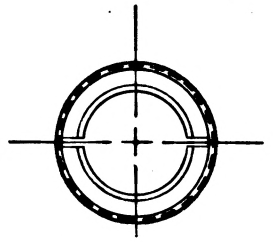
2011668

REVISIONS 7DRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.


CHAMFER 45°×.020
1 5/16-32 UNS-2A
MAJOR DIA. = 1.3114-1.3054
PITCH DIA. = 1.2911-1.2872
MINOR DIA. = 1.2731 REF.
CHAMFER 45°×.031
32√
◉A .002 TIR
1.188 +.000 −.005 DIA.
1.000 +.002 −.000 DIA.
.875 DIA.
1.250 DIA.
32√
-A-
1 1/16-32 UNS-3B
MINOR DIA. = 1.0287-1.0330
PITCH DIA. = 1.0422-1.0459
MAJOR DIA. = 1.0625 MIN.
.188
.031
.062 UNDERCUT TO 1.078 DIA.
.328
.562
32√
.625
.046 SLOT TO DEPTH SHOWN
IDENT MARK SEE NOTE 6



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011794	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUM. ALLOY
FED. SPEC. QQ-A-268
COND T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 57386910990

DRAWN V. AMATO DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, LENS

CODE IDENT NO. SIZE C NASA NUMBER 2011668

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

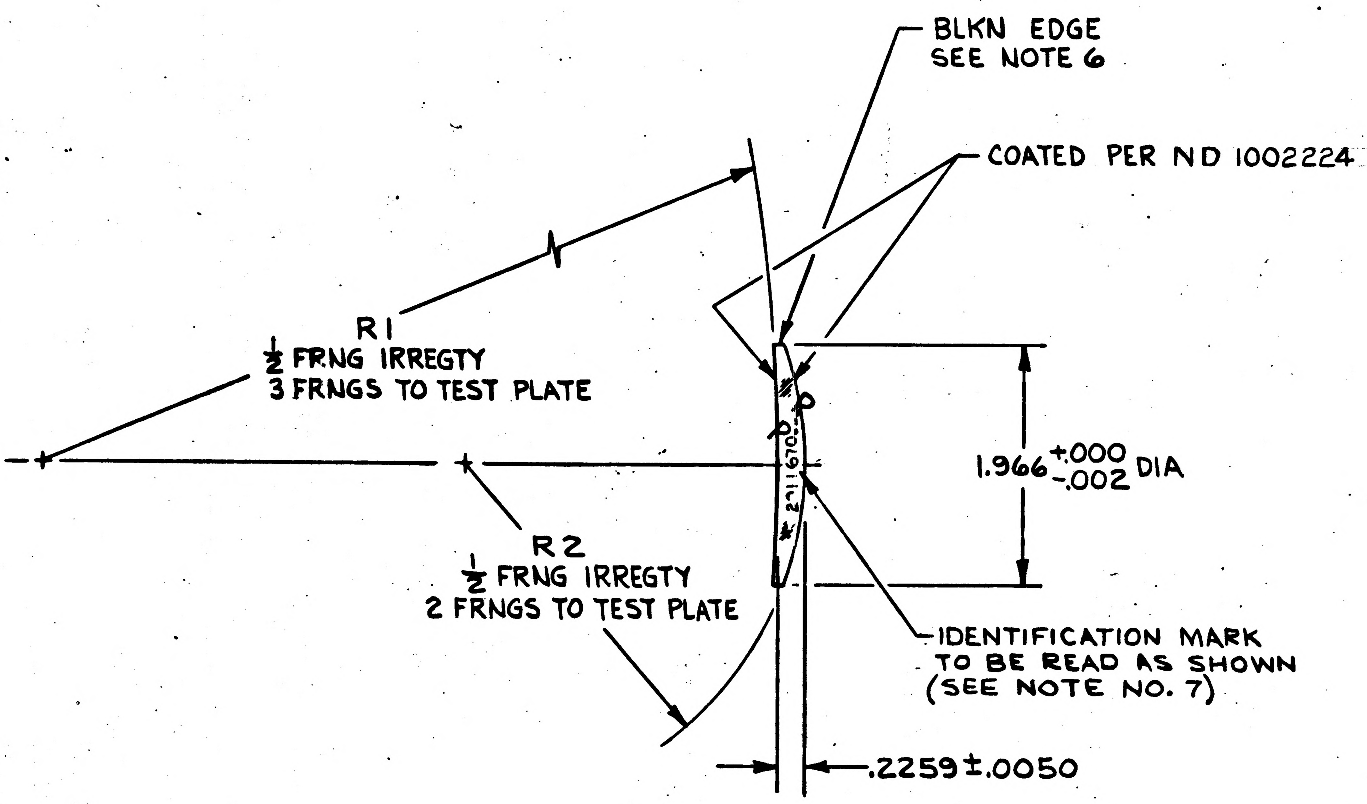
2011670

REVISIONS TORR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
GRADE B- FINE ANNEALED
TYPE 691-548
4. CA: ENT= 1.831 EXIT= 1.845
SURF. QUAL: 60-40
CTRG ERROR ½ MINUTE.
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.12 WITH BLACK INK PER FED. SPEC TT-1-528.
7. IDENTIFY USING NASA DWG NO, REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORD WITH ND 1002019. (BAGGING).

N_D	R1	R2
1.69133	-14.588±.061	-2.8708±.0011


BLKN EDGE
SEE NOTE 6
COATED PER ND 1002224
R1
½ FRNG IRREGTY
3 FRNGS TO TEST PLATE
R2
½ FRNG IRREGTY
2 FRNGS TO TEST PLATE
P
P
2011670
1.966 +.000 -.002 DIA
IDENTIFICATION MARK
TO BE READ AS SHOWN
(SEE NOTE NO. 7)
.2259±.0050

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011732	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910340

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/30/64 FS
APPROVAL 7/22/64
APPROVAL E. Whinig 6-12-64
NASA APPROVAL
MIT APPROVAL 6/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(TELESCOPE RELAY)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011670
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

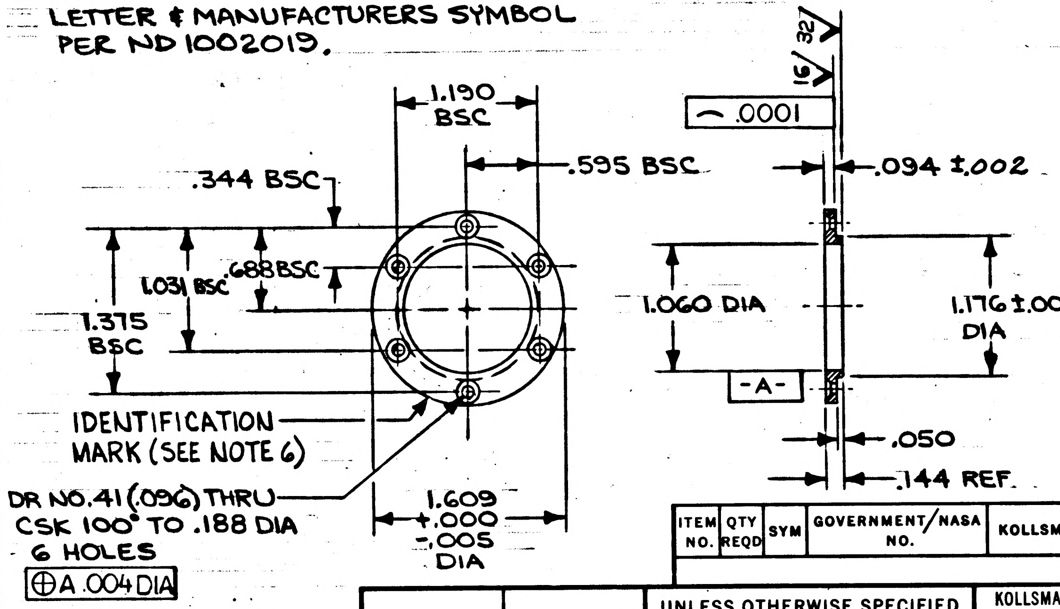
2011670

2011671

REVISIONS TDRR 10793

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE II, CLASS 2 (KPS-1005A.150).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.


1.190 BSC
.595 BSC
.344 BSC
.688 BSC
1.031 BSC
1.375 BSC
IDENTIFICATION MARK (SEE NOTE 6)
DR NO.41 (.096) THRU CSK 100° TO .188 DIA 6 HOLES
⊕ A .004 DIA
1.609 +.000 -.005 DIA
16/ 32/
⌒ .0001
.094 ±.002
1.060 DIA
-A-
1.176 ±.002 DIA
.050
.144 REF.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910010

DRAWN J. Schiller DATE 12-5-63
CHECKED J. SULLIVAN 6-24-64
APPROVAL G. Purdum 6/25/64
APPROVAL E. Thomas 7/1/64
NASA APPROVAL
MIT APPROVAL L. Hagel 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RETAINER, DRIVE BEARING,

CODE IDENT NO. | SIZE B | NASA NUMBER 2011671

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

E-153

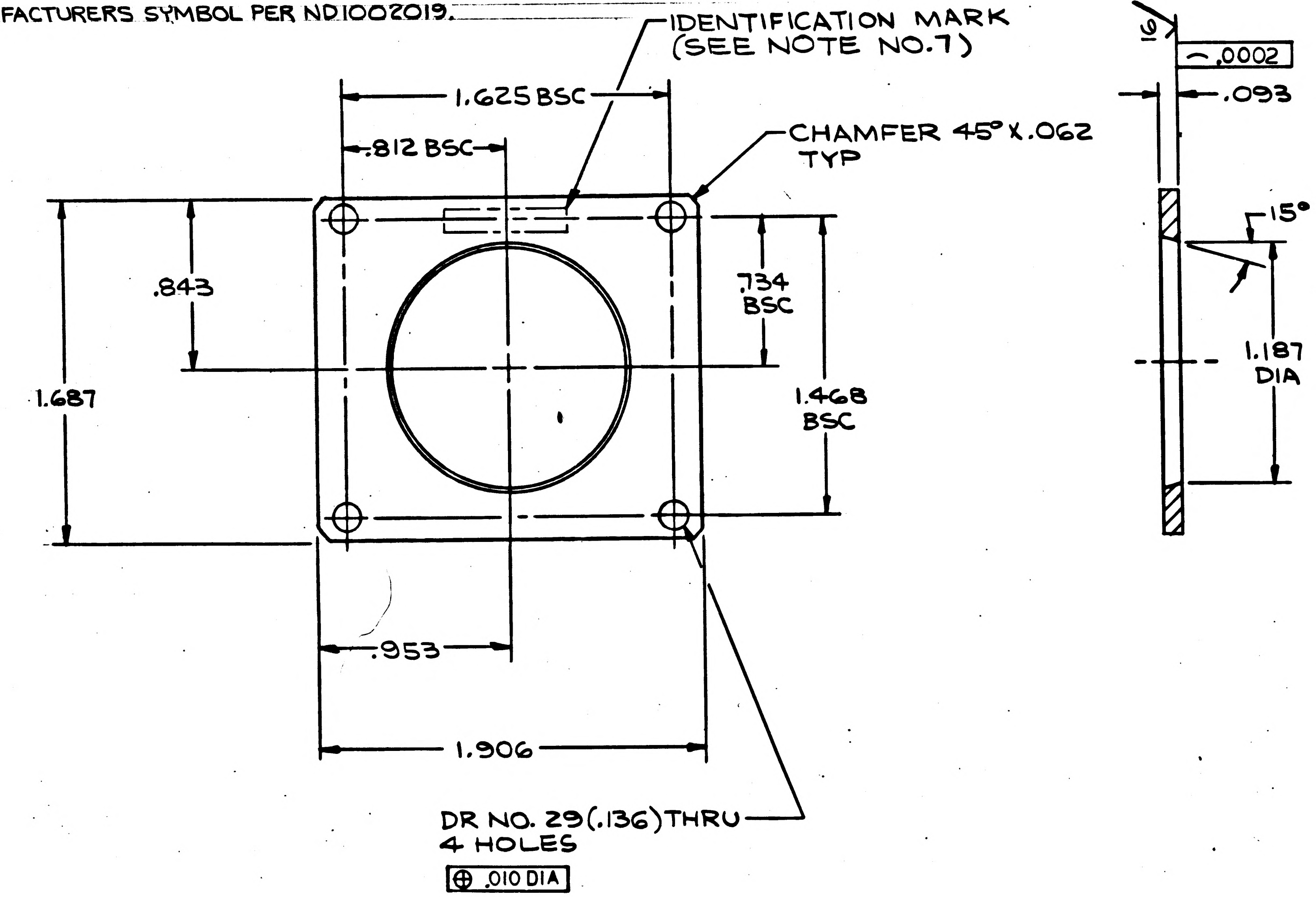
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011674

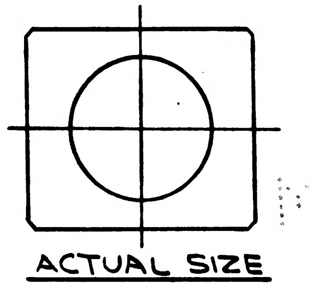
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TRRR 09890

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63/ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND 1002114.
6. FINISH: BLACK ANODIZE IN ACCORDANCE WITH ND1002127.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.



IDENTIFICATION MARK (SEE NOTE NO.7)
1.625 BSC
.812 BSC
CHAMFER 45° X .062 TYP
.843
.734 BSC
1.687
1.468 BSC
.953
1.906
DR NO. 29 (.136) THRU 4 HOLES
⊕ .010 DIA
16/
⌒ .0002
.093
15°
1.187 DIA


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011724	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL BERYLLIUM (ND 1002125)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910540

DRAWN R. BRUNELLE DATE ~~4-9-64~~
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL E. Morup 6/1/64
NASA APPROVAL 6/8/64
MIT APPROVAL 6/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, PECHAN PRISM

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011674

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

K+E E-184

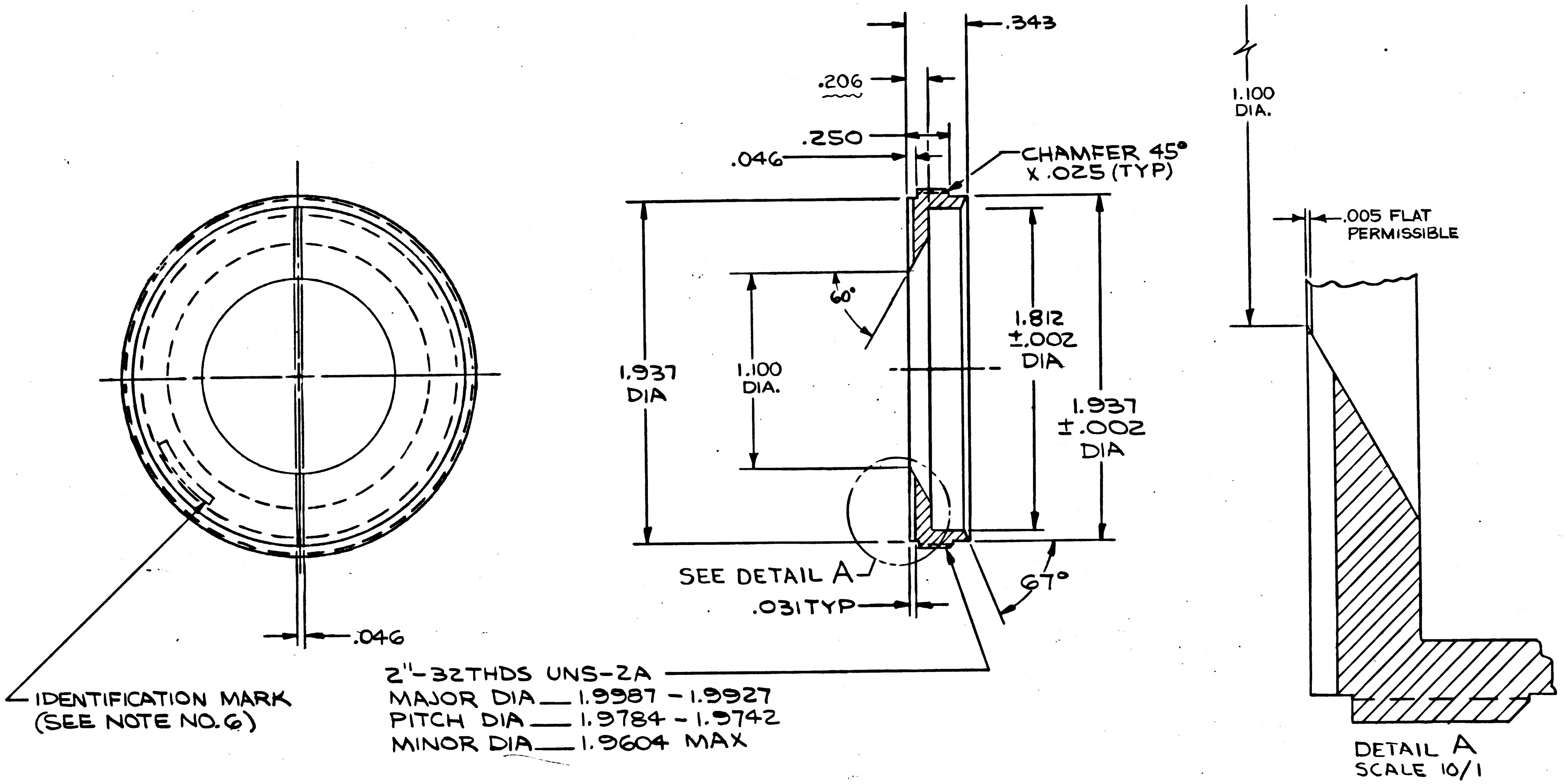
INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

A 2011677

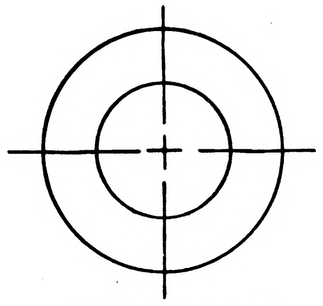
NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: a) PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1)
b) BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3 (KPS-1005B.100).
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019

REVISIONS 10048

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15629	1/19/65	WK



.343
.206
.250
.046
CHAMFER 45° X .025 (TYP)
60°
1.937 DIA
1.100 DIA.
1.812 ±.002 DIA
1.937 ±.002 DIA
SEE DETAIL A
67°
.031 TYP
.046
IDENTIFICATION MARK (SEE NOTE NO. 6)
2"-32THDS UNS-2A
MAJOR DIA — 1.9987 - 1.9927
PITCH DIA — 1.9784 - 1.9742
MINOR DIA — 1.9604 MAX
1.100 DIA.
.005 FLAT PERMISSIBLE
DETAIL A
SCALE 10/1


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011792	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	±1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910500
DRAWN R. BRUNELLE DATE 4-8-64
CHECKED 5/27/64 JS
APPROVAL 5/29/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 6/64

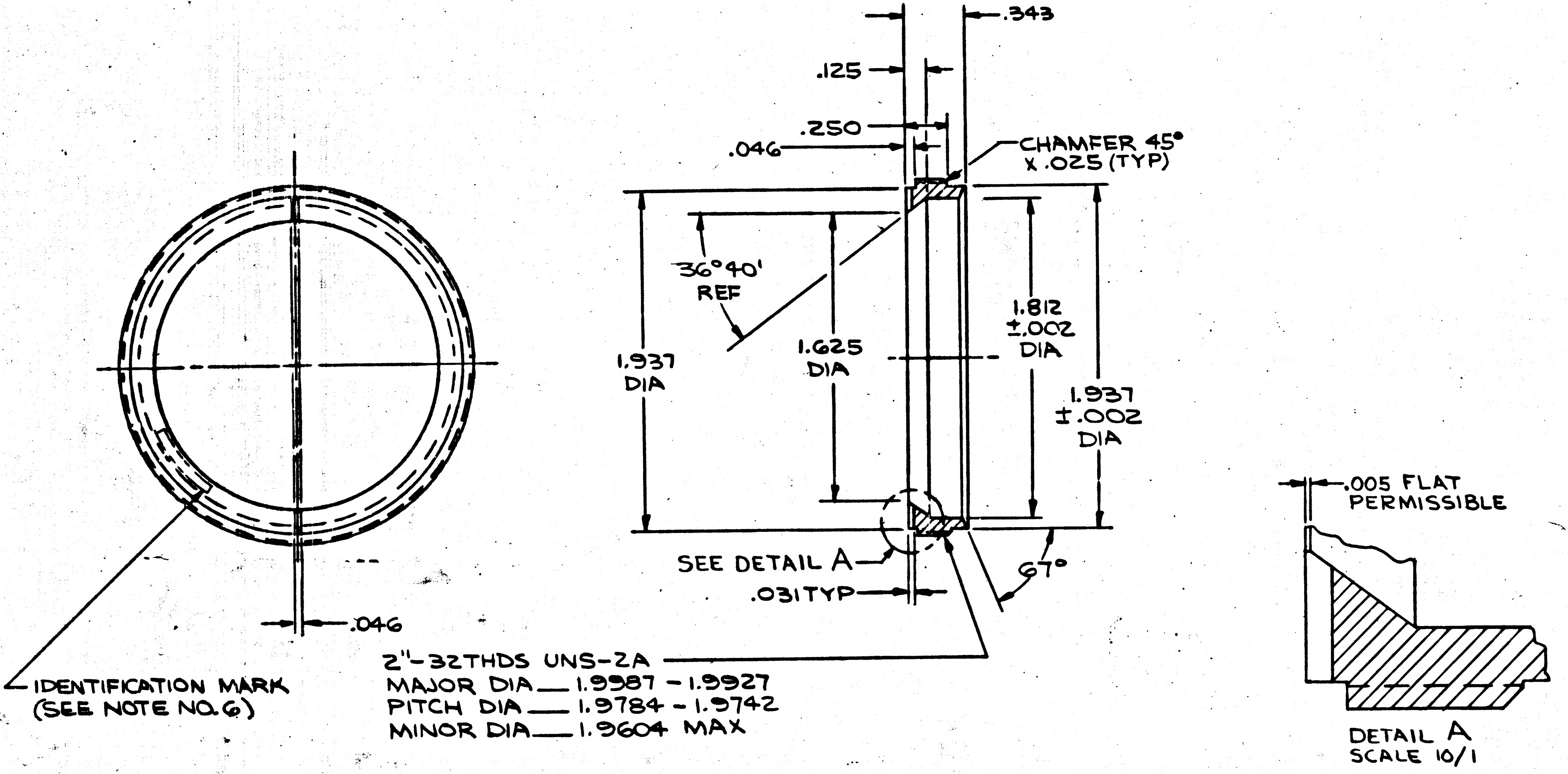
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE RING, LOCKING
CODE IDENT NO.
SIZE C
NASA NUMBER 2011677
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

2011677

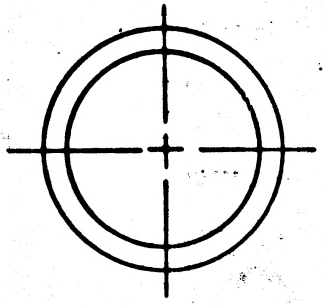
SYM	ZONE	REVISIONS 10048 DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: a) PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1)
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3 (KPS-1005B.100).
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019


.343
.125
.250
.046
CHAMFER 45° X .025 (TYP)
36°40' REF
1.937 DIA
1.625 DIA
1.812 ±.002 DIA
1.937 ±.002 DIA
SEE DETAIL A
.031 TYP
67°
.046
IDENTIFICATION MARK (SEE NOTE NO. 6)
2"-32 THDS UNS-2A
MAJOR DIA 1.9987 - 1.9927
PITCH DIA 1.9784 - 1.9742
MINOR DIA 1.9604 MAX
.005 FLAT PERMISSIBLE

DETAIL A
SCALE 10/1

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011792	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910500
DRAWN R. BRUNELLE DATE 4-8-64
CHECKED Rudging 5/27/64 JS
APPROVAL Kuhlman 5/29/64
APPROVAL E. Morup 6-5-64
NASA APPROVAL
MIT APPROVAL W. Hoppe 6/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011677
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

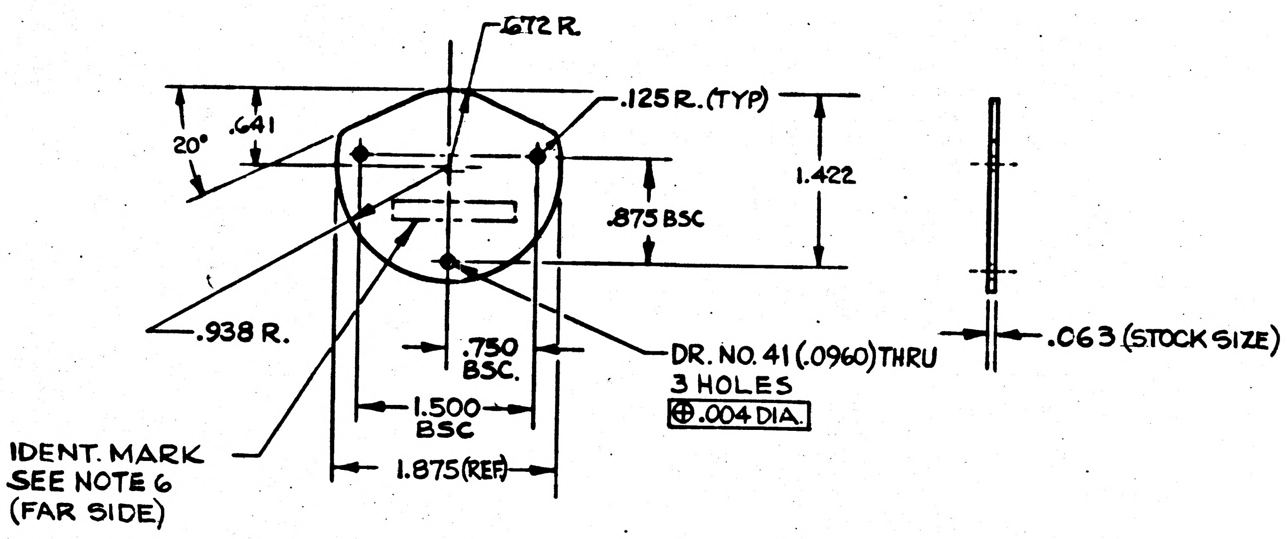
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011680	REVISIONS			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63✓ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019


.672 R.
.125 R. (TYP)
.641
20°
1.422
.875 BSC
.938 R.
.750 BSC.
1.500 BSC
1.875 (REF)
DR. NO. 41 (.0960) THRU
3 HOLES
⊕ .004 DIA.
.063 (STOCK SIZE)
IDENT. MARK
SEE NOTE 6
(FAR SIDE)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011786	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±		± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY SHEET
FED. SPEC. QQ-A-250/8
TEMPER H34

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910680

DRAWN V. AMATO DATE 4-15-64
CHECKED 4/27/64
APPROVED 5/22/64
APPROVAL E. 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, COVER, MIRROR

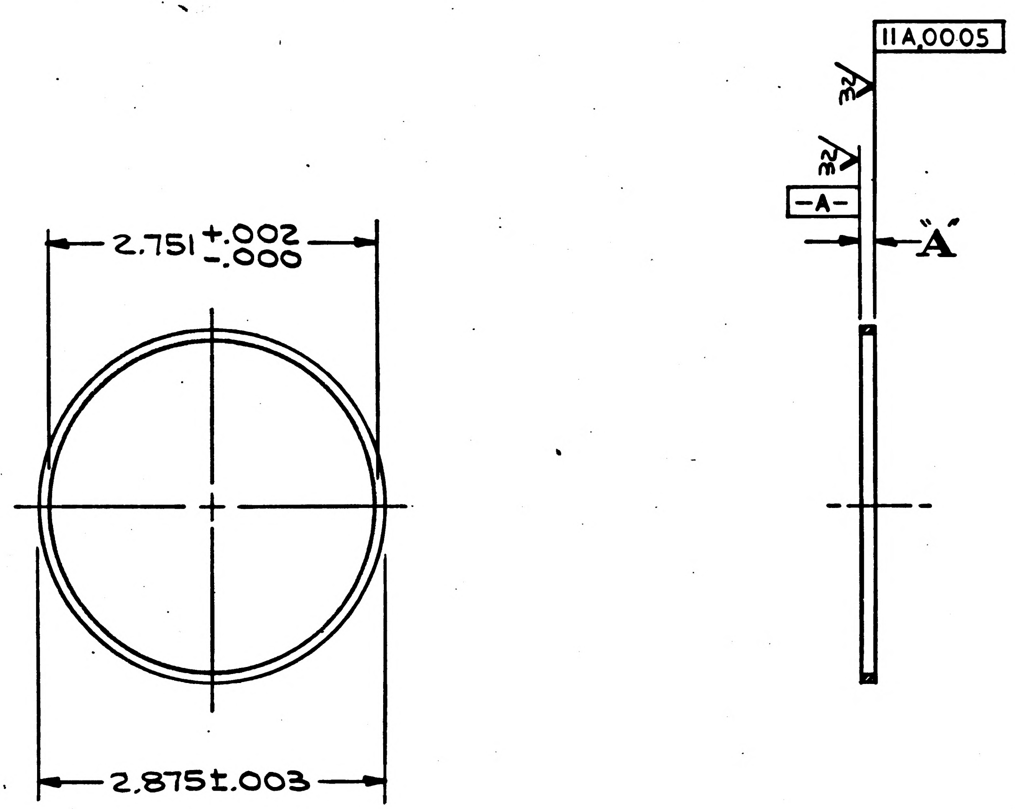
CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011680

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011680

NOTES:-
1. INTERPRET DRAWING PER MIL-D-70327
2. GENERAL MACHINING STANDARDS PER ND1002078
3. UNLESS OTHERWISE SPECIFIED
63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. ANODIZE PER MIL-A-8625 TYPE II (KPS-1005A.200)

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



NASA DRAWING NUMBER	KOLLSMAN DRAWING NUMBER	DIM. A TOL OF ±.0005
2011683-1	79386910501	.117
2011683-2	79386910502	.120
2011683-3	79386910503	.123
2011683-4	79386910504	.126
2011683-5	79386910505	.129
2011683-6	79386910506	.132
2011683-7	79386910507	.135
2011683-8	79386910508	.138
2011683-9	79386910509	.141

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011723	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY TUBE
3" O.D. × .125 WALL
FED SPEC WW-T-789
TYPE I, 6061-T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 7938691 0501 THRU 0509

DRAWN R. BRUNELLE DATE 4-10-64
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL E. Morey 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER

CODE IDENT NO.
SIZE C
NASA NUMBER 2011683-

SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011683

E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

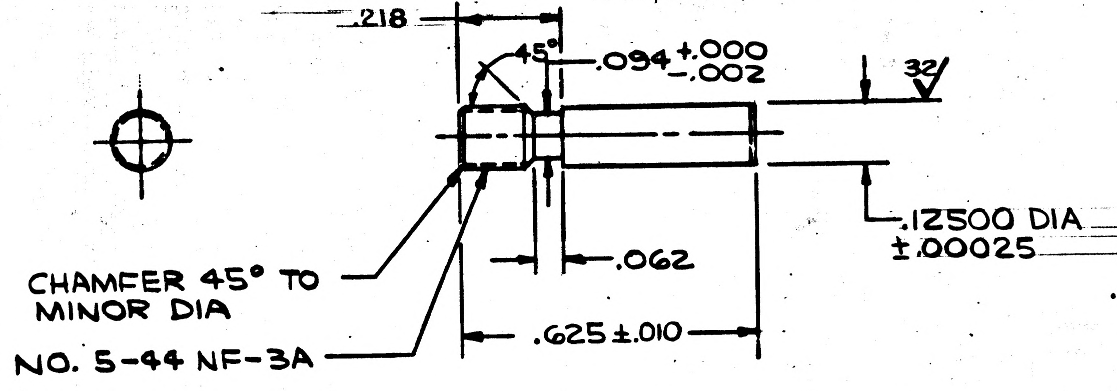
MASTER

2011684

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS 1004

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. $\overset{63}{\vee}$ FINISH ON ALL MACHINED SURFACES UNLESS OTHERWISE SPECIFIED.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005 I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING).



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K/C PN 48386910030
DRAWN F. Schiller DATE 4-8-64
CHECKED J. SULLIVAN 5-28-64
APPROVAL R. Kuehnen 5-29-64
APPROVAL E. Moray 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

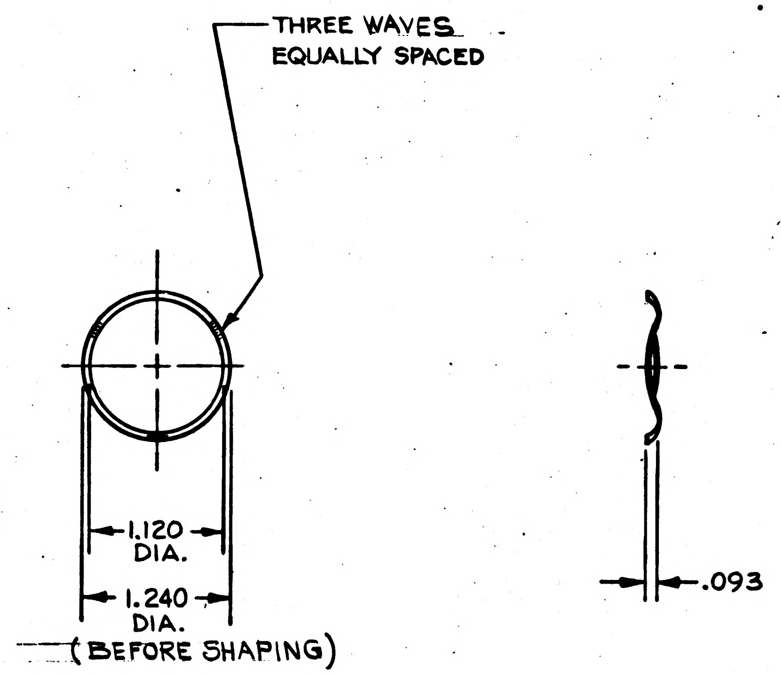
TITLE
PIN, THREADED

CODE IDENT NO.
SIZE B
NASA NUMBER 2011684
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\surd}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREATMENT IN ACCORDANCE WITH MIL-STD-7199 (KPS-1001C.105) ROCKWELL C39-43.
6. SPRING SHALL DEFLECT .031 WITH A LOAD OF 2 LB. ±10%
7. IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).



REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011685

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL .015 THICK BERYLLIUM COPPER STRIP FED. SPEC. QQ-C-533 HALF HARD

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910470

DRAWN V. AMATO DATE 4-15-64
CHECKED 5/28/64
APPROVED 5/27/64
APPROVAL E. Thorup 6/15/64
NASA APPROVAL
MIT APPROVAL 6/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WASHER, WAVE

CODE IDENT NO.
SIZE C
NASA NUMBER 2011685
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-194

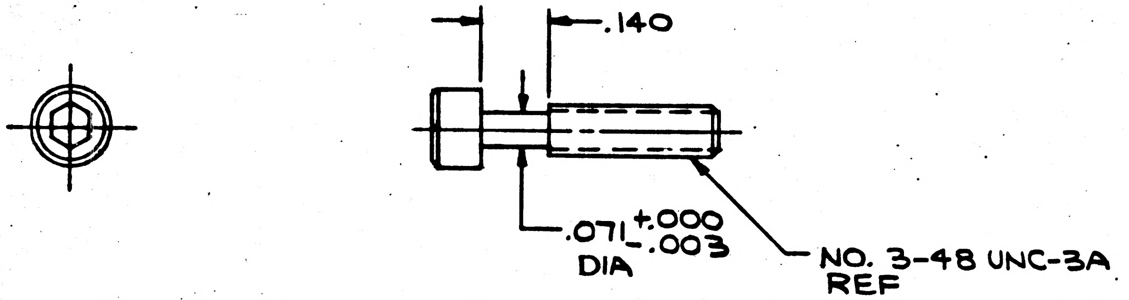
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011688

SYM	REVISIONS DESCRIPTION	DATE	APPROVAL

100488

NOTE:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. $\overset{63}{\surd}$ FINISH ON ALL MACHINED SURFACES
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. ~~IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)~~



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011722	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL NAS1352C03LL8
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 48386910010

DRAWN R. BRUNELLE DATE 4-2-64
CHECKED 5/27/64 FS
APPROVAL 5-21-64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCREW, CAP, SOCKET HEAD, CAPTIVE

CODE IDENT NO.
SIZE B
NASA NUMBER 2011688
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

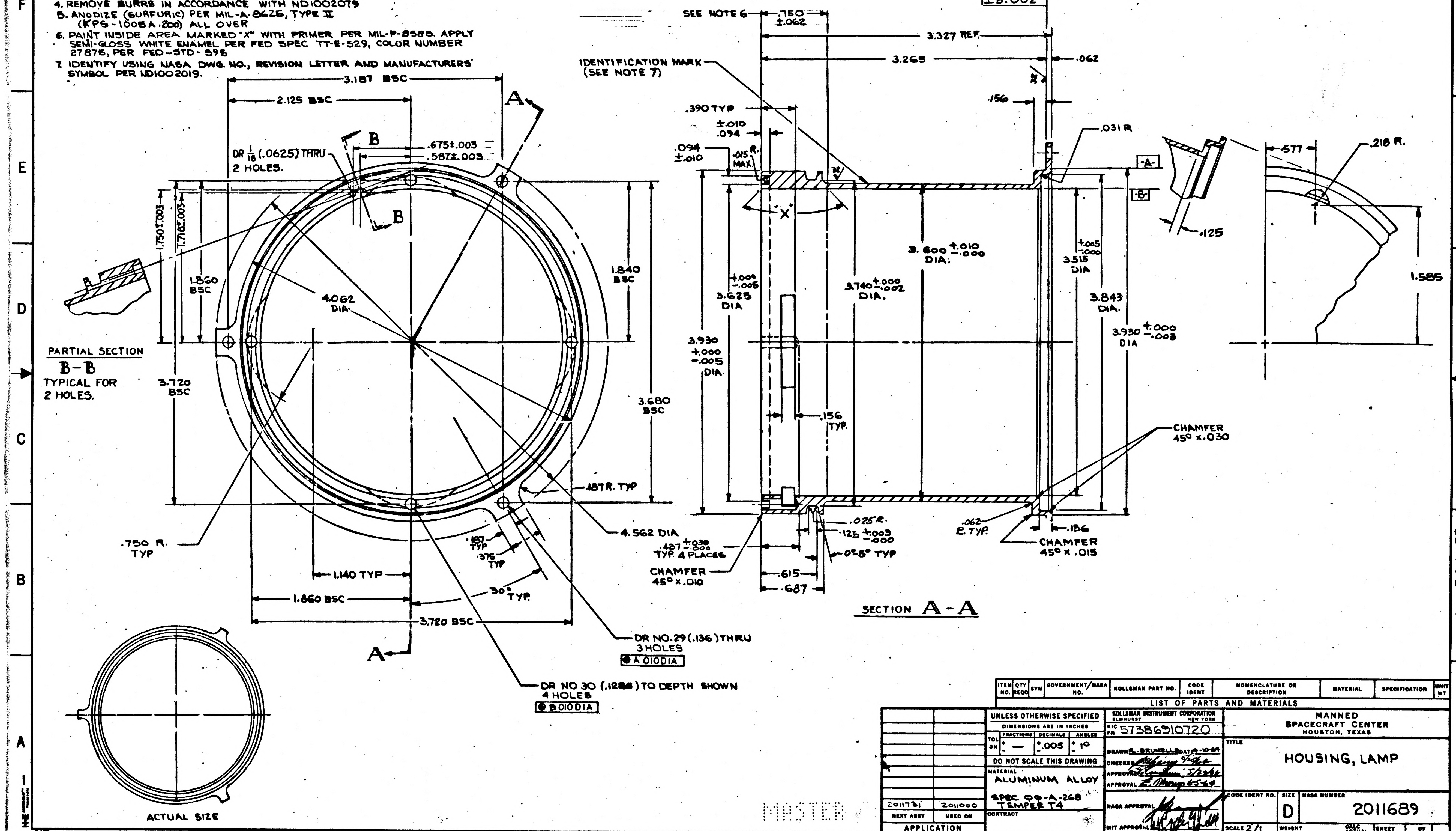
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011689		

REVISIONS			10048	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. ANODIZE (SURFURIC) PER MIL-A-8625, TYPE II (KPS-1005A.200) ALL OVER
6. PAINT INSIDE AREA MARKED "X" WITH PRIMER PER MIL-P-8585. APPLY SEMI-GLOSS WHITE ENAMEL PER FED SPEC TT-E-529, COLOR NUMBER 27875, PER FED-STD-595
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURERS' SYMBOL PER ND1002019.


3.187 BSC
2.125 BSC
A
B
DR 1/16 (.0625) THRU 2 HOLES.
.675±.003
.587±.003
B
1.750±.003
1.718±.003
1.860 BSC
4.062 DIA
1.840 BSC
PARTIAL SECTION B-B
TYPICAL FOR 2 HOLES.
3.720 BSC
3.680 BSC
.187 R. TYP
4.562 DIA
.750 R. TYP
.187 TYP
.375 TYP
1.140 TYP
30° TYP.
1.860 BSC
3.720 BSC
A
DR NO.29 (.136) THRU 3 HOLES
⊕ A .010 DIA
DR NO 30 (.1285) TO DEPTH SHOWN 4 HOLES
⊕ B .010 DIA
ACTUAL SIZE
SEE NOTE 6
.750 ±.062
3.327 REF.
3.265
.062
⊥ B .002
IDENTIFICATION MARK (SEE NOTE 7)
.390 TYP
±.010 .094
.094 ±.010
.015 R. MAX
32
.156
.031 R
-A-
-B-
"X"
.125
.577
.218 R.
1.585
3.600 +.010 −.000 DIA.
3.740 +.000 −.002 DIA.
+.000 −.005 3.625 DIA
3.930 +.000 −.005 DIA.
+.005 −.000 3.515 DIA
3.843 DIA.
3.930 +.000 −.003 DIA
.156 TYP.
CHAMFER 45° x .030
.025 R.
.125 +.003 −.000
0°-5° TYP
.487 +.030 −.000 TYP. 4 PLACES
CHAMFER 45° x .010
.615
.687
.062 R. TYP.
.156
CHAMFER 45° x .015
SECTION A-A
MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011731	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
SPEC QQ-A-268
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910720

DRAWN R. BRUNELLE DATE 4-10-64
CHECKED
APPROVAL 5/29/64
APPROVAL E. Mong 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

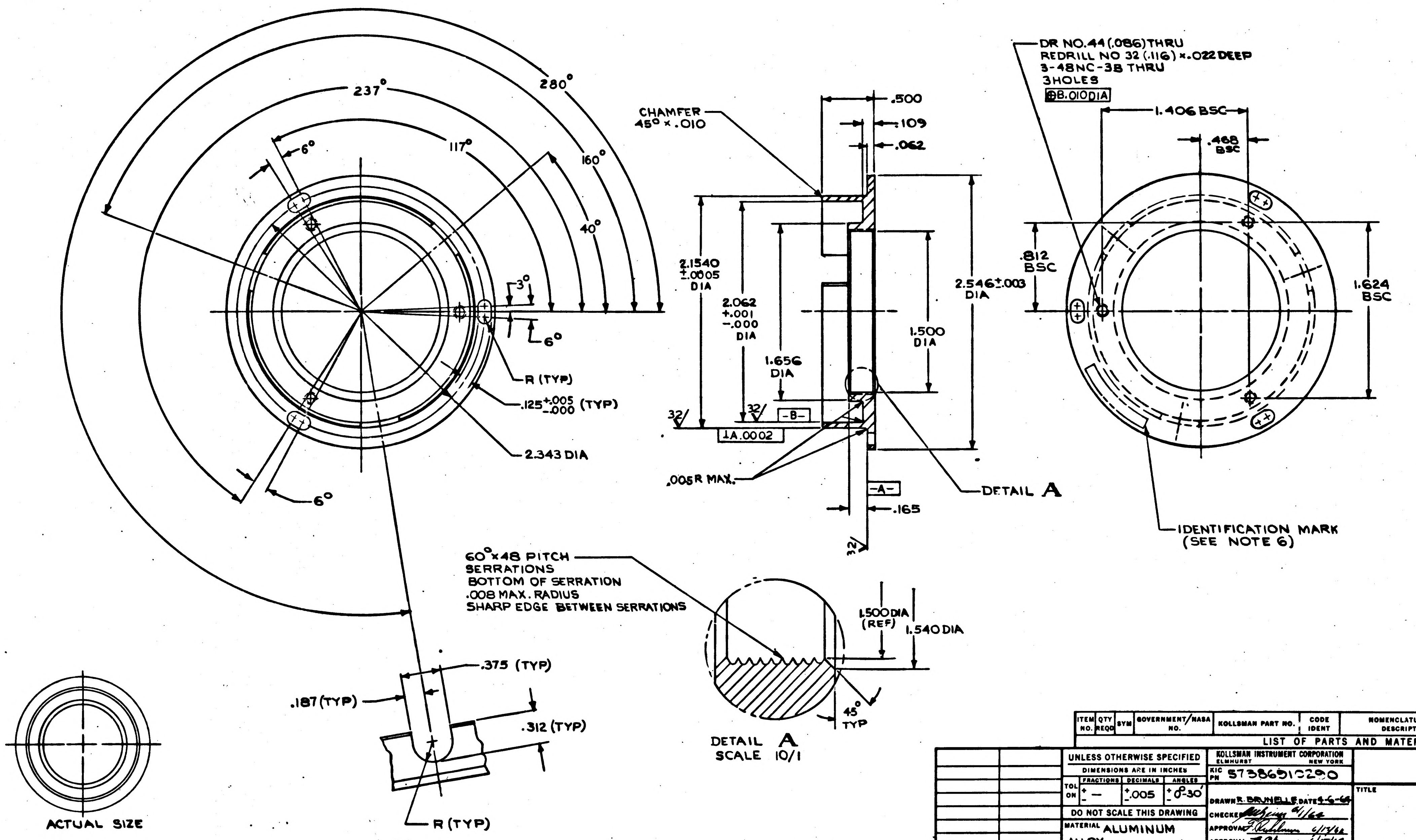
TITLE
HOUSING, LAMP

CODE IDENT NO.
SIZE D
NASA NUMBER 2011689

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE (BLACK SULFURIC) PER MIL-A-8625, TYPE II BLACK (KPS.1005A.201)
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


237°
280°
6°
117°
160°
40°
3°
6°
R (TYP)
.125 +.005 −.000 (TYP)
2.343 DIA
6°
CHAMFER 45° × .010
.500
.109
.062
2.1540 ±.0005 DIA
2.062 +.001 −.000 DIA
1.656 DIA
2.546 ±.003 DIA
1.500 DIA
32
−B−
⊥A.0002
.005R MAX.
−A−
.165
DETAIL A
DR NO.44 (.086) THRU
REDRILL NO 32 (.116) × .022 DEEP
3-48NC-3B THRU
3 HOLES
⊕B.010DIA
1.406 BSC
.468 BSC
.812 BSC
1.624 BSC
IDENTIFICATION MARK (SEE NOTE 6)
60° × 48 PITCH SERRATIONS
BOTTOM OF SERRATION .008 MAX. RADIUS
SHARP EDGE BETWEEN SERRATIONS
1.500 DIA (REF)
1.540 DIA
45° TYP
DETAIL A
SCALE 10/1
.375 (TYP)
.187 (TYP)
.312 (TYP)
R (TYP)
ACTUAL SIZE

MASTER

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011722	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ±0°-30′
DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-325 TEMPER T6
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910290
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 6/1/64
APPROVAL 6/13/64
APPROVAL 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

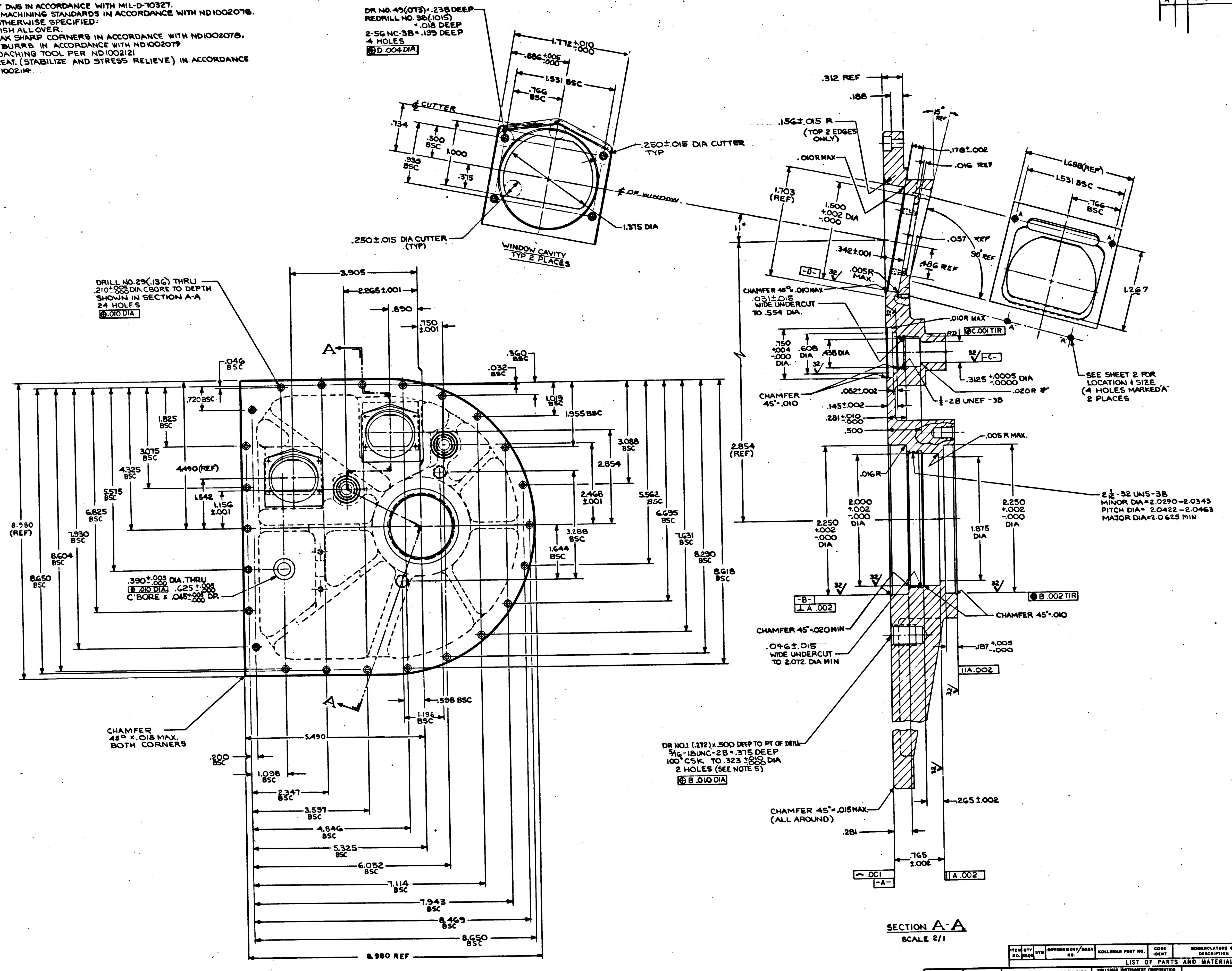
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
MOUNT, RETICLE
CODE IDENT NO.
SIZE D
NASA NUMBER 2011692
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011692

A	9691102

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11239	7/24/64	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114



DR NO. 49(.073) × .238 DEEP
REDRILL NO. 38(.1015) × .018 DEEP
2-56 NC-3B × .135 DEEP
4 HOLES
⊕ D .004 DIA
1.772 +.010 -.000
.886 +.005 -.000
1.531 BSC
.766 BSC
℄ CUTTER
.734
.500 BSC
1.000
.938 BSC
.375
.250±.015 DIA CUTTER TYP
℄ OF WINDOW
1.375 DIA
.250±.015 DIA CUTTER (TYP)
WINDOW CAVITY TYP 2 PLACES
DRILL NO. 29(.136) THRU
.210 +.005 -.000 DIA CBORE TO DEPTH SHOWN IN SECTION A-A
24 HOLES
⊕ .010 DIA
3.905
2.265±.001
.850
.750 ±.001
.046 BSC
.360 BSC
.032 BSC
.720 BSC
1.019 BSC
1.955 BSC
1.825 BSC
3.015 BSC
4.325 BSC
4.490 (REF)
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.650 BSC
8.980 (REF)
1.542
1.156 ±.001
3.088 BSC
2.854
2.468 ±.001
3.288 BSC
1.644 BSC
5.562 BSC
6.695 BSC
7.631 BSC
8.290 BSC
8.618 BSC
.390 +.003 -.000 DIA. THRU
⊕ .010 DIA
C'BORE X .045 +.005 -.000 DP.
.625 +.005 -.000
A
A
CHAMFER 45° X .018 MAX. BOTH CORNERS
.598 BSC
1.196 BSC
.200 BSC
1.098 BSC
2.347 BSC
3.597 BSC
4.846 BSC
5.490
5.325 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
8.650 BSC
8.980 REF
.312 REF
.188
15° REF
.156±.015 R (TOP 2 EDGES ONLY)
.178±.002
.016 REF
.010R MAX
1.703 (REF)
1.500 +.002 -.000 DIA
11°
.057 REF
.486 REF
90° REF
.342±.001
-D-
.005R MAX.
CHAMFER 45° × .010 MAX
.031±.015 WIDE UNDERCUT TO .554 DIA.
.010R MAX
⊚ C .001 TIR
.750 +.004 -.000 DIA.
.608 DIA
.438 DIA
-C-
.3125 +.0005 -.0000 DIA
.020R
CHAMFER 45° × .010
.052±.002
.145±.002
.281 +.010 -.000
.500
1/4-28 UNEF-3B
2.854 (REF)
.005 R MAX.
.016R
2 1/16-32 UNS-3B
MINOR DIA = 2.0290 - 2.0343
PITCH DIA = 2.0422 - 2.0463
MAJOR DIA = 2.0625 MIN
2.250 +.002 -.000 DIA
2.000 +.002 -.000 DIA
1.815 DIA
2.250 +.002 -.000 DIA
-B-
⊥ A .002
⊚ B .002 TIR
CHAMFER 45° × .010
CHAMFER 45° × .020 MIN
.046±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
∥ A .002
DR NO. 1 (.228) × .500 DEEP TO PT OF DRILL
5/16-18UNC-2B × .375 DEEP
100° CSK. TO .323 +.010 -.000 DIA
2 HOLES (SEE NOTE 5)
⊕ B .010 DIA
CHAMFER 45° × .015 MAX. (ALL AROUND)
.265±.002
.281
.765 ±.002
⌒ .001
-A-
∥ A .002
1.688 (REF)
1.531 BSC
.766 BSC
1.267
A
A
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED "A" 2 PLACES
32

SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED
APPROVAL 6/15/64
APPROVAL E. 6/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011696

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 2

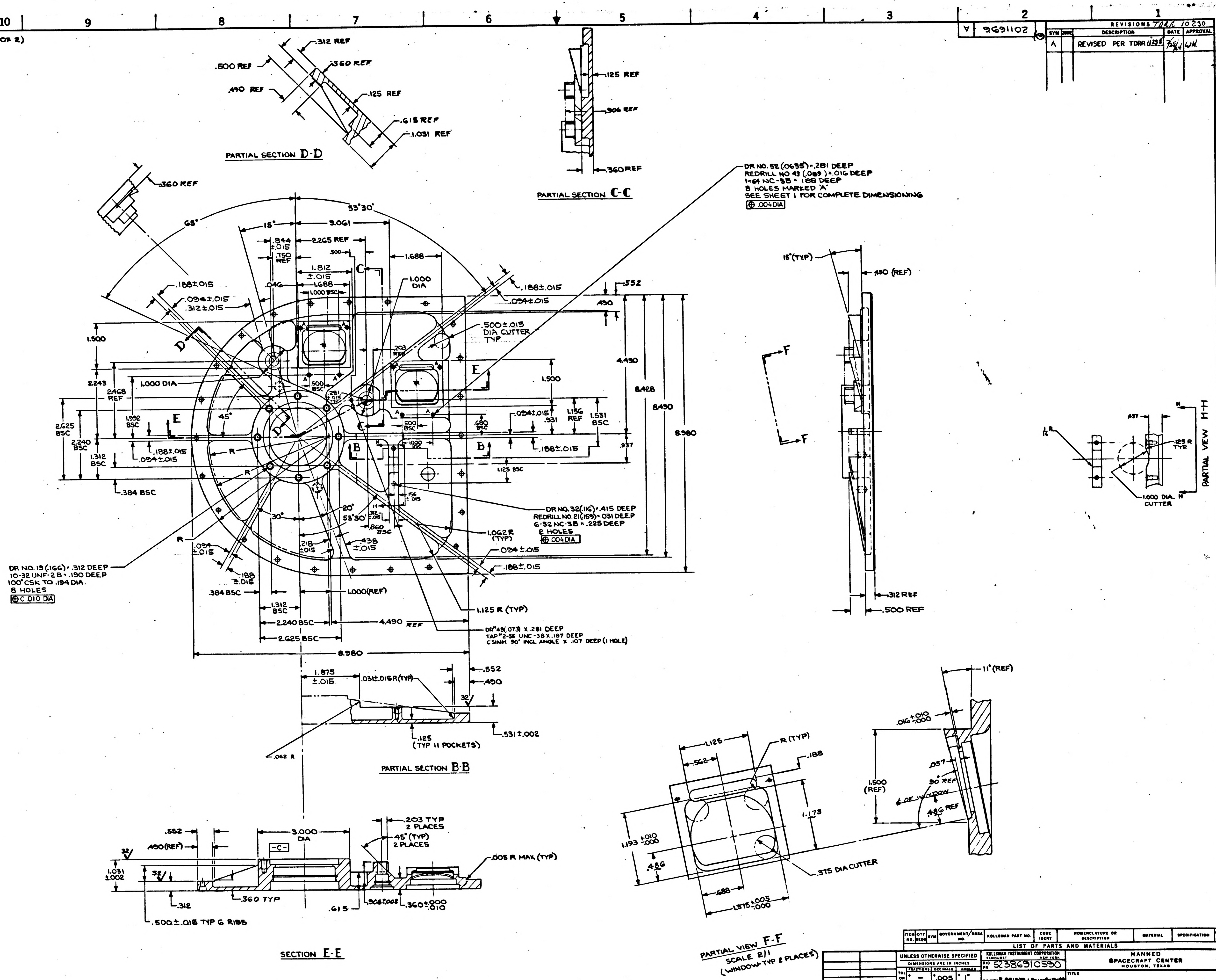
2011696 A

A 2011696

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11235	7/25/64	WH.

REVISIONS TDRR 10230

NOTES: (SEE SHEET 1 OF 2)



.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
PARTIAL SECTION D-D
.125 REF
.906 REF
.360 REF
PARTIAL SECTION C-C
DR NO. 52 (.0635) × .281 DEEP
REDRILL NO 43 (.089) × .016 DEEP
1-64 NC-3B × .188 DEEP
8 HOLES MARKED "A"
SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA
.360 REF
65°
53°30'
15°
3.061
.844 ±.015
2.265 REF
.750 REF
1.812 ±.015
1.688
1.000 BSC
.046
1.688
1.000 DIA
.188±.015
.094±.015
.312±.015
.188±.015
.094±.015
.552
.490
.500±.015 DIA CUTTER TYP
.203 REF
1.500
2.243
2.468 REF
1.000 DIA
1.992 BSC
2.625 BSC
2.240 BSC
1.312 BSC
.188±.015
.094±.015
.384 BSC
45°
.500 BSC
.281 ±.015
1.500
.094±.015
.931
1.156 REF
1.531 BSC
.480 BSC
.500 BSC
1.000 BSC
.188±.015
.937
4.490
8.428
8.490
8.980
1.125 BSC
.156 ±.015
DR NO. 32 (.116) × .415 DEEP
REDRILL NO. 21 (.159) × .031 DEEP
6-32 NC-3B × .225 DEEP
2 HOLES
⊕ .004 DIA
1.062 R (TYP)
.094 ±.015
.188±.015
20°
30°
53°30'
.860 BSC
.438 ±.015
.218 ±.015
.094 ±.015
.188 ±.015
DR NO. 19 (.166) × .312 DEEP
10-32 UNF-2B × .190 DEEP
100° CSK TO .194 DIA.
8 HOLES
⊕ C .010 DIA
.384 BSC
1.312 BSC
1.000 (REF)
2.240 BSC
4.490 REF
2.625 BSC
1.125 R (TYP)
DR #49 (.073) X .281 DEEP
TAP #2-56 UNC-3B X .187 DEEP
C'SINK 90° INCL ANGLE X .107 DEEP (1 HOLE)
8.980
1.875 ±.015
.031±.015 R (TYP)
.552
.490
32
.531 ±.002
.125 (TYP 11 POCKETS)
.062 R
PARTIAL SECTION B-B
.552
.490 (REF)
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
1.031 ±.002
32
.312
.360 TYP
.615
.906±.002
.360 +.000 -.010
.500±.015 TYP 6 RIBS
SECTION E-E
15° (TYP)
.450 (REF)
F
F
.312 REF
.500 REF
.437
.125 R TYP
1/16
1.000 DIA. CUTTER
H
H
PARTIAL VIEW H-H
11° (REF)
.016 +.010 -.000
.057
90° REF
℄ OF WINDOW
.486 REF
1.500 (REF)
1.125
.562
R (TYP)
.188
1.173
1.193 +.010 -.000
.486
.688
1.375 +.005 -.000
.375 DIA CUTTER
PARTIAL VIEW F-F
SCALE 2/1
(WINDOW-TYP 2 PLACES)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/23/64 J.F.S.
APPROVAL 6/17/64
APPROVAL E. Mays 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

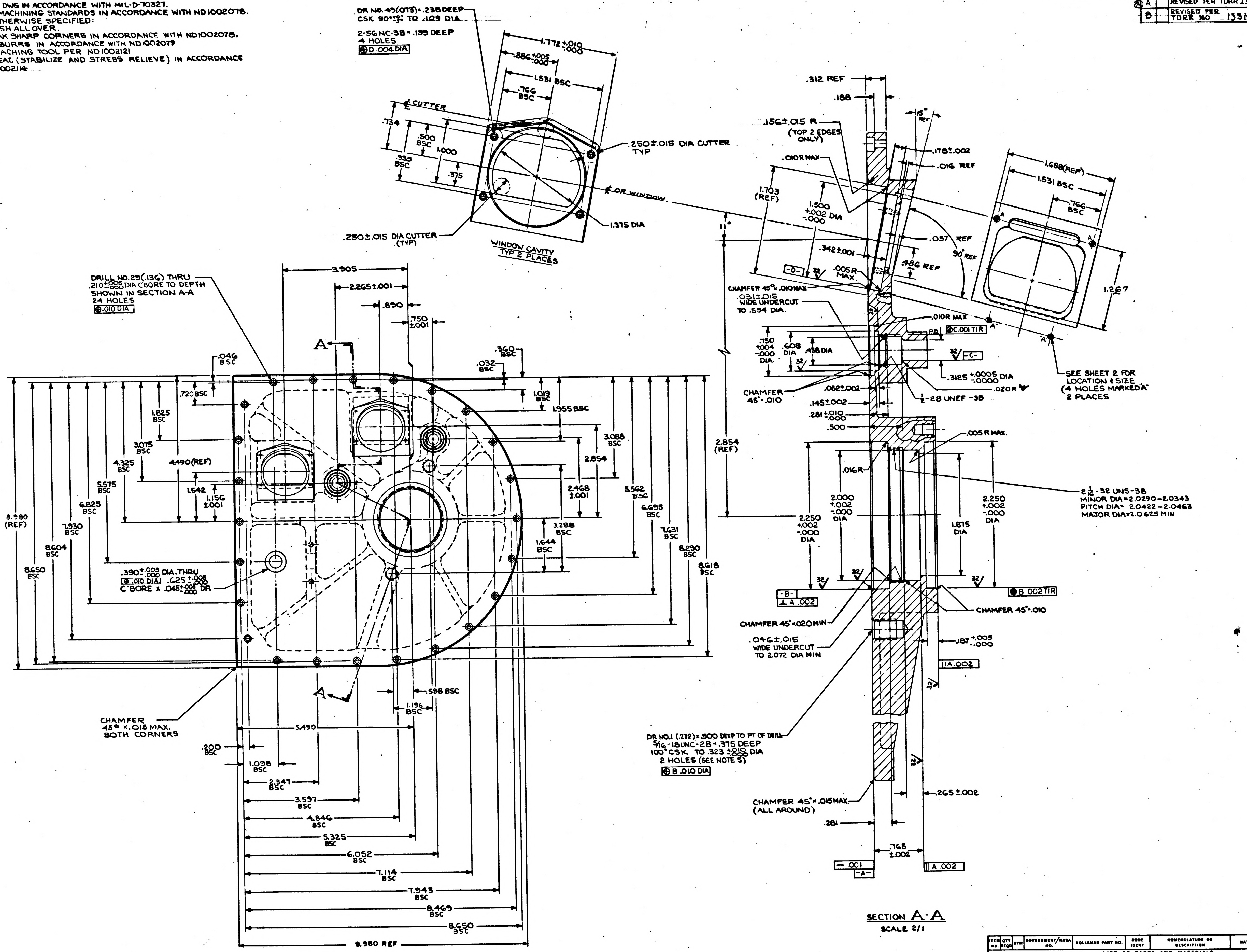
CODE IDENT NO.
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011696 A

B	9691102

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11139	7/2/64	WR
B		REVISED PER TDRR NO 13319	10/7/64	WG

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. ✓ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114



DR NO. 49(.073) × .238 DEEP
CSK 90° TO .109 DIA
2-56 NC-3B × .199 DEEP
4 HOLES
⊕ D .004 DIA.
1.772 +.010 -.000
.886 +.005 -.000
1.531 BSC
.766 BSC
℄ CUTTER
.734
.500 BSC
1.000
.938 BSC
.375
.250±.015 DIA CUTTER TYP
℄ OF WINDOW
1.375 DIA
.250±.015 DIA CUTTER (TYP)
WINDOW CAVITY TYP 2 PLACES
DRILL NO. 29(.136) THRU .210 +.005 -.000 DIA C'BORE TO DEPTH SHOWN IN SECTION A-A 24 HOLES
⊕ .010 DIA
3.905
2.265±.001
.890
.750 ±.001
A
.046 BSC
.360 BSC
.032 BSC
.720 BSC
1.019 BSC
1.825 BSC
1.955 BSC
3.075 BSC
3.088 BSC
4.325 BSC
4.490 (REF)
2.854
1.542
1.156 ±.001
2.468 ±.001
5.575 BSC
5.562 BSC
6.825 BSC
6.695 BSC
7.930 BSC
7.631 BSC
8.980 (REF)
8.604 BSC
8.650 BSC
3.288 BSC
1.644 BSC
8.290 BSC
8.618 BSC
.390 +.003 -.000 DIA. THRU
⊕ .010 DIA. .625 +.005 -.000
C'BORE × .045 +.005 -.000 DP.
CHAMFER 45° × .015 MAX. BOTH CORNERS
.598 BSC
1.196 BSC
5.490
.200 BSC
1.098 BSC
2.347 BSC
3.597 BSC
4.846 BSC
5.325 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
8.650 BSC
8.980 REF
.312 REF
.188
.156±.015 R (TOP 2 EDGES ONLY)
15° REF
.178±.002
.016 REF
.010 R MAX
1.703 (REF)
1.500 +.002 -.000 DIA
11°
.057 REF
.342±.001
90° REF
.486 REF
-D-
.005 R MAX.
1.688 (REF)
1.531 BSC
.766 BSC
1.267
CHAMFER 45° × .010 MAX
.031±.015 WIDE UNDERCUT TO .554 DIA.
.010 R MAX
P.D. ⊚ C .001 TIR
.750 +.004 -.000 DIA.
.608 DIA
.438 DIA
-C-
.3125 +.0005 -.0000 DIA
.020 R
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED "A" 2 PLACES
CHAMFER 45° × .010
.052±.002
1/2-28 UNEF-3B
.145±.002
.281 +.010 -.000
.500
.005 R MAX.
2.854 (REF)
.016 R
2 1/16-32 UNS-3B
MINOR DIA = 2.0290-2.0343
PITCH DIA = 2.0422-2.0463
MAJOR DIA = 2.0625 MIN
2.000 +.002 -.000 DIA
2.250 +.002 -.000 DIA
1.875 DIA
2.250 +.002 -.000 DIA
-B-
⊥ A .002
● B .002 TIR
CHAMFER 45° × .010
CHAMFER 45° × .020 MIN
.046±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
∥ A .002
DR NO. 1 (.272) × .500 DEEP TO PT OF DRILL
5/16-18UNC-2B × .375 DEEP
100° CSK TO .323 +.010 -.000 DIA
2 HOLES (SEE NOTE 5)
⊕ B .010 DIA
CHAMFER 45° × .015 MAX. (ALL AROUND)
.265±.002
.281
.765 ±.002
⌒ .001
-A-
∥ A .002
32
SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011005
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/15/64 JB
APPROVAL 6/15/64
APPROVAL E. Pikarsy 6/15/64
NASA APPROVAL
MIT APPROVAL G. Hyleon 6/16

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011696

SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 2

2011696 B

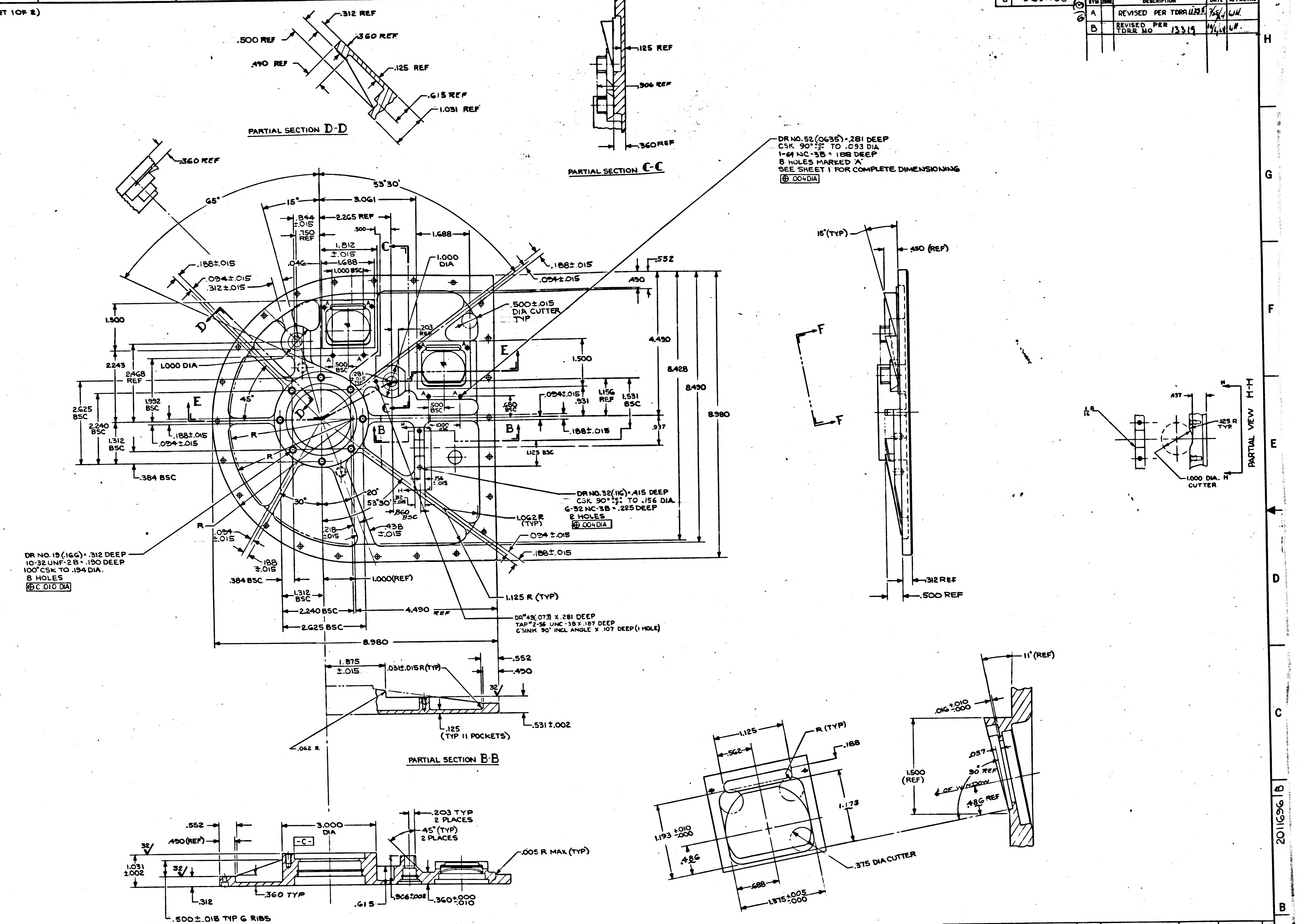
MASTER

NOTES: (SEE SHEET 1 OF 2)

B	2011696

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11238	7/28/64	WK.
B		REVISED PER TDRR NO 13319	10/16/64	WK.



.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
.125 REF
.906 REF
.360 REF
.360 REF
53°30'
65°
15°
3.061
.844 ±.015
2.265 REF
.750 REF
.500
1.688
1.812 ±.015
1.688
1.000 BSC
.046
1.000 DIA
.188±.015
.094±.015
.312±.015
.552
.490
.500±.015 DIA CUTTER TYP
.203 REF
1.500
2.243
2.468 REF
1.000 DIA
.500 BSC
.281 ±.015
1.500
4.490
8.428
8.490
8.980
2.625 BSC
1.932 BSC
2.240 BSC
1.312 BSC
45°
.188±.015
.094±.015
.094±.015
.931
1.156 REF
1.531 BSC
.680 BSC
.500 BSC
1.000 BSC
.188±.015
.937
1.125 BSC
.384 BSC
R
R
R
30°
20°
53°30'
.156 ±.015
.312 ±.015
.860 BSC
.438 ±.015
.218 ±.015
1.062 R (TYP)
.094±.015
.188±.015
.094 ±.015
.188 ±.015
.384 BSC
1.000 (REF)
1.312 BSC
2.240 BSC
4.490 REF
2.625 BSC
8.980
1.125 R (TYP)
C
C
D
D
E
E
B
B
H
H
A
A
15° (TYP)
.450 (REF)
F
F
.312 REF
.500 REF
1/16
.437
H
.125 R TYP
1.000 DIA. CUTTER
H
1.875 ±.015
.031±.015R(TYP)
.552
.490
32
.125 (TYP 11 POCKETS)
.531±.002
.062 R.
11° (REF)
.016 +.010 −.000
1.500 (REF)
.057
90° REF
℄ OF WINDOW
.486 REF
1.125
.562
R (TYP)
.188
1.173
1.193 +.010 −.000
.486
.375 DIA CUTTER
.688
1.375 +.005 −.000
.552
.490 (REF)
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
32
1.031 ±.002
32
.312
.360 TYP
.615
.906±.002
.360 +.000 −.010
.500±.015 TYP 6 RIBS

PARTIAL SECTION D-D

PARTIAL SECTION C-C

DR NO. 52 (.0635) × .281 DEEP
CSK 90° +5° −0° TO .093 DIA
1-64 NC-3B × .188 DEEP
8 HOLES MARKED 'A'
SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA

DR NO. 32 (.116) × .415 DEEP
CSK 90° +5° −0° TO .156 DIA
6-32 NC-3B × .225 DEEP
2 HOLES
⊕ .004 DIA

DR NO. 19 (.166) × .312 DEEP
10-32 UNF-2B × .190 DEEP
100° CSK TO .194 DIA.
8 HOLES
⊕ C .010 DIA

DR #49 (.073) X .281 DEEP
TAP #2-56 UNC-3B X .187 DEEP
C'SINK 90° INCL ANGLE X .107 DEEP (1 HOLE)

PARTIAL VIEW H-H

PARTIAL SECTION B-B

SECTION E-E

PARTIAL VIEW F-F
SCALE 2/1
(WINDOW-TYP 2 PLACES)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/22/64 J.F.S.
APPROVAL 6/11/64
APPROVAL E. Maring 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

CODE IDENT NO.
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011696 B

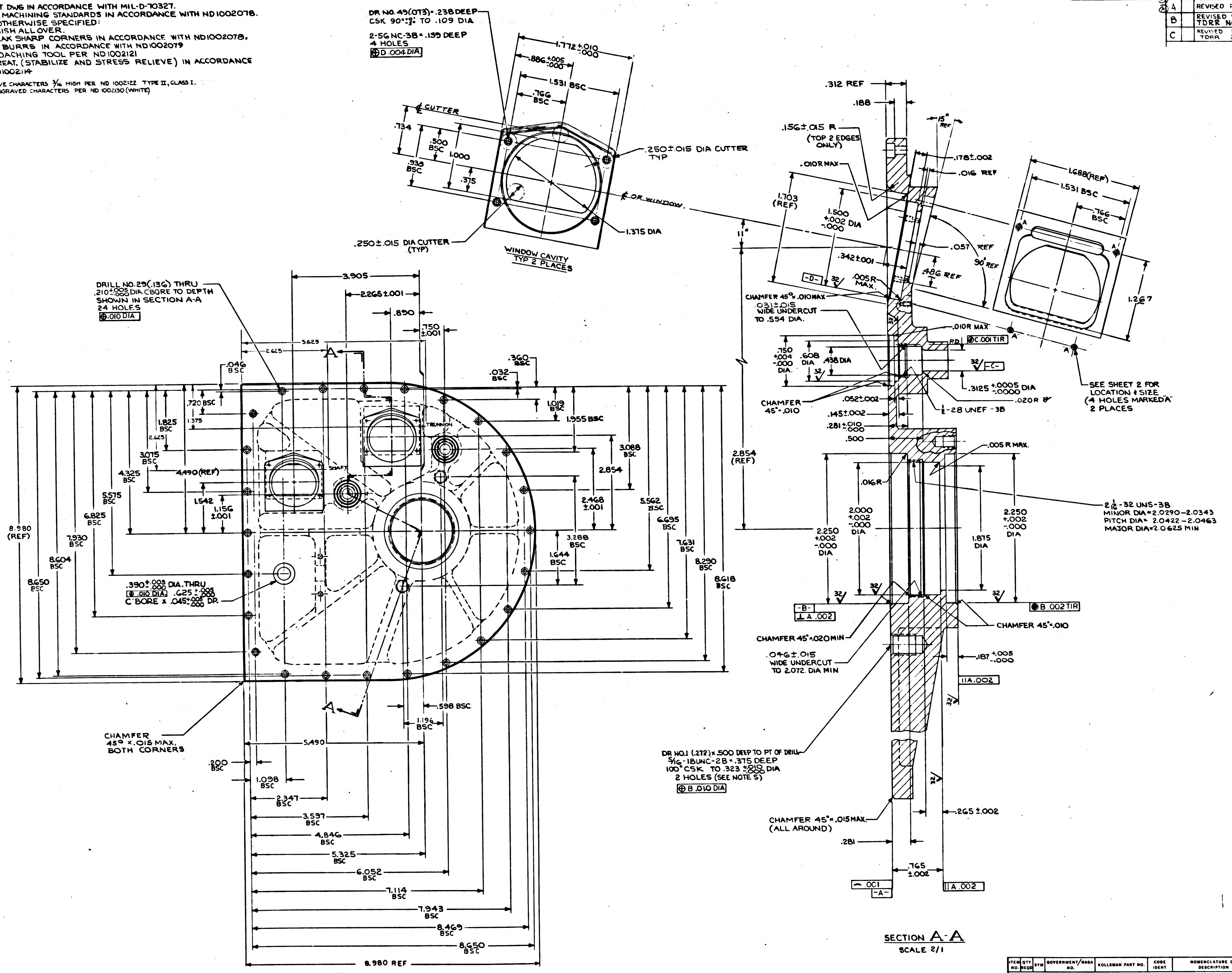
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63/ FINISH ALL OVER.
   - b. ✓ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
7. MARKING
   - a. ENGRAVE CHARACTERS 3/16 HIGH PER ND 1002122 TYPE II, CLASS I.
   - b. FILL ENGRAVED CHARACTERS PER ND 1002130 (WHITE)

C	9691102

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11139		
B		REVISED PER TDRR NO 13319		
C		REVISED PER TDRR 21309	9/2/5	



DR NO. 49(.073) × .238 DEEP
CSK 90° TO .109 DIA
2-56NC-3B × .139 DEEP
4 HOLES
⊕ D .004 DIA
1.772 +.010 -.000
.886 +.005 -.000
1.531 BSC
.766 BSC
℄ CUTTER
.734
.500 BSC
1.000
.938 BSC
.375
.250±.015 DIA CUTTER TYP
℄ OF WINDOW
1.375 DIA
.250±.015 DIA CUTTER (TYP)
WINDOW CAVITY TYP 2 PLACES
DRILL NO.29(.136) THRU
.210 +.005 -.000 DIA C'BORE TO DEPTH SHOWN IN SECTION A-A
24 HOLES
⊕ .010 DIA
3.905
2.265±.001
.890
.750 ±.001
5.625
2.625
A
.046 BSC
.360 BSC
.032 BSC
.720 BSC
1.825 BSC
1.375
2.625
3.015 BSC
4.325 BSC
4.490 (REF)
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.650 BSC
8.980 (REF)
1.542
1.156 ±.001
1.019 BSC
1.955 BSC
3.088 BSC
2.854
2.468 ±.001
3.288 BSC
1.644 BSC
5.562 BSC
6.695 BSC
7.631 BSC
8.290 BSC
8.618 BSC
TRUNNION
SHAFT
.390 +.003 -.000 DIA THRU
⊕ .010 DIA
.625 +.005 -.000
C'BORE × .045 +.005 -.000 DP.
CHAMFER 45° × .015 MAX. BOTH CORNERS
.598 BSC
1.196 BSC
5.490
.200 BSC
1.098 BSC
2.347 BSC
3.597 BSC
4.846 BSC
5.325 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
8.650 BSC
8.980 REF
.312 REF
.188
15° REF
.156±.015 R (TOP 2 EDGES ONLY)
.178±.002
.016 REF
.010R MAX
1.703 (REF)
1.500 +.002 -.000 DIA
11°
.057 REF
90° REF
.342±.001
.486 REF
-D-
32
.005R MAX.
CHAMFER 45° × .010MAX
.031±.015 WIDE UNDERCUT TO .554 DIA.
1.688(REF)
1.531 BSC
.766 BSC
1.267
.010R MAX
P.D.
◎ C .001 TIR
-C-
.750 +.004 -.000 DIA.
.608 DIA
.438 DIA
.3125 +.0005 -.0000 DIA
.020R
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED "A" 2 PLACES
CHAMFER 45° × .010
.052±.002
1/2-28 UNEF -3B
.145±.002
.281 +.010 -.000
.500
.005 R MAX.
2.854 (REF)
.016R
2 1/16-32 UNS-3B
MINOR DIA = 2.0290–2.0343
PITCH DIA = 2.0422–2.0463
MAJOR DIA = 2.0625 MIN
2.000 +.002 -.000 DIA
2.250 +.002 -.000 DIA
1.875 DIA
2.250 +.002 -.000 DIA
-B-
⊥ A .002
● B .002 TIR
CHAMFER 45° × .020MIN
CHAMFER 45° × .010
.046±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
∥ A .002
DR NO.1 (.272) × .500 DEEP TO PT OF DRILL
5/16-18UNC-2B × .375 DEEP
100° CSK TO .323 +.010 -.000 DIA
2 HOLES (SEE NOTE 5)
⊕ B .010 DIA
.265 ±.002
CHAMFER 45° × .015MAX. (ALL AROUND)
.281
.765 ±.002
— .001
-A-
∥ A .002

SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED
APPROVAL 6/15/64
APPROVAL E. Morris 6/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

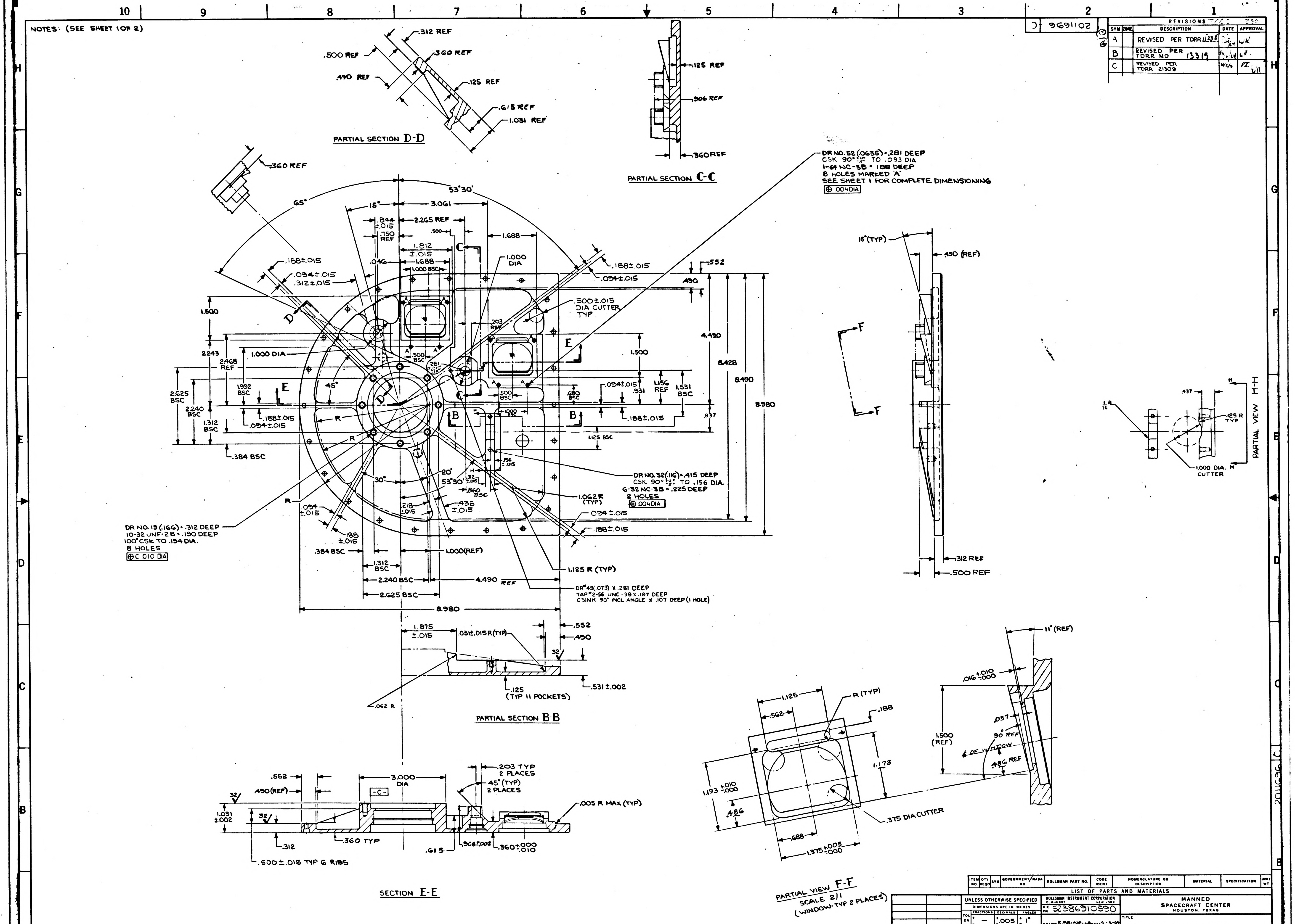
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 2

2011696 C

NOTES: (SEE SHEET 1 OF 2)

C	2011696

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11238	7-25-64	W.K.
B		REVISED PER TDRR NO 13319	10-1-64	W.K.
C		REVISED PER TDRR 21309	8/2/5	PI



.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
PARTIAL SECTION D-D
.125 REF
.906 REF
.360 REF
PARTIAL SECTION C-C
DR NO. 52 (.0635) × .281 DEEP
CSK 90° TO .093 DIA
1-64 NC-3B × .188 DEEP
8 HOLES MARKED 'A'
SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA
.360 REF
53°30'
65°
15°
3.061
.844 ±.015
2.265 REF
.750 REF
.500
1.688
1.812 ±.015
1.688
1.000 BSC
.046
1.000 DIA
.188±.015
.094±.015
.312±.015
.188±.015
.094±.015
.552
.490
.500±.015 DIA CUTTER TYP
.203 REF
1.500
2.243
2.468 REF
1.000 DIA
.500 BSC
.281 ±.015
4.490
8.428
8.490
8.980
1.500
.094±.015
.931
1.156 REF
1.531 BSC
.680 BSC
.500 BSC
1.992 BSC
2.625 BSC
2.240 BSC
1.312 BSC
45°
.188±.015
.094±.015
.937
.188±.015
1.000 BSC
1.125 BSC
.384 BSC
R
R
R
30°
20°
53°30'
.860 BSC
.156 ±.015
.312 ±.015
.218 ±.015
.438 ±.015
.094 ±.015
.188 ±.015
DR NO. 32 (.116) × .415 DEEP
CSK 90° TO .156 DIA
6-32 NC-3B × .225 DEEP
2 HOLES
⊕ .004 DIA
1.062 R (TYP)
.094±.015
.188±.015
DR NO. 19 (.166) × .312 DEEP
10-32 UNF-2B × .190 DEEP
100° CSK TO .194 DIA.
8 HOLES
⊕ C .010 DIA
.384 BSC
1.000 (REF)
1.312 BSC
2.240 BSC
2.625 BSC
4.490 REF
8.980
1.125 R (TYP)
DR #49 (.073) X .281 DEEP
TAP #2-56 UNC-3B X .187 DEEP
C'SINK 90° INCL ANGLE X .107 DEEP (1 HOLE)
A
B
B
C
C
D
D
E
E
15° (TYP)
.450 (REF)
F
F
.312 REF
.500 REF
1/16 R
.437
H
H
.125 R TYP
1.000 DIA. CUTTER
PARTIAL VIEW H-H
1.875 ±.015
.031±.015 R (TYP)
.552
.490
32
.125 (TYP 11 POCKETS)
.531±.002
.062 R
PARTIAL SECTION B-B
11° (REF)
.016 +.010 -.000
1.500 (REF)
.057
90° REF
℄ OF WINDOW
.486 REF
1.125
R (TYP)
.562
.188
1.173
1.193 +.010 -.000
.486
.688
1.375 +.005 -.000
.375 DIA CUTTER
PARTIAL VIEW F-F
SCALE 2/1
(WINDOW-TYP 2 PLACES)
.552
.490 (REF)
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
1.031 ±.002
32
.312
.360 TYP
.615
.906±.002
.360 +.000 -.010
.500±.015 TYP 6 RIBS
SECTION E-E
2011696 C

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/27/64 J.F.S.
APPROVAL 6/17/64
APPROVAL E. Thomp 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

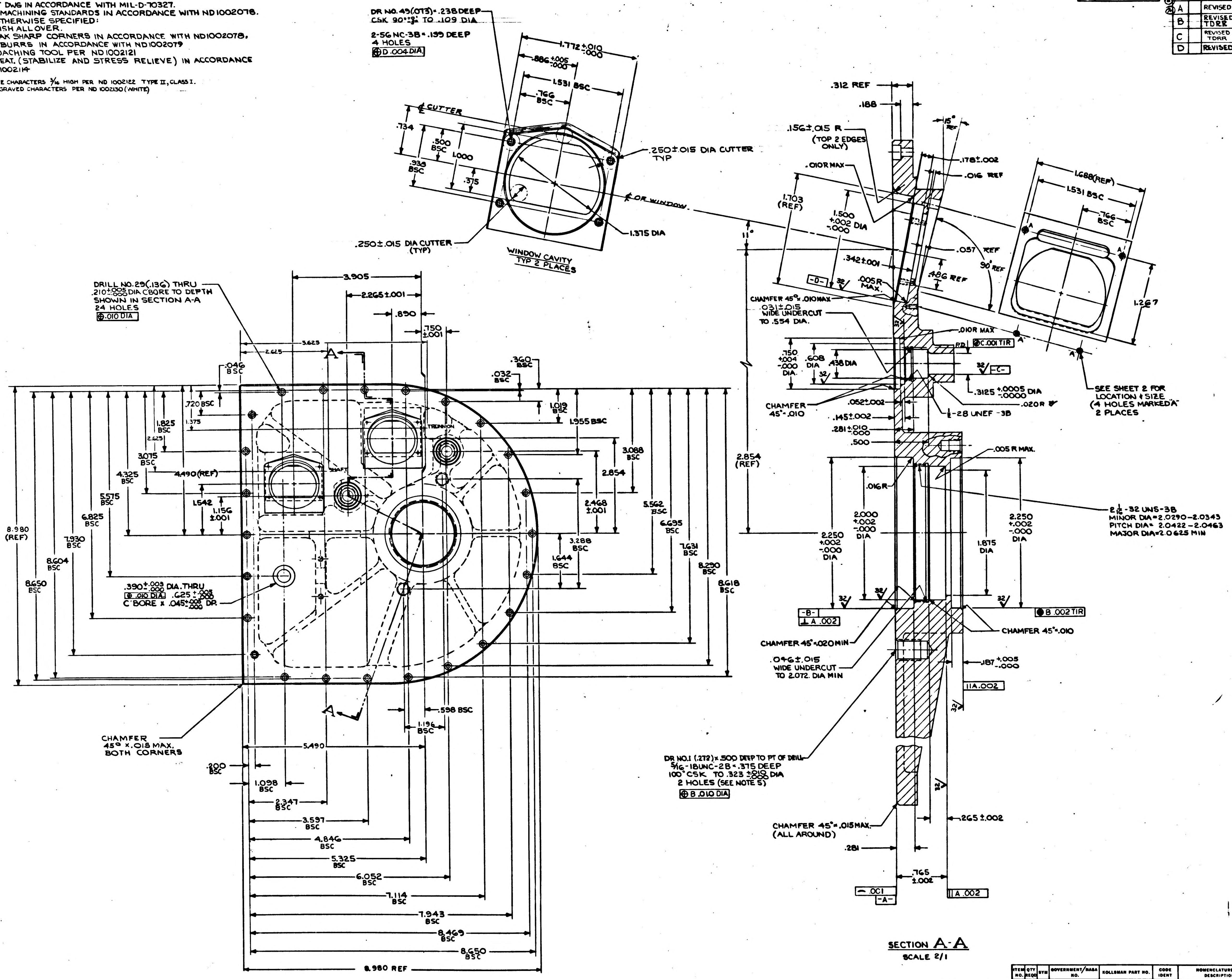
CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011696

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 2 OF 2

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
7. MARKING
   a. ENGRAVE CHARACTERS 3/16 HIGH PER ND 1002122 TYPE II, CLASS I.
   b. FILL ENGRAVED CHARACTERS PER ND 1002130 (WHITE)

D 2011696

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11139	7/[illegible]	WK
B		REVISED PER TDRR NO 13319	10/6/64	WK
C		REVISED PER TDRR 21309	4/2/5	PK. WK
D		REVISED PER TDRR 21662	[illegible]	[illegible]



DR NO. 49 (.073) × .238 DEEP
CSK 90° TO .109 DIA
2-56 NC-3B × .199 DEEP
4 HOLES
⊕ D .004 DIA
1.772 +.010 -.000
.886 +.005 -.000
1.531 BSC
.766 BSC
℄ CUTTER
.734
.500 BSC
.938 BSC
1.000
.375
.250 ±.015 DIA CUTTER TYP
℄ OF WINDOW
1.375 DIA
.250 ±.015 DIA CUTTER (TYP)
WINDOW CAVITY TYP 2 PLACES
.312 REF
.188
15° REF
.156 ±.015 R (TOP 2 EDGES ONLY)
.178 ±.002
.016 REF
.010 R MAX
1.703 (REF)
1.500 +.002 -.000 DIA
11°
.057 REF
90° REF
.342 ±.001
.486 REF
-D-
.005 R MAX.
CHAMFER 45° × .010 MAX
.031 ±.015 WIDE UNDERCUT TO .554 DIA.
1.688 (REF)
1.531 BSC
.766 BSC
1.267
A
.010 R MAX
P.D. ◎ C .001 TIR
.750 +.004 -.000 DIA.
.608 DIA
.438 DIA
-C-
.3125 +.0005 -.0000 DIA
.020 R
1/2-28 UNEF-3B
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED "A" 2 PLACES
CHAMFER 45° × .010
.052 ±.002
.145 ±.002
.281 +.010 -.000
.500
.005 R MAX.
2.854 (REF)
.016 R
2.250 +.002 -.000 DIA
2.000 +.002 -.000 DIA
1.875 DIA
2 1/16-32 UNS-3B
MINOR DIA = 2.0290-2.0343
PITCH DIA = 2.0422-2.0463
MAJOR DIA = 2.0625 MIN
-B-
⊥ A .002
● B .002 TIR
CHAMFER 45° × .010
CHAMFER 45° × .020 MIN
.046 ±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
∥ A .002
DR NO. 1 (.272) × .500 DEEP TO PT OF DRILL
5/16-18UNC-2B × .375 DEEP
100° CSK TO .323 +.010 -.000 DIA
2 HOLES (SEE NOTE 5)
⊕ B .010 DIA
.265 ±.002
CHAMFER 45° × .015 MAX. (ALL AROUND)
.281
.765 ±.002
— .001
-A-
∥ A .002
32
DRILL NO. 29 (.136) THRU
.210 +.005 -.000 DIA C'BORE TO DEPTH SHOWN IN SECTION A-A
24 HOLES
⊕ .010 DIA
3.905
2.265 ±.001
.890
.750 ±.001
3.625
2.625
A
.046 BSC
.360 BSC
.032 BSC
.720 BSC
1.825 BSC
1.375
2.625
1.019 BSC
1.955 BSC
TRUNNION
SHAFT
3.075 BSC
4.490 (REF)
4.325 BSC
3.088 BSC
2.854
5.575 BSC
1.542
1.156 ±.001
2.468 ±.001
5.562 BSC
6.825 BSC
8.980 (REF)
7.930 BSC
3.288 BSC
1.644 BSC
6.695 BSC
7.631 BSC
8.604 BSC
8.650 BSC
.390 +.003 -.000 DIA. THRU
⊕ .010 DIA
.625 +.005 -.000
C'BORE × .045 +.005 -.000 DP.
8.290 BSC
8.618 BSC
CHAMFER 45° × .015 MAX. BOTH CORNERS
.598 BSC
1.196 BSC
5.490
.200 BSC
1.098 BSC
2.347 BSC
3.597 BSC
4.846 BSC
5.325 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
8.650 BSC
8.980 REF

SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED [illegible] 4/[illegible]
APPROVAL E. [illegible] 6/15/64
APPROVAL E. [illegible] 6/15/64
NASA APPROVAL
MIT APPROVAL G. Mulson 4/[illegible]

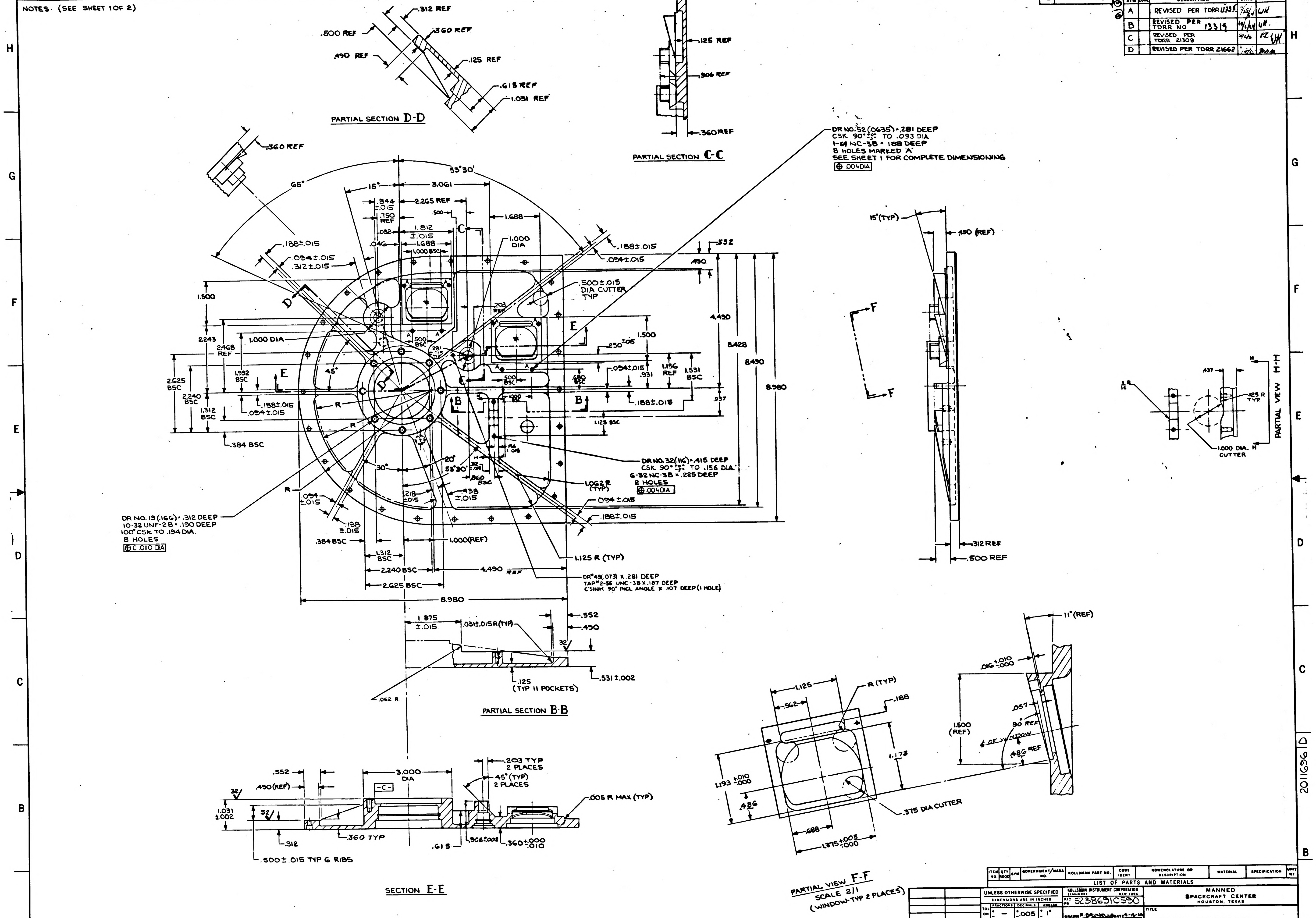
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

2011696 D

NOTES: (SEE SHEET 1 OF 2)


PARTIAL SECTION D-D
.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
PARTIAL SECTION C-C
.125 REF
.906 REF
.360 REF
.360 REF
DR NO. 52 (.0635) × .281 DEEP
CSK 90° TO .093 DIA
1-64 NC-3B × .188 DEEP
8 HOLES MARKED 'A'
SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA
65°
53°30'
15°
3.061
2.265 REF
1.688
1.812 ±.015
1.000 BSC
1.000 DIA
.188 ±.015
.094 ±.015
.312 ±.015
.500 ±.015 DIA CUTTER TYP
.552
.490
4.490
8.428
8.490
8.980
1.500
1.000 DIA
2.243
2.468 REF
1.992 BSC
2.625 BSC
2.240 BSC
1.312 BSC
.384 BSC
.250 ±.015
.094 ±.015
.931
1.156 REF
1.531 BSC
.188 ±.015
.937
1.125 BSC
DR NO. 32 (.116) × .415 DEEP
CSK 90° TO .156 DIA.
6-32 NC-3B × .225 DEEP
2 HOLES
⊕ .004 DIA
1.062 R (TYP)
.094 ±.015
.188 ±.015
DR NO. 19 (.166) × .312 DEEP
10-32 UNF-2B × .190 DEEP
100° CSK TO .194 DIA.
8 HOLES
⊕ C .010 DIA
.384 BSC
1.312 BSC
2.240 BSC
2.625 BSC
4.490 REF
8.980
1.000 (REF)
1.125 R (TYP)
DR #49 (.073) × .281 DEEP
TAP #2-56 UNC-3B × .187 DEEP
C'SINK 90° INCL ANGLE × .107 DEEP (1 HOLE)
1.875 ±.015
.031 ±.015 R (TYP)
.552
.490
.125 (TYP 11 POCKETS)
.531 ±.002
.062 R.
PARTIAL SECTION B-B
.552
.490 (REF)
1.031 ±.002
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
.312
.360 TYP
.615
.906 ±.002
.360 +.000 −.010
.500 ±.015 TYP 6 RIBS
SECTION E-E
15° (TYP)
.150 (REF)
.312 REF
.500 REF
PARTIAL VIEW H-H
.437
.125 R TYP
1.000 DIA. CUTTER
11° (REF)
.016 +.010 −.000
1.500 (REF)
.057
90° REF
℄ OF WINDOW
.486 REF
1.125
.562
R (TYP)
.188
1.173
1.193 +.010 −.000
.486
.688
1.375 +.005 −.000
.375 DIA CUTTER
PARTIAL VIEW F-F
SCALE 2/1
(WINDOW - TYP 2 PLACES)

D 9691102

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11235	7/25/64	WK.
B		REVISED PER TDRR NO 13319	10/6/64	WK.
C		REVISED PER TDRR 21309	8/2/65	PL WK
D		REVISED PER TDRR 21662		

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE SHEET 1

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/22/64 J.F.S.
APPROVAL 6/17/64
APPROVAL E. Morup 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

2011696 D

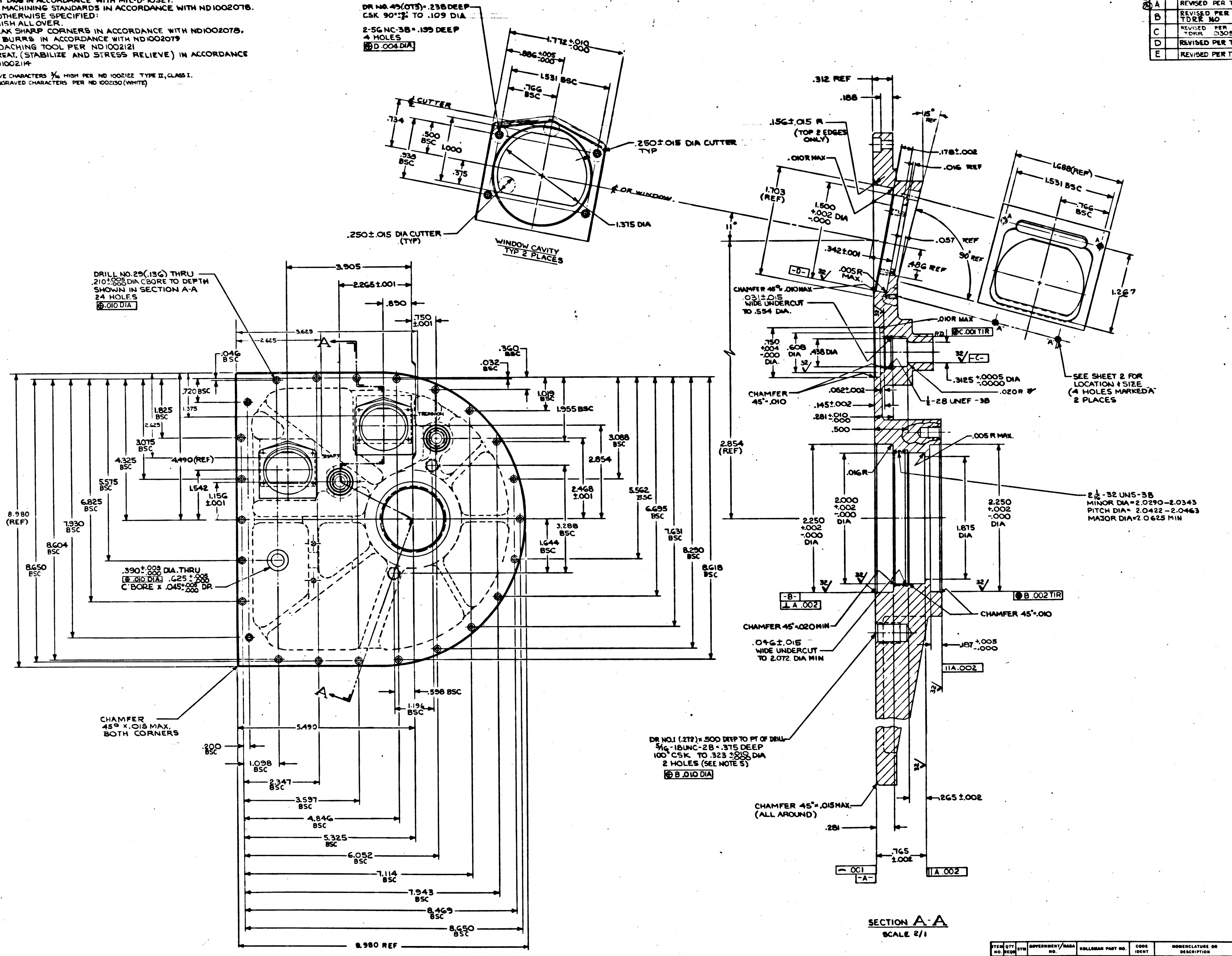
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
7. MARKING
   - a. ENGRAVE CHARACTERS 3/16 HIGH PER ND 1002122 TYPE II, CLASS I.
   - b. FILL ENGRAVED CHARACTERS PER ND 1002130 (WHITE)

E	9691102

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11139	7/2/64	
B		REVISED PER TDRR NO 13319	10/6/64	
C		REVISED PER TDRR 21309	4/2/5	
D		REVISED PER TDRR 21662		
E		REVISED PER TDRR 24746		



DR NO.45(.082)×.238 DEEP CSK 90°±2° TO .109 DIA
2-56NC-3B×.139 DEEP 4 HOLES
⊕ D .004 DIA
1.772±.010 -.000
.886±.005 -.000
1.531 BSC
.766 BSC
CUTTER
.734
.500 BSC
1.000
.938 BSC
.375
.250±.015 DIA CUTTER TYP
OR WINDOW
1.375 DIA
.250±.015 DIA CUTTER (TYP)
WINDOW CAVITY TYP 2 PLACES
DRILL NO.29(.136) THRU .210±.002 DIA CBORE TO DEPTH SHOWN IN SECTION A-A 24 HOLES
⊕ .010 DIA
3.905
2.265±.001
.850
.750 ±.001
5.625
2.625
.046 BSC
.032 BSC
.360 BSC
.720 BSC
1.375
1.825 BSC
2.625
3.015 BSC
4.325 BSC
4.490 (REF)
5.575 BSC
6.825 BSC
7.930 BSC
8.604 BSC
8.650 BSC
8.980 (REF)
1.542
1.156 ±.001
1.019 BSC
1.955 BSC
TRUNNION
SHAFT
3.088 BSC
2.854
2.468 ±.001
5.562 BSC
6.695 BSC
3.288 BSC
1.644 BSC
7.631 BSC
8.290 BSC
8.618 BSC
.390±.003 DIA.THRU
⊕ .010 DIA
.625±.005 C'BORE × .045±.005 DP.
A
A
CHAMFER 45° × .015 MAX. BOTH CORNERS
.598 BSC
1.196 BSC
.200 BSC
1.098 BSC
5.490
2.347 BSC
3.597 BSC
4.846 BSC
5.325 BSC
6.052 BSC
7.114 BSC
7.943 BSC
8.469 BSC
8.650 BSC
8.980 REF
.312 REF
.188
.156±.015 R (TOP 2 EDGES ONLY)
.010R MAX
1.703 (REF)
1.500 +.002 -.000 DIA
.178±.002
.016 REF
15° REF
1.688 (REF)
1.531 BSC
.766 BSC
.057 REF
90° REF
.342±.001
.486 REF
-D-
32
.005R MAX
11°
1.267
CHAMFER 45° × .010 MAX
.031±.015 WIDE UNDERCUT TO .554 DIA.
.010R MAX
⊕ C .001 TIR
.750 +.004 -.000 DIA
.608 DIA
.438 DIA
32 -C-
.3125 +.0005 -.0000 DIA
.020R
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED "A" 2 PLACES
CHAMFER 45° × .010
.062±.002
1/4-28 UNEF-3B
.145±.002
.281±.010 -.000
.500
2.854 (REF)
.005 R MAX.
.016R
2 1/16-32 UNS-3B MINOR DIA = 2.0290-2.0343 PITCH DIA = 2.0422-2.0463 MAJOR DIA = 2.0625 MIN
2.250 +.002 -.000 DIA
2.000 +.002 -.000 DIA
1.875 DIA
2.250 +.002 -.000 DIA
-B-
⊥ A .002
32
⊚ B .002 TIR
CHAMFER 45° × .020 MIN
CHAMFER 45° × .010
.046±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
// A .002
DR NO.1 (.272) × .500 DEEP TO PT OF DRILL 5/16-18UNC-2B × .375 DEEP 100° CSK TO .323 ±.010 -.005 DIA 2 HOLES (SEE NOTE 5)
⊕ B .010 DIA
.265±.002
CHAMFER 45° × .015 MAX. (ALL AROUND)
.281
.765 ±.002
⏥ .001 -A-
// A .002

SECTION A-A

SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL BERYLLIUM ND1002125 SEE NOTE 6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910590

DRAWN R. BRUNELLE DATE 4-13-64

CHECKED

APPROVAL 6/15/64

APPROVAL E. Murray 6/15/64

NASA APPROVAL

MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PANEL, TELESCOPE

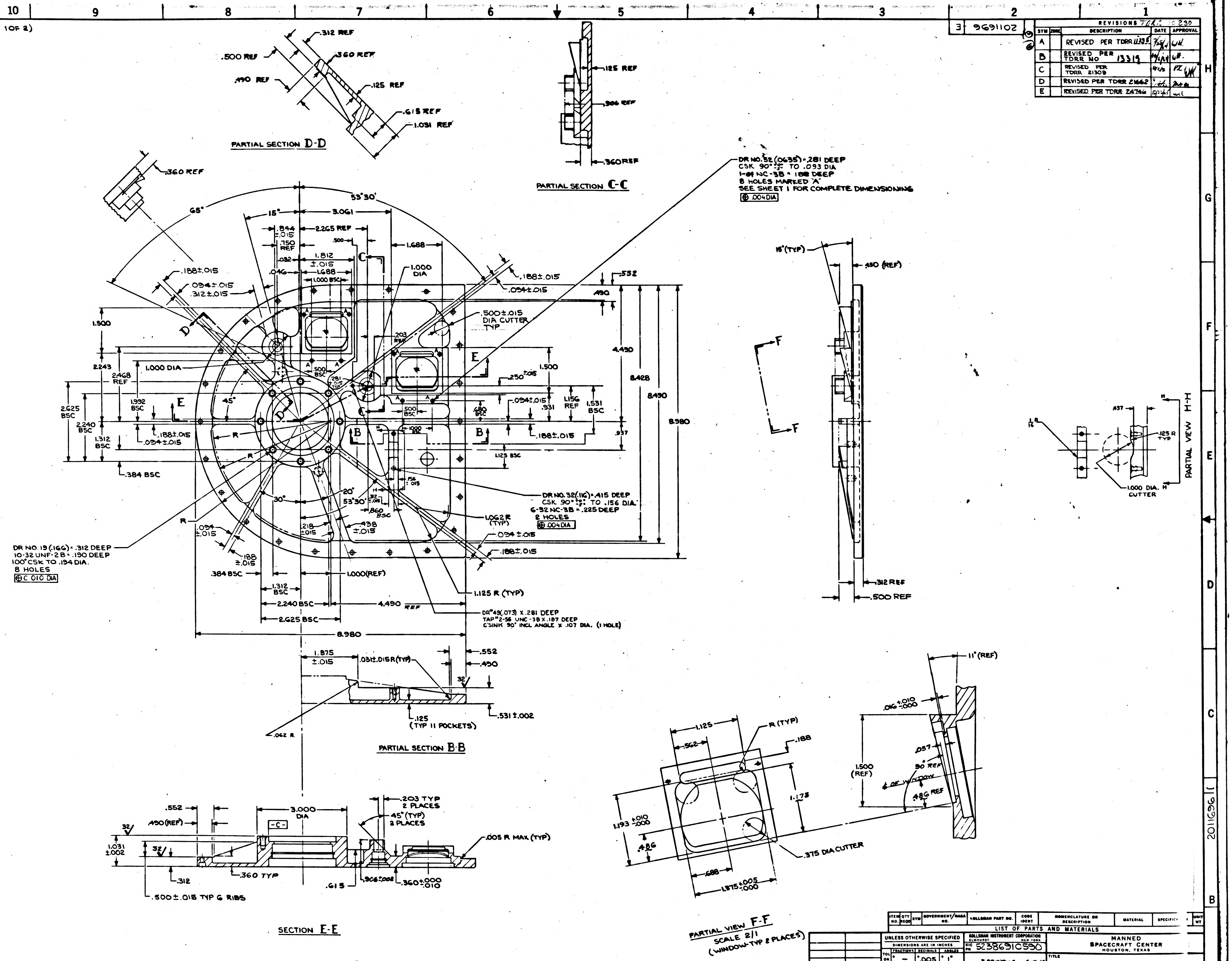
CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011696

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 2

2011696 E

MASTER

NOTES: (SEE SHEET 1 OF 2)


PARTIAL SECTION D-D
.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
PARTIAL SECTION C-C
.125 REF
.906 REF
.360 REF
.360 REF
65°
15°
53°30'
3.061
.844 ±.015
2.265 REF
.750 REF
1.812 ±.015
1.688
1.000 BSC
1.688
1.000 DIA
.188±.015
.094±.015
.312±.015
.188±.015
.094±.015
.552
.490
.500±.015 DIA CUTTER TYP
1.500
2.243
2.468 REF
1.000 DIA
1.992 BSC
2.625 BSC
2.240 BSC
1.312 BSC
.188±.015
.094±.015
.384 BSC
45°
.500 BSC
.281 ±.015
.250±.015
1.500
.094±.015
1.156 REF
.931
1.531 BSC
.480 BSC
.937
.188±.015
4.490
8.428
8.490
8.980
1.125 BSC
DR NO. 32 (.0635) × .281 DEEP CSK 90° +5° -0° TO .093 DIA 1-64 NC-3B × .188 DEEP 8 HOLES MARKED 'A' SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA
DR NO. 32 (.116) × .415 DEEP CSK 90° +5° -0° TO .156 DIA. 6-32 NC-3B × .225 DEEP 2 HOLES
⊕ .004 DIA
1.062 R (TYP)
.094±.015
.188±.015
20°
53°30'
30°
.860 BSC
.438 ±.015
.218 ±.015
.094 ±.015
.188 ±.015
.384 BSC
DR NO. 19 (.166) × .312 DEEP 10-32 UNF-2B × .190 DEEP 100° CSK TO .194 DIA. 8 HOLES
⊕ C .010 DIA
1.000 (REF)
1.312 BSC
2.240 BSC
4.490 REF
2.625 BSC
8.980
1.125 R (TYP)
DR #49 (.073) X .281 DEEP TAP #2-56 UNC-3B X .187 DEEP C'SINK 90° INCL ANGLE X .107 DIA. (1 HOLE)
1.875 ±.015
.031±.015 R (TYP)
.552
.490
32
.531±.002
.125 (TYP 11 POCKETS)
.062 R.
PARTIAL SECTION B-B
.552
.490 (REF)
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
1.031 ±.002
32
.312
.360 TYP
.615
.906±.005
.360 +.000 -.010
.500±.015 TYP 6 RIBS
SECTION E-E
16° (TYP)
.450 (REF)
.312 REF
.500 REF
F
F
PARTIAL VIEW H-H
.437
.125 R TYP
1.000 DIA. CUTTER
H
H
11° (REF)
.016 +.010 -.000
1.500 (REF)
.057
90° REF
℄ OF WINDOW
.486 REF
1.125
.562
R (TYP)
.188
1.173
1.193 +.010 -.000
.486
.688
1.375 +.005 -.000
.375 DIA CUTTER
PARTIAL VIEW F-F SCALE 2/1 (WINDOW-TYP 2 PLACES)
A
B
C
D
E

2011696 E	9691102

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 11235	7/25/64	WH.
B		REVISED PER TDRR NO 13319	10/6/64	WH.
C		REVISED PER TDRR 21309	9/2/65	PL WH
D		REVISED PER TDRR 21662		
E		REVISED PER TDRR 24746	12/2/65	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICA	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011600
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910590
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/27/64 J.F.S.
APPROVAL 6/17/64
APPROVAL E. Thomas 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

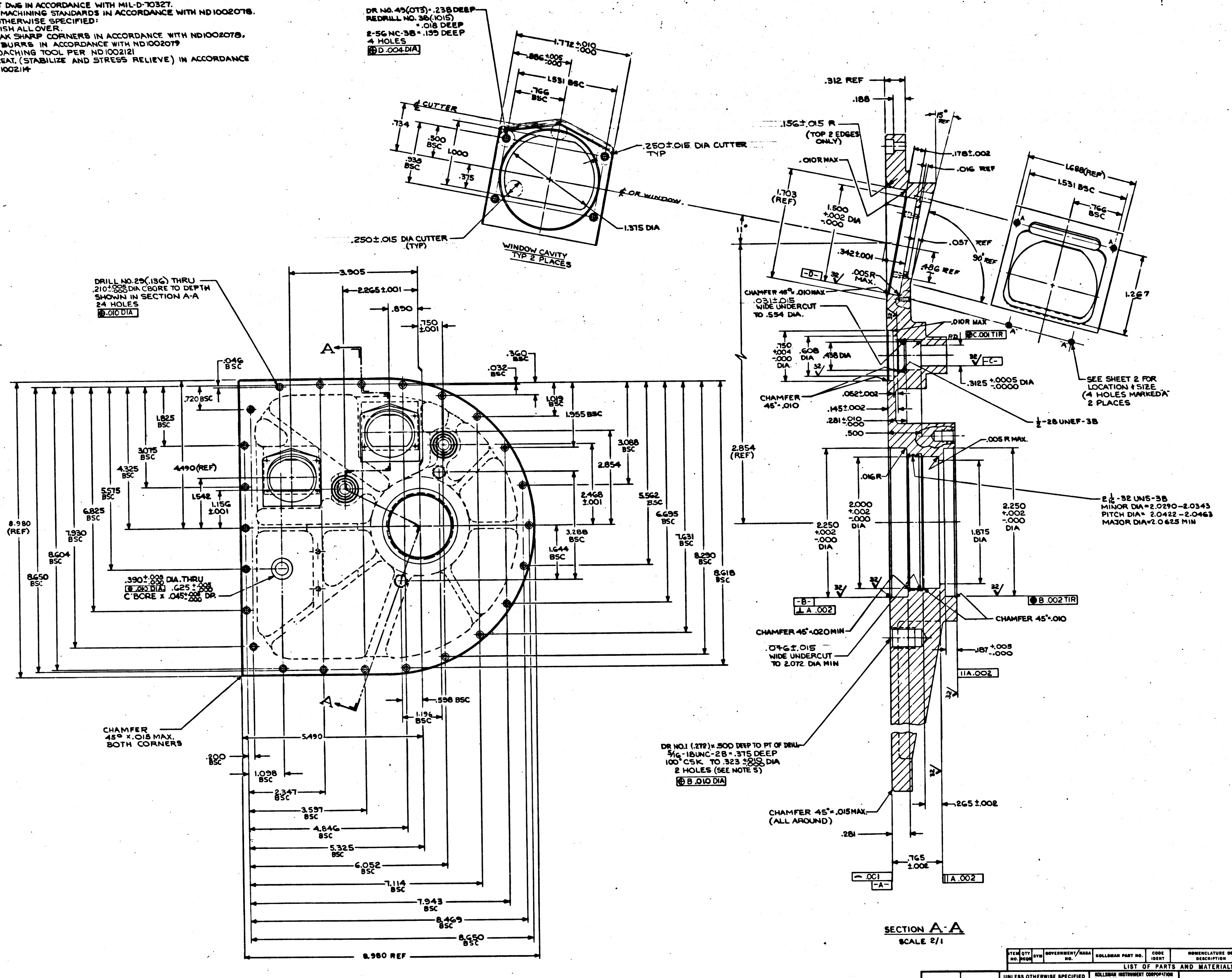
TITLE
PANEL, TELESCOPE

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. USE BROACHING TOOL PER ND1002121
6. HEAT TREAT. (STABILIZE AND STRESS RELIEVE) IN ACCORDANCE WITH ND1002114

9691102

REVISIONS TDAR 10230


DR NO. 49 (.073) × .238 DEEP
REDRILL NO. 38 (.1015) × .018 DEEP
2-56NC-3B × .155 DEEP
4 HOLES
D .004 DIA
CUTTER
WINDOW CAVITY TYP 2 PLACES
.250±.015 DIA CUTTER TYP
.250±.015 DIA CUTTER (TYP)
1.375 DIA
WINDOW
DRILL NO. 29 (.136) THRU
.210 +.005 -.000 DIA C'BORE TO DEPTH SHOWN IN SECTION A-A
24 HOLES
.010 DIA
.390 +.002 -.000 DIA. THRU
B .010 DIA
C'BORE × .045 +.005 -.000 DP.
.625 +.005 -.000
CHAMFER 45° × .015 MAX. BOTH CORNERS
8.980 REF
A
A
.312 REF
.188
.156±.015 R (TOP 2 EDGES ONLY)
.010R MAX
.178±.002
.016 REF
1.703 (REF)
1.600 +.002 -.000 DIA
.342±.001
.057 REF
.486 REF
90° REF
15° REF
11°
-D-
.005R MAX.
CHAMFER 45° × .010 MAX
.031±.015 WIDE UNDERCUT TO .554 DIA.
.010R MAX
C .001 TIR
.750 +.004 -.000 DIA.
.608 DIA
.438 DIA
-C-
.3125 +.0005 -.0000 DIA
CHAMFER 45° × .010
.052±.002
.145±.002
.281 +.010 -.000
.500
1/2-28 UNEF-3B
.005 R MAX.
.016R
2.854 (REF)
2 1/16-32 UNS-3B
MINOR DIA = 2.0290-2.0343
PITCH DIA = 2.0422-2.0463
MAJOR DIA = 2.0625 MIN
2.250 +.002 -.000 DIA
2.000 +.002 -.000 DIA
1.875 DIA
-B-
A .002
B .002 TIR
CHAMFER 45° × .010
CHAMFER 45° × .020 MIN
.046±.015 WIDE UNDERCUT TO 2.072 DIA MIN
.187 +.005 -.000
A .002
DR NO. 1 (.228) × .500 DEEP TO PT OF DRILL
5/16-18UNC-2B × .375 DEEP
100° CSK TO .323 ±.010 DIA
2 HOLES (SEE NOTE 5)
B .010 DIA
CHAMFER 45° × .015 MAX. (ALL AROUND)
.265±.002
.281
.765 ±.002
.001
-A-
A .002
1.267
1.688 (REF)
1.531 BSC
.766 BSC
SEE SHEET 2 FOR LOCATION & SIZE (4 HOLES MARKED A) 2 PLACES
1.772±.010
.886 +.005 -.000
.734
.500 BSC
1.000
.938 BSC
.375

SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM ND1002125 SEE NOTE 6
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 52386910590
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER HOUSTON, TEXAS

TITLE PANEL, TELESCOPE

CODE IDENT NO. | SIZE E | NASA NUMBER 2011696
SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 2

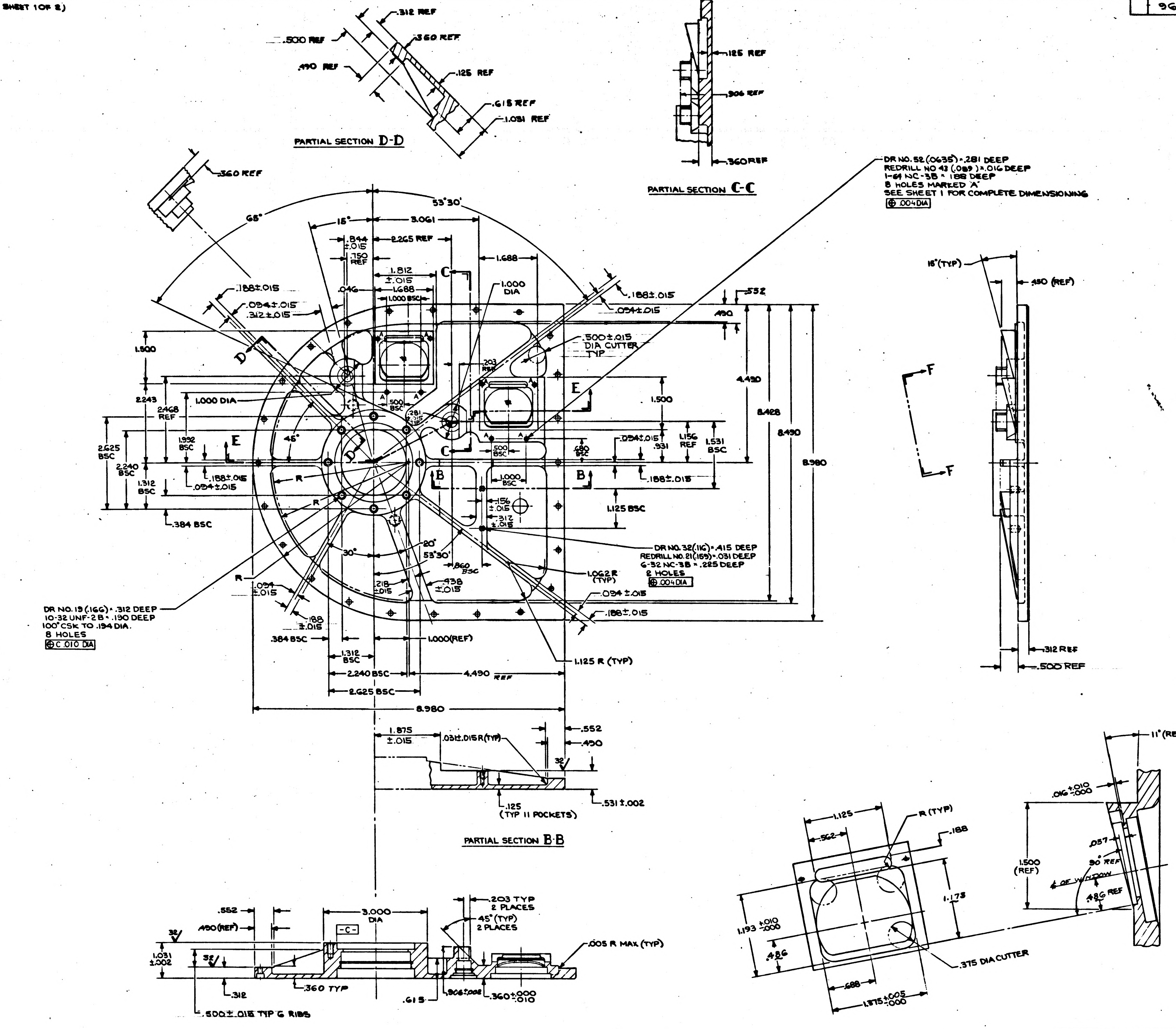
2011696

NOTES: (SEE SHEET 1 OF 2)

2011696

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TMR 10230



.312 REF
.500 REF
.360 REF
.490 REF
.125 REF
.615 REF
1.031 REF
.125 REF
.906 REF
.360 REF
.360 REF
68°
53°30'
15°
3.061
.844 ±.015
2.265 REF
.750 REF
1.688
1.812 ±.015
1.688
1.000 BSC
1.000 DIA
.046
.188±.015
.094±.015
.312±.015
.188±.015
.094±.015
.532
.490
.500±.015 DIA CUTTER TYP
DR NO.52 (.0635) × .281 DEEP
REDRILL NO 43 (.089) × .016 DEEP
1-64 NC-3B × .188 DEEP
8 HOLES MARKED 'A'
SEE SHEET 1 FOR COMPLETE DIMENSIONING
⊕ .004 DIA
1.500
2.243
2.468 REF
1.000 DIA
.203 REF
.500 BSC
.281 ±.015 TYP
1.500
4.490
8.428
8.490
8.980
2.625 BSC
1.992 BSC
2.240 BSC
1.312 BSC
45°
.188±.015
.094±.015
.500 BSC
.480 BSC
.094±.015
.931
1.156 REF
1.531 BSC
.188±.015
1.000 BSC
1.125 BSC
.156 ±.015
.312 ±.015
.384 BSC
R
R
R
30°
20°
53°30'
.860 BSC
.438 ±.015
.218 ±.015
.094 ±.015
.188 ±.015
1.062 R (TYP)
DR NO.32 (.116) × .415 DEEP
REDRILL NO.21 (.159) × .031 DEEP
6-32 NC-3B × .225 DEEP
2 HOLES
⊕ .004 DIA
.094 ±.015
.188 ±.015
DR NO.19 (.166) × .312 DEEP
10-32 UNF-2B × .190 DEEP
100° CSK TO .194 DIA.
8 HOLES
⊕ C .010 DIA
.384 BSC
1.000 (REF)
1.312 BSC
2.240 BSC
2.625 BSC
4.490 REF
8.980
1.125 R (TYP)
D
D
C
C
E
E
B
B
15° (TYP)
.450 (REF)
F
F
.312 REF
.500 REF
1.875 ±.015
.031±.015 R (TYP)
.552
.450
32
.125 (TYP 11 POCKETS)
.531±.002
PARTIAL SECTION B-B
11° (REF)
.016 +.010 -.000
1.125
R (TYP)
.562
.188
1.500 (REF)
.057
90° REF
℄ OF WINDOW
.486 REF
1.193 +.010 -.000
1.173
.486
.688
.375 DIA CUTTER
1.375 +.005 -.000
.552
.490 (REF)
3.000 DIA
-C-
.203 TYP 2 PLACES
45° (TYP) 2 PLACES
.005 R MAX (TYP)
32
32
1.031 ±.002
.312
.360 TYP
.615
.906±.002
.360 +.000 -.010
.500±.015 TYP 6 RIBS

PARTIAL SECTION D-D

PARTIAL SECTION C-C

PARTIAL SECTION B-B

SECTION E-E

PARTIAL VIEW F-F
SCALE 2/1
(WINDOW-TYP 2 PLACES)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011717	2011600
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE SHEET 1
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910530

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/22/64 JFS
APPROVAL 6/17/64
APPROVAL E. Mayo 6/15/64
NASA APPROVAL
MIT APPROVAL Wilson 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL, TELESCOPE

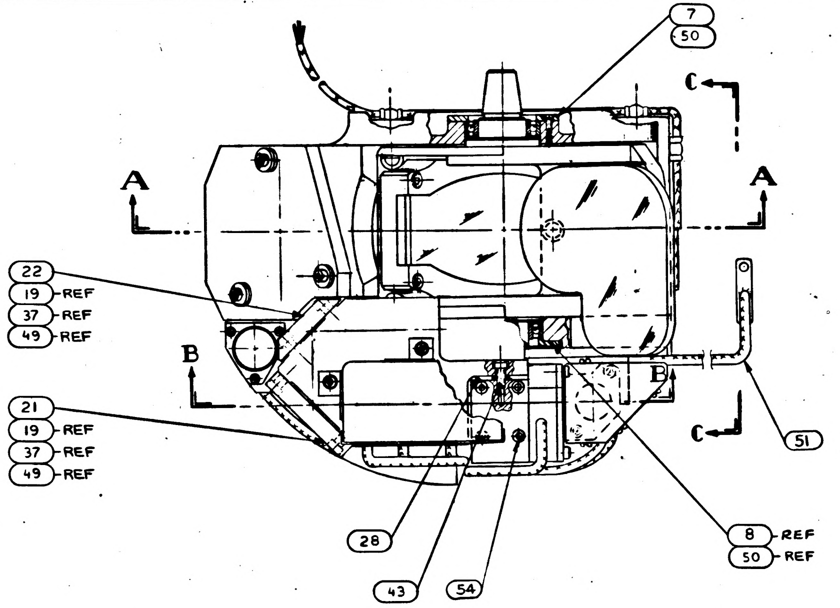
CODE IDENT NO.
SIZE E
NASA NUMBER 2011696
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 2 OF 2

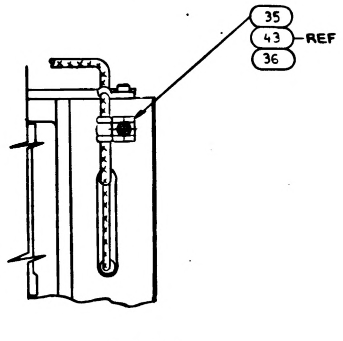
A 2011701

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 20187		

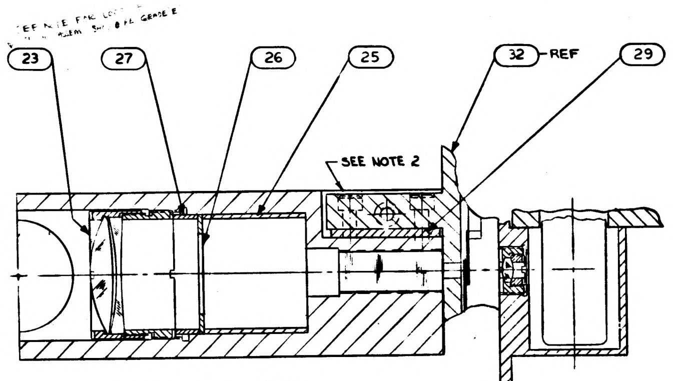
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

NOTE
ASSEMBLY INSTRUCTIONS
PENDING

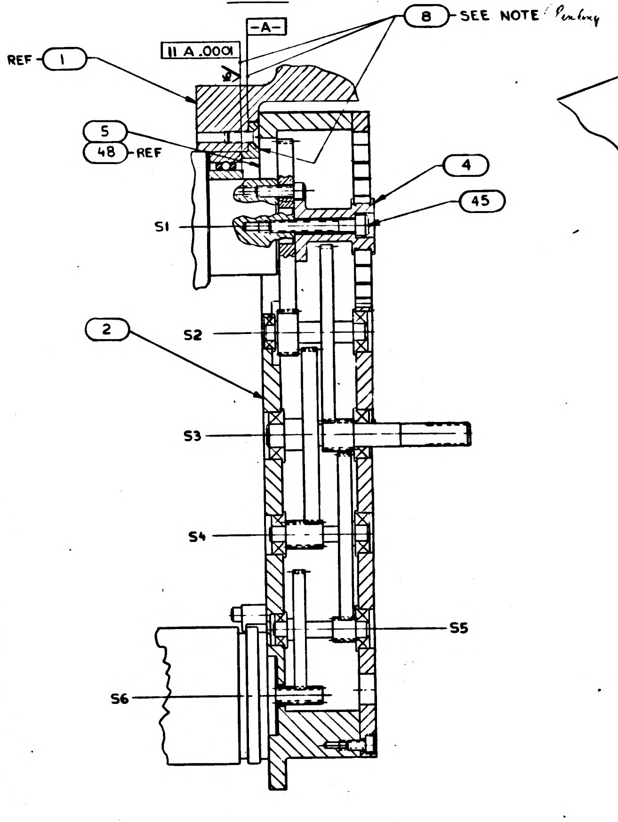




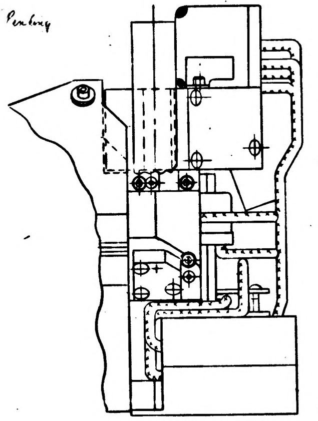
PARTIAL VIEW C-C

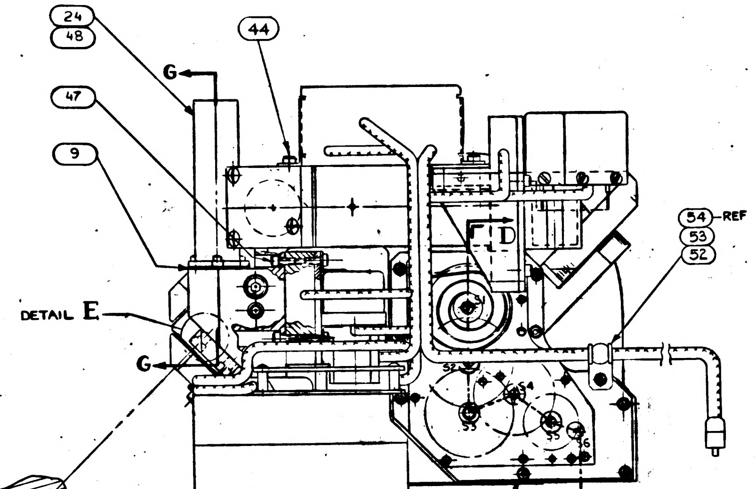


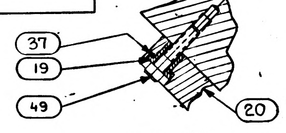
PARTIAL SECTION B-B
SCALE 2/1



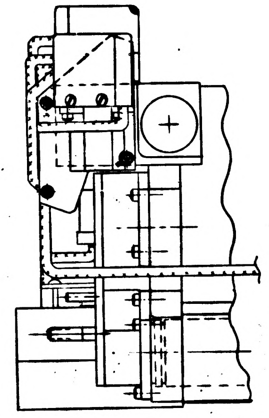
PARTIAL SECTION D-D
SCALE 2/1

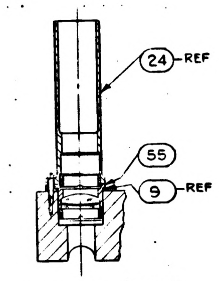




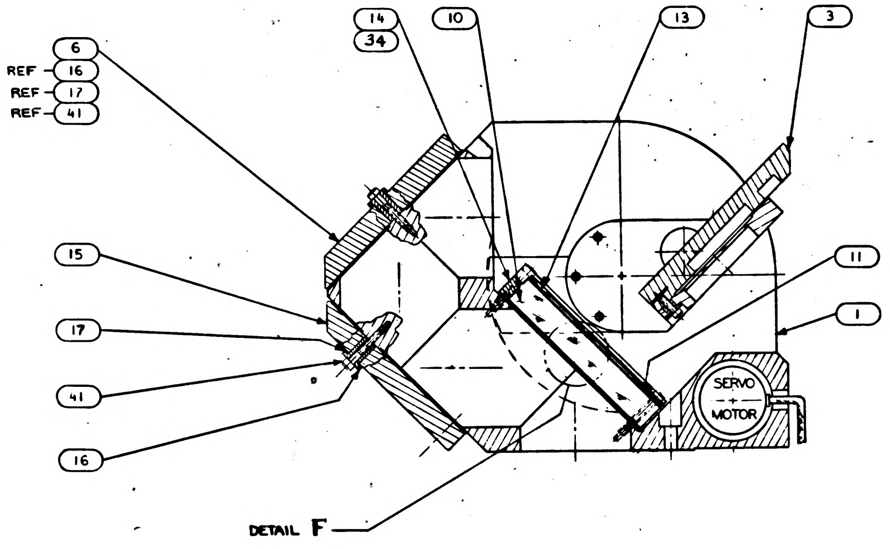


DETAIL E
SCALE 2/1

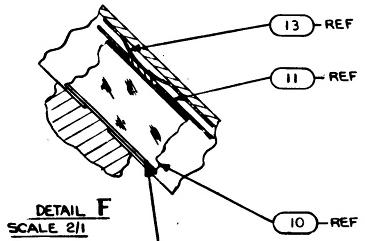




PARTIAL SECTION G-G
SCALE: 1/1



SECTION A-A



DETAIL F
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
55	1		2012515	85386911280		HOUSING & LENS, ASSY OF (HORIZON SENSING)			
54	5	*	1011625-30	74455151030		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
53	1	*	1011918-1			WASHER, CABLE CLAMP			
52	1	*	1000220-5			CLAMP, CABLE			
51	1		2012509	80386910070		HEAD ELECTRONICS, HARNESS ASSY OF			
50	12		NAS1189C02P4L	74455155002		SCREW, 100° FLAT HD, SELF LOCKING			
49	9		NAS1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
48	6	*	1011625-11	74455151011		↑			
47	3		NAS1352C03LL4	74455157009		↑			
46									
45	1	*	1011625-24	74455151024		↓			
44	3		NAS1352C04LL4	74455157013		↓			
43	4	*	1011625-28	74455151028		↓			
42									
41	6		NAS1352C04LL10	74455157016		SCREW, CAP, HEX SOC HD, SELF LOCKING			
40									
39									
38									
37	9	*	1010608-2	—		WASHER, SPRING, CURVED			
36	3	*	1011918-1	—		WASHER, CABLE CLAMP			
35	3	*	1000220-4	—		CLAMP, CABLE			
34	4	*	1011625-34	74455151034		SCREW, CAP, HEX SOC HD, SELF LOCKING			
33									
32									
31									
30									
29	1		2012461	52386910860		SPACER			
28	1		2012462	56386910500		SPACER			
27	1		2012466	57386911120		SPACER, VARIABLE			
26	1		2012464	56386910520		APERTURE, STAR TRACKER			
25	1		2012467	57386911130		SPACER			
24	1		2012393	85386911270		HOUSING & FILTER, ASSY OF			
23	1		2012480	85386910980		HOUSING & LENS ASSY (STAR TRACKER)			
22	1		2012368	52386910080		MIRROR, STAR TRACKER			
21	1		2012369	52386910090		MIRROR, STAR TRACKER			
20	1		2012451	52386910810		MIRROR, HORIZON SENSOR			
19	9		2012465	57386911110		BUSHING, MIRROR			
18									
17	6		2011213	59386910010		WASHER, WAVE			
16	6		2011214	57386910220		BUSHING, MIRROR			
15	1		2011260	52386910380		MIRROR, SEXTANT HEAD			
14	1		2011598	52386910390		RETAINER, BEAM SPLITTER			
13	1		2011634	56386910150		SPRING, BEAM SPLITTER			
12	7		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF LOCKING			
11	AR		2011635	56386910160		SPACER, BEAM SPLITTER			
10	1		2012222	28386910550		BEAM SPLITTER			
9	1		2012482	56386910540		SPACER			
8	1		2011671	57386910010		RETAINER, DRIVE BEARING			
7	1		2011266	57386910230		RETAINER, BEARING			
6	1		2012366	52386910310		MIRROR, SEXTANT HEAD			
5	1		2011233	33386910010		GEAR, SPUR (128T-96P)			
4	1		2011940	85386910090		SPRING & COLLET, ASSY OF			
3	1		2011712	85386910050		INDEXING MIRROR & MOUNT ASSEMBLY			
2	1		2011706	85386910100		TRUNNION DRIVE GEARBOX ASSEMBLY			
1	1		2011254	85386910040		HOUSING, SXT HEAD, ASSY OF (MACHINING)			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150

DRAWN J. Schiller DATE 6-9-64
CHECKED C. Lupitoff 8/1/64
APPROVAL 8/3/
APPROVAL E. Khouey 8/31/64
NASA APPROVAL
MIT APPROVAL W Kupfer 11/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

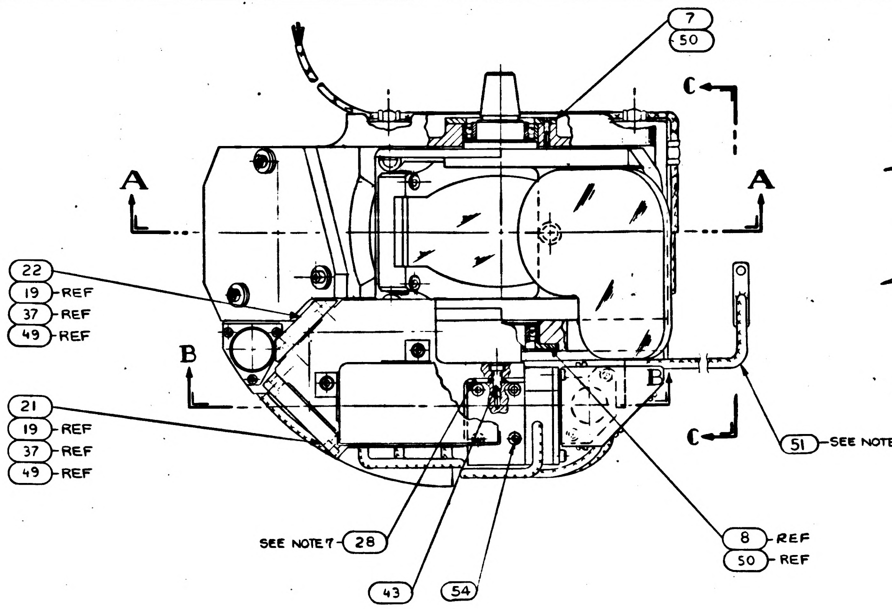
CODE IDENT NO. | SIZE E | NASA NUMBER 2011701
SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011701 A

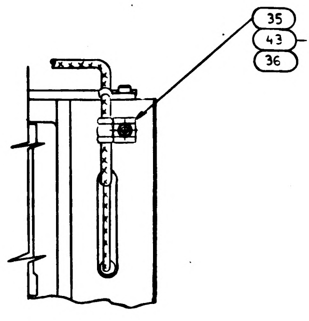
SEE SHEET 2 OF 2 FOR NOTES.

2011701 B

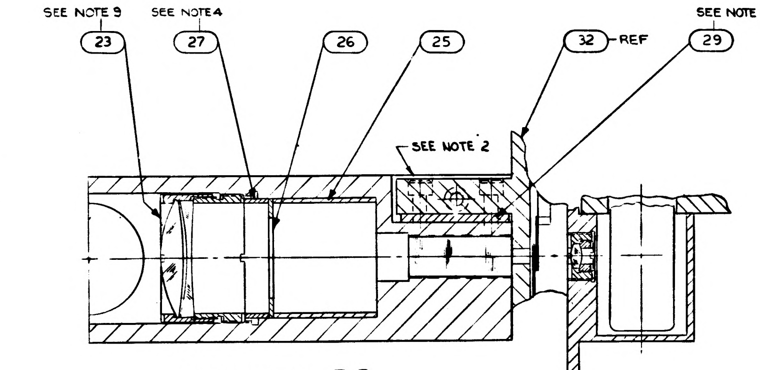
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 20187		
B		REVISED PER TDRR 20199		



7
50
C
A
A
22
19 REF
37 REF
49 REF
B
B
21
19 REF
37 REF
49 REF
C
51 SEE NOTE 8
SEE NOTE 7 28
43
54
8 REF
50 REF

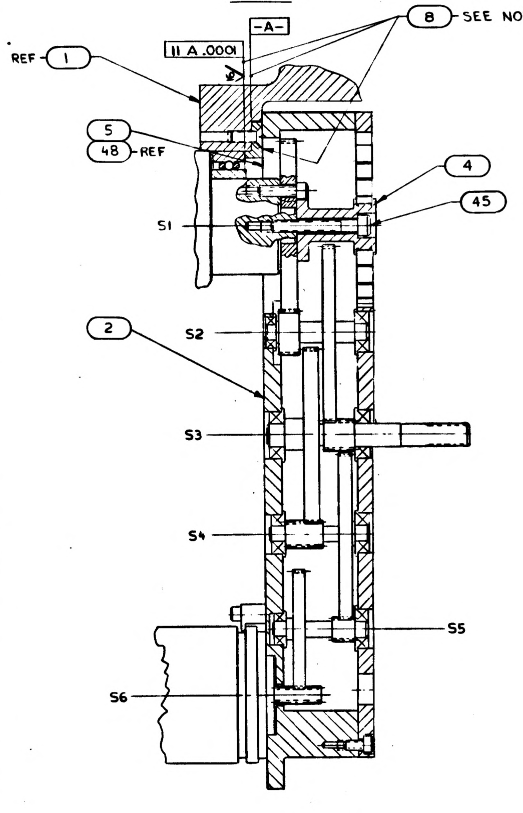


PARTIAL VIEW C-C



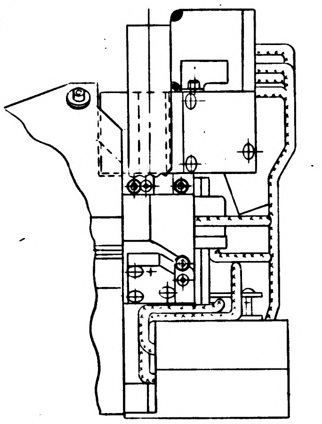
SEE NOTE 9
23
SEE NOTE 4
27
26
25
32 REF
SEE NOTE 6
29
SEE NOTE 2

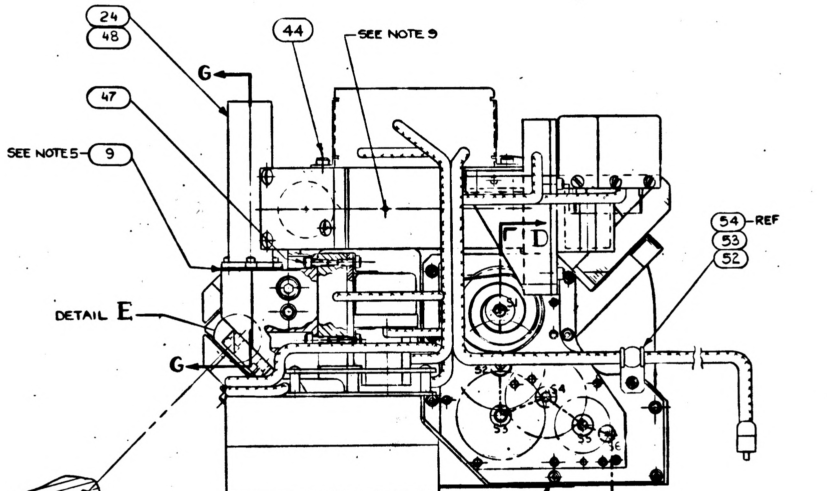
PARTIAL SECTION B-B
SCALE 2/1



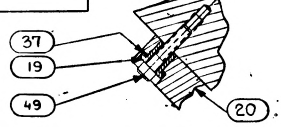
8 SEE NOTE 3
-A-
11 A .0001
REF 1
5
48 REF
4
45
S1
2
S2
S3
S4
S5
S6

PARTIAL SECTION D-D
SCALE 2/1

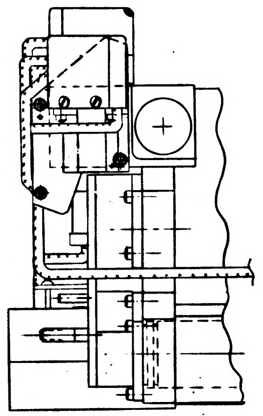


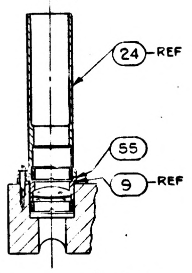


24
48
G
44
SEE NOTE 9
47
SEE NOTE 5 9
DETAIL E
G
54 REF
53
52
12
D



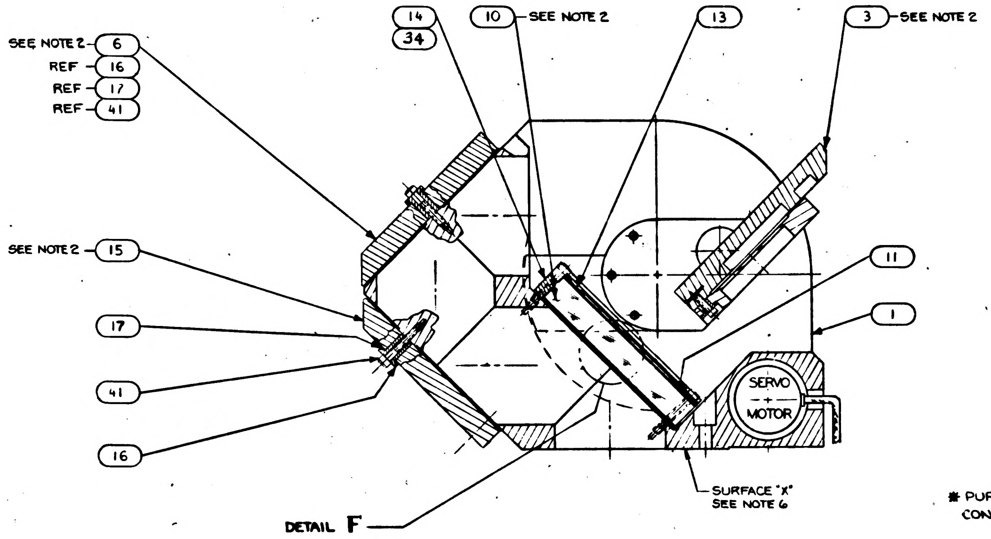
DETAIL E
SCALE 2/1





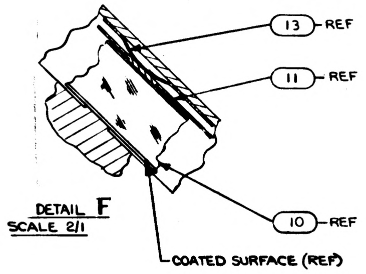
24 REF
55
9 REF

PARTIAL SECTION G-G
SCALE: 1/1



14
34
10 SEE NOTE 2
13
3 SEE NOTE 2
SEE NOTE 2 6
REF 16
REF 17
REF 41
SEE NOTE 2 15
17
41
16
11
1
SERVO MOTOR
SURFACE "X"
SEE NOTE 6
DETAIL F

SECTION A-A



13 REF
11 REF
10 REF
COATED SURFACE (REF)

DETAIL F
SCALE 2/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
55	1		2012515	85386911280		HOUSING & LENS, ASSY OF (HORIZON SENSING)			
54	5	*	1011625-30	74455151030		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
53	1	*	1011918-1			WASHER, CABLE CLAMP			
52	1	*	1000220-5			CLAMP, CABLE			
51	1		2012509	80386910070		HEAD ELECTRONICS, HARNESS ASSY OF			
50	12		NAS1189C02P4L	74455155002		SCREW 100° FLAT HD, SELF LOCKING			
49	9		NAS1352C02LL6	74455157007		SCREW, CAP HEX SOC HD, SELF LOCKING			
48	6	*	1011625-11	74455151011		↑			
47	3		NAS1352C03LL4	74455157009		↑			
46									
45	1	*	1011625-24	74455151024		↓			
44	3		NAS1352C04LL4	74455157013		↓			
43	4	*	1011625-28	74455151028		↓			
42									
41	6		NAS1352C04LL10	74455157016		SCREW, CAP, HEX SOC HD, SELF LOCKING			
40									
39									
38									
37	9	*	1010608-2	—		WASHER, SPRING, CURVED			
36	3	*	1011918-1	—		WASHER, CABLE CLAMP			
35	3	*	1000220-4	—		CLAMP, CABLE			
34	4	*	1011625-34	74455151034		SCREW, CAP, HEX SOC HD, SELF LOCKING			
33									
32									
31									
30									
29	1		2012461	52386910860		SPACER			
28	1		2012462	56386910500		SPACER			
27	1		2012466	57386911120		SPACER, VARIABLE			
26	1		2012464	56386910520		APERTURE, STAR TRACKER			
25	1		2012467	57386911130		SPACER			
24	1		2012393	85386911270		HOUSING & FILTER, ASSY OF			
23	1		2012480	85386910980		HOUSING & LENS ASSY (STAR TRACKER)			
22	1		2012368	52386910080		MIRROR, STAR TRACKER			
21	1		2012369	52386910090		MIRROR, STAR TRACKER			
20	1		2012451	52386910810		MIRROR, HORIZON SENSOR			
19	9		2012465	57386911110		BUSHING, MIRROR			
18									
17	6		2011213	59386910010		WASHER, WAVE			
16	6		2011214	57386910220		BUSHING, MIRROR			
15	1		2011260	52386910380		MIRROR, SEXTANT HEAD			
14	1		2011598	52386910390		RETAINER, BEAM SPLITTER			
13	1		2011634	56386910150		SPRING, BEAM SPLITTER			
12	7		NAS1352C04LL6	74455157014		SCREW, CAP HEX SOC HD, SELF LOCKING			
11	AR		2011635	56386910160		SPACER, BEAM SPLITTER			
10	1		2012222	28386910550		BEAM SPLITTER			
9	1		2012482	56386910540		SPACER			
8	1		2011671	57386910010		RETAINER, DRIVE BEARING			
7	1		2011266	57386910230		RETAINER, BEARING			
6	1		2012366	52386910310		MIRROR, SEXTANT HEAD			
5	1		2011233	33386910010		GEAR, SPUR (128T-96P)			
4	1		2011940	85386910090		SPRING & COLLET, ASSY OF			
3	1		2011712	85386910050		INDEXING MIRROR & MOUNT ASSEMBLY			
2	1		2011706	85386910100		TRUNNION DRIVE GEARBOX ASSEMBLY			
1	1		2011254	85386910040		HOUSING, SXT HEAD, ASSY OF (MACHINING)			

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150

DRAWN J Schuller DATE 6-9-64
CHECKED C Lappstuff 8/1/64
APPROVAL 9/3/
APPROVAL E Phang 8/31/64
NASA APPROVAL
MIT APPROVAL 11 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 2011701
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

2011701 B

2011701 B

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER TDRR 20199	7/8/65	WR

NOTES:

1. a. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

1. b. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

2. SELECT ITEMS 6, 10, AND 15 TO PRODUCE OPTIMUM FOCUS AND RESOLUTION IN CONJUNCTION WITH ITEM 3 BY THE FOLLOWING CRITERIA BASED ON THE INSPECTION OF ITEMS BY INTERFEROMETER.

a) THE ALGEBRAIC SUM OF THE FRINGE CURVATURES TAKING CONCAVE AS PLUS AND CONVEX AS MINUS SHALL BE BETWEEN +1/2 AND -1/2 FOR BOTH THE LONG (2 1/4") AND SHORT (1.6") AXES OF THE USED ELLIPTICAL AREA OF THE SURFACES. THE ALGEBRAIC SUM OF THE FRINGE CURVATURES FOR THE LONG AXIS SHALL EQUAL THE ALGEBRAIC SUM OF THE FRINGE CURVATURES FOR THE SHORT AXIS WITHING 1/2 FRINGE.

b) MEASUREMENT PRECISION OF 1/4 FRINGE AT 5461 Å IS ASSUMED.

c) VERIFY SELECTION BY MEASUREMENT OF:

1. RESOLUTION -- 5 SECONDS OF ARC OR BETTER

2. a. COMBINED FLATNESS -- 1/2 FRINGE (INTERFEROMETER)

OR

2. b. FOCUS -- ± 1 1/4 MILLI DIOPTERS

3. MACHINE ITEM 8 AT ASSEMBLY TO APPLY 10 ± 1 POUNDS PRELOAD ON THE BALL BEARINGS OF ITEM 3. TOUCH UP ITEM 8 BY APPLICATION OF CHEMICAL FILM PER MIL-C-5541, TYPE I, GRADE B, CLASS 1, WHERE MACHINING HAS REMOVED ORIGINAL FINISH.

4. MACHINE ITEM 27 AT ASSEMBLY TO FOCUS COLLIMATED LIGHT OF 4000Å WAVELENGTH AT WITHIN ±.003 OF MIDPOINT BETWEEN THE TWO REEDS OF THE 1012154 STAR TRACKER TUNING FORK ASSY (PART OF ITEM 51). THIS OPERATION MAY BE MONITORED BY CALCULATING THE SPACER (ITEM 27) DIMENSION FROM MEASUREMENTS ON THE FOCUS AT SOME OTHER WAVELENGTH OF KNOWN DISPLACEMENT FROM THE 4000Å FOCUS AND FROM MEASUREMENTS RELATING THE POSITION OF A REFERENCE RETICLE SUBSTITUTE FOR THE TUNING FORK ASSY. TOUCH UP ITEM 27 BY APPLICATION OF CHEMICAL FILM PER MIL-C-5541 TYPE I, GRADE B, CLASS I WHERE MACHINING HAS REMOVED ORIGINAL FINISH.

5. MACHINE AND REPASSIVATE ITEM 9 AT ASSEMBLY TO FOCUS COLLIMATED LIGHT OF 3500 Å WAVELENGTH WITHIN ±.003 AT THE APERATURE OF THE 1012155 HORIZON PHOTOMETER TUNING FORK ASSY (PART OF ITEM 51). THIS OPERATION MAY BE MONITORED BY CALCULATING THE SPACER (ITEM 9) DIMENSION FROM MEASUREMENTS ON THE FOCUS AT SOME OTHER WAVELENGTH OF KNOWN DISPLACEMENT FROM THE 3500 Å FOCUS AND FROM MEASUREMENTS RELATING THE POSITION OF A REFERENCE RETICLE SUBSTITUTED FOR THE TUNING FORK ASSY.

6. MACHINE AND REPASSIVATE ITEM 29 AT ASSEMBLY TO POSITION THE 1012154 STAR TRACKER TUNING FORK ASSY. (PART OF ITEM 51) SO THAT A LINE OF SIGHT TO THE MID-POINT OF THE REED APERATURES AT REST IS PERPENDICULAR WITHIN 20 SECONDS TO A LINE OF SIGHT WHICH EXITS NORMAL TO SURFACE "X".

7. SIMILARLY TREAT ITEM 28 TO OBTAIN PERPENDICULARITY OF 1 MINUTE TO THE TRUNNION DRIVE AXIS.

8. WITH COLLIMATED LIGHT PARALLEL TO THE SLOS DIRECTED INTO THE TRACKER, ROTATE HEAD ELECTRONICS (TRACKER) (PART OF ITEM 51) TO OBTAIN MAXIMUM PHOTOTUBE CURRENT.

9. VIBRATION PROOF ITEM 23 BY APPLYING ONE DROP OF LOCKING COMPOUND, GRADE "E" OF MIL-S-22473 IN ACCORDANCE WITH ND 1002211, THRU .060 DIAMETER HOLE IN ITEM 1.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150

DRAWN V. AMATO DATE 6-11-65
CHECKED F. Raymond 6-30-65
APPROVAL
APPROVAL E. Thorup 7-2-65
NASA APPROVAL 7-13-65
MIT APPROVAL 12 July 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

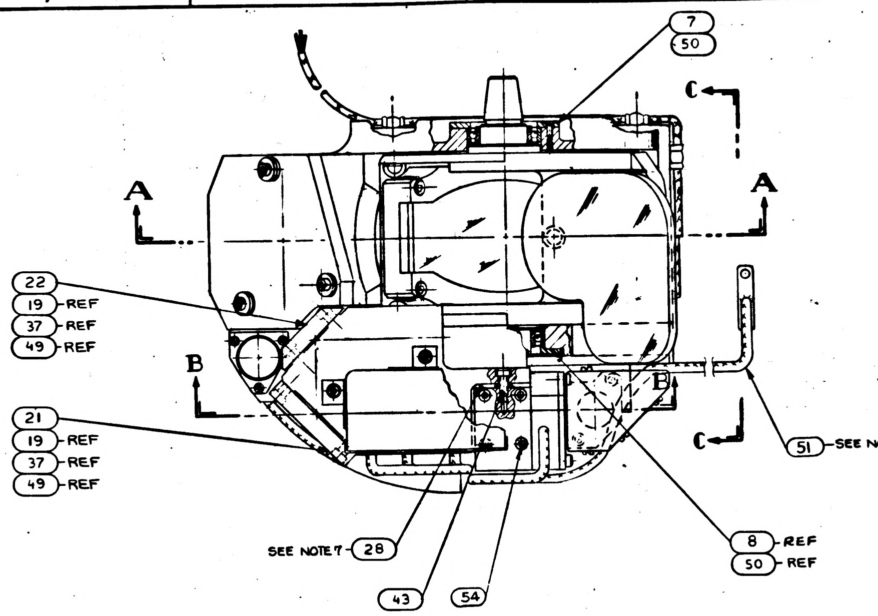
CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011701

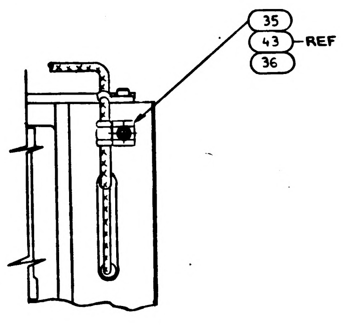
SCALE V1 WEIGHT CALC ACTUAL SHEET 2 OF 2

2011701 C

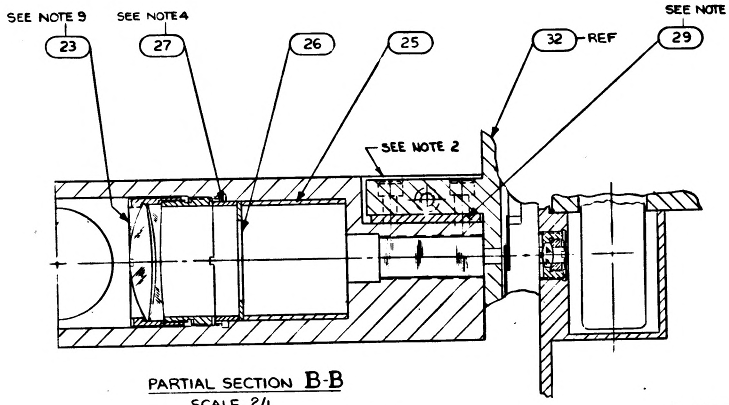
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 20187		wk
B		REVISED PER TDRR 20199	5-5-65	wk
C		REVISED PER TDRR 21535		wk

SEE SHEET 2 OF 2 FOR NOTES.

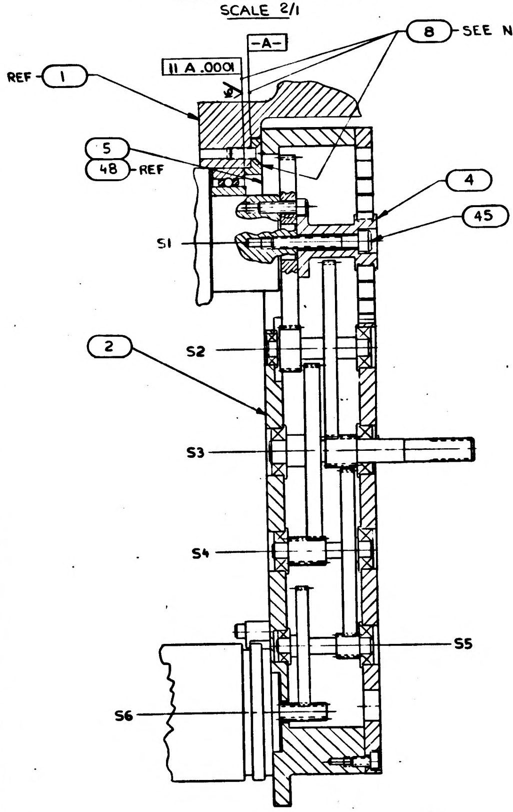

7
50
A
A
C
C
B
B
22
19 REF
37 REF
49 REF
21
19 REF
37 REF
49 REF
SEE NOTE 7 28
43
54
51 SEE NOTE 8
8 REF
50 REF



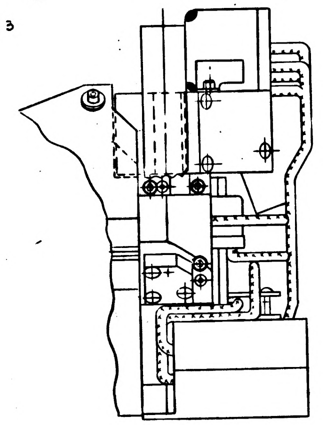
PARTIAL VIEW C-C

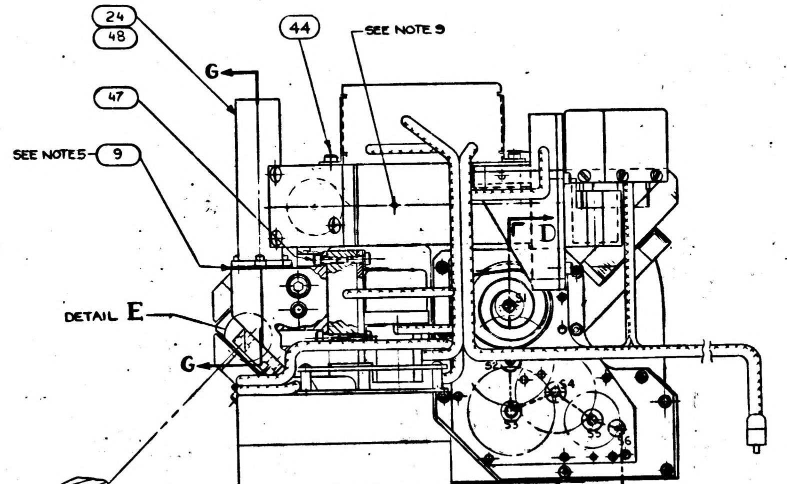

SEE NOTE 9
23
SEE NOTE 4
27
26
25
32 REF
SEE NOTE 6
29
SEE NOTE 2

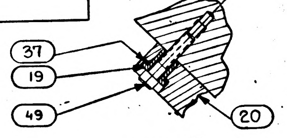
PARTIAL SECTION B-B
SCALE 2/1


REF 1
11 A .0001
-A-
8 SEE NOTE 3
5
48 REF
4
45
S1
2
S2
S3
S4
S5
S6

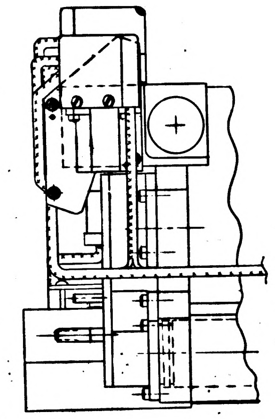
PARTIAL SECTION D-D
SCALE 2/1

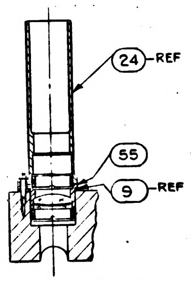



24
48
44
SEE NOTE 9
47
G
SEE NOTE 5 9
DETAIL E
G
D
12
D

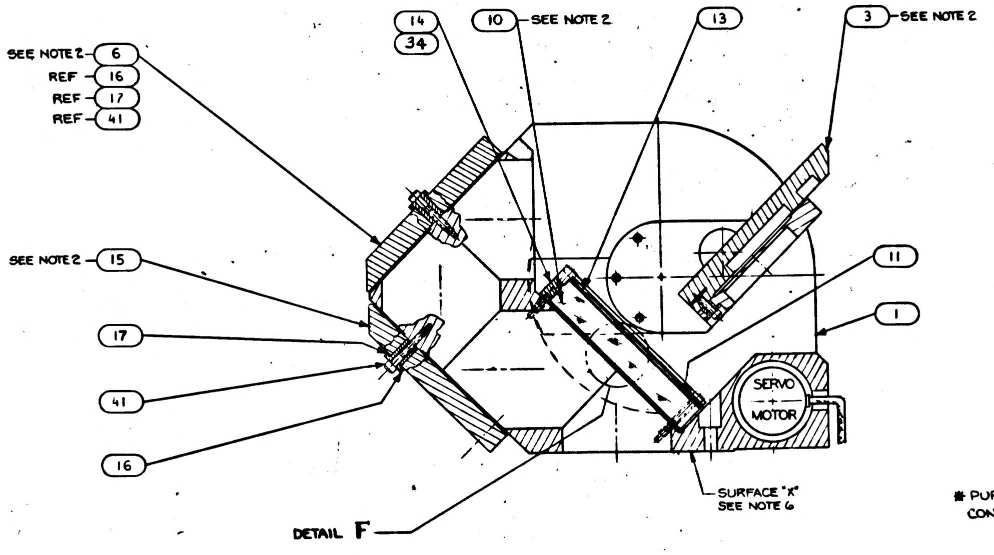


DETAIL E
SCALE 2/1

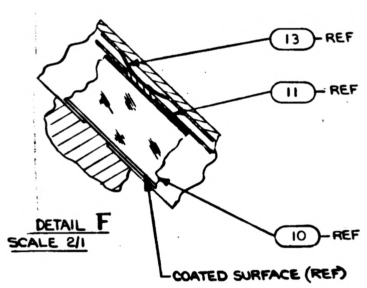



24 REF
55
9 REF

PARTIAL SECTION G-G
SCALE: 1/1


SEE NOTE 2 6
REF 16
REF 17
REF 41
14
34
10 SEE NOTE 2
13
3 SEE NOTE 2
SEE NOTE 2 15
11
1
17
41
16
SERVO MOTOR
SURFACE "X" SEE NOTE 6
DETAIL F

SECTION A-A


13 REF
11 REF
10 REF
COATED SURFACE (REF)

DETAIL F
SCALE 2/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
55	1		2012515	85386911280		HOUSING & LENS, ASSY OF (HORIZON SENSING)			
54	4	*	1011625-30	74455151030		SCREW, CAP, HEX SOC. HD, SELF LOCKING			
53									
52									
51	1		2012509	80386910070		HEAD ELECTRONICS, HARNESS ASSY OF			
50	12		NAS1189C02P4L	74455155002		SCREW, 100° FLAT HD, SELF LOCKING			
49	9		NAS1352C02LL6	74455157007		SCREW, CAP HEX SOC HD, SELF LOCKING			
48	6	*	1011625-11	74455151011		↑			
47	3		NAS1352C03LL4	74455157009					
46									
45	1	*	1011625-24	74455151024					
44	3		NAS1352C04LL4	74455157013					
43	4	*	1011625-28	74455151028		↓			
42									
41	6		NAS1352C04LL10	74455157016		SCREW, CAP, HEX SOC HD, SELF LOCKING			
40									
39									
38									
37	9	*	1010608-2	—		WASHER, SPRING, CURVED			
36	3	*	1011918-1	—		WASHER, CABLE CLAMP			
35	3	*	1000220-4	—		CLAMP, CABLE			
34	4	*	1011625-34	74455151034		SCREW, CAP, HEX SOC HD, SELF LOCKING			
33									
32									
31									
30									
29	1		2012461	52386910860		SPACER			
28	1		2012462	56386910500		SPACER			
27	1		2012466	57386911120		SPACER, VARIABLE			
26	1		2012464	56386910520		APERTURE, STAR TRACKER			
25	1		2012467	57386911130		SPACER			
24	1		2012393	85386911270		HOUSING & FILTER, ASSY OF			
23	1		2012480	85386910980		HOUSING & LENS ASSY (STAR TRACKER)			
22	1		2012368	52386910080		MIRROR, STAR TRACKER			
21	1		2012369	52386910090		MIRROR, STAR TRACKER			
20	1		2012451	52386910810		MIRROR, HORIZON SENSOR			
19	9		2012465	57386911110		BUSHING, MIRROR			
18									
17	6		2011213	59386910010		WASHER, WAVE			
16	6		2011214	57386910220		BUSHING, MIRROR			
15	1		2011260	52386910380		MIRROR, SEXTANT HEAD			
14	1		2011598	52386910390		RETAINER, BEAM SPLITTER			
13	1		2011634	56386910150		SPRING, BEAM SPLITTER			
12	8		NAS1352C04LL6	74455157014		SCREW CAP HEX SOC HD, SELF LOCKING			
11	AR		2011635	56386910160		SPACER, BEAM SPLITTER			
10	1		2012222	28386910550		BEAM SPLITTER			
9	1		2012482	56386910540		SPACER			
8	1		2011671	57386910010		RETAINER, DRIVE BEARING			
7	1		2011266	57386910230		RETAINER, BEARING			
6	1		2012366	52386910310		MIRROR, SEXTANT HEAD			
5	1		2011233	33386910010		GEAR, SPUR (128T-96P)			
4	1		2011940	85386910090		SPRING & COLLET, ASSY OF			
3	1		2011712	85386910050		INDEXING MIRROR & MOUNT ASSEMBLY			
2	1		2011706	85386910100		TRUNNION DRIVE GEARBOX ASSEMBLY			
1	1		2011254	85386910040		HOUSING, SXT HEAD, ASSY OF (MACHINING)			

LIST OF PARTS AND MATERIALS

2011701 C

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150
DRAWN Schiller DATE 6-9-64
CHECKED 8/1/64
APPROVAL 9/3/64
APPROVAL E. Thomas 8/31/64
NASA APPROVAL
MIT APPROVAL 11 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 2011701
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

2011701 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
B		REVISED PER TDRR 20199	7/8/65	WR
C		REVISED PER TDRR 21535	[illegible]	WR

NOTES:

1. a. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

1. b. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

2. SELECT ITEMS 6, 10, AND 15 TO PRODUCE OPTIMUM FOCUS AND RESOLUTION IN CONJUNCTION WITH ITEM 3 BY THE FOLLOWING CRITERIA BASED ON THE INSPECTION OF ITEMS BY INTERFEROMETER.

   a) THE ALGEBRAIC SUM OF THE FRINGE CURVATURES TAKING CONCAVE AS PLUS AND CONVEX AS MINUS SHALL BE BETWEEN +1/2 AND -1/2 FOR BOTH THE LONG (2 1/4") AND SHORT (1.6") AXES OF THE USED ELLIPTICAL AREA OF THE SURFACES. THE ALGEBRAIC SUM OF THE FRINGE CURVATURES FOR THE LONG AXIS SHALL EQUAL THE ALGEBRAIC SUM OF THE FRINGE CURVATURES FOR THE SHORT AXIS WITHING 1/2 FRINGE.

   b) MEASUREMENT PRECISION OF 1/4 FRINGE AT 5461 Å IS ASSUMED.

   c) VERIFY SELECTION BY MEASUREMENT OF:

      1. RESOLUTION -- 5 SECONDS OF ARC OR BETTER

      2. a. COMBINED FLATNESS -- 1/2 FRINGE (INTERFEROMETER)

      OR

      2. b. FOCUS -- ± 1 1/4 MILLI DIOPTERS

3. MACHINE ITEM 8 AT ASSEMBLY TO APPLY 10 ± 1 POUNDS PRELOAD ON THE BALL BEARINGS OF ITEM 3. TOUCH UP ITEM 8 BY APPLICATION OF CHEMICAL FILM PER MIL-C-5541, TYPE I, GRADE B, CLASS 1, WHERE MACHINING HAS REMOVED ORIGINAL FINISH.

4. MACHINE ITEM 27 AT ASSEMBLY TO FOCUS COLLIMATED LIGHT OF 4000Å WAVELENGTH AT WITHIN ±.003 OF MIDPOINT BETWEEN THE TWO REEDS OF THE 1012154 STAR TRACKER TUNING FORK ASSY (PART OF ITEM 51). THIS OPERATION MAY BE MONITORED BY CALCULATING THE SPACER (ITEM 27) DIMENSION FROM MEASUREMENTS ON THE FOCUS AT SOME OTHER WAVELENGTH OF KNOWN DISPLACEMENT FROM THE 4000Å FOCUS AND FROM MEASUREMENTS RELATING THE POSITION OF A REFERENCE RETICLE SUBSTITUTE FOR THE TUNING FORK ASSY. TOUCH UP ITEM 27 BY APPLICATION OF CHEMICAL FILM PER MIL-C-5541 TYPE I, GRADE B, CLASS I WHERE MACHINING HAS REMOVED ORIGINAL FINISH.

5. MACHINE AND REPASSIVATE ITEM 9 AT ASSEMBLY TO FOCUS COLLIMATED LIGHT OF 3500 Å WAVELENGTH WITHIN ±.003 AT THE APERATURE OF THE 1012155 HORIZON PHOTOMETER TUNING FORK ASSY (PART OF ITEM 51). THIS OPERATION MAY BE MONITORED BY CALCULATING THE SPACER (ITEM 9) DIMENSION FROM MEASUREMENTS ON THE FOCUS AT SOME OTHER WAVELENGTH OF KNOWN DISPLACEMENT FROM THE 3500 Å FOCUS AND FROM MEASUREMENTS RELATING THE POSITION OF A REFERENCE RETICLE SUBSTITUTED FOR THE TUNING FORK ASSY.

6. MACHINE AND REPASSIVATE ITEM 29 AT ASSEMBLY TO POSITION THE 1012154 STAR TRACKER TUNING FORK ASSY. (PART OF ITEM 51) SO THAT A LINE OF SIGHT TO THE MID-POINT OF THE REED APERATURES AT REST IS PERPENDICULAR WITHIN 20 SECONDS TO A LINE OF SIGHT WHICH EXITS NORMAL TO SURFACE "X".

7. SIMILARLY TREAT ITEM 28 TO OBTAIN PERPENDICULARITY OF 1 MINUTE TO THE TRUNNION DRIVE AXIS.

8. WITH COLLIMATED LIGHT PARALLEL TO THE SLOS DIRECTED INTO THE TRACKER, ROTATE HEAD ELECTRONICS (TRACKER) (PART OF ITEM 51) TO OBTAIN MAXIMUM PHOTOTUBE CURRENT.

9. VIBRATION PROOF ITEM 23 BY APPLYING ONE DROP OF LOCKING COMPOUND, GRADE "E" OF MIL-S-22473 IN ACCORDANCE WITH ND 1002211, THRU .060 DIAMETER HOLE IN ITEM 1.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150
DRAWN V. AMATO DATE 6-11-65
CHECKED R. Raymond 6-30-65
APPROVAL
APPROVAL E. Thorup 7-2-65
NASA APPROVAL 7-13-65
MIT APPROVAL 12 July 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011701
SCALE V1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

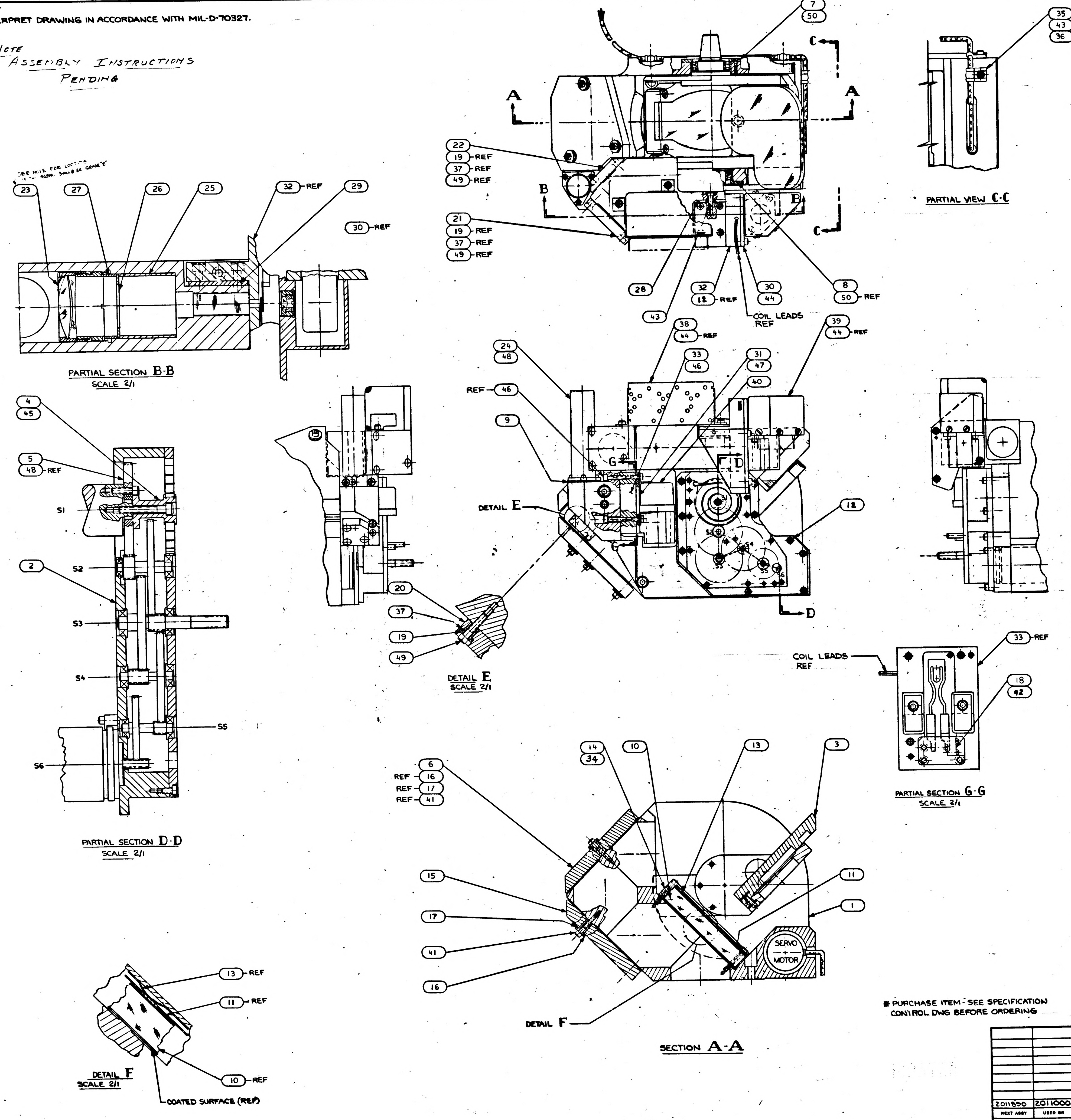
2011701 C

REVISIONS 12217

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.

NOTE
ASSEMBLY INSTRUCTIONS
PENDING



SEE NOTE FOR LOCTITE ... SHALL BE GRADE "C"
23
27
26
25
32 REF
29
30 REF
PARTIAL SECTION B-B
SCALE 2/1
4
45
5
48 REF
S1
2
S2
S3
S4
S5
S6
PARTIAL SECTION D-D
SCALE 2/1
7
50
C
A
A
22
19 REF
37 REF
49 REF
B
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21
19 REF
37 REF
49 REF
28
32
12 REF
30
44
COIL LEADS
REF
8
50 REF
43
C
35
43 REF
36
PARTIAL VIEW C-C
24
48
REF 46
9
38
44 REF
33
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39
44 REF
G
D
DETAIL E
G
12
D
20
37
19
49
DETAIL E
SCALE 2/1
COIL LEADS
REF
33 REF
18
42
PARTIAL SECTION G-G
SCALE 2/1
6
REF 16
REF 17
REF 41
14
34
10
13
3
15
17
41
16
11
1
SERVO MOTOR
DETAIL F
SECTION A-A
13 REF
11 REF
10 REF
DETAIL F
SCALE 2/1
COATED SURFACE (REF)

50	12		NAS1189C02P4L	74455155002		SCREW, 100° FLAT HD, SELF LOCKING			
49	9		NAS1352C02LL6	74455157007		SCREW, CAP, HEX SOC HD, SELF LOCKING			
48	6	*	1011625-11	74455151011					
47	3		NAS1352C03LL4	74455157009					
46	3	*	1011625-22	74455151022					
45	1	*	1011625-24	74455151024					
44	8		NAS1352C04LL4	74455157013					
43	4	*	1011625-28	74455151028					
42	3	*	1011625-4	74455151004					
41	6		NAS1352C04LL10	74455157016		SCREW, CAP, HEX SOC HD, SELF LOCKING			
40	1		2007025	—		HEAD, ELECTRONICS (PHOTOMETER)			
39	1		2007024	—		HEAD, ELECTRONICS (TRACKER)			
38	1		2007023	—		TUNING FORK ASSY (TRACKER & PHOTOMETER)			
37	9	*	1010608-2	—		WASHER, SPRING, CURVED			
36	3	*	1011918-1	—		WASHER, CABLE CLAMP			
35	3	*	1000220-4	—		CLAMP, CABLE			
34	4	*	1011625-34	74455151034		SCREW, CAP, HEX SOC HD, SELF LOCKING			
33	1	*	1012155	—		RESONATOR, TUNING FORKS, ASSY OF (H.P)			
32	1	*	1012154	—		RESONATOR, TUNING FORK, ASSY OF (S.T)			
31	1		2012481	85386910990		PHOTOMULTIPLIER HOUSING & LENS ASSY (H.S)			
30	1		2012483	85386911000		PHOTOMULTIPLIER HOUSING & LENS ASSY (S.T.)			
29	1		2012461	52386910860		SPACER			
28	1		2012462	56386910500		SPACER			
27	1		2012466	57386911120		SPACER, VARIABLE			
26	1		2012464	56386910520		APERTURE, STAR TRACKER			
25	1		2012467	57386911130		SPACER			
24	1		2012477	85386910950		HOUSING, HORIZON PHOTOMETER, ASSY OF			
23	1		2012480	85386910980		HOUSING & LENS ASSY (STAR TRACKER)			
22	1		2012368	52386910080		MIRROR, STAR TRACKER			
21	1		2012369	52386910090		MIRROR, STAR TRACKER			
20	1		2012451	52386910810		MIRROR, HORIZON SENSOR			
19	9		2012465	57386911110		BUSHING, MIRROR			
18	1		2012484	85386911010		PLATE, FIELD STOP, ASSY OF			
17	6		2011213	59386910010		WASHER, WAVE			
16	6		2011214	57386910220		BUSHING, MIRROR			
15	1		2011260	52386910380		MIRROR, SEXTANT HEAD			
14	1		2011598	52386910390		RETAINER, BEAM SPLITTER			
13	1		2011634	56386910150		SPRING, BEAM SPLITTER			
12	12		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC HD, SELF LOCKING			
11	AR		2011635	56386910160		SPACER, BEAM SPLITTER			
10	1		2012222	28386910550		BEAM SPLITTER			
9	1		2012482	56386910540		SPACER			
8	1		2011671	57386910010		RETAINER, DRIVE BEARING			
7	1		2011266	57386910230		RETAINER, BEARING			
6	1		2012366	52386910310		MIRROR, SEXTANT HEAD			
5	1		2011910	85386910060		GEAR & PIN, ASSY OF			
4	1		2011940	85386910090		SPRING & COLLET, ASSY OF			
3	1		2011712	85386910050		INDEXING MIRROR & MOUNT ASSEMBLY			
2	1		2011706	85386910100		TRUNNION DRIVE GEARBOX ASSEMBLY			
1	1		2011254	85386910040		HOUSING, SXT HEAD, ASSY OF (MACHINING)			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NAJA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910150
DRAWN DATE 6-3-64
CHECKED 8/1/64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SEXTANT INDEX HEAD
ASSEMBLY

CODE IDENT NO. SIZE E NASA NUMBER 2011701
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 2

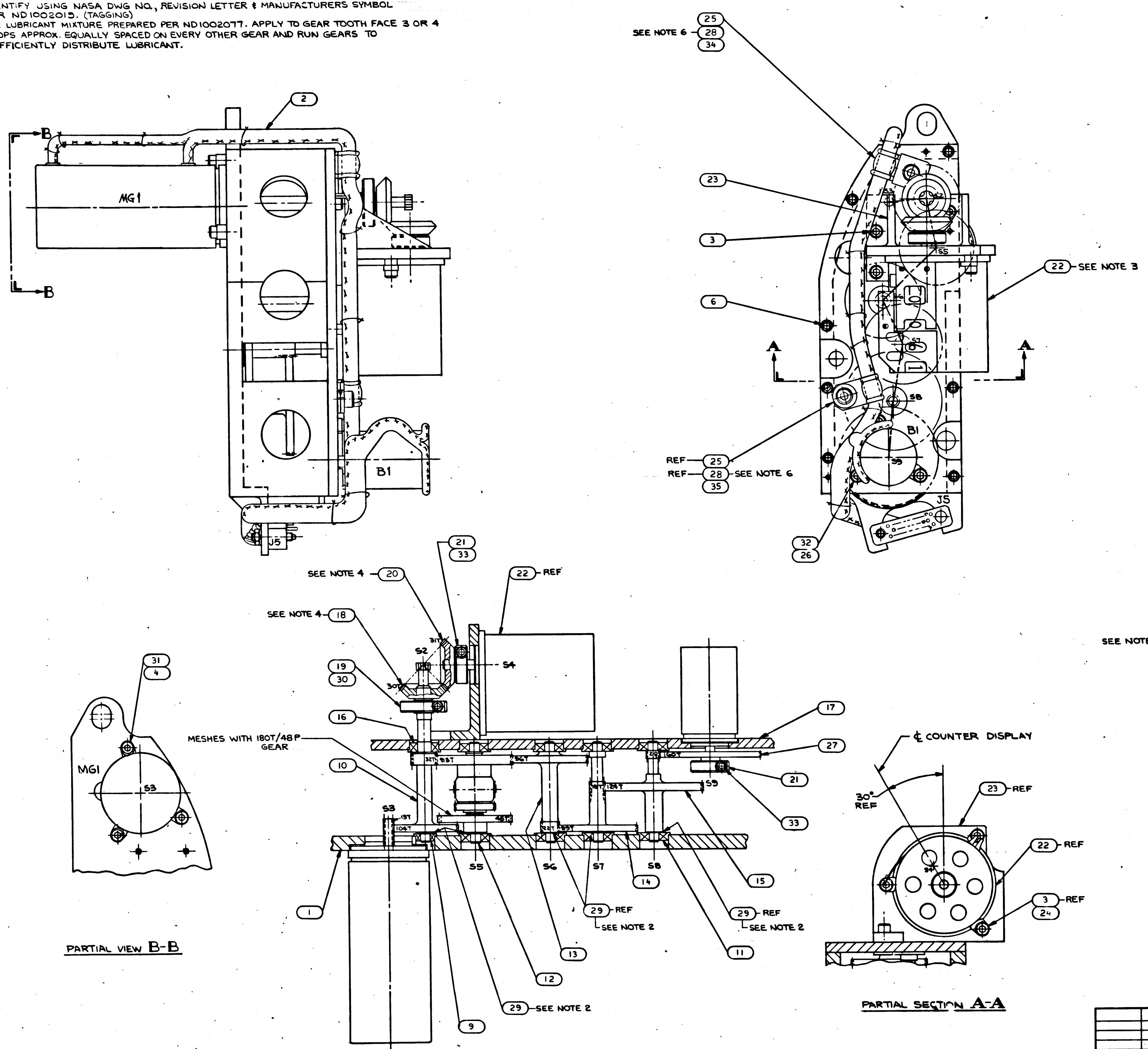
2011701

A 2011702

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	1-65	WK

NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FLAT WASHERS (ITEM 29) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT END PLAY TO .0005 TO .004 AT SHAFTS S2, S5, S6, S7 & S8.
3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEM 18 AND 20) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. VIBRATION PROOF ITEM 28 USING LOCKING COMPOUND GRADE "EV" OF MIL-S-22473 PER ND1002211
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
8. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROX. EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.



LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
30	1		NAS1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804-	938691 0201 0206		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD,			
27	1		2011277	33386910280		GEAR, SPUR (160T/120P)			
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	2	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
22	1	*	1012512	75005006801		COUNTER, ANGLE			
21	2		2011356-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	74471370001		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7		NAS1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6		NAS1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	80386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630

DRAWN [illegible] DATE 7-1-64
CHECKED J. SULLIVAN 7-20-64
APPROVAL [illegible] 7/23/64
APPROVAL E. Dhaup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO. | SIZE E | NASA NUMBER 2011702
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

B 2011702

REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	1/6/65	WK
B		REVISED PER TDRR 18562	1/27/65	WK

NOTES:-
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3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEM 18 AND 20) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
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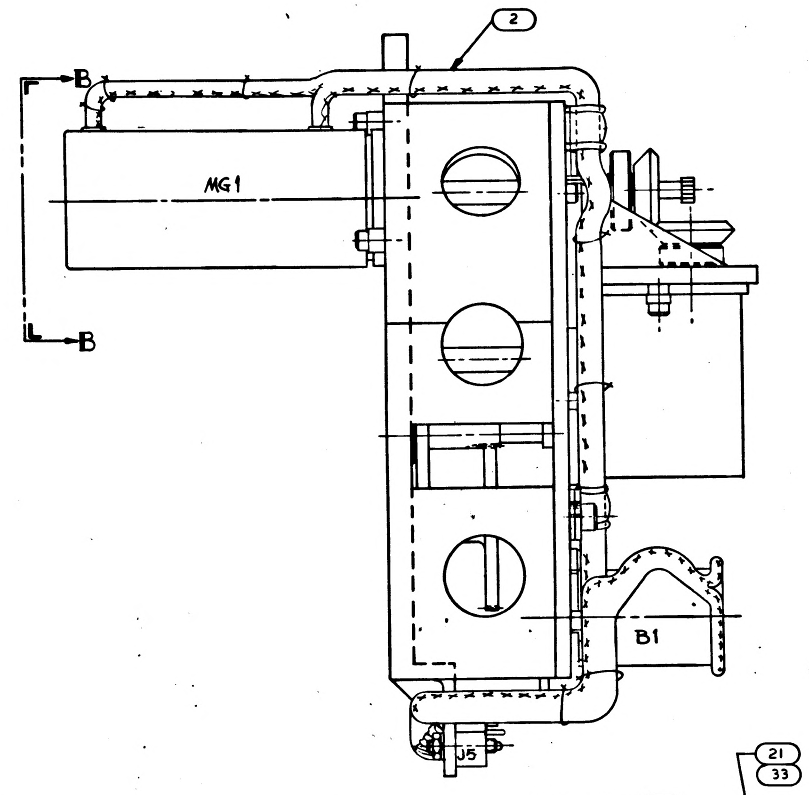
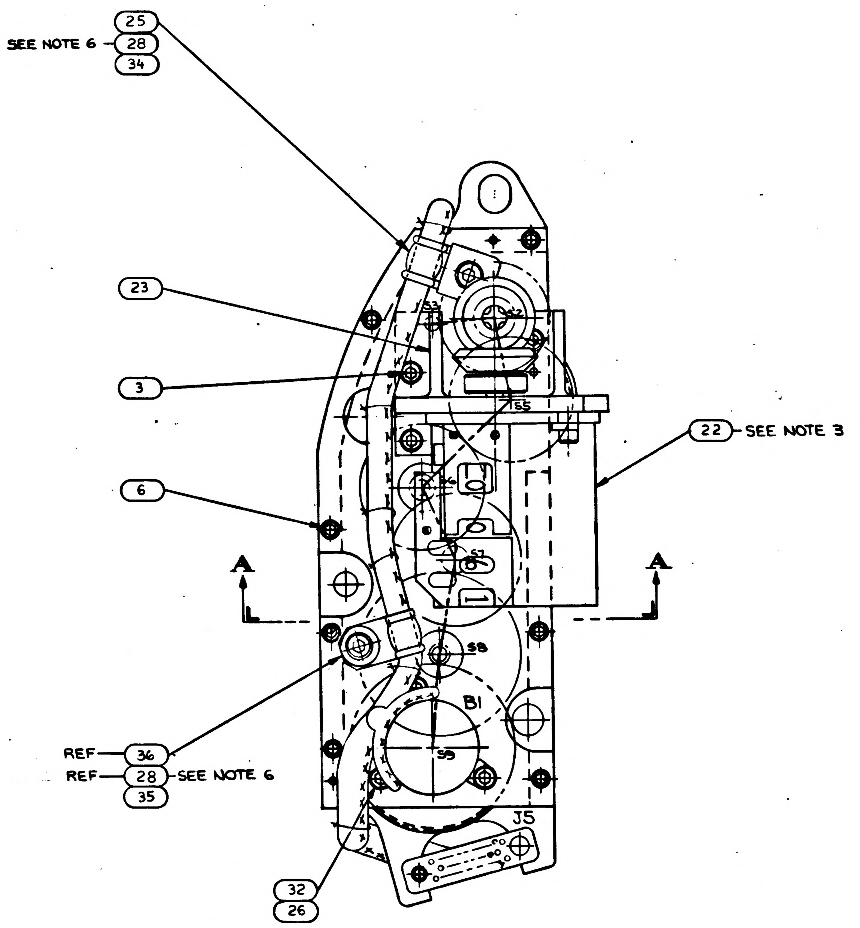
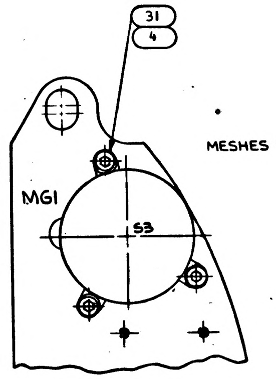
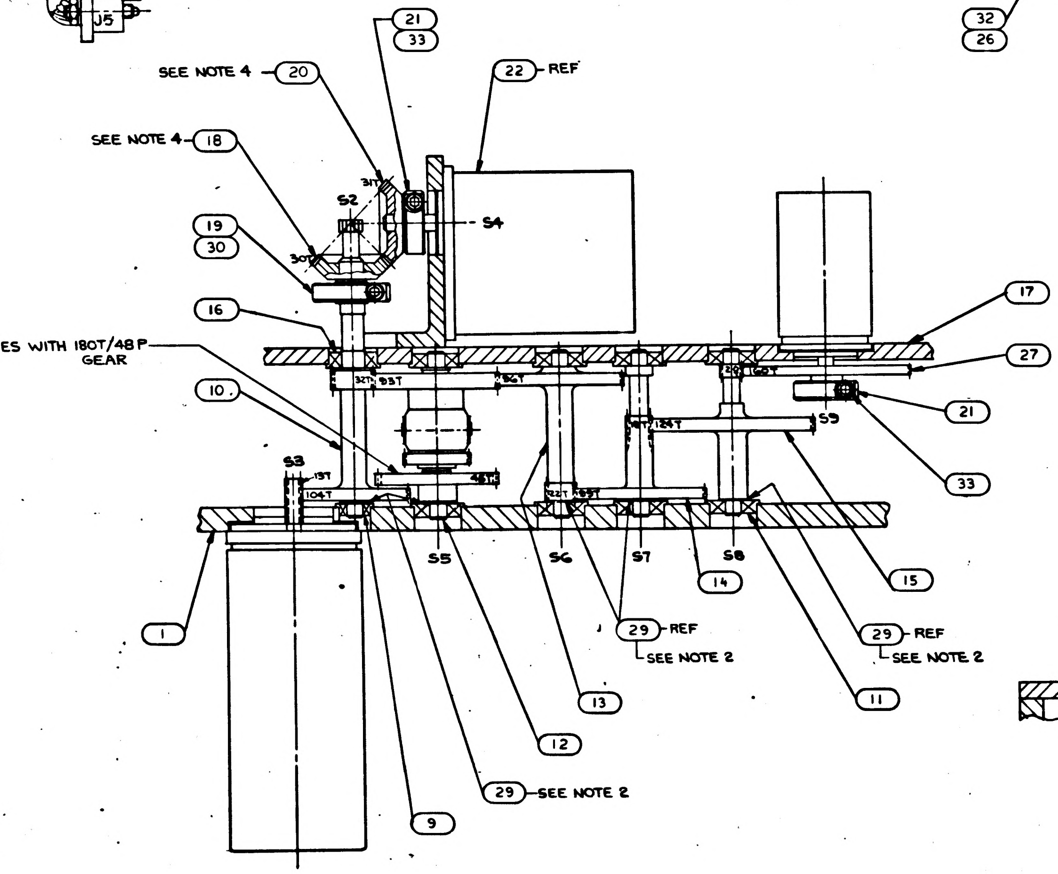
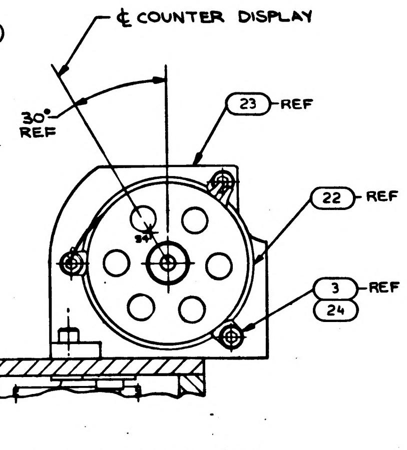






PARTIAL VIEW B-B





PARTIAL SECTION A-A

SEE NOTE 2 → item 29

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
36	1		2012510	48386910140		CLAMP, CABLE			
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
30	1	NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804-	79386910201 0206		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD,			
27	1		2011277	33386910280		GEAR, SPUR (160T/120P)			
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	1	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
22	1	*	1012512	75005006801		COUNTER, ANGLE			
21	2		2011355-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	74471370001		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011350	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	80386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN DATE 7-1-64
CHECKED T. SULLIVAN 7-28-64
APPROVAL 7/29/64
APPROVAL E. Dhaup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF 1

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

2011702

C 2011702

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	6/65	WK
B		REVISED PER TDRR 18562	12/65	WC
C		REVISED PER TDRR 19037	5/66	

REVISIONS TDRR 12119

NOTES:-

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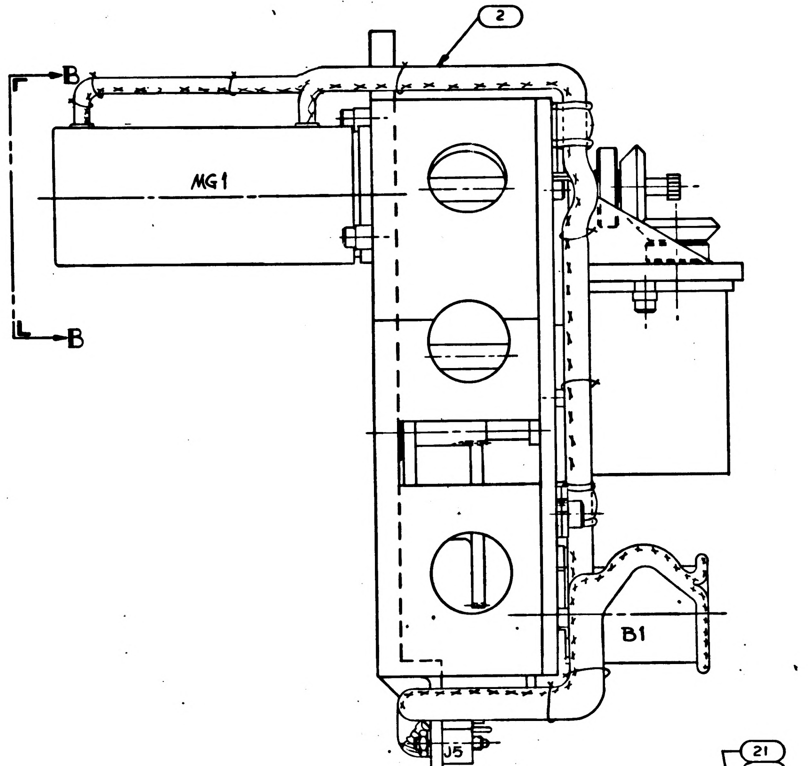
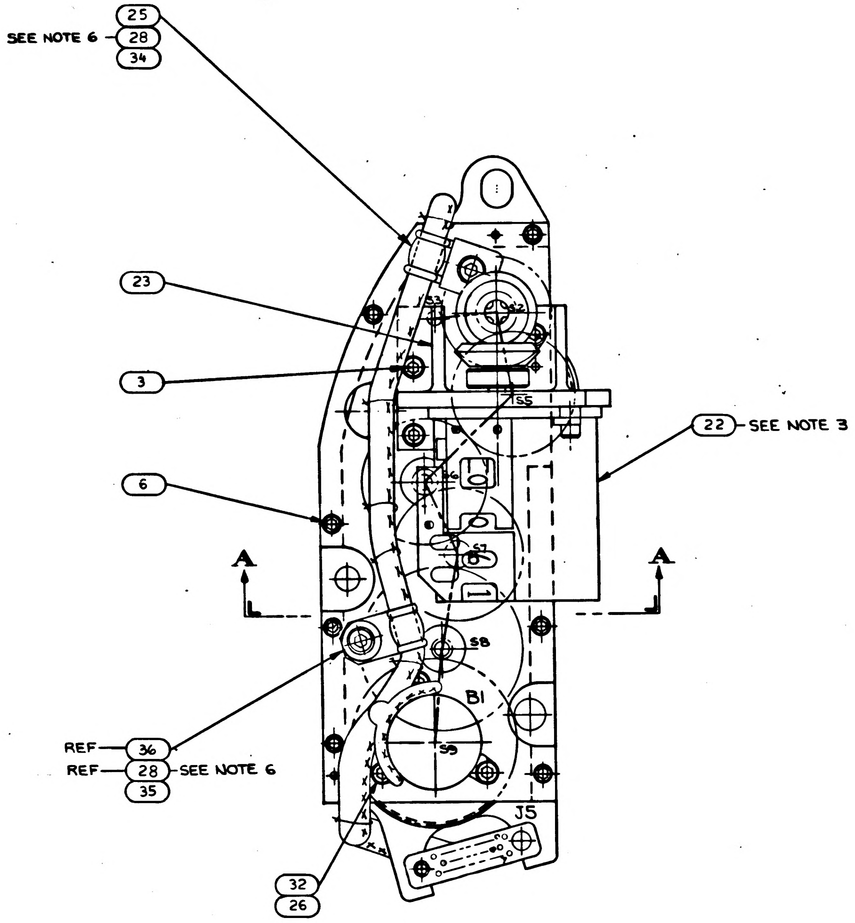
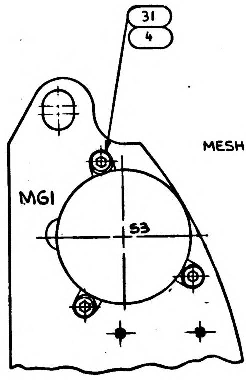
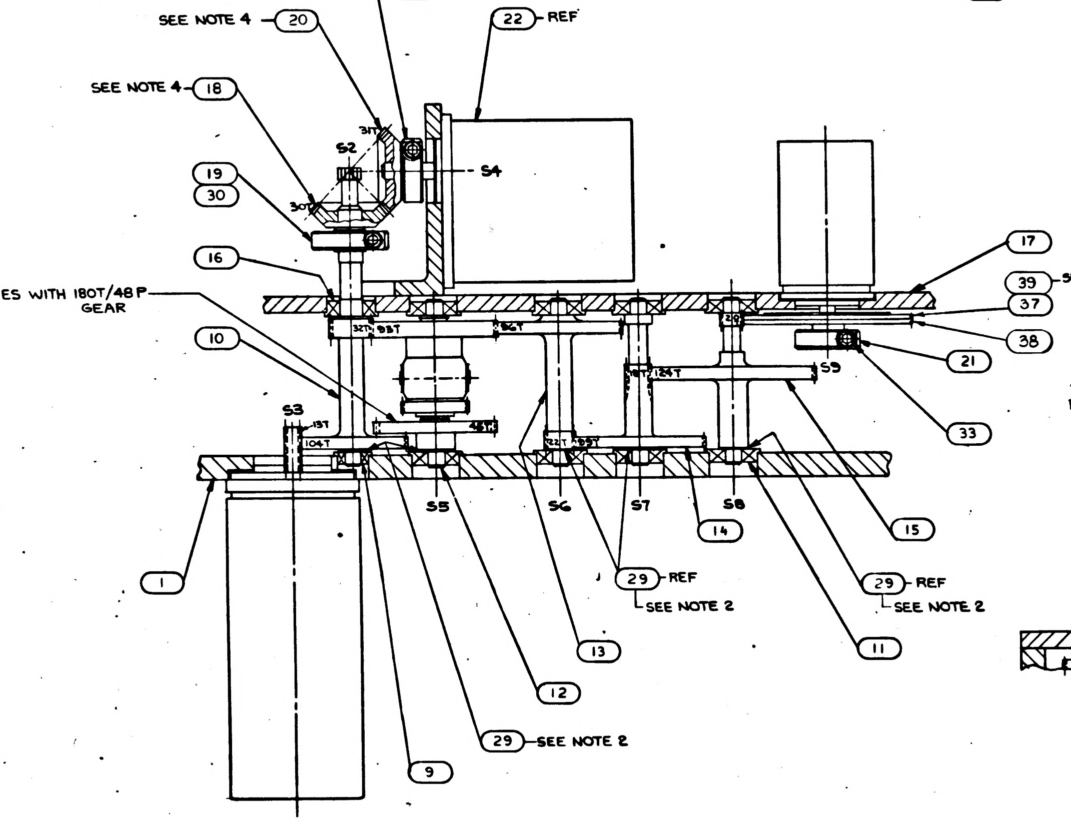
9. BEFORE MESHING ITEMS 37 AND 38 WITH ITEM 15, ASSEMBLE ITEMS 37, 38 & 39 AND ROTATE ITEM 37 CLOCKWISE WHEN VIEWED FROM THE CLAMP END UNTIL A TORQUE OF 1.5 ±0.2 OZ.IN. IS OBTAINED.

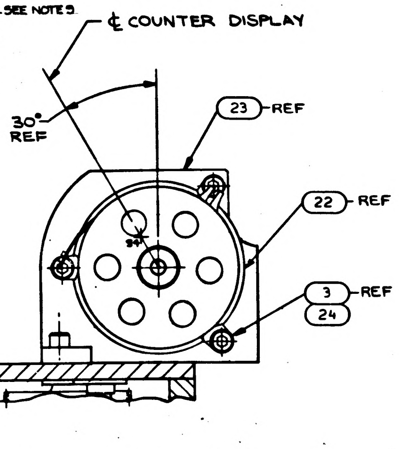






PARTIAL VIEW B-B





PARTIAL SECTION A-A

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
39	1		2012580-1	56386910590		SPRING, ANTI-BACKLASH			
38	1		2012577	33386910320		GEAR, SPUR 160T/120P			
37	1		2012576	33386910310		GEAR, SPUR 160T/120P			
36	1		2012510	48386910140		CLAMP, CABLE			
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
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29	AR		2011804-	79386910201 0206		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD,			
27									
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	1	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
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21	2		2011355-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
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16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
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11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
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1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

SEE NOTE 2 → 29

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

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APPLICATION

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ELMHURST NEW YORK
KIC PN 85386910630

DRAWN [illegible] DATE 7-1-64
CHECKED J. SULLIVAN 7-20-64
APPROVAL [illegible] 7/23/64
APPROVAL E. Maup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

2011702 D

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 12119		
A		REVISED PER TDRR NO. 15370	4/65	WK
B		REVISED PER TDRR 18562	1/27/65	WK
C		REVISED PER TURR 19037	8/65	WK
D		REVISED PER TDRR 20353	[illegible]	WK

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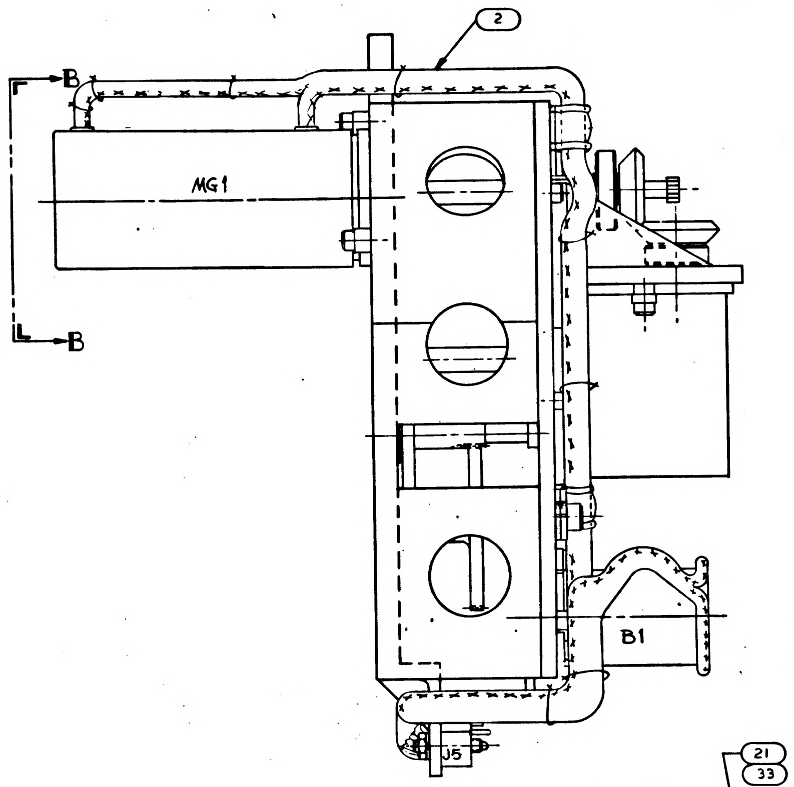
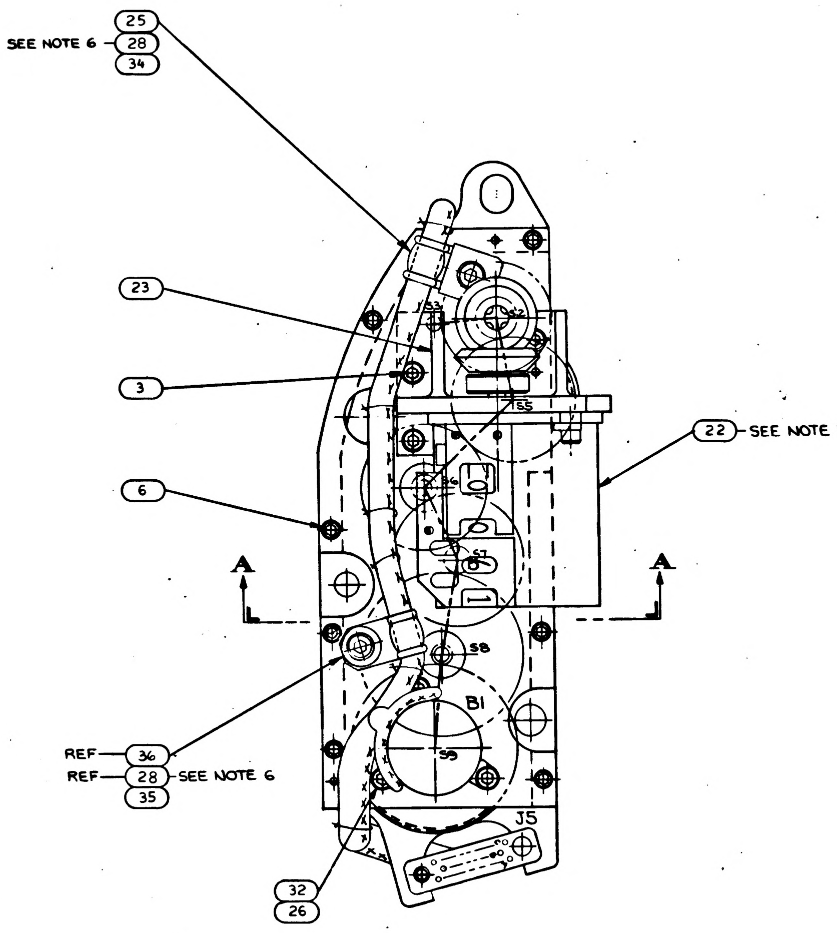
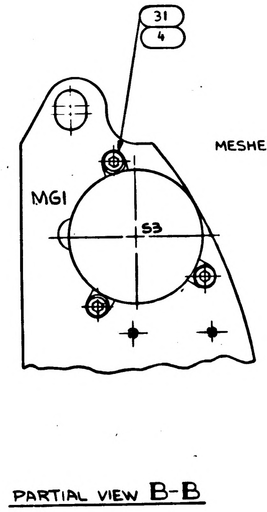
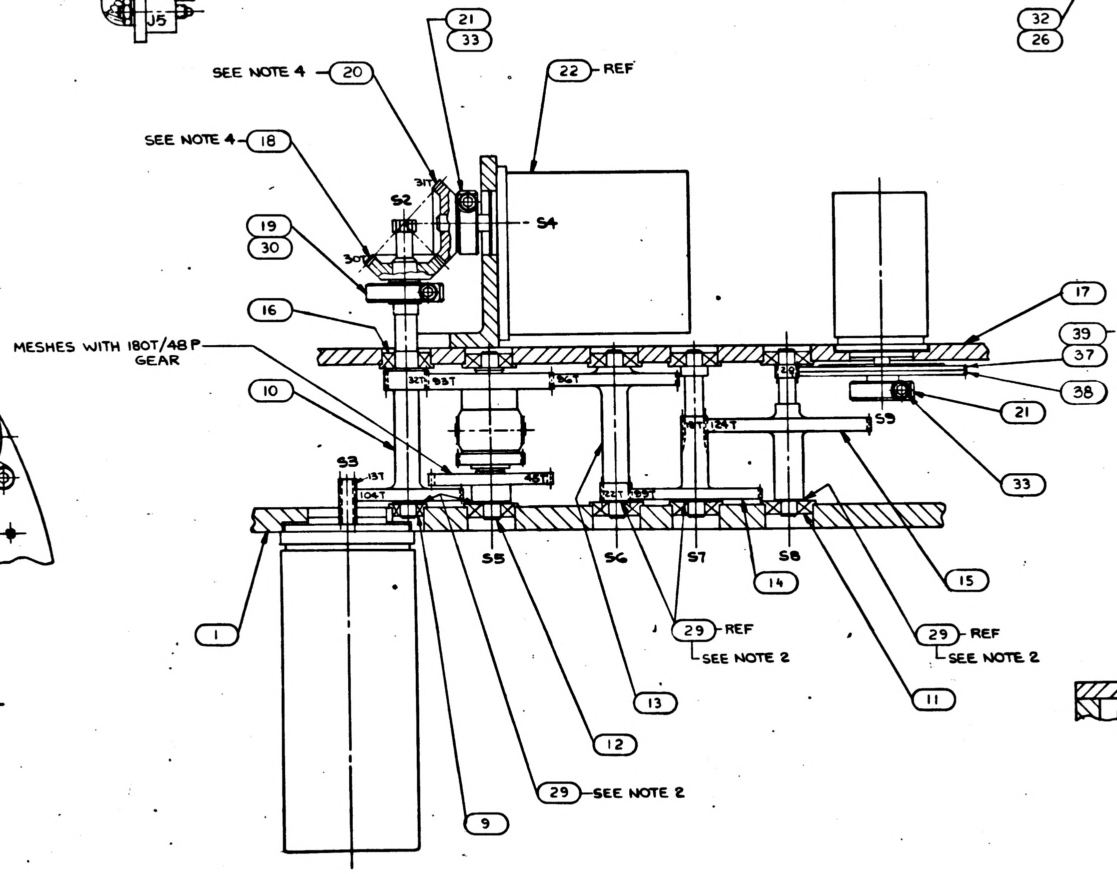
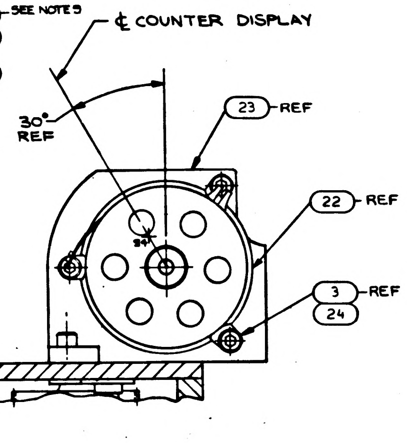






PARTIAL VIEW B-B





PARTIAL SECTION A-A

SEE NOTE 2 → 29

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
39	1		2012580-1	56386910590		SPRING, ANTI-BACKLASH			
38	1		2012577	33386910320		GEAR, SPUR 160T/120P			
37	1		2012576	33386910310		GEAR, SPUR 160T/120P			
36	1		2012510	48386910140		CLAMP, CABLE			
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
30	1	NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804-	79386910201 0206		WASHER, FLAT			
28	2	NAS	1352C06-6	—		SCREW, CAP, SOC HD,			
27									
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	1	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
22	1	*	1012512	75005006801		COUNTER, ANGLE			
21	2		2011356-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	74471370001		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	80336910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN [illegible] DATE 7-1-64
CHECKED J. SULLIVAN 7-20-64
APPROVAL [illegible] 7/29/64
APPROVAL E. Dhaus 8/15/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

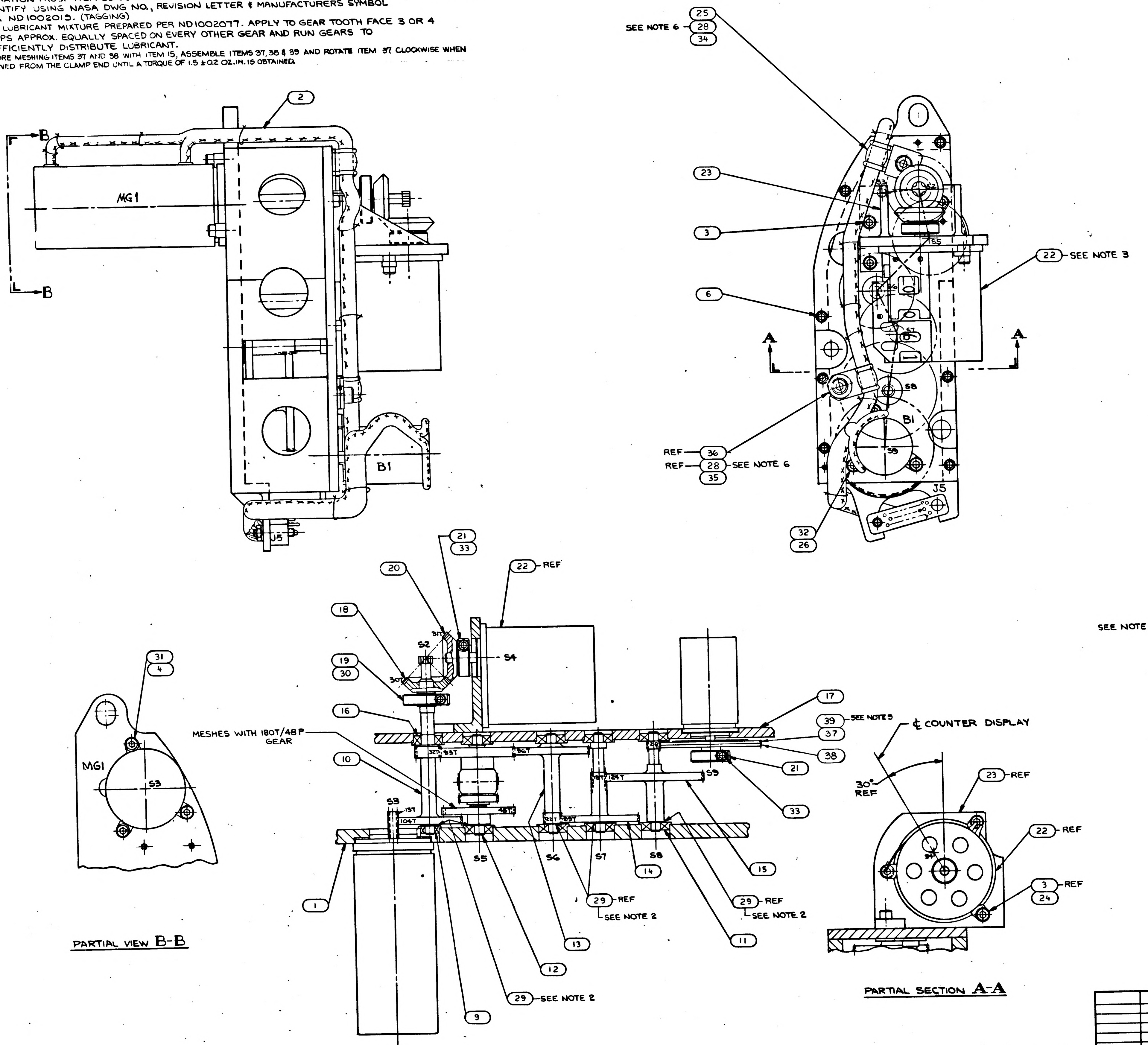
TITLE
TRUNNION DRIVE GEARBOX,
SCT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FLAT WASHERS (ITEM 29) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT END PLAY TO .0005 TO .004 AT SHAFTS S2, S5, S6, S7 & S8.
3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. VIBRATION PROOF ITEM 28 USING LOCKING COMPOUND GRADE "EV" OF MIL-S-22473 PER ND1002211
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)
8. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROX. EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
9. BEFORE MESHING ITEMS 37 AND 38 WITH ITEM 15, ASSEMBLE ITEMS 37, 38 & 39 AND ROTATE ITEM 37 CLOCKWISE WHEN VIEWED FROM THE CLAMP END UNTIL A TORQUE OF 1.5 ±0.2 OZ.IN. IS OBTAINED.

REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	6/65	wk
B		REVISED PER TDRR 18562	[illegible]	wk
C		REVISED PER TDRR 19037	[illegible]	wk
D		RE.ISED PER TDRR 20353	[illegible]	[illegible]
E		REVISED PER TDRR 20873	[illegible]	wk



PARTIAL VIEW B-B

PARTIAL SECTION A-A

SEE NOTE 2

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
39	1		2012580-1	56386910590		SPRING, ANTI-BACKLASH			
38	1		2012577	33386910320		GEAR, SPUR 160T/120P			
37	1		2012576	33386910310		GEAR, SPUR 160T/120P			
36	1		2012510	48386910140		CLAMP, CABLE			
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
30	1	NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804-	7938691 0201/0206		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD,			
27									
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	1	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
22	1	*	1012512	75005006801		COUNTER, ANGLE			
21	2		2011355-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 24T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	74471370001		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	80386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN [illegible] DATE 7-1-64
CHECKED J SULLIVAN 7-28-64
APPROVAL [illegible] 7/29/64
APPROVAL E. Dhaup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

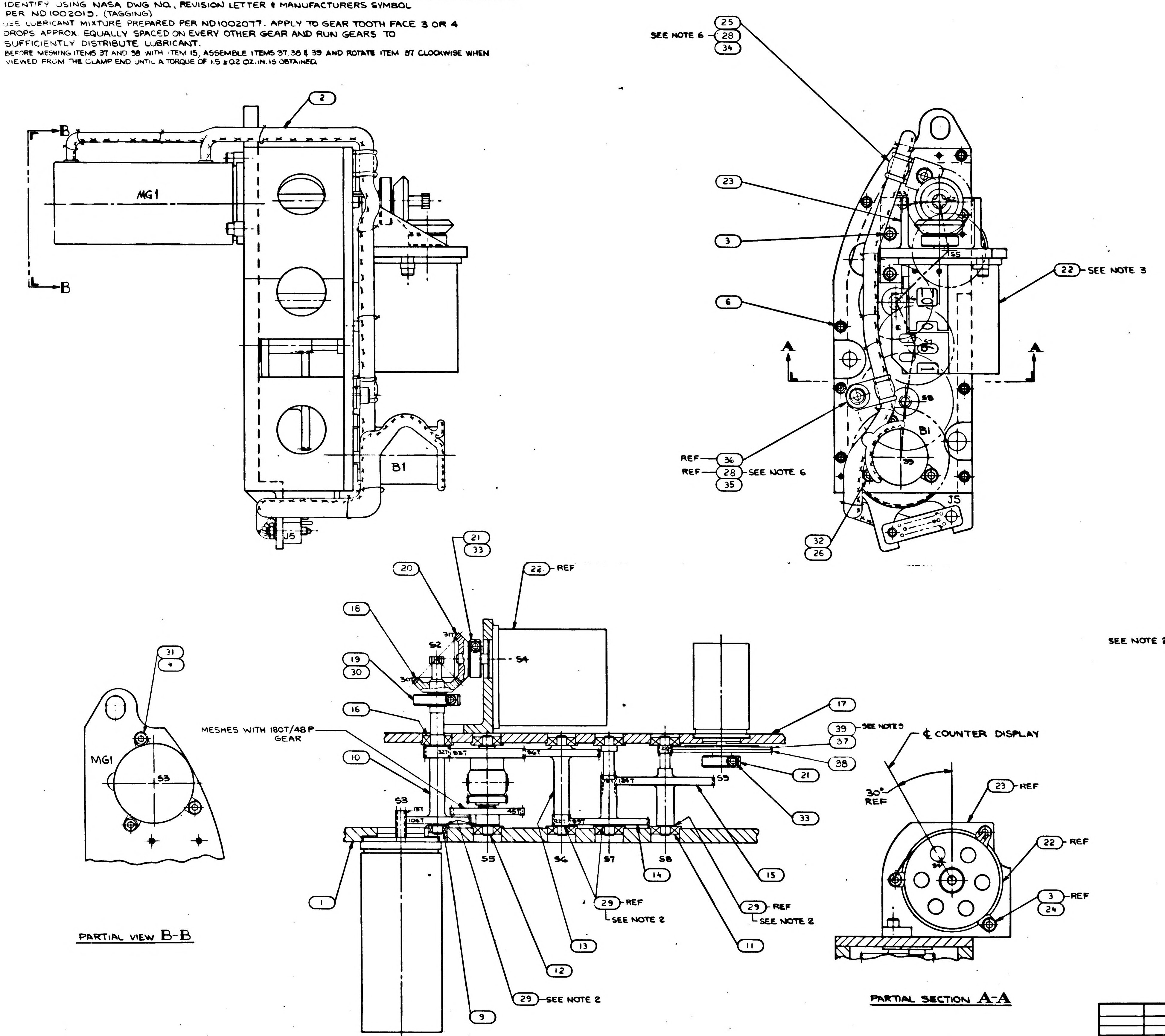
NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FLAT WASHERS (ITEM 29) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT END PLAY TO .0005 TO .004 AT SHAFTS S2, S5, S6, S7 & S8.
3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. VIBRATION PROOF ITEM 28 USING LOCKING COMPOUND GRADE "B" OF MIL-S-22473 PER ND1002211.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)
8. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROX EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
9. BEFORE MESHING ITEMS 37 AND 38 WITH ITEM 15, ASSEMBLE ITEMS 37, 38 & 39 AND ROTATE ITEM 37 CLOCKWISE WHEN VIEWED FROM THE CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ. IN. IS OBTAINED.

F 2011702

REVISIONS TDRR 2119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	1/6/65	WK
B		REVISED PER TDRR 18562	4/27/65	WK
C		REVISED PER TDRR 19037	5/18/65	WK
D		REVISED PER TDRR 20353	[illegible]	[illegible]
E		REVISED PER TDRR 20873	[illegible]	WK
F		REVISED PER TDRR 31911	[illegible]	[illegible]



SEE NOTE 2 → 29

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
39	1		2012550-1	56386910590		SPRING, ANTI-BACKLASH			
38	1		2012577	33386910320		GEAR, SPUR 160T/120P			
37	1		2012576	33386910310		GEAR, SPUR 160T/120P			
36	1		2012510	48386910140		CLAMP, CABLE			
35	1		MS15795-305	—		WASHER, FLAT METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-15	74455151015		SCREW, CAP, SOC HD SELF LOCKING			
30	1	NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804	7938691[illegible]		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD.			
27									
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	1	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	52386910640		BRACKET, COUNTER			
22	1	*	1012512	75005006801		COUNTER, ANGLE			
21	2		2011355-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	7447370[illegible]		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	50386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN F. McQuillan DATE 7-1-64
CHECKED J. SULLIVAN 7-28-64
APPROVAL 7/29/64
APPROVAL E. Dhaup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011702
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011702

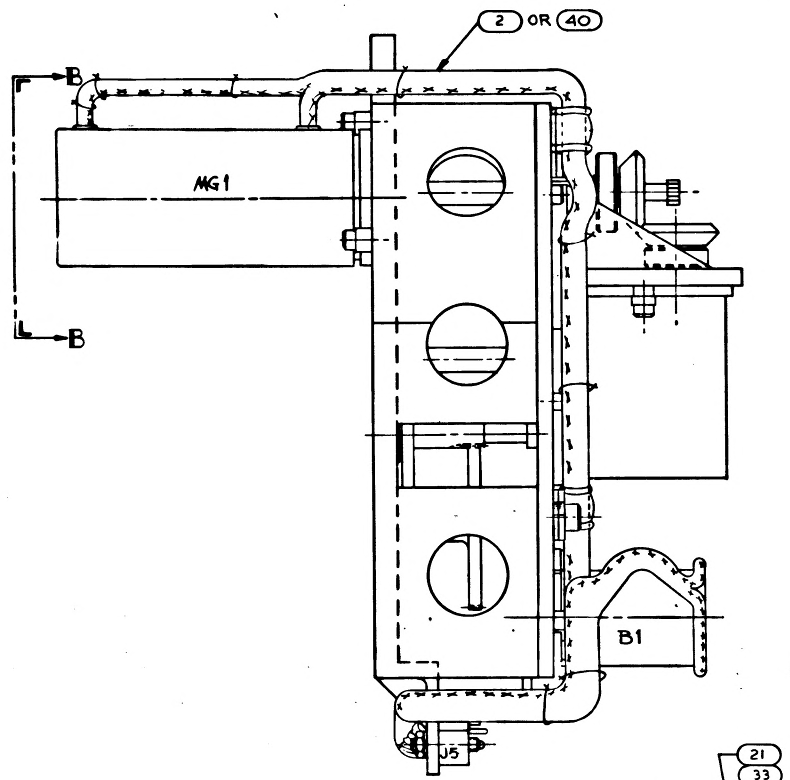
2011702 G

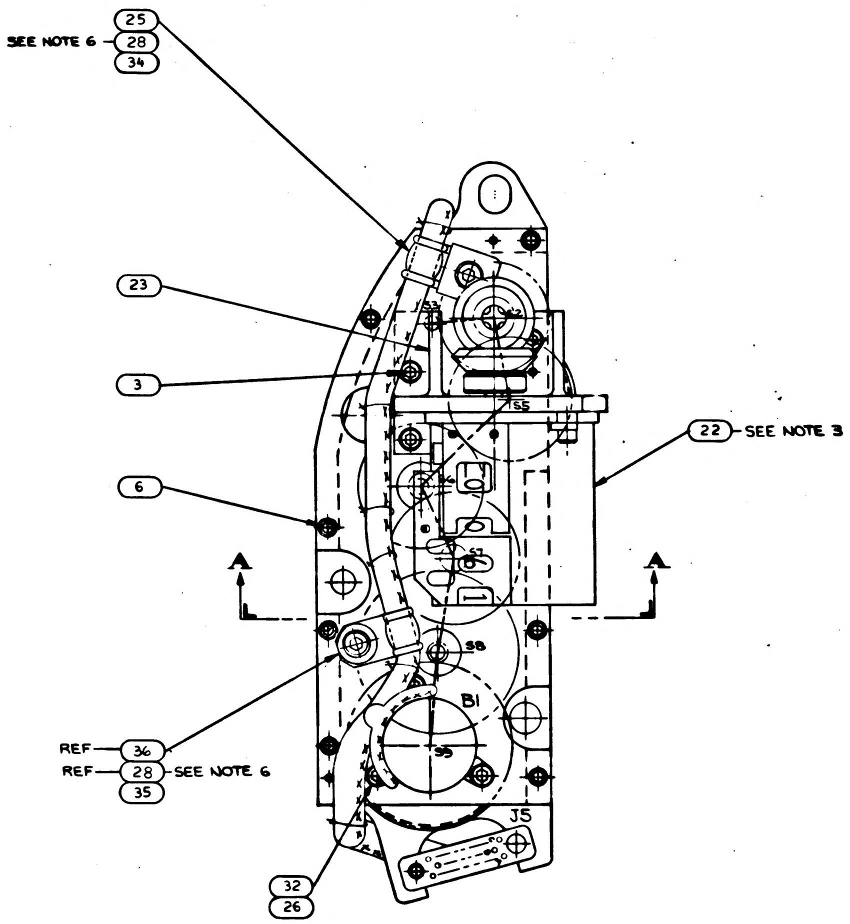
NOTES:-

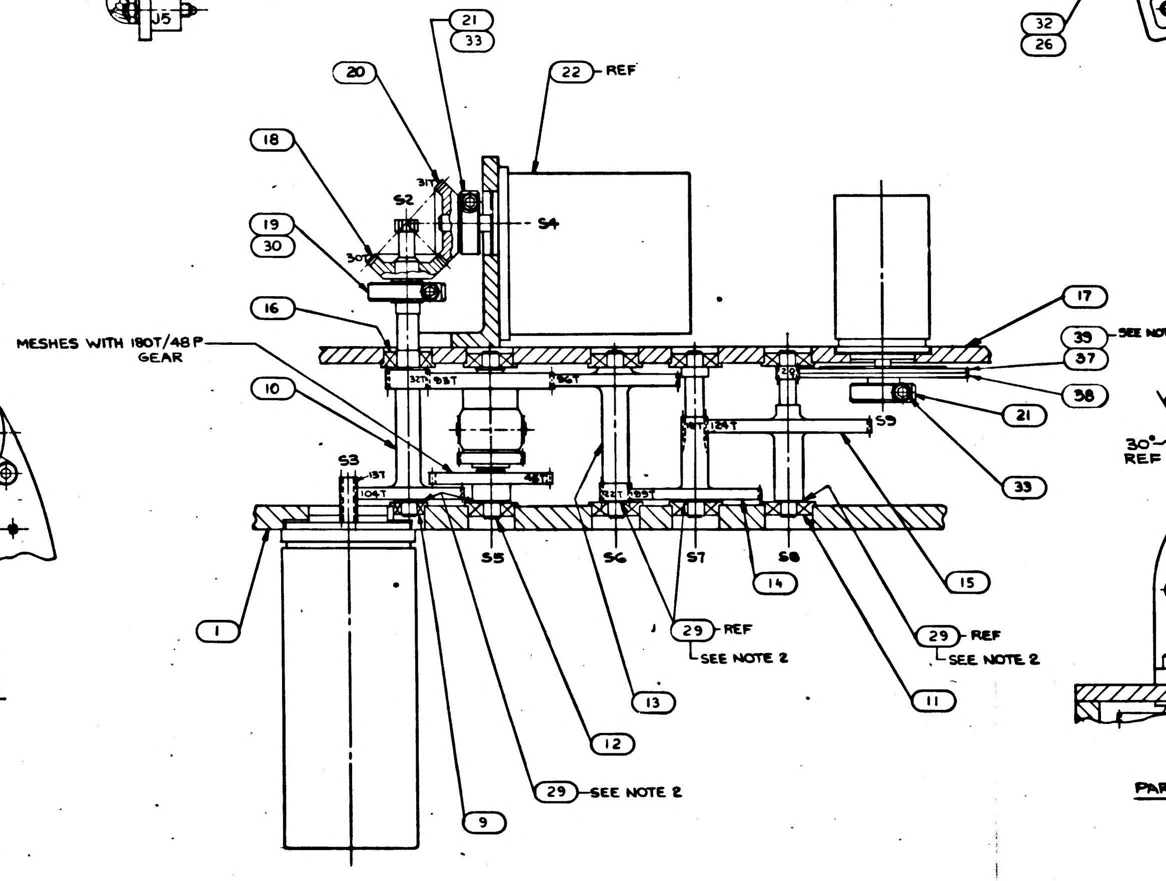
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FLAT WASHERS (ITEM 29) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT END PLAY TO .0005 TO .004 AT SHAFTS S2, S5, S6, S7 & S8.
3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. VIBRATION PROOF ITEM 28 USING LOCKING COMPOUND GRADE "B" OF MIL-S-22473 PER ND1002211.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
8. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROX. EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
9. BEFORE MESHING ITEMS 37 AND 38 WITH ITEM 15, ASSEMBLE ITEMS 37, 38 & 39 AND ROTATE ITEM 37 CLOCKWISE WHEN VIEWED FROM THE CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN. IS OBTAINED.

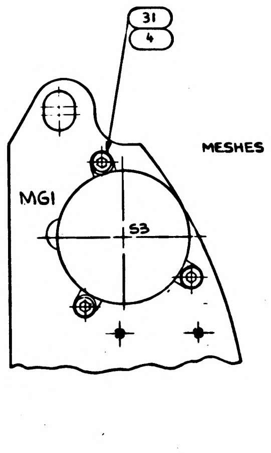
REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15370	1/6/65	WK
B		REVISED PER TDRR 18562	4/13/65	WK
C		REVISED PER TDRR 19037	5/18/65	WK
D		REVISED PER TDRR 20353	6/24/65	WK
E		REVISED PER TDRR 20873	7/26/65	WK
F		REVISED PER TDRR 31911		
G		REVISED PER TDRR 32827	1-27-67	

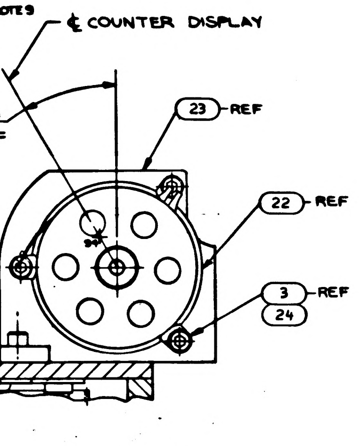








PARTIAL VIEW B-B



PARTIAL SECTION A-A

SEE NOTE 2

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	40			2011935-011			SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1	39			2012580-1	56386910590		SPRING, ANTI-BACKLASH			
1	1	38			2012577	33386910320		GEAR, SPUR 160T/120P			
1	1	37			2012576	33386910310		GEAR, SPUR 160T/120P			
1	1	36			2012510	48386910140		CLAMP, CABLE			
1	1	35			MS15795-305	—		WASHER, FLAT, METAL, ROUND			
1	1	34		*	1011918-3	—		WASHER, CABLE CLAMP			
2	2	33		*	1011625-11	74455151011		SCREW, CAP, SOC HD SELF LOCKING			
3	3	32		*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
3	3	31		*	1011625-18	74455151018		SCREW, CAP, SOC HD SELF LOCKING			
1	1	30		NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
AR	AR	29			2011804-	79386910201 0206		WASHER, FLAT			
2	2	28		NAS	1352C06-6	—		SCREW, CAP, SOC HD.			
		27									
3	3	26			2011868-3	54386910103		CLAMP, RIM CLENCHING			
1	1	25		*	1000220-4	—		CLAMP, CABLE			
3	3	24			2011868-2	54386910102		CLAMP, RIM CLENCHING			
1	1	23			2011275	52386910640		BRACKET, COUNTER			
1	1	22		*	1012512	75005026801		COUNTER, ANGLE			
2	2	21			2011356-2	57386910451		CLAMP, COLLAR			
1	1	20			2011357	33386910140		GEAR, BEVEL (31T/48P)			
1	1	19			2011355-4	57386910453		CLAMP, COLLAR			
1	1	18			2011356	33386910150		GEAR, BEVEL (30T/48P)			
1	1	17			2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
1	1	16		*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
1	1	15			2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
1	1	14			2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
1	1	13			2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
1	1	12		*	1011281	74471370001		DIFFERENTIAL			
8	8	11		*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
1	1	10			2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
1	1	9		*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
					—	—					
					—	—					
7	7	6		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
					—	—					
3	3	4			2011868-1	54386910101		CLAMP, RIM CLENCHING			
6	6	3		NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
0	1	2			2011935-000	80386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1	1			2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2012736	
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN DATE 7-1-64
CHECKED T. SULLIVAN 7-28-64
APPROVAL 7/29/64
APPROVAL E. Dhaup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

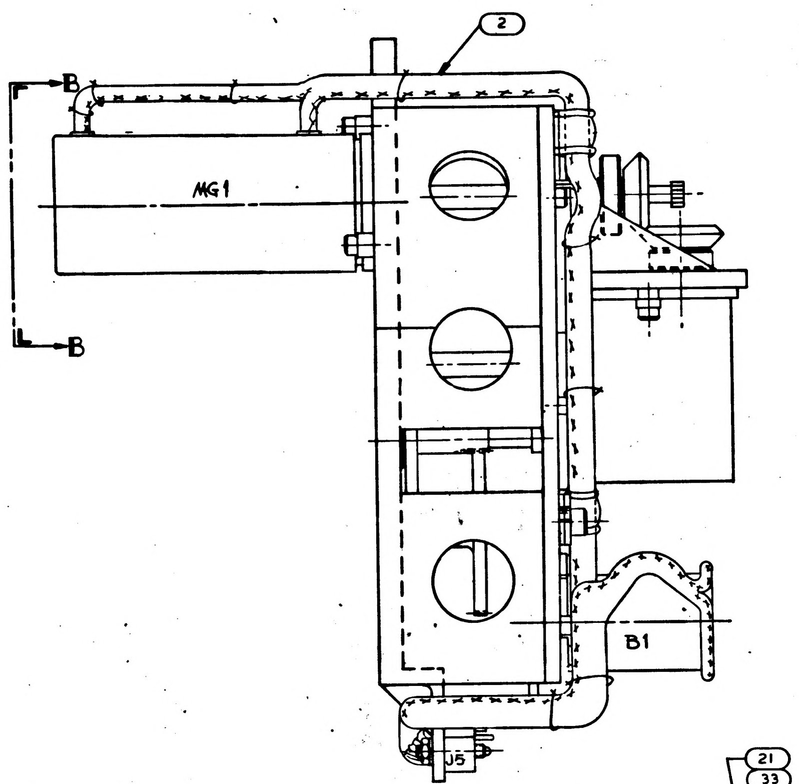
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

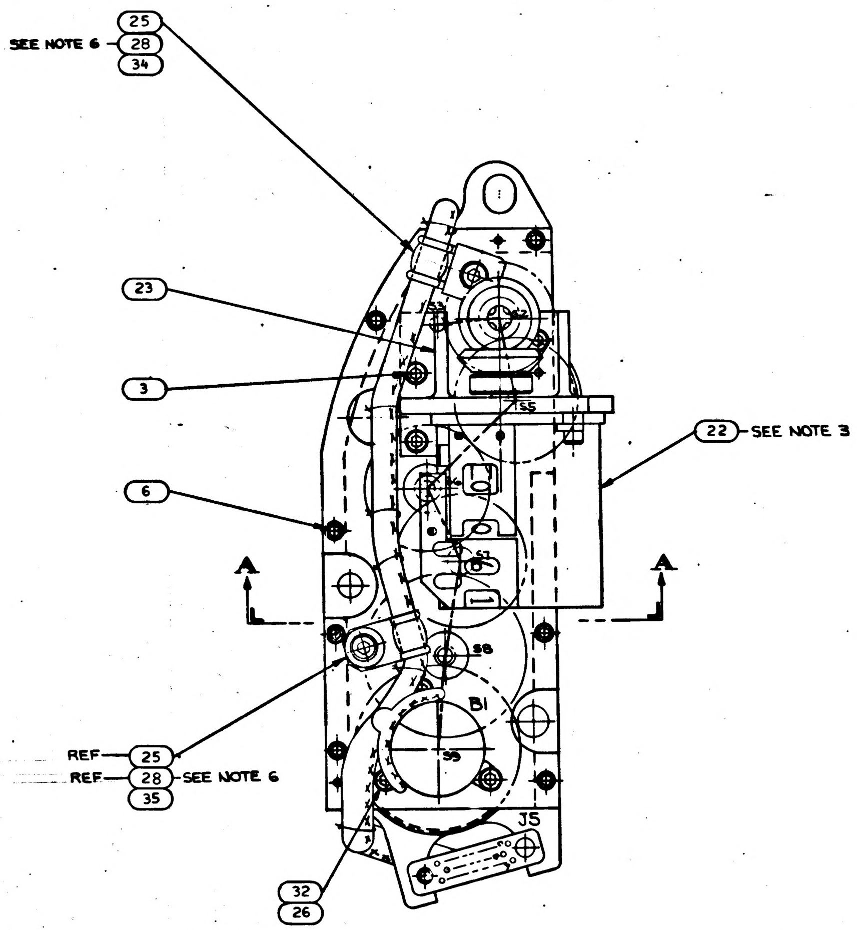
2011702

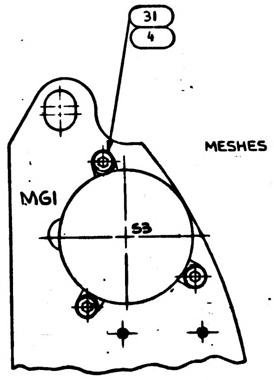
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-

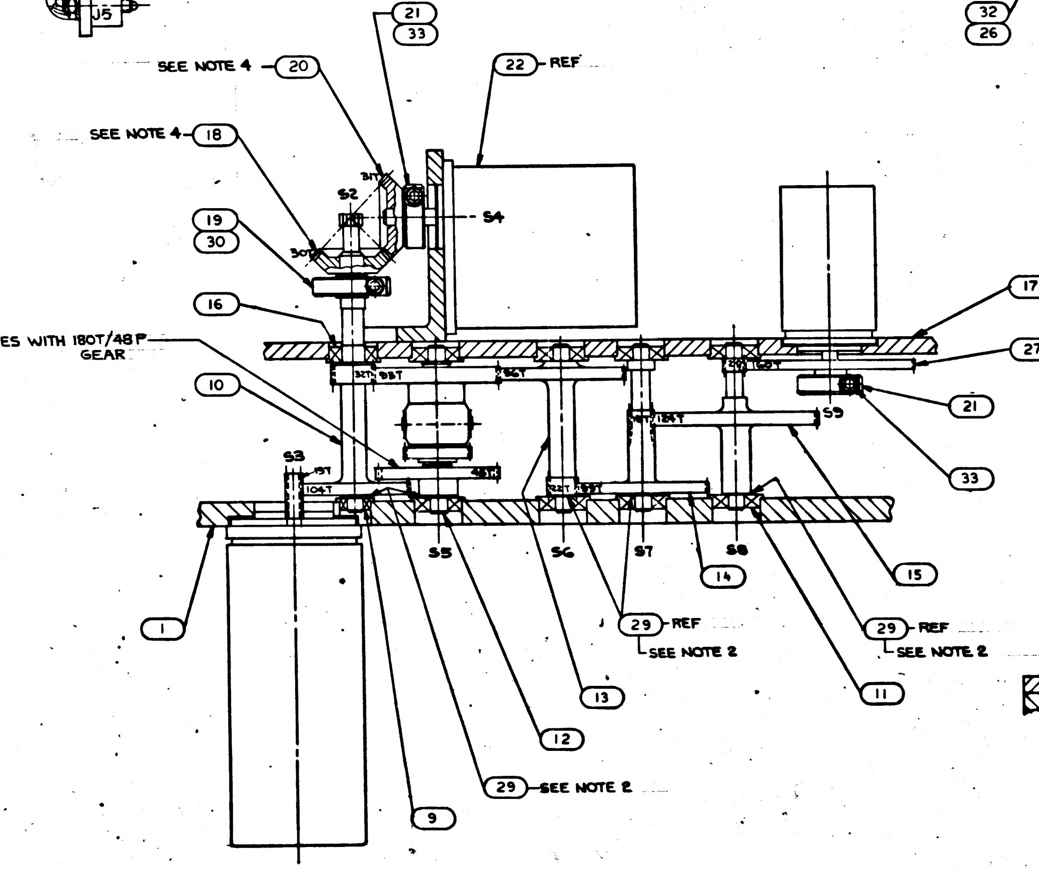
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. FLAT WASHERS (ITEM 29), OF INCREMENTAL THICKNESS, SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARING TO LIMIT END PLAY TO .004 MAX AT SHAFTS S2, S5, S6, S7 AND S8.
3. COUNTER (ITEM 22) SHALL REGISTER ZERO WHEN RESOLVER B1 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEM 18 AND 20) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG-1 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX, AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX, IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGES MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. VIBRATION PROOF ITEM 28 USING LOCKING COMPOUND GRADE "EV" OF MIL-S-22473 PER ND1002211
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)
8. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROX. EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.

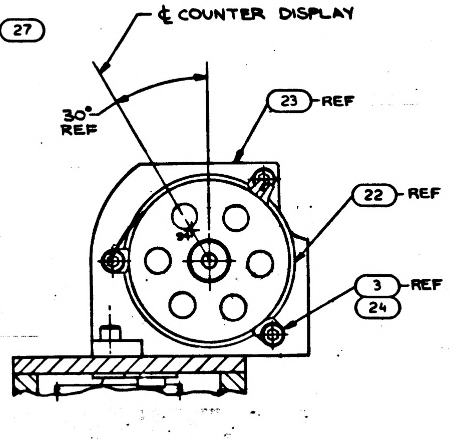






PARTIAL VIEW B-B





PARTIAL SECTION A-A

SEE NOTE 2 → item 29

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
35	1		MS15795-305	—		WASHER, FLAT, METAL, ROUND			
34	1	*	1011918-3	—		WASHER, CABLE CLAMP			
33	2	*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD, SELF LOCKING			
31	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD, SELF LOCKING			
30	1	NAS	1352C02LL6	74455157007		SCREW, CAP, SOC HD, SELF LOCKING			
29	AR		2011804-	79386910201 0206		WASHER, FLAT			
28	2		NAS1352C06-6	—		SCREW, CAP, SOC HD,			
27	1		2011277	33386910280		GEAR, SPUR (160T/120P)			
26	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
25	2	*	1000220-4	—		CLAMP, CABLE			
24	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
23	1		2011275	5[illegible]386910640		BRACKET, COUNTER			
22	1	*	1011744	88237000001		COUNTER, ANGLE			
21	2		2011356-2	57386910451		CLAMP, COLLAR			
20	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
19	1		2011355-4	57386910453		CLAMP, COLLAR			
18	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
17	1		2011308	85386910620		PLATE, BEARING, ASSEMBLY OF			
16	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED)			
15	1		2011276	33386910270		GEARSHAFT (20T/120P, 124T/96P)			
14	1		2011279	33386910130		GEARSHAFT (18T/96P, 99T/96P)			
13	1		2011280	33386910120		GEARSHAFT (22T/96P, 96T/96P)			
12	1	*	1011281	74471370001		DIFFERENTIAL			
11	8	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED)			
10	1		2011358	33386910110		GEARSHAFT (104T/120P, 32T/96P)			
9	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED)			
			—	—					
			—	—					
6	7	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC HD, SELF LOCKING			
			—	—					
4	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
3	6	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC HD, SELF LOCKING			
2	1		2011935	80386910030		SCT TRUNNION DRIVE HARNESS, ASSY OF			
1	1		2011306	52386910610		HOUSING GEAR SCT TRUNNION DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910630
DRAWN J DeLuca DATE 7-1-64
CHECKED T. SULLIVAN 7-28-64
APPROVAL 7/29/64
APPROVAL 8/15/64
NASA APPROVAL
KIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

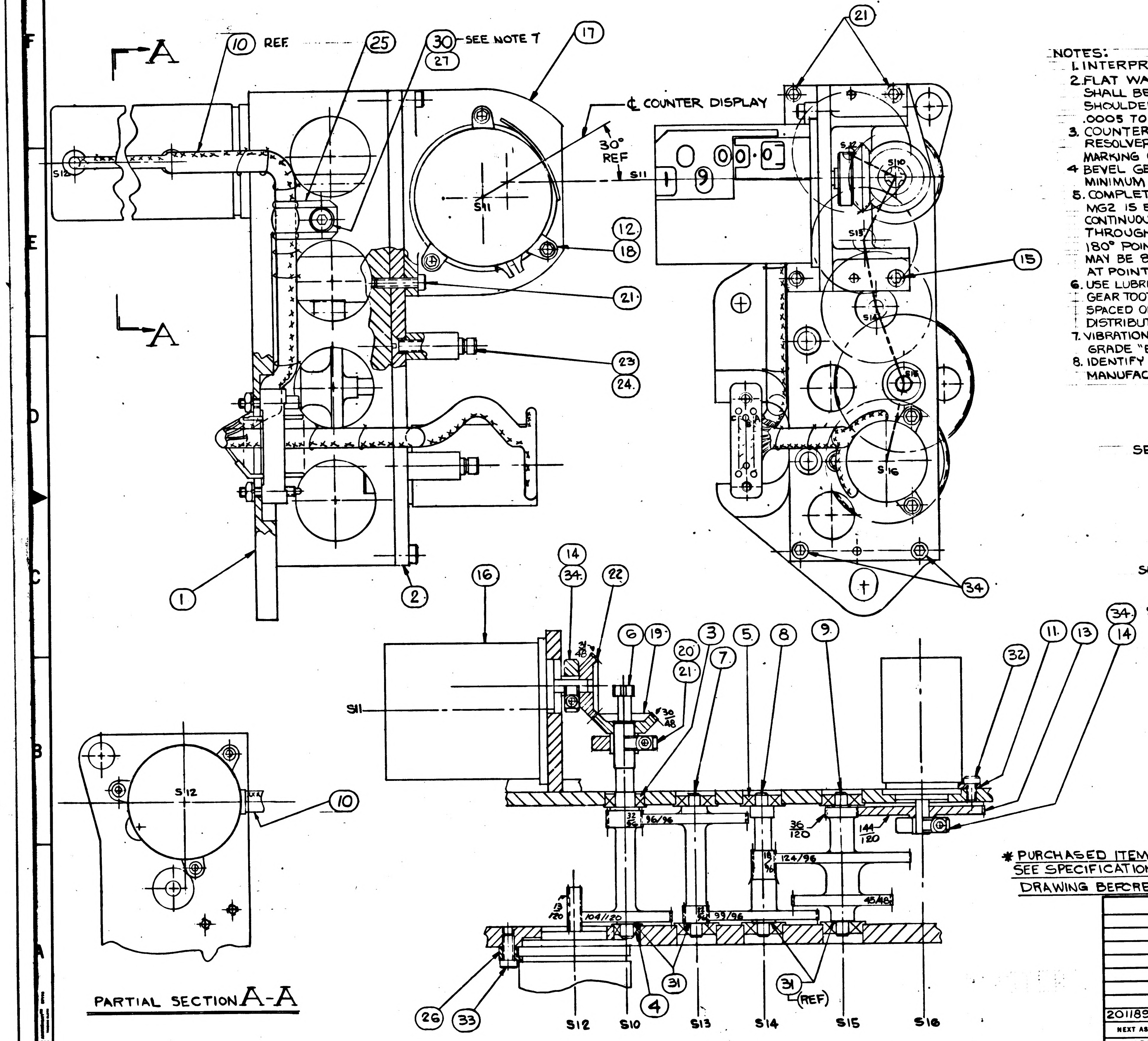
TITLE
TRUNNION DRIVE GEARBOX, SCT, ASSEMBLY OF

CODE IDENT NO.
SIZE E
NASA NUMBER 2011702
SCALE 2/1
WEIGHT
SHEET OF 1

MASTER

2011703 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TD22 : 2119				
A		REVISED PER TDRR NO. 15369	1/6/65	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 & S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEMS 19 & 22) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

	ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	34	4	*	1011625-11	74455151011		SCREW, CAP, SOC HD			
	33	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD			
	32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD			
SEE NOTE 2	31	AS REQ		2011804-	7938691 0201 0206		WASHER, FLAT			
	30	1	NAS	1352C06-6			SCREW, CAP SOC. HD			
	29									
	28									
	27	1	*	1011918-3			WASHER, CABLE CLAMP			
	26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
	25	1	*	1000220-4			CLAMP, CABLE			
	24	2	NAS	1189C04P4L	74455155008		SCREW, 100° FLAT HD			
	23	2		2011332	57386910460		POST, SPACER			
SEE NOTE 4	22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
	21	4	NAS	1352C02LL6	74455157007		SCREW CAP, SOCKET HD			
	20	1		2011355-4	57386910453		CLAMP, COLLAR			
SEE NOTE 4	19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
	18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
	17	1		2011274	52386910500		BRACKET, COUNTER			
SEE NOTE 3	16	1	*	1012512	75005006801		COUNTER, ANGLE			
	15	1	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HD			
	14	2		2011355-2	57386910451		CLAMP, COLLAR			
	13	1		2012372	33386910070		GEAR SPUR 144T/120P			
	12	3	NAS	1352C03LL4	74455157009		SCREW, CAP, SOCKET HD.			
	11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
	10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
	9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
	8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
	7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
	6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
	5	6	*	1011608-3	30257700052		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	4	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	3	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	2	1		2011333	85386910400		PLATE, BEARING ASSEMBLY OF,			
	1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

*PURCHASED ITEM
SEE SPECIFICATION CONTROL
DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200

DRAWN E. DRAPALA DATE: 4-6-64
CHECKED: J. SULLIVAN 5-6-64
APPROVAL 7/23/64
APPROVAL E. Thorup 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

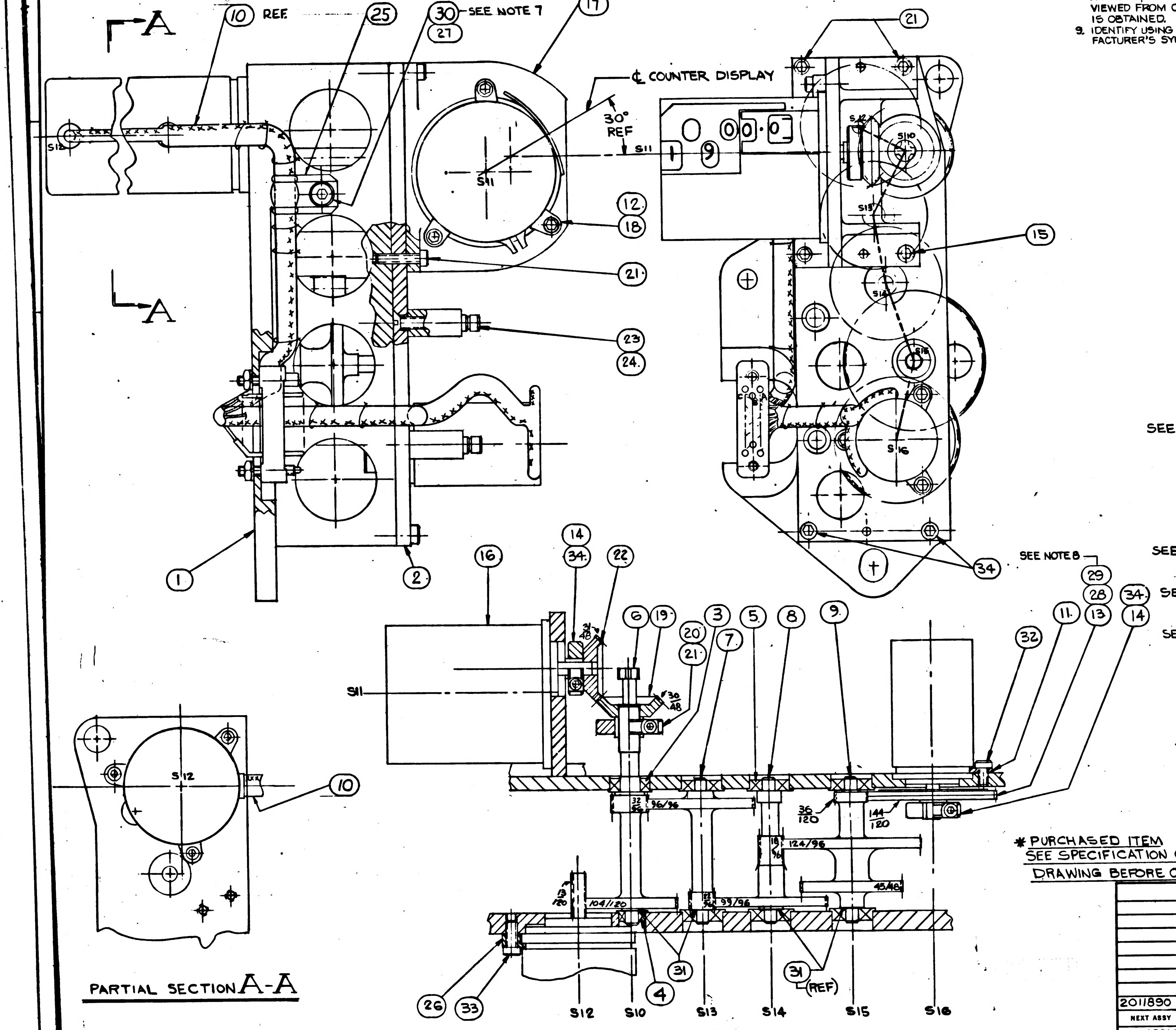
B | 2011703

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEMS 19 & 21) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. BEFORE MESHING ITEMS 13 AND 28 WITH ITEM 9, ASSEMBLE ITEMS 13, 28 AND 29 AND ROTATE ITEM 13 CLOCKWISE WHEN VIEWED FROM CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN. IS OBTAINED.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

REVISIONS TDR2 2119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15369	1/6/65	WK
B		REVISED PER TDRR 19038	6/15/65	



*PURCHASED ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

	ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	34	4	*	1011625-11	7445515 1011		SCREW, CAP, SOC HD			
	33	3	*	1011625-18	7445515 1018		SCREW, CAP, SOC HD			
	32	3	*	1011625-16	7445515 1016		SCREW, CAP, SOC HD			
SEE NOTE 2	31	AS REQ		2011804-	79 38691 0201 0206		WASHER, FLAT			
	30	1	NAS	1352C06-6			SCREW, CAP SOC. HD			
	29	1		2012580-2	56386910590		SPRING, ANTI-BACKLASH			
	28	1		2012579	33386910340		SPUR GEAR 144T/120 P			
	27	1	*	1011918-3			WASHER, CABLE CLAMP			
	26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
	25	1	*	1000220-4			CLAMP, CABLE			
	24	2	NAS	1189C04P4L	7445515 5008		SCREW, 100° FLAT HD			
	23	2		2011332	57386910460		POST, SPACER			
SEE NOTE 4	22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
	21	4	NAS	1352C02LL6	7445515 7007		SCREW CAP, SOCKET HD			
	20	1		2011355-4	57386910453		CLAMP, COLLAR			
SEE NOTE 4	19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
	18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
	17	1		2011274	52386910500		BRACKET, COUNTER			
SEE NOTE 3	16	1	*	1012512	75005006801		COUNTER, ANGLE			
	15	1	NAS	1352C02LL4	7445515 7006		SCREW, CAP, SOCKET HD			
	14	2		2011355-2	57386910451		CLAMP, COLLAR			
	13	1		2012578	33386910330		GEAR SPUR 144T/120P			
	12	3	NAS	1352C03LL4	7445515 7009		SCREW, CAP. SOCKET HD.			
	11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
	10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
	9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
	8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
	7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
	6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
	5	6	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	4	1	*	1011608-1	3025770 0080		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	3	1	*	1011608-4	3025770 0120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	2	1		2011333	85386910400	-	PLATE, BEARING ASSEMBLY OF,			
	1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200
DRAWN E. DRAPALA DATE: 4-6-64
CHECKED: J. SULLIVAN 5-6-64
APPROVAL 7/22/64
APPROVAL E. Thomp 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

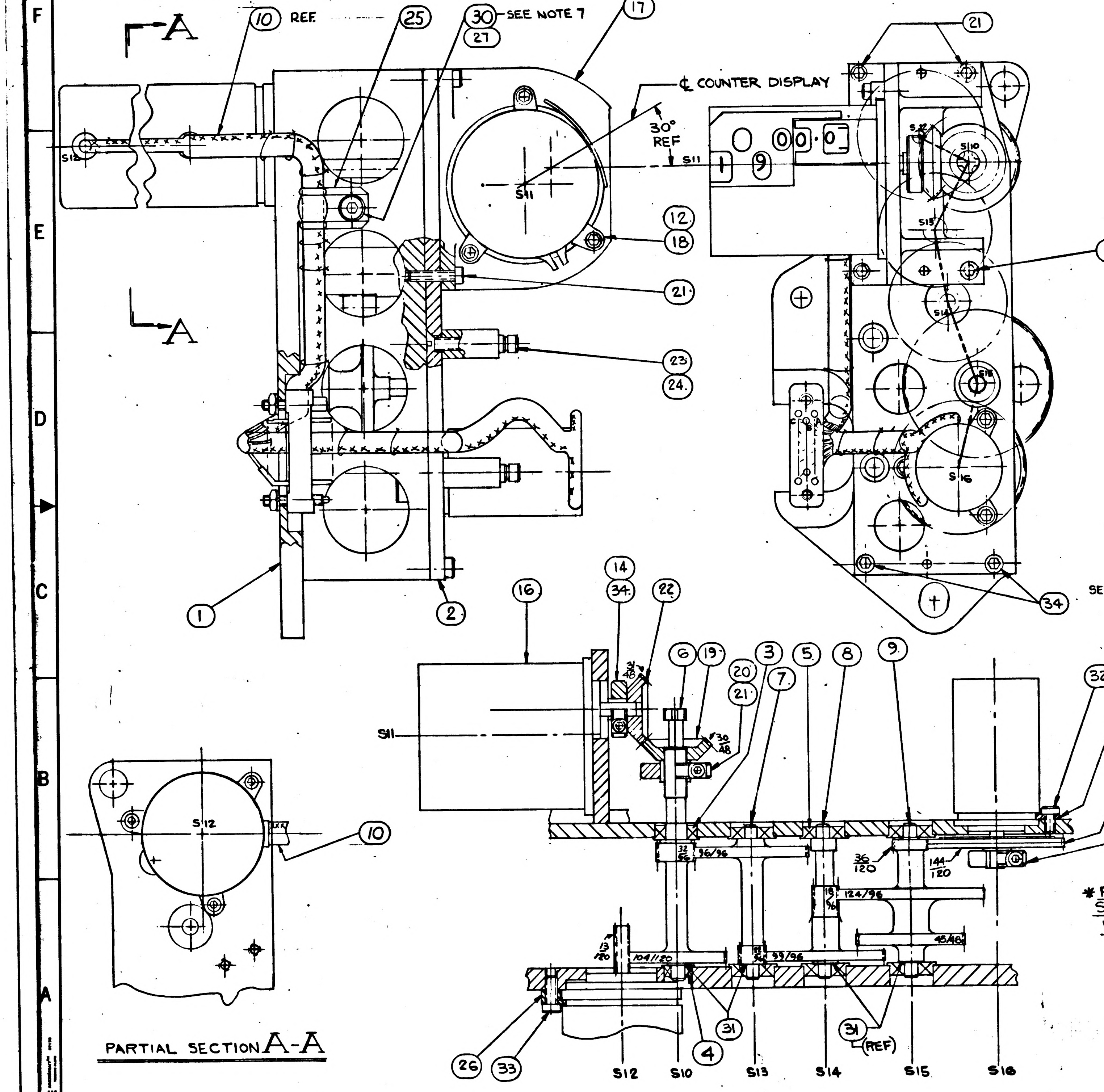
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEMS 19 & 21) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. BEFORE MESHING ITEMS 13 AND 28 WITH ITEM 9, ASSEMBLE ITEMS 13, 28 AND 29 AND ROTATE ITEM 13 CLOCKWISE WHEN VIEWED FROM CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN. IS OBTAINED.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

C 2011703

REVISIONS TDRR 2119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15369	1/6/65	WK
B		REVISED PER TDRR 19038	5/5/65	WK
C		REVISED PER TDRR 20354	6/6/65	WK



	ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
	34	4	*	1011625-11	7445515 1011		SCREW, CAP, SOC HD			
	33	3	*	1011625-18	7445515 1018		SCREW, CAP, SOC HD			
	32	3	*	1011625-16	7445515 1016		SCREW, CAP, SOC HD			
SEE NOTE 2	31	AS REQ		2011804-	79386910201 0206		WASHER, FLAT			
	30	1	NAS	1352C06-6			SCREW, CAP, SOC. HD			
	29	1		2012580-2	56386910590		SPRING, ANTI-BACKLASH			
	28	1		2012579	33386910340		SPUR GEAR 144T/120P			
	27	1	*	1011918-3			WASHER, CABLE CLAMP			
	26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
	25	1	*	1000220-4			CLAMP, CABLE			
	24	2	NAS	1189C04P4L	7445515 5008		SCREW, 100° FLAT HD			
	23	2		2011332	57386910460		POST, SPACER			
SEE NOTE 4	22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
	21	4	NAS	1352C02LL6	7445515 7007		SCREW CAP, SOCKET HD			
	20	1		2011355-4	57386910453		CLAMP, COLLAR			
SEE NOTE 4	19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
	18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
	17	1		2011274	52386910500		BRACKET, COUNTER			
SEE NOTE 3	16	1	*	1012512	75005006801		COUNTER, ANGLE			
	15	1	NAS	1352C02LL4	7445515 7006		SCREW, CAP, SOCKET HD			
	14	2		2011355-2	57386910451		CLAMP, COLLAR			
	13	1		2012578	33386910330		GEAR SPUR 144T/120P			
	12	3	NAS	1352C03LL4	7445515 7009		SCREW, CAP, SOCKET HD.			
	11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
	10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
	9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
	8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
	7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
	6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
	5	6	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	4	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED PHENOLIC RETAINER)			
	3	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
	2	1		2011333	85386910400	-	PLATE, BEARING ASSEMBLY OF,			
	1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASED ITEM
SEE SPECIFICATION CONTROL
DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200
DRAWN E. DRAPALA DATE: 4-6-6
CHECKED: J. SULLIVAN 5-6-64
APPROVAL 2/27/6
APPROVAL E. J. Thorup 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

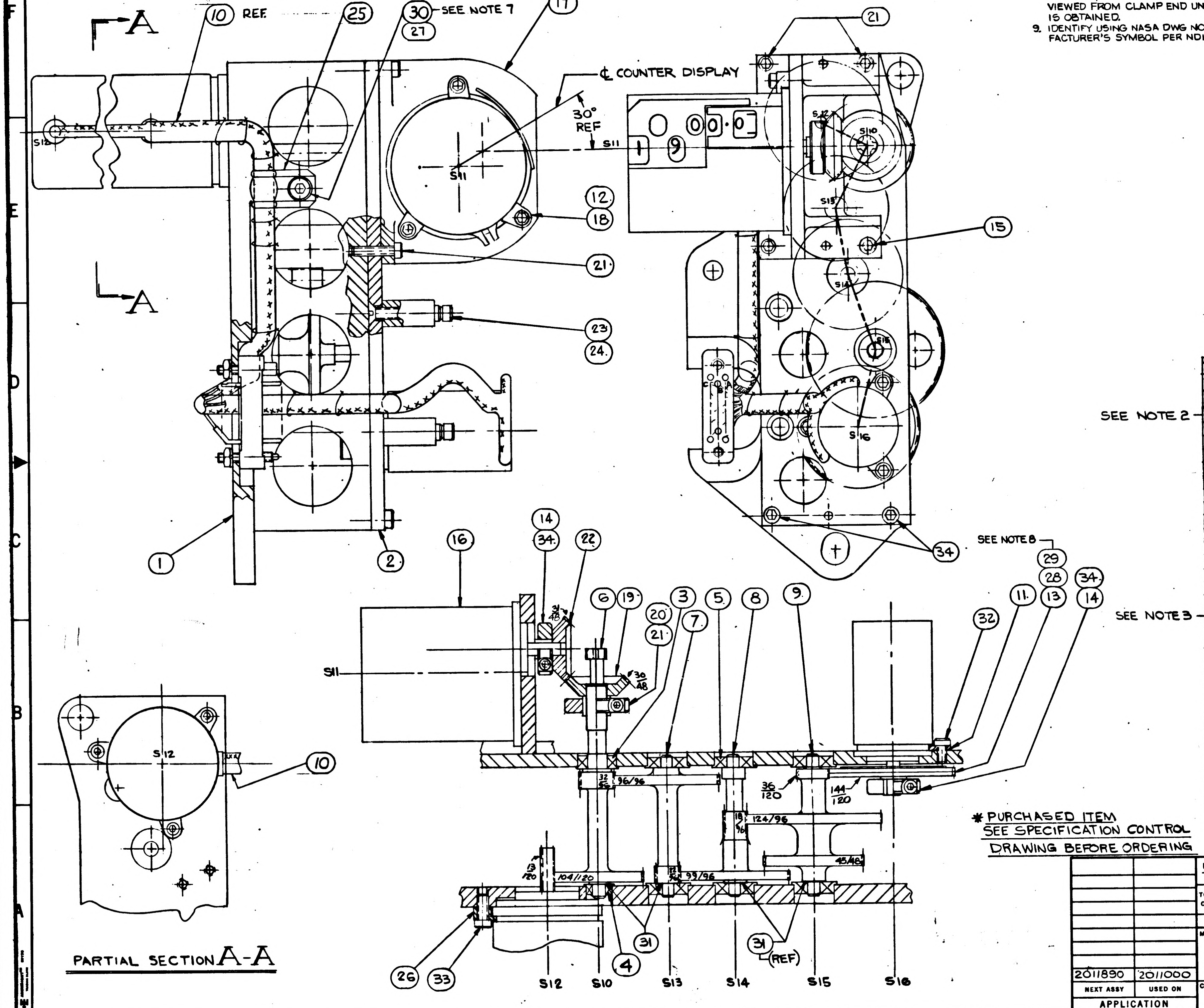
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. BEFORE MESHING ITEMS 13 AND 28 WITH ITEM 9, ASSEMBLE ITEMS 13, 28 AND 29 AND ROTATE ITEM 13 CLOCKWISE WHEN VIEWED FROM CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN. IS OBTAINED.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

D 2011703

REVISIONS TDRR 2113

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15369	1/6/65	WK
B		REVISED PER TDRR 19038	5/5/65	WK
C		REVISED PER TDRR 20354	6/2/65	WK
D		REVISED PER TDRR 20882	7/21/65	WK



SEE NOTE 2 — 31

SEE NOTE 3 — 16

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
34	4	*	1011625-11	7445515011		SCREW, CAP, SOC HD			
33	3	*	1011625-18	7445515018		SCREW, CAP, SOC HD			
32	3	*	1011625-16	7445515016		SCREW, CAP, SOC HD			
31	AS REQ		2011804-	7938691 0201 0206		WASHER, FLAT			
30	1	NAS	1352C06-6			SCREW, CAP SOC. HD			
29	1		2012580-2	56386910590		SPRING, ANTI-BACKLASH			
28	1		2012579	33386910340		SPUR GEAR 144T/120P			
27	1	*	1011913-3			WASHER, CABLE CLAMP			
26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
25	1	*	1000220-4			CLAMP, CABLE			
24	2	NAS	1189C04P4L	7445515 5008		SCREW, 100° FLAT HD			
23	2		2011332	57386910460		POST, SPACER			
22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
21	4	NAS	1352C02LL6	7445515 7007		SCREW CAP, SOCKET HD			
20	1		2011355-4	57386910453		CLAMP, COLLAR			
19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
17	1		2011274	52386910500		BRACKET, COUNTER			
16	1	*	1012512	75 005006801		COUNTER, ANGLE			
15	1	NAS	1352C02LL4	7445515 7006		SCREW, CAP, SOCKET HD			
14	2		2011355-2	57386910451		CLAMP, COLLAR			
13	1		2012578	33386910330		GEAR SPUR 144T/120P			
12	3	NAS	1352C03LL4	7445515 7009		SCREW, CAP. SOCKET HD.			
11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
5	6	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
4	1	*	1011608-1	3025770 0080		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
3	1	*	1011608-4	3025770 0120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
2	1		2011333	85386910400	-	PLATE, BEARING ASSEMBLY OF,			
1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASED ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200

DRAWN E. DRAPALA DATE: 4-6-64
CHECKED: J. SULLIVAN 5-6-64
APPROVAL 7/23/64
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

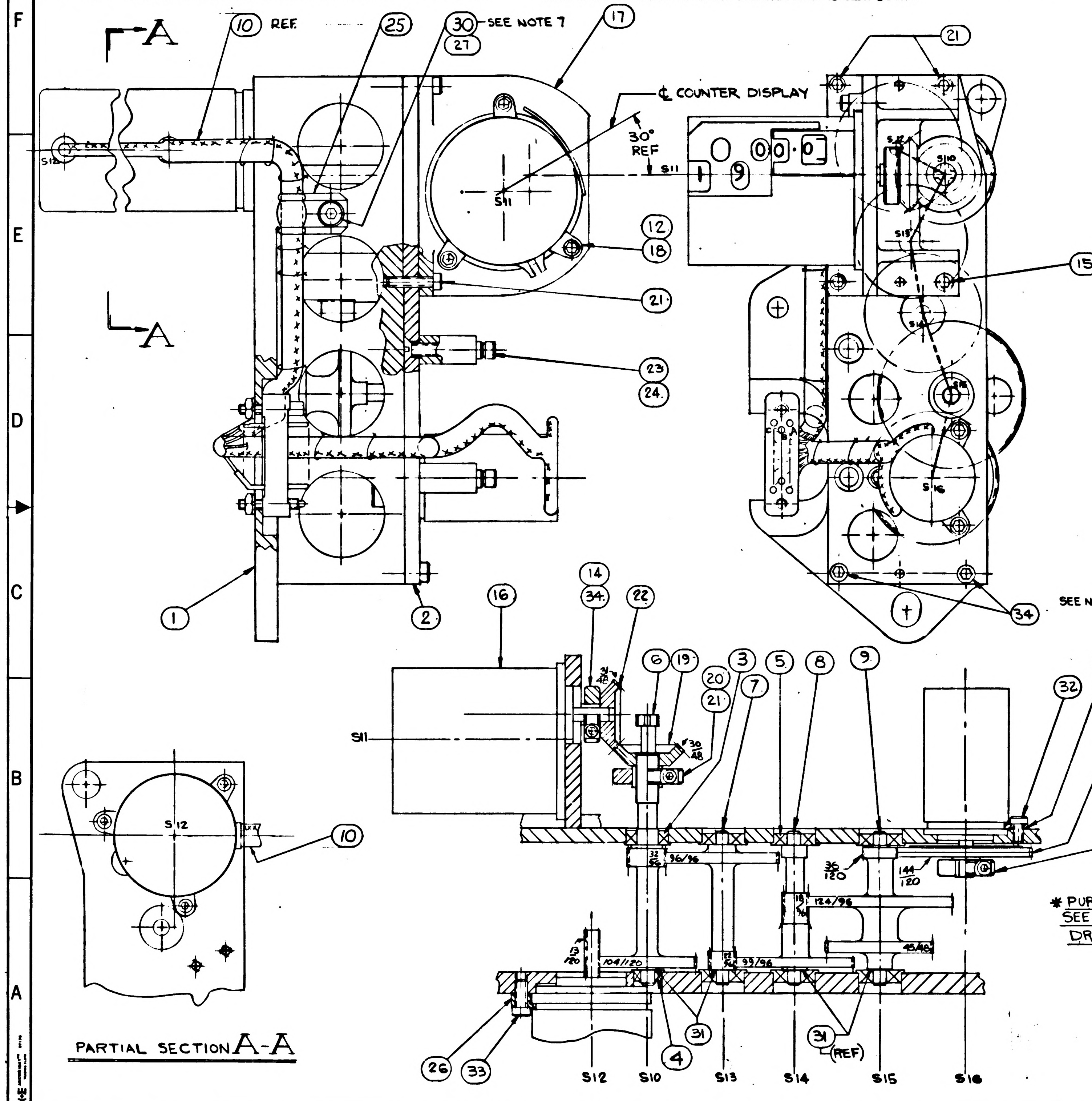
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "B" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. BEFORE MESHING ITEMS 13 AND 28 WITH ITEM 9, ASSEMBLE ITEMS 13, 28 AND 29 AND ROTATE ITEM 13 CLOCKWISE WHEN VIEWED FROM CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN IS OBTAINED.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

2011703 E

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15369	1/6/65	WK
B		REVISED PER TDRR 19038	6/15/65	WK
C		REVISED PER TDRR 20354	6/16/65	WK
D		REVISED PER TDRR 20882	7/21/65	WK
E		REVISED PER TDRR 3.910	11-10-66	



✱ PURCHASED ITEM
SEE SPECIFICATION CONTROL
DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
34	4	✱	1011625-11	7445515101 1		SCREW, CAP, SOC HD			
33	3	✱	1011625-18	7445515101 8		SCREW, CAP, SOC HD			
32	3	✱	1011625-16	7445515101 6		SCREW, CAP, SOC HD			
SEE NOTE 2 – 31	AS REQ		2011804-	7938691 0201 0206		WASHER, FLAT			
30	1	NAS	1352C06-6			SCREW, CAP SOC. HD			
29	1		2012580-2	56386910590		SPRING, ANTI-BACKLASH			
28	1		2012579	33386910340		SPUR GEAR 144T/120P			
27	1	✱	1011918-3			WASHER CABLE CLAMP			
26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
25	1	✱	1000220-4			CLAMP, CABLE			
24	2	NAS	1189C04P4L	74455155008		SCREW, 100° FLAT HD			
23	2		2011332	57386910460		POST, SPACER			
22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
21	4	NAS	1352C02LL6	74455157007		SCREW CAP, SOCKET HD			
20	1		2011355-4	57386910453		CLAMP, COLLAR			
19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
17	1		2011274	52386910500		BRACKET, COUNTER			
SEE NOTE 3 – 16	1	✱	1012512	75005006801		COUNTER, ANGLE			
15	1	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HD			
14	2		2011355-2	57386910451		CLAMP, COLLAR			
13	1		2012578	33386910330		GEAR SPUR 144T/120P			
12	3	NAS	1352C03LL4	74455157009		SCREW, CAP, SOCKET HD.			
11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
5	6	✱	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
4	1	✱	1011608-1	30257700080		BEARING, BALL ANNULAR (FLANGED PHENOLIC RETAINER)			
3	1	✱	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
2	1		2011333	85386910400	-	PLATE, BEARING ASSEMBLY OF,			
1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200
DRAWN E. DRAPALA DATE: 4-6-64
CHECKED: J. SULLIVAN 5-6-64
APPROVAL
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

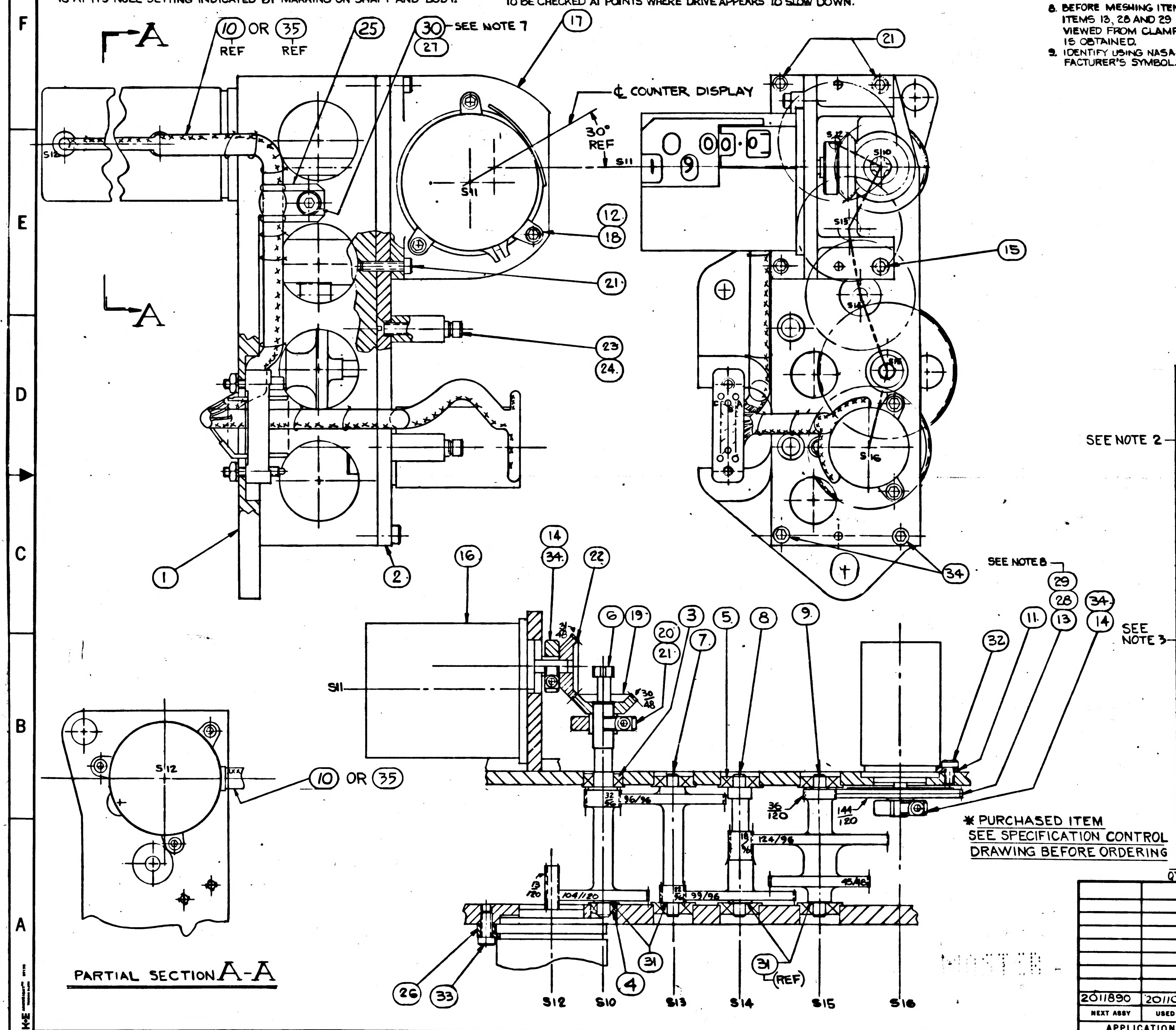
2011703 E

2011703 F

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .0005 TO .004 AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR AND RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "B" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. BEFORE MESHING ITEMS 13 AND 28 WITH ITEM 9, ASSEMBLE ITEMS 13, 28 AND 29 AND ROTATE ITEM 13 CLOCKWISE WHEN VIEWED FROM CLAMP END UNTIL A TORQUE OF 1.5 ± 0.2 OZ.IN. IS OBTAINED.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15369	1/6/65	WK
B		REVISED PER TDRR 19038	6/15/65	WK
C		REVISED PER TDRR 20354	6/25/65	WK
D		REVISED PER TDRR 20882	7/21/65	WR
E		REVISED PER TDRR 31910	11-10-66	
F		REVISED PER TDRR 32829	1-27-67	



SEE NOTE 2

SEE NOTE 3

* PURCHASED ITEM
SEE SPECIFICATION CONTROL
DRAWING BEFORE ORDERING

011	000	ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	35			2011934-011			SCT SHAFT DRIVE HARNESS, ASSY OF			
4	4	34		*	1011625-11	7445515 1011		SCREW, CAP, SOC HD			
3	3	33		*	1011625-18	7445515 1018		SCREW, CAP, SOC HD			
3	3	32		*	1011625-16	7445515 1016		SCREW, CAP, SOC HD			
AS REQD	AS REQD	31			2011804-	7938691 0201 0206		WASHER, FLAT			
1	1	30		NAS	1352C06-6			SCREW, CAP SOC. HD			
1	1	29			2012580-2	56386910590		SPRING, ANTI-BACKLASH			
1	1	28			2012579	33386910340		SPUR GEAR 144T/120P			
1	1	27		*	1011918-3			WASHER, CABLE CLAMP			
3	3	26			2011868-1	54386910101		CLAMP, RIM CLENCHING			
1	1	25		*	1000220-4			CLAMP, CABLE			
2	2	24		NAS	1189C04P4L	7445515 5008		SCREW, 100° FLAT HD			
2	2	23			2011332	57386910460		POST, SPACER			
1	1	22			2011357	33386910140		GEAR, BEVEL (31T/48P)			
4	4	21		NAS	1352C02LL6	7445515 7007		SCREW CAP, SOCKET HD			
1	1	20			2011355-4	57386910453		CLAMP, COLLAR			
1	1	19			2011356	33386910150		GEAR, BEVEL (30T/48P)			
3	3	18			2011868-2	54386910102		CLAMP, RIM CLENCHING			
1	1	17			2011274	52386910500		BRACKET, COUNTER			
1	1	16		*	1012512	75005006801		COUNTER, ANGLE			
1	1	15		NAS	1352C02LL4	7445515 7006		SCREW, CAP, SOCKET HD			
2	2	14			2011355-2	57386910451		CLAMP, COLLAR			
1	1	13			2012578	33386910330		GEAR SPUR 144T/120P			
3	3	12		NAS	1352C03LL4	7445515 7009		SCREW, CAP. SOCKET HD.			
3	3	11			2011868-3	54386910103		CLAMP, RIM CLENCHING			
0	1	10			2011934-000	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
1	1	9			2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
1	1	8			2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
1	1	7			2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
1	1	6			2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
6	6	5		*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
1	1	4		*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
1	1	3		*	1011608-4	3025770 0120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
1	1	2			2011333	85386910400	-	PLATE, BEARING ASSEMBLY OF,			
1	1	1			2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

QTY REQD

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200
DRAWN E. DRAPALA DATE 4-6-64
CHECKED J. SULLIVAN 5-6-64
APPROVAL
APPROVAL E. Thomp 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

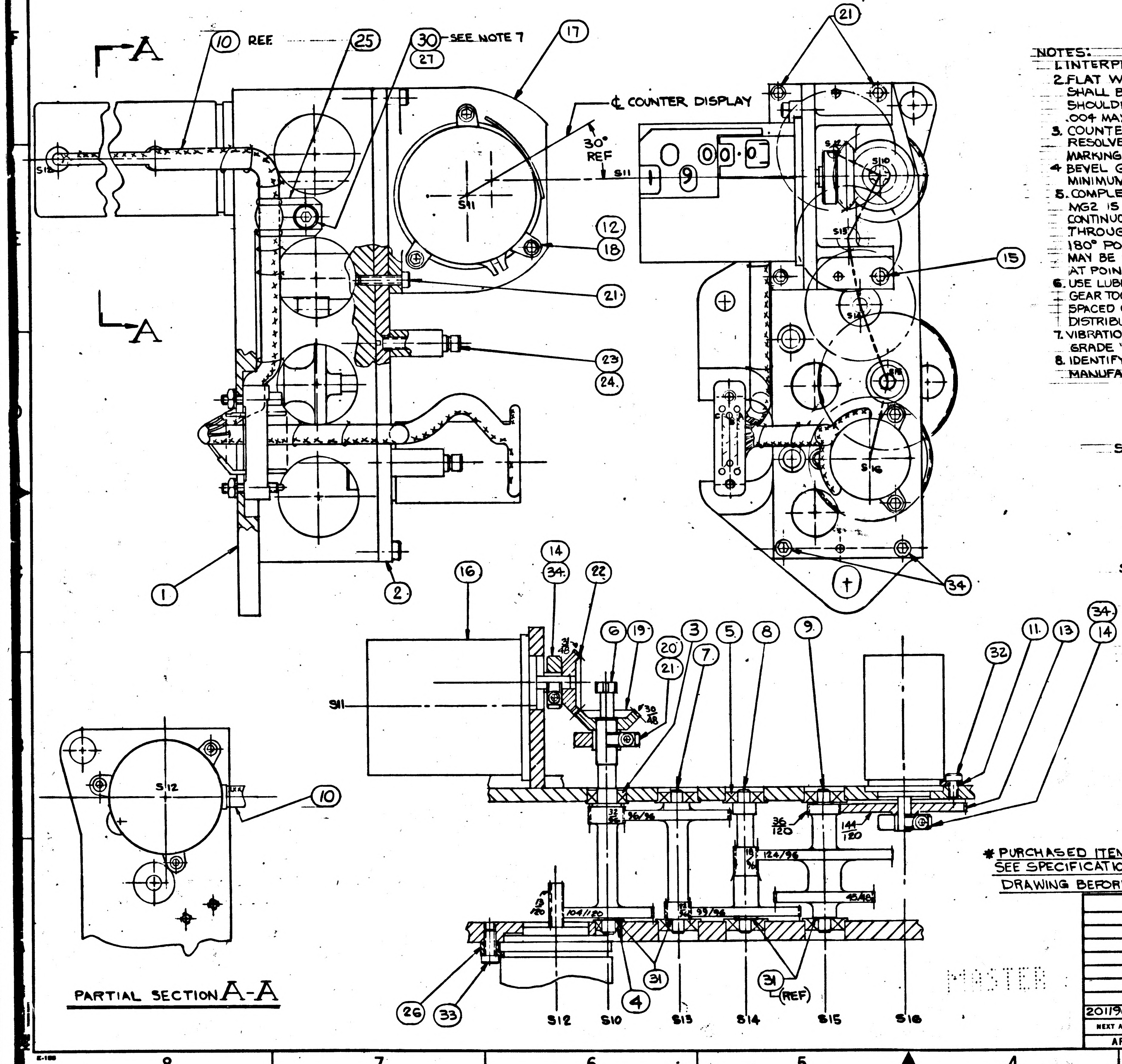
TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011703
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011703 F

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011703



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 31) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .004 MAX AT SHAFTS S10, S13, S14 AND S15.
3. COUNTER (ITEM 16) SHALL REGISTER ZERO WHEN THE RESOLVER B2 IS AT ITS NULL SETTING INDICATED BY MARKING ON SHAFT AND BODY.
4. BEVEL GEARS (ITEMS 19 & 22) SHALL BE ALIGNED FOR MINIMUM BACKLASH COMPATIBLE WITH NOTE 5.
5. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 CPS MAX AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX., IN EITHER DIRECTION, THROUGH 360° COUNTER ROTATION EXCEPT AT 0° AND 180° POINTS WHERE THE STARTING AND RUNNING VOLTAGE MAY BE 8.0 VOLTS MAX. STARTING VOLTAGE TO BE CHECKED AT POINTS WHERE DRIVE APPEARS TO SLOW DOWN.
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. VIBRATION PROOF ITEM 30 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES PER ND1002211.
8. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

SEE NOTE 2 — 31
SEE NOTE 4 — 22
SEE NOTE 4 — 19
SEE NOTE 3 — 16

ITEM NO.	QTY REQD		GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
34	4	*	1011625-11	7445515101 1		SCREW, CAP, SOC HD			
33	3	*	1011625-18	74455151018		SCREW, CAP, SOC HD			
32	3	*	1011625-16	74455151016		SCREW, CAP, SOC HD			
31	AS REQ		2011804-	7938691 0201 0206		WASHER, FLAT			
30	1	NAS	1352C06-6			SCREW, CAP SOC. HD			
29									
28									
27	1	*	1011918-3			WASHER, CABLE CLAMP			
26	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
25	1	*	1000220-4			CLAMP, CABLE			
24	2	NAS	1189 04P4L	74455155008		SCREW, 100° FLAT HD			
23	2		2011332	57386910460		POST, SPACER			
22	1		2011357	33386910140		GEAR, BEVEL (31T/48P)			
21	4	NAS	1352C02LL6	74455157007		SCREW CAP, SOCKET HD			
20	1		2011355-4	57386910453		CLAMP, COLLAR			
19	1		2011356	33386910150		GEAR, BEVEL (30T/48P)			
18	3		2011868-2	54386910102		CLAMP, RIM CLENCHING			
17	1		2011274	52386910500		BRACKET, COUNTER			
16	1	*	1011744	75005005701		COUNTER, ANGLE			
15	1	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HD			
14	2		2011355-2	57386910451		CLAMP, COLLAR			
13	1		2012372	33386910070		GEAR SPUR 144T/120P			
12	3	NAS	1352C03LL4	74455157009		SCREW, CAP, SOCKET HD.			
11	3		2011868-3	54386910103		CLAMP, RIM CLENCHING			
10	1		2011934	80386910010		SCT SHAFT DRIVE HARNESS, ASSY OF			
9	1		2011278	33386910080		GEARSHAFT 36T/120P-124T/96P-45T/48P			
8	1		2011279	33386910130		GEARSHAFT 18T/96P-99T/96P			
7	1		2011280	33386910120		GEARSHAFT 22T/96P-96T/96P			
6	1		2011358	33386910110		GEARSHAFT 104T/120P/32T/96P			
5	6	*	1011608-3	30257700082		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
4	1	*	1011608-1	30257700080		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
3	1	*	1011608-4	30257700120		BEARING, BALL, ANNULAR (FLANGED, PHENOLIC RETAINER)			
2	1		2011333	85386910400		PLATE, BEARING ASSEMBLY OF,			
1	1		2011329	52386910480		HOUSING, GEAR SCT SHAFT DRIVE			

LIST OF PARTS AND MATERIALS

* PURCHASED ITEM
SEE SPECIFICATION CONTROL
DRAWING BEFORE ORDERING

MASTER

NEXT ASSY	USED ON
2011902	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910200

DRAWN E. DRAPALA DATE: 4-6-64
CHECKED: J. SULLIVAN 5-6-64
APPROVAL 8/25/64
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX,
SCT,
ASSEMBLY OF

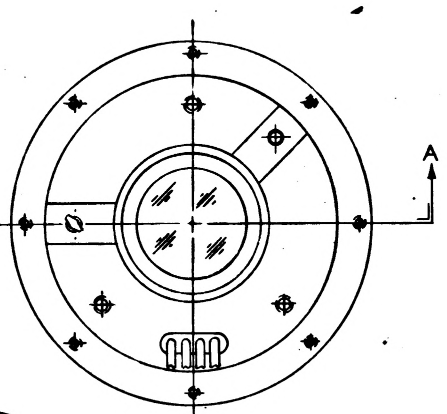
CODE IDENT NO. SIZE D NASA NUMBER 2011703
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

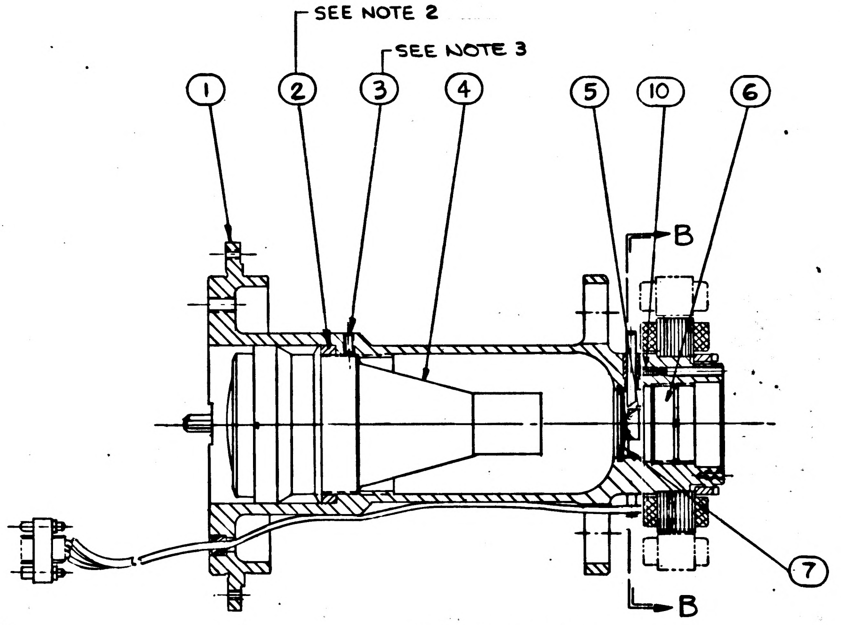
2011704 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15364	4/4/65	WK.

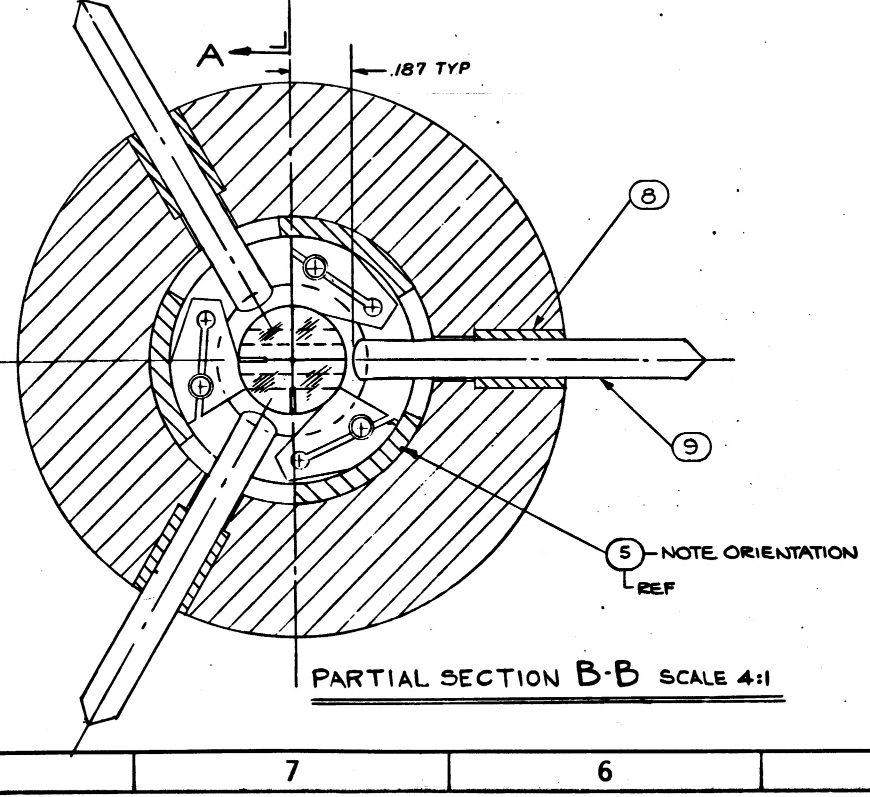
REVISIONS TDR 11109

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 2 SHALL BE MACHINED AT ASSEMBLY TO FOCUS AN IMAGE OF A COLLIMATED TARGET THROUGH ITEM 4 AT THE RETICLE PLANE OF ITEM 5 WITH NO APPARENT PARALLAX. ITEM 2 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING.
3. SECURE ITEM 3 WITH LOCKING COMPOUND PER ND 1002211 USING GRADE "E" OF MIL-S-22473.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).





SECTION A-A



PARTIAL SECTION B-B SCALE 4:1

*PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	3		2011952	48386910060		SCREW, SELF LOCKING, SET			
9	3		2011584	25386910060		ROD, ILLUMINATING			
8	3		2011633	57386910240		SLEEVE, SPLIT, ILLUMINATING ROD			
7	1		2011944	56386910180		WASHER, SPRING			
6	1		2011305	57386910330		RING, LOCKING OUTER			
5	1		2011716	85386910340		RETICLE ASSY OF,			
4	1		2011796	85386910330		LENS HOLDER ASSY, SEXTANT TELESCOPE			
3	1	*	1011773-2	74455166002		SET SCREW, FLAT (NYLON) POINT, HEX. SOC			
2	1		2011304	57386910320		SPACER			
1	1		2011797	85386910290		TELESCOPE TUBE ASSY			

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910320

DRAWN F. Schiller DATE 4-3-64
CHECKED C. Lewz 7/13/64
APPROVAL F. Rischmann 7/14/64
APPROVAL E. Thoma 7/14/64
NASA APPROVAL
MIT APPROVAL WKupfer 21/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT AXIS ASSY, SEXTANT

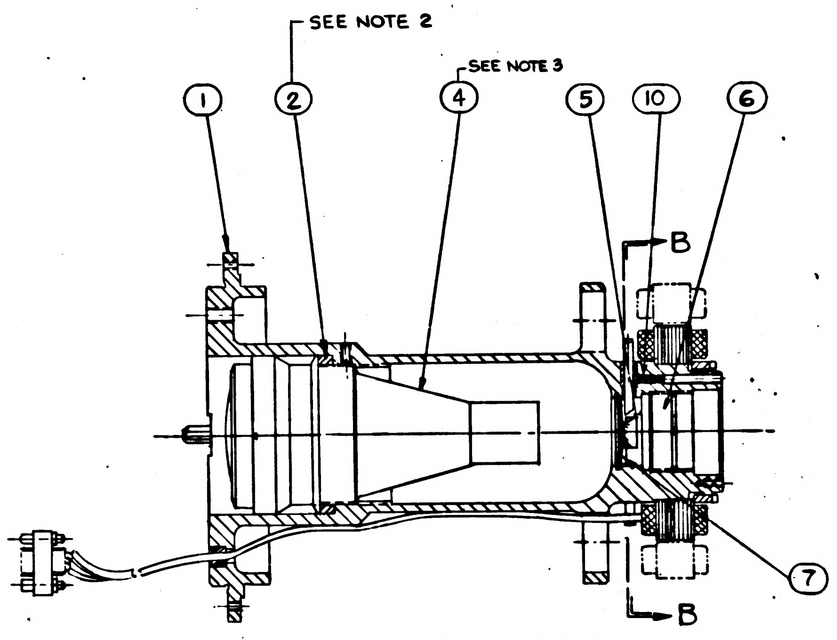
CODE IDENT NO.
SIZE D
NASA NUMBER 2011704 -
SCALE 1/1 & 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011704 B

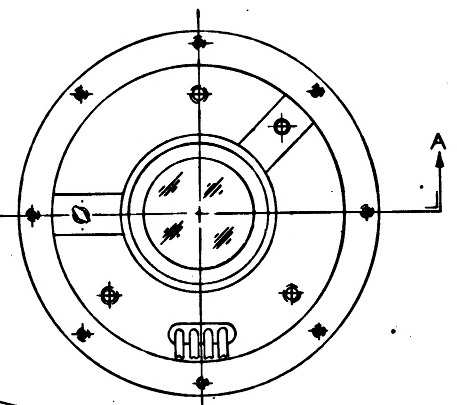
SYM	ZONE	REVISIONS TDRR 11109 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15364	4/4/65	W.K.
B		REVISED PER TDRR NO. 17396	18 Mar 65	WK

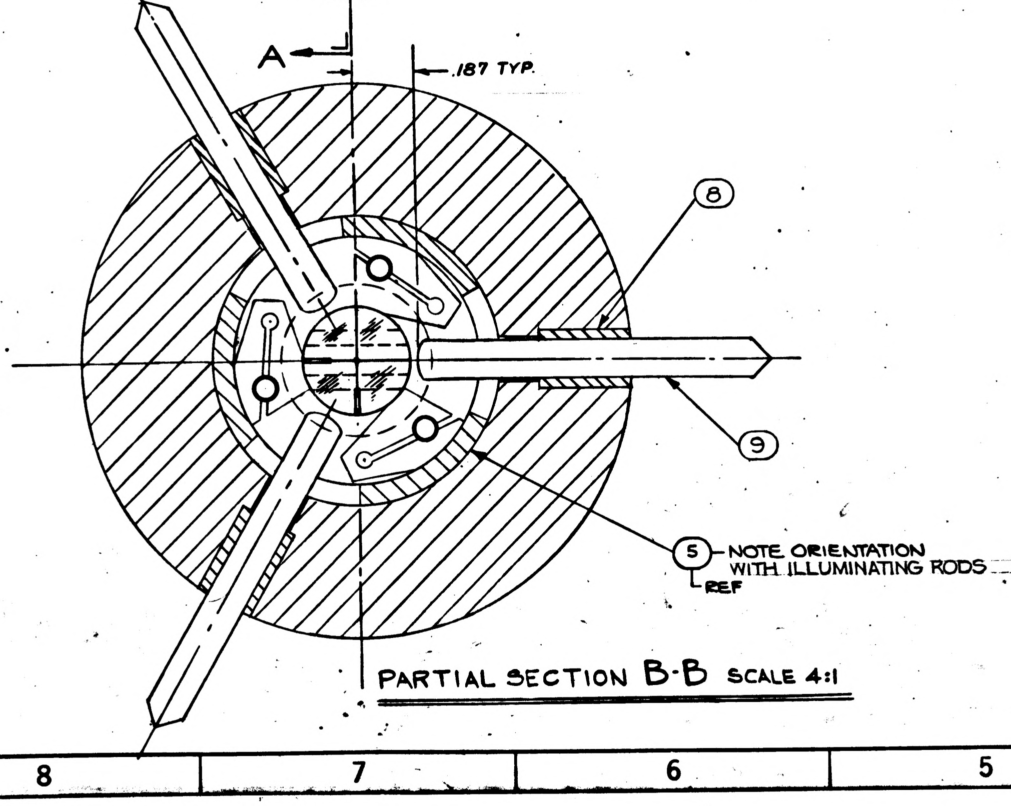
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 2 SHALL BE MACHINED AT ASSEMBLY TO FOCUS AN IMAGE OF A COLLIMATED TARGET THROUGH ITEM 4 AT THE RETICLE PLANE OF ITEM 5 WITH NO APPARENT PARALLAX. ITEM 2 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING.
3. SECURE ITEM 4 TO ITEM 1 USING 4 DROPS OF SEALING COMPOUND GRADE "A" OF MIL-S-22473 PER ND1002211. ITEM 4 TO BE THREADED TO ITEM 1 WITH TORQUE BETWEEN 180 TO 240 INCH LBS.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).



SECTION A-A





PARTIAL SECTION B-B SCALE 4:1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	3		2011952	48386910060		SCREW, SELF LOCKING, SET			
9	3		2011584	25386910060		ROD, ILLUMINATING			
8	3		2011633	57386910240		SLEEVE, SPLIT, ILLUMINATING ROD			
7	1		2011944	56386910180		WASHER, SPRING			
6	1		2011305	57386910330		RING, LOCKING OUTER			
5	1		2011716	85386910340		RETICLE ASSY OF,			
4	1		2011796	85386910330		LENS HOLDER ASSEMBLY, SEXTANT TELESCOPE			
3									
2	1		2011304	57386910320		SPACER			
1	1		2011797	85386910290		TELESCOPE TUBE ASSY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910320

DRAWN DATE 4-3-64
CHECKED C. Lewz 7/13/64
APPROVAL 7/14/64
APPROVAL 7/14/64
NASA APPROVAL
MIT APPROVAL 21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT AXIS ASSY, SEXTANT

CODE IDENT NO.
SIZE D
NASA NUMBER 2011704
SCALE 1/1 & 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

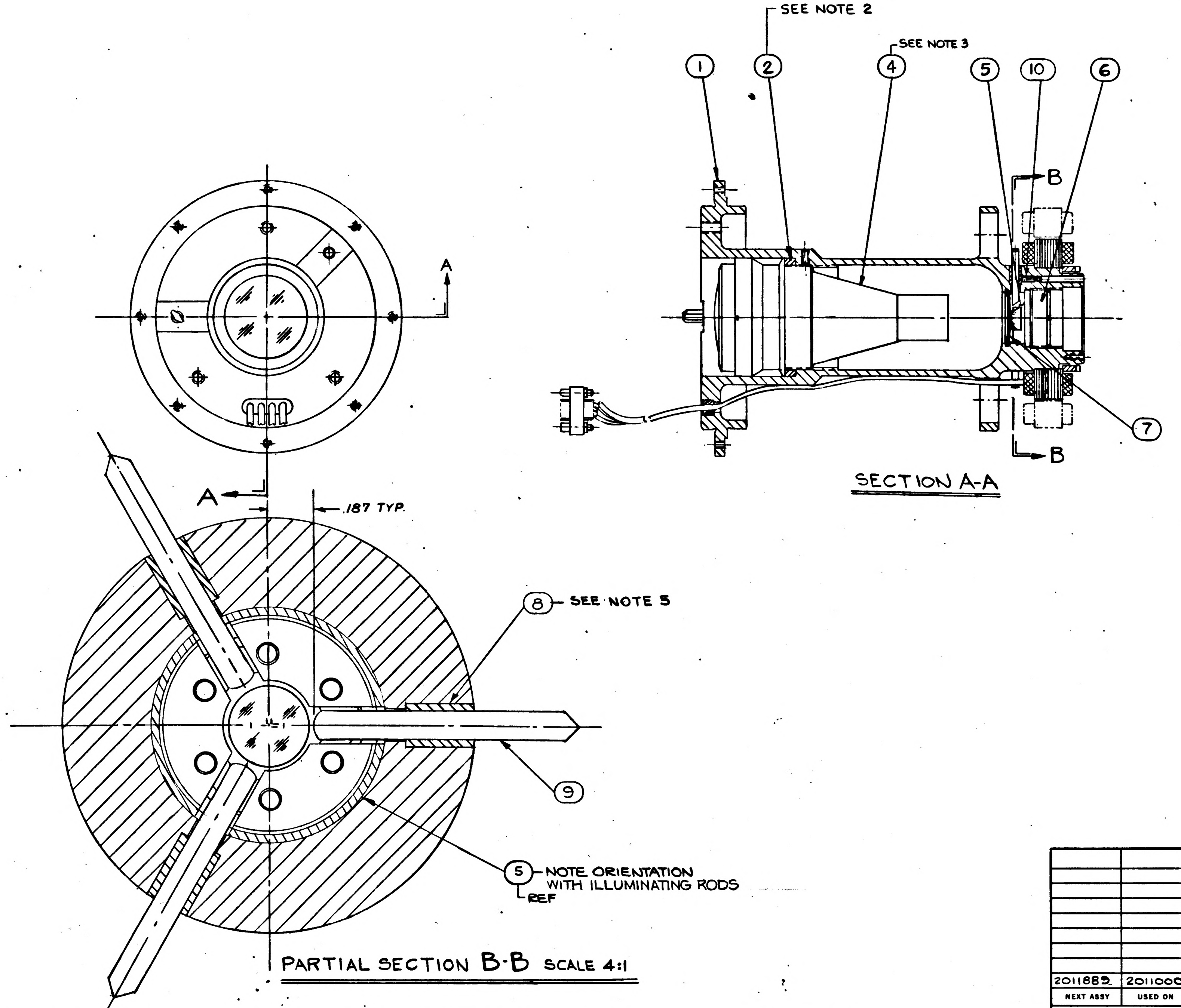
2011704 B

C	2011704

REVISIONS			TDRR 11109	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15364	9/4/65	wK.
B		REVISED PER TDRR NO. 17396	12/14/65	wK
C		REVISED PER TDRR 20690	7/13/65	wK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 2 SHALL BE MACHINED AT ASSEMBLY TO FOCUS AN IMAGE OF A COLLIMATED TARGET THROUGH ITEM 4 AT THE RETICLE PLANE OF ITEM 5 WITH NO APPARENT PARALLAX. ITEM 2 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING.
3. SECURE ITEM 4 TO ITEM 1 USING 4 DROPS OF SEALING COMPOUND GRADE "A" OF MIL-S-22473 PER ND1002211. ITEM 4 TO BE THREADED TO ITEM 1 WITH TORQUE BETWEEN 180 TO 240 INCH LBS.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).
5. SLEEVE (ITEM 8) SHALL BE POSITIONED WITH SLOT APPROXIMATELY 90° AWAY FROM SETSCREW (ITEM 10).


SEE NOTE 2
SEE NOTE 3
1
2
4
5
10
6
7
B
B
A
SECTION A-A
A
.187 TYP.
8 SEE NOTE 5
9
5 NOTE ORIENTATION WITH ILLUMINATING RODS
REF
PARTIAL SECTION B-B SCALE 4:1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	3		2011952	48386910060		SCREW, SELF LOCKING, SET			
9	3		2011584	25386910060		ROD, ILLUMINATING			
8	3		2011633	57386910240		SLEEVE, SPLIT, ILLUMINATING ROD			
7	1		2011944	56386910180		WASHER, SPRING			
6	1		2012513	57386911414		RING, LOCKING			
5	1		2012426	85386911210		RETICLE ASSY OF, SXT			
4	1		2011796	85386910330		LENS HOLDER ASSEMBLY, SEXTANT TELESCOPE			
3									
2	1		2011304	57386910320		SPACER			
1	1		2011797	85386910290		TELESCOPE TUBE ASSY			

LIST OF PARTS AND MATERIALS

2011889	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910320

DRAWN F. Schiller DATE 4-3-64
CHECKED C. Lewz (CRT) 7/13/64
APPROVAL F. Fischmann 7/14/64
APPROVAL E. Thomp 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT AXIS ASSY, SEXTANT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011704

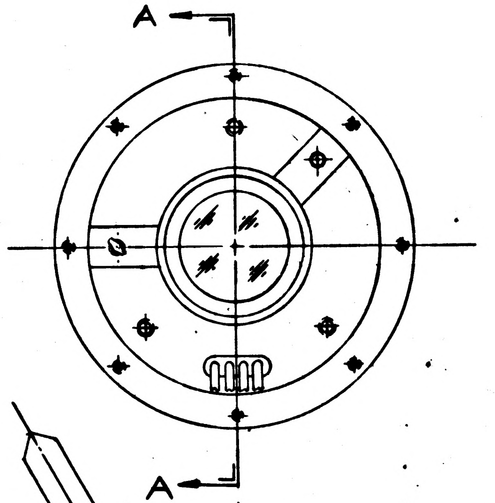
SCALE 1/1 & 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

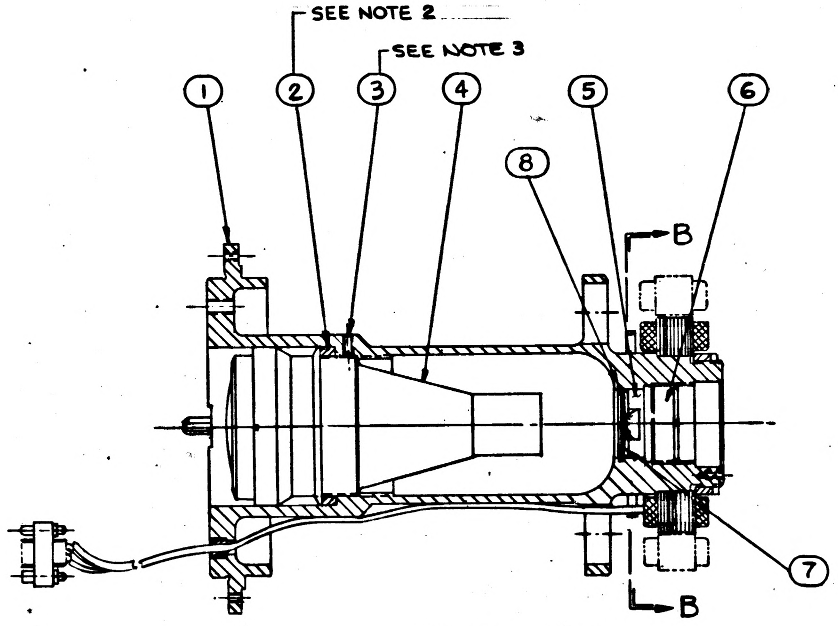
2011704 C

2011704

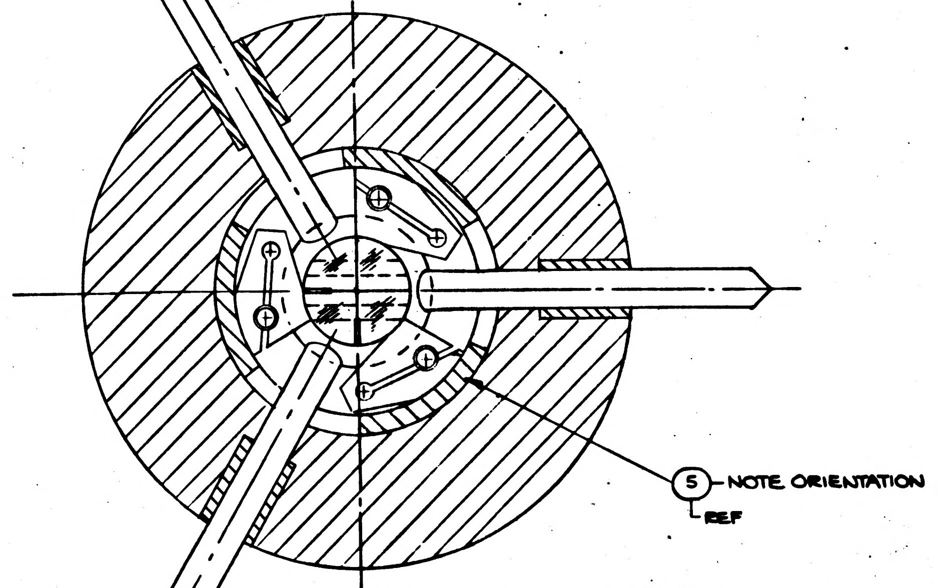
REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 2 SHALL BE MACHINED AT ASSEMBLY TO FOCUS AN IMAGE OF A COLLIMATED TARGET THROUGH ITEM 4 AT THE RETICLE PLANE OF ITEM 5 WITH NO APPARENT PARALLAX. ITEM 2 SHALL REQUIRE PASSIVATION AFTER FINAL MACHINING.
3. SECURE ITEM 3 WITH LOCKING COMPOUND PER ND 1002211 USING GRADE "E" OF MIL-S-22473.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).





SECTION A-A



PARTIAL SECTION B-B SCALE 4:1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1		MS16625-90	—		RING, RETAINING, INTERNAL, BASIC			
7	1		2011944	56386910180		WASHER, SPRING			
6	1		2011305	57386910330		RING, LOCKING OUTER			
5	1		2011716	85386910340		RETICLE ASSY OF,			
4	1		2011796	85386910330		LENS HOLDER ASSY, SEXTANT TELESCOPE			
3	1	*	1011773-2	74455166002		SET SCREW, FLAT (NYLON) POINT, HEX. SOC			
2	1		2011304	57386910320		SPACER			
1	1		2011797	85386910290		TELESCOPE TUBE ASSY			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910320
DRAWN J. Schiller DATE 4-3-64
CHECKED C. Lewz (CR) 7/13/64
APPROVAL E. Rechmann 7/14/64
APPROVAL 7/14/64
NASA APPROVAL
MIT APPROVAL 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT AXIS ASSY, SEXTANT

CODE IDENT NO.
SIZE D
NASA NUMBER 2011704
SCALE 1/1 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

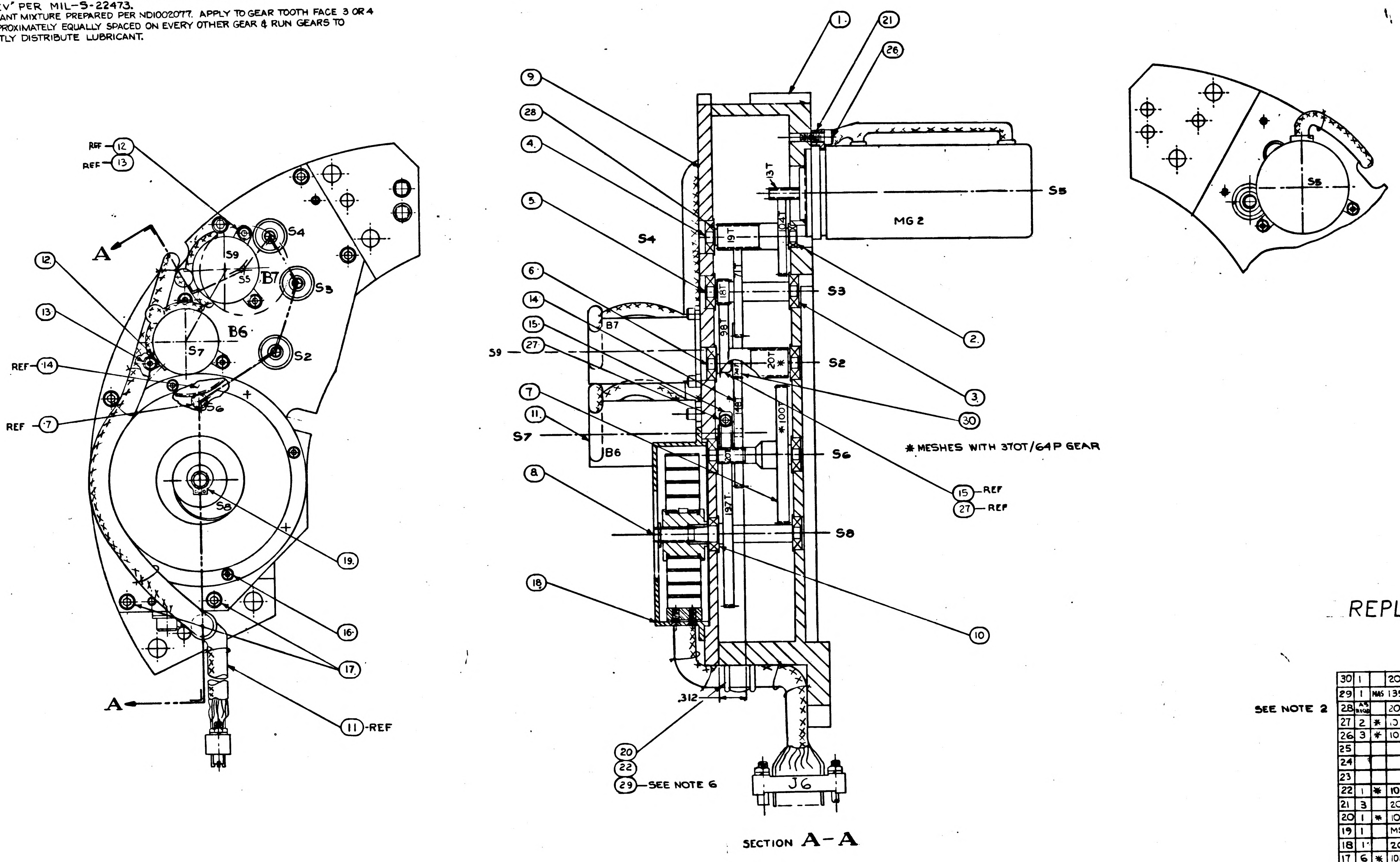
MASTER

2011704

2011705 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 12119		
A		REVISED PER ~~TDRR NO.~~ + REDRAWN REPLACED BY		
		REV. B WITH CHANGES PER TDRR 15351	1/6/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 28) OF INCREMENTAL THICKNESS SHELL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .004 IN MAX. AT SHAFTS S2, S3, S4, S6 AND S8. WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
3. RESOLVERS B6 AND B7 SHALL BE ADJUSTED TO THEIR NULL SETTINGS (AS INDICATED BY MARKING ON RESOLVER SHAFT AND BODY) WHEN THE SPRING, OF THE HOUSING AND SPRING ASSEMBLY (ITEM 18), IS IN THE UNLOADED ATTITUDE.
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM (6).
5. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
6. VIBRATION PROOF ITEM 29 USING LOCKING COMPOUND GRADE 'EV' PER MIL-S-22473.
7. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.



SECTION A-A

REPLACED BY REV. B WITH CHANGES

SEE NOTE 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
30	1		2012035	33386910060		GEAR SPUR (74T-120P)			
29	1	NAS	1352C06-6	-		SCREW, CAP, SOC HD.			
28	AS REQD		2011804-	79386910201 0206		WASHER, FLAT			
27	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
26	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25									
24									
23									
22	1	*	1011918-3			WASHER, CABLE CLAMP			
21	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
20	1	*	1000220-4			CLAMP, CABLE			
19	1		MS16624-18			RING, RETAINING (WALDES TRUARC 5100-18)			
18	1		2011911	85386910480		HOUSING AND SPRING ASSEMBLY			
17	6	*	1011625-28	74455151028		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	4	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
15	2		2011355-2	57386910451		CLAMP, COLLAR			
14	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
13	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
12	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
11	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
10	1	*	1011608-4	30025770120		BEARING, BALL, ANNULAR			
9	1		2011715	85386910130		PLATE BEARING AND PIN ASSY			
8	1		2011309	33386910210		GEARSHAFT (197T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
5	1		2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
4	1		2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
3	8	*	1011608-[illegible]	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2011897	85386910120		HOUSING, GEAR (SEXTANT SHAFT DRIVE) ASSY OF			

LIST OF PARTS AND MATERIALS

*PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E. DRAPALA DATE 4-9-64
CHECKER J. SULLIVAN 6-1-64
APPROVAL 7/22/64
APPROVAL E. [illegible] 8/25/64
NASA APPROVAL
MIT APPROVAL 25

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

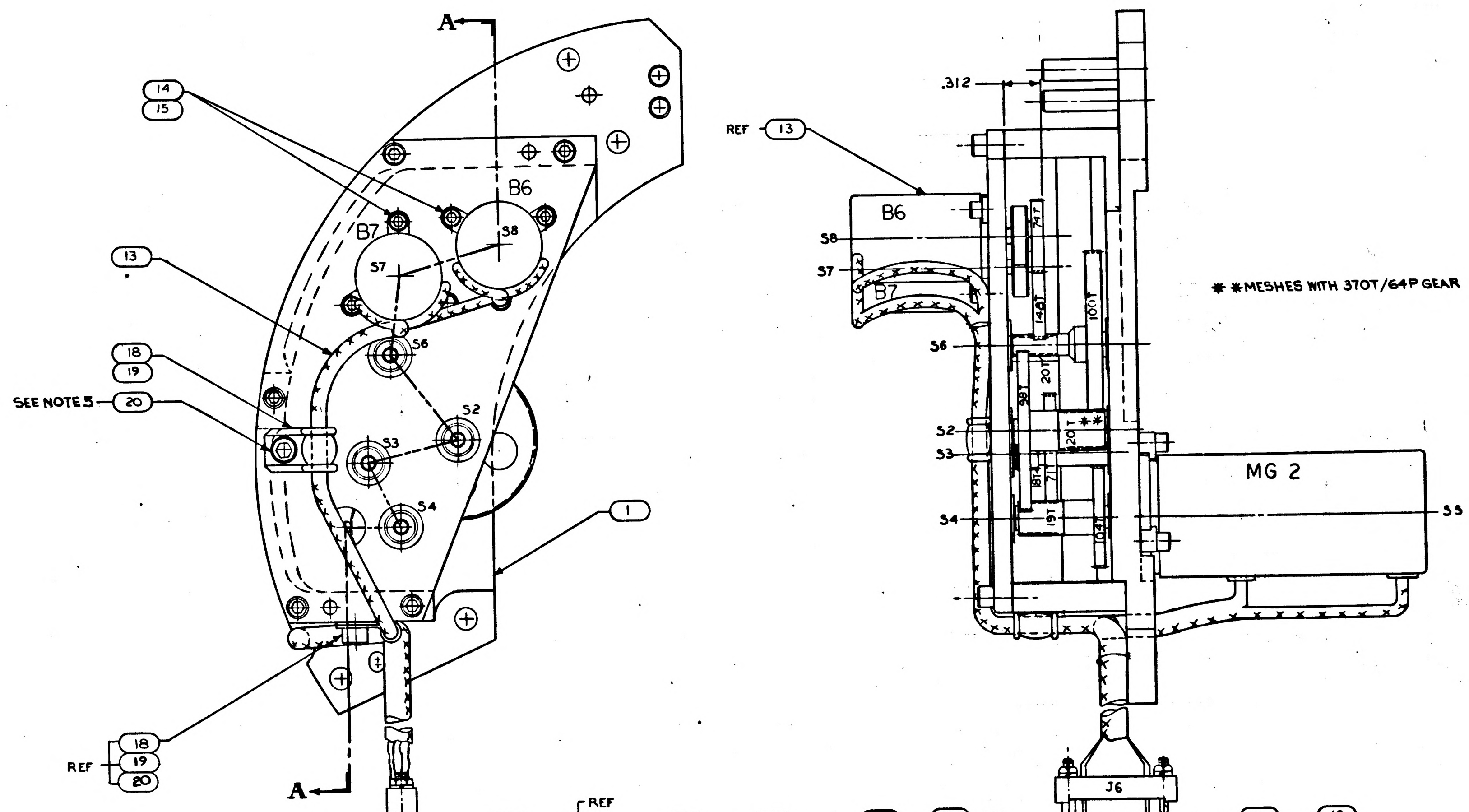
TITLE
SHAFT DRIVE GEARBOX,
SXT, ASSEMBLY OF

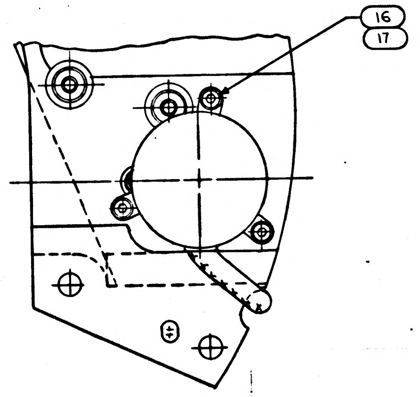
CODE IDENT NO.
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

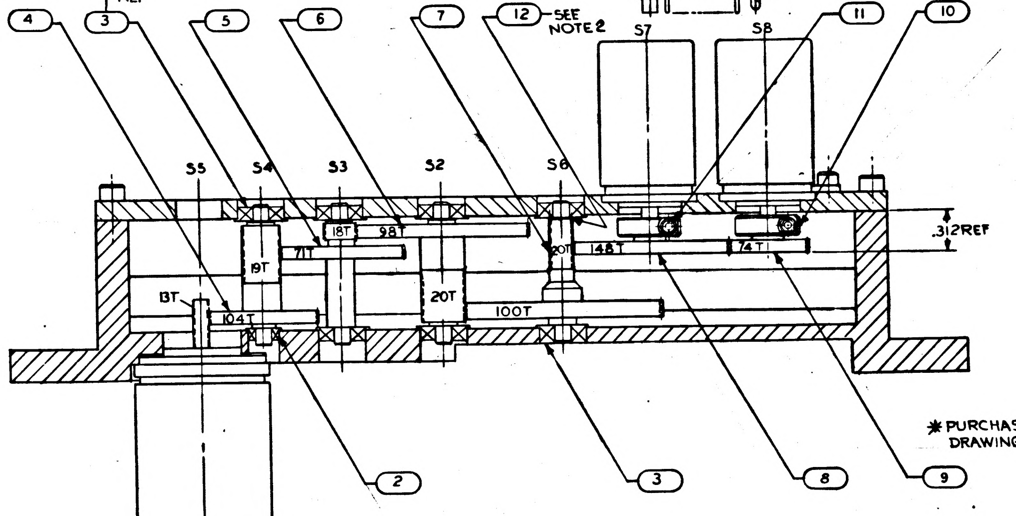
2011705 B

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
B		REVISED PER + REDRAWN TDRR NO. 15351	1/6/65	WR.
		REPLACES REV. A.		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM NO.12) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY WITHIN .0005 TO .004 IN. AT SHAFTS S2, S3, S4 AND S6, WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
3. RESOLVERS B6 AND B7 SHALL BE ADJUSTED TO THEIR NULL SETTINGS (AS INDICATED BY MARKING ON RESOLVER SHAFT AND BODY)
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM NO. 9.
5. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (H) PREPARE SURFACES IN ACCORDANCE WITH ND1002211 ITEM NO. 20
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)







SECTION A - A

* PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

REPLACES REV. A WITH CHANGES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
20	2		NAS1352C06-6			SCREW, CAP, SOC HD			
19	2	*	1011918-3			WASHER, CABLE CLAMP			
18	2	*	1000220-3			CLAMP, CABLE			
17	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
15	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
14	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
13	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
12	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
11	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	2		2011355-2	573869110451		CLAMP, COLLAR			
9	1		2012035	33386910060		GEAR SPUR (74T-120P)			
8	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
5	1		2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
4	1		2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
3	7	*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2012380	85386911090		HOUSING, GEAR MACHINING ASSEMBLY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490
DRAWN E. DRAPALA DATE 11-12-64
CHECKED 11-12-64
APPROVAL 11-17-64
APPROVAL 11/12/64
NASA APPROVAL 1-6-65
MIT APPROVAL Jan 65

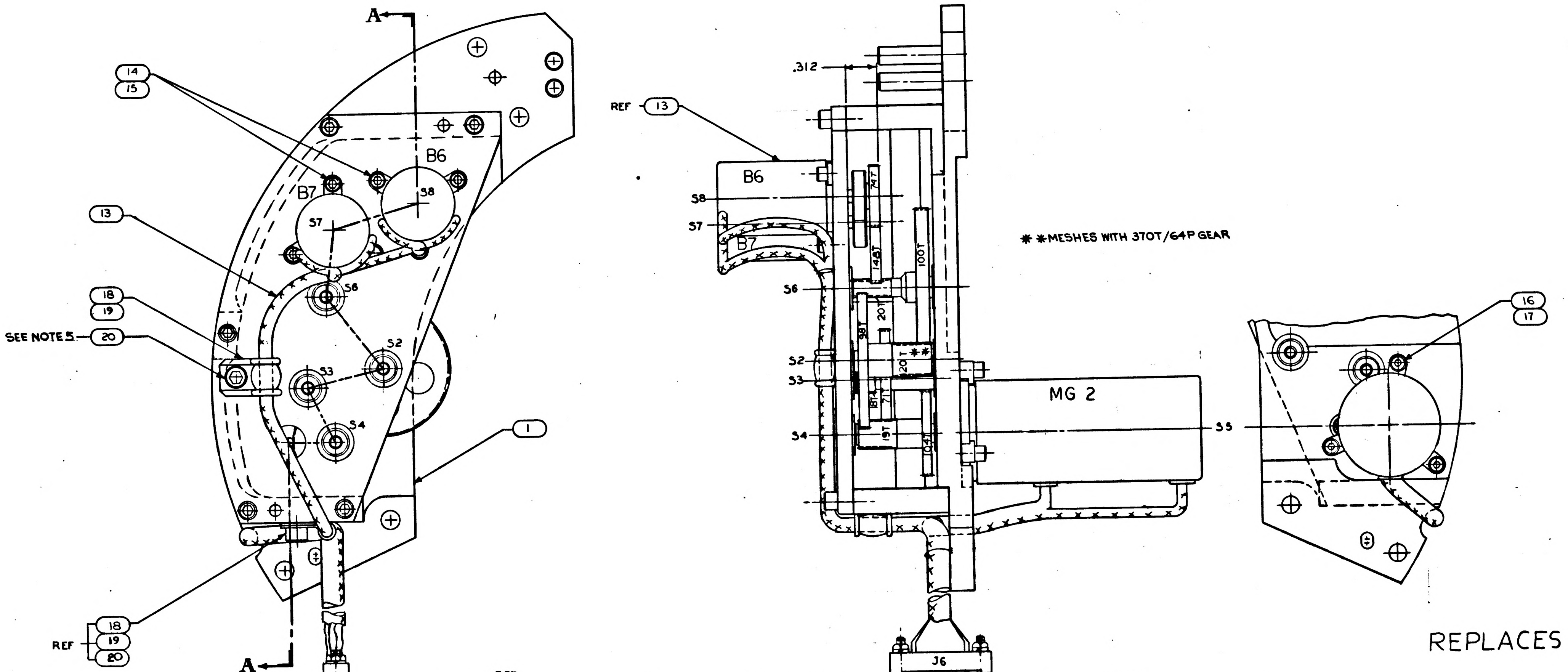
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
SHAFT DRIVE GEARBOX
SXT, ASSEMBLY OF
CODE IDENT NO.
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

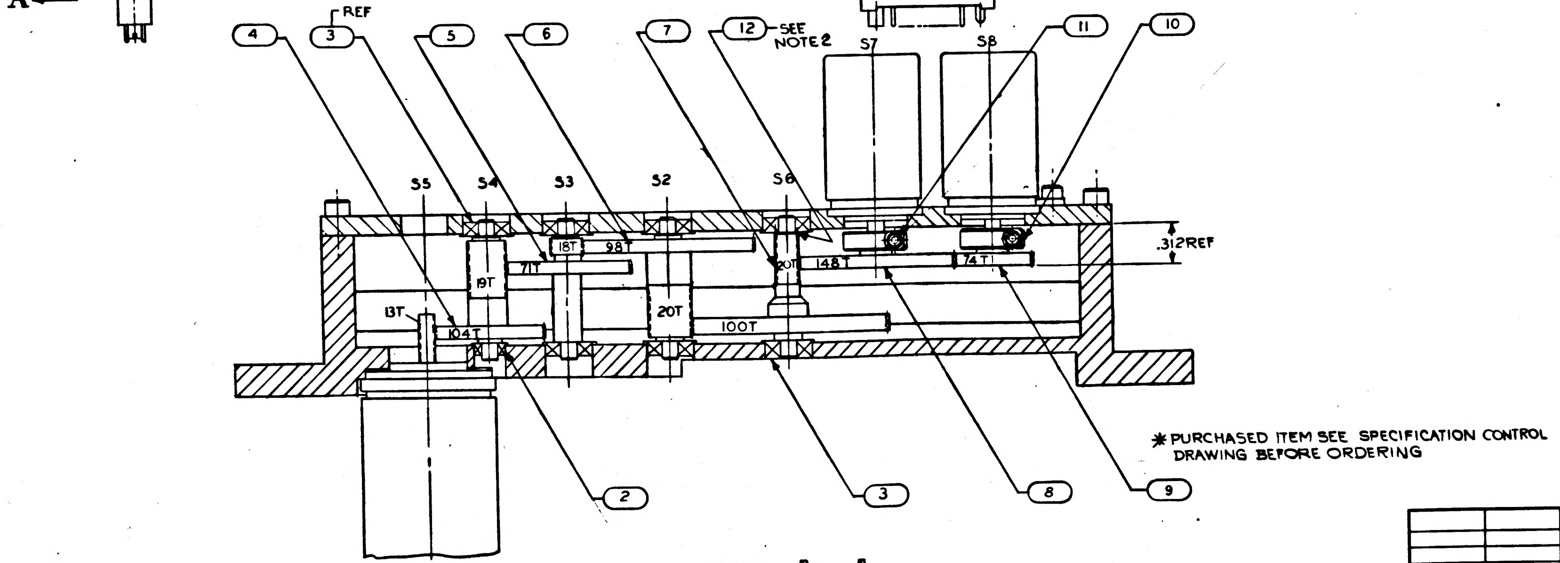
2011705 C

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER + REDRAWN TDRR NO. 15351	1/4/65	WK.
		REPLACES REV. A.		
C		REVISED PER TDRR 18564	4/27/65	WP

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM NO.12) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY WITHIN .0005 TO .004 IN. AT SHAFTS S2, S3, S4 AND S6, WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
3. RESOLVERS B6 AND B7 SHALL BE ADJUSTED TO THEIR NULL SETTINGS (AS INDICATED BY MARKING ON RESOLVER SHAFT AND BODY)
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM NO. 9.
5. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (H) PREPARE SURFACES IN ACCORDANCE WITH ND1002211 ITEM NO. 20
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)



REPLACES REV. A WITH CHANGES



SECTION A - A

*PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UN
20	2		NAS1352C06-6			SCREW, CAP, SOC HD			
19	2	*	1011918-3			WASHER, CABLE CLAMP			
18	2	*	1000220-4			CLAMP, CABLE			
17	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
15	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
14	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
13	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
12	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
11	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	2		2011355-2	573869110451		CLAMP, COLLAR			
9	1		2012035	33386910060		GEAR SPUR (74T-120P)			
8	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
5	1		2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
4	1		2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
3	7	*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2012380	85386911090		HOUSING, GEAR MACHINING ASSEMBLY OF			

LIST OF PARTS AND MATERIALS

2011890	2011000	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E. DRAPALA DATE 11-12-64
CHECKED H. E. Ernsnger 11-12-64
APPROVAL E. Randmann 11-17-64
APPROVAL E. Alrong 11/12/64
NASA APPROVAL 1-6-65
MIT APPROVAL 1/6/65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX
SXT, ASSEMBLY OF

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011705

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

2011705 D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM NO.12) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY WITHIN .0005 TO .004 IN. AT SHAFTS S2, S3, S4 AND S6, WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
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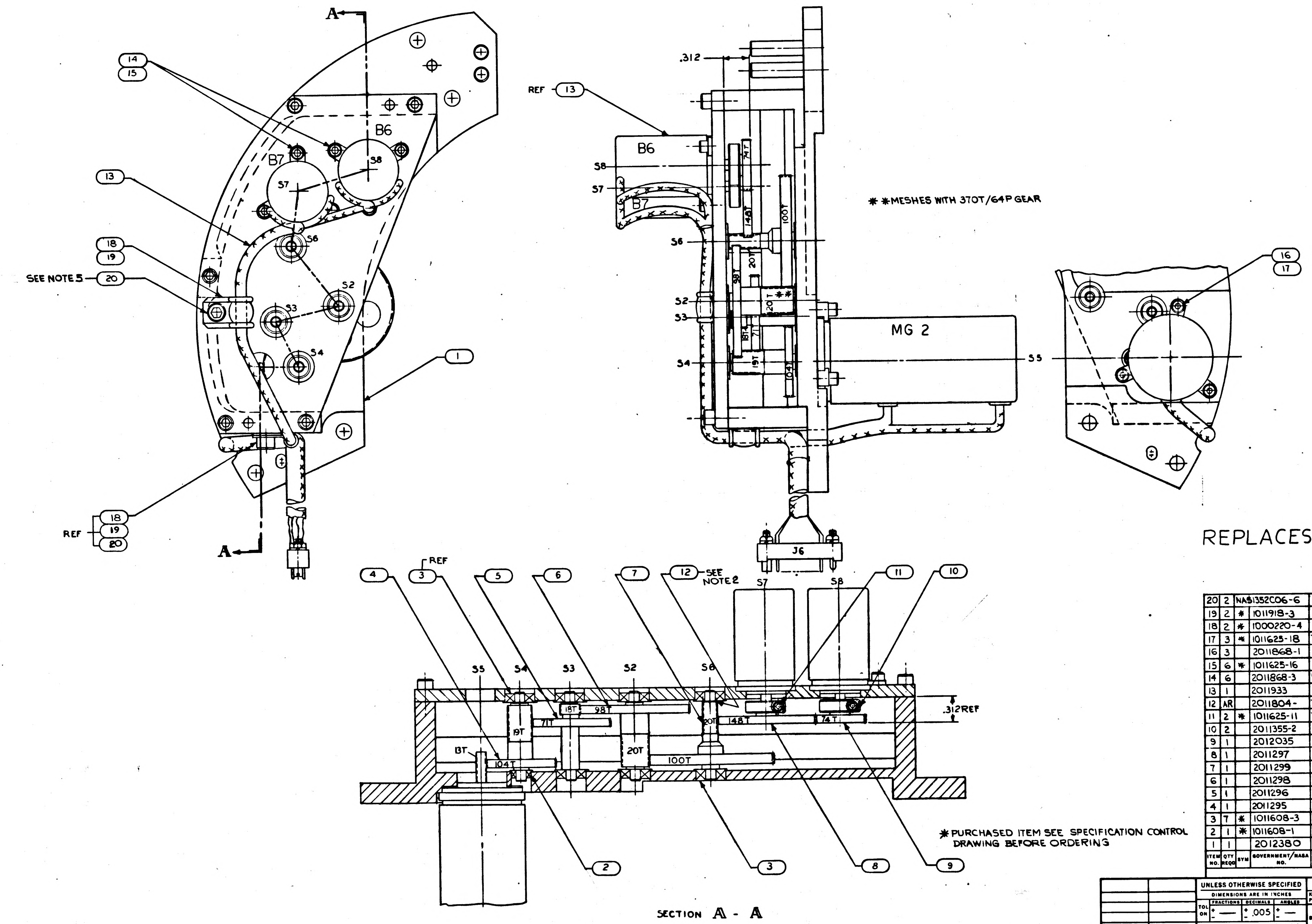
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM NO. 9.
5. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (H) PREPARE SURFACES IN ACCORDANCE WITH ND1002211 ITEM NO. 20
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER + REDRAWN TDRR NO. 15351	1/4/65	WK.
		REPLACES REV. A.		
C		REVISED PER TDRR 18564	4/27/65	WK
D		REVISED PER TDRR 20355	6/5/65	WK



*PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

SECTION A - A

REPLACES REV. A WITH CHANGES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
20	2		NAS1352C06-6			SCREW, CAP, SOC HD			
19	2	*	1011918-3			WASHER, CABLE CLAMP			
18	2	*	1000220-4			CLAMP, CABLE			
17	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
15	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
14	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
13	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
12	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
11	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	2		2011355-2	57386910451		CLAMP, COLLAR			
9	1		2012035	33386910060		GEAR SPUR (74T-120P)			
8	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
5	1		2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
4	1		2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
3	7	*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2012380	85386911090		HOUSING, GEAR MACHINING ASSEMBLY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .005; ANGLES ± —
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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E. DRAPALA DATE 11-12-64
CHECKED 11-12-64
APPROVAL 11-17-64
APPROVAL E. Alonzo 11/12/64
NASA APPROVAL 1-6-65
MIT APPROVAL 1/4/65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX
SXT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

2011705	E

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM NO.12) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY WITHIN .0005 TO .004 IN. AT SHAFTS S2,S3,S4 AND S6, WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
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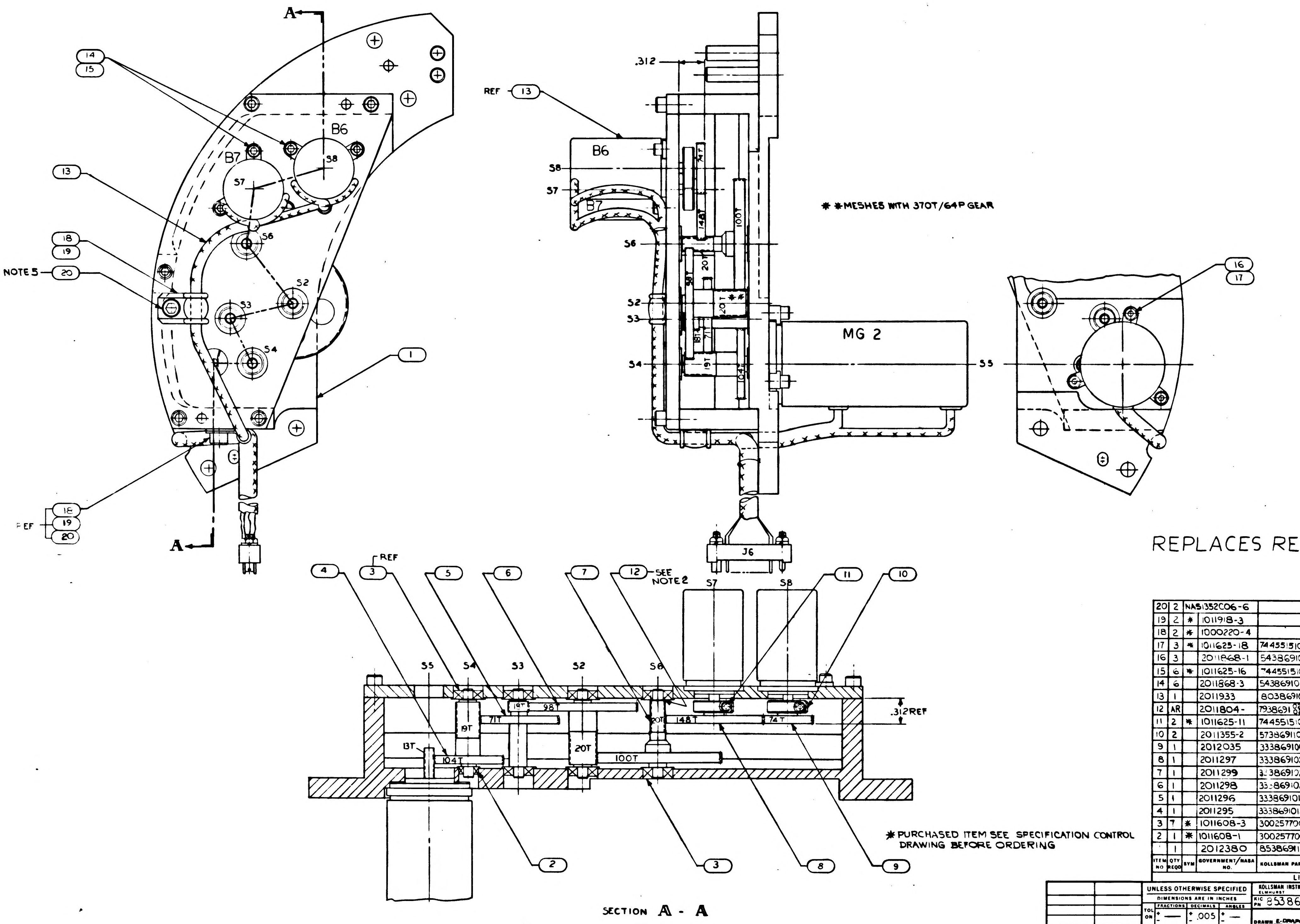
5. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE [illegible]. PREPARE SURFACES IN ACCORDANCE WITH ND1002211 ITEM NO 20
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER + REDRAWN TDRR NO. 15351	1/4/65	W.K.
		REPLACES REV. A.		
C		REVISED PER TDRR 18564	[illegible]	WN
D		REVISED PER TDRR [illegible]355	[illegible]	[illegible]
E		REVISED PER TDRR 31909	–	[illegible]



SECTION A - A

REPLACES REV. A WITH CHANGES

* PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
20	2		NAS1352C06-6			SCREW, CAP SOC HD			
19	2	*	1011918-3			WASHER, CABLE CLAMP			
18	2	*	1000220-4			CLAMP, CABLE			
17	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
15	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
14	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
13	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
12	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
11	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	2		2011355-2	573869110451		CLAMP, COLLAR			
9	1		2012035	33386910060		GEAR SPUR (74T-120P)			
8	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
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3	7	*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2012380	85386911090		HOUSING, GEAR MACHINING ASSEMBLY OF			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON

APPLICATION

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KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E-DRAPALA DATE 11-12-64
CHECKED [illegible] 11-12-64
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX
SXT, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

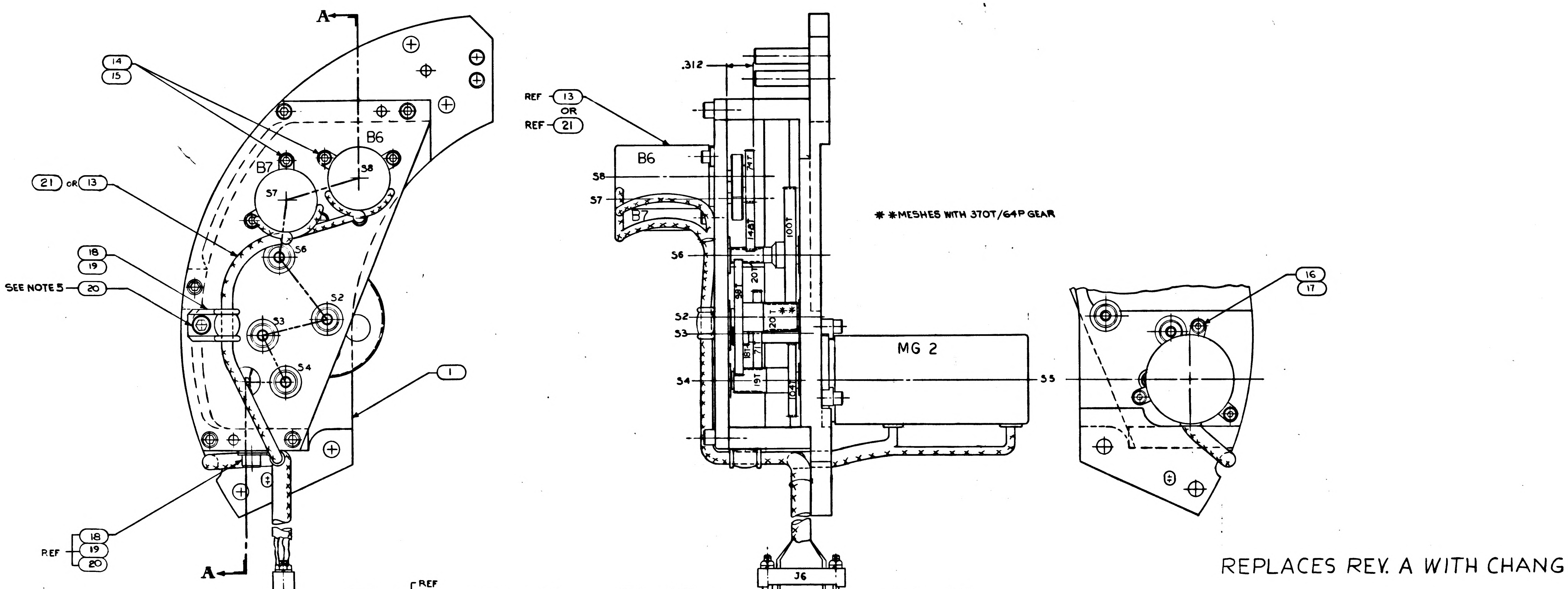
2011705 F

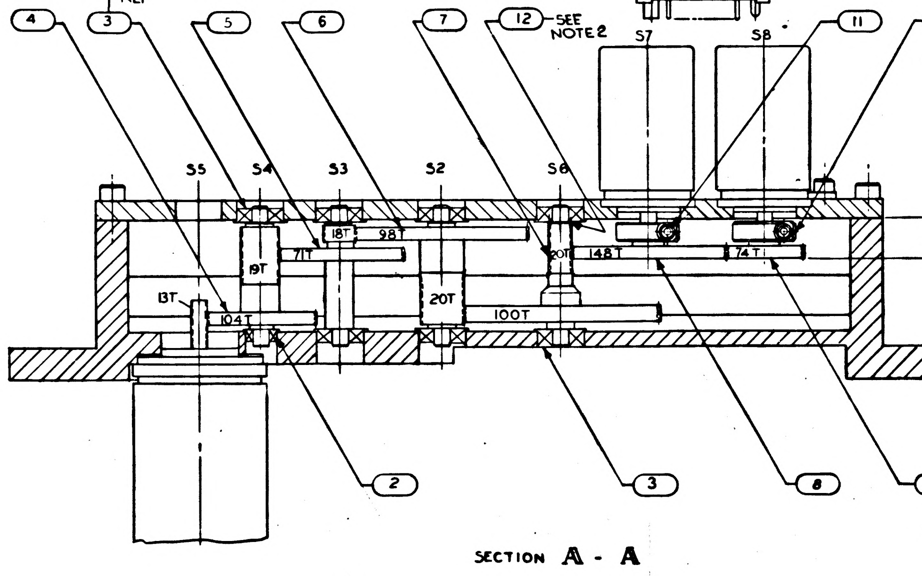
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM NO.12) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY WITHIN .0005 TO .004 IN. AT SHAFTS S2, S3, S4 AND S6, WHEN REQUIRED. THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
3. RESOLVERS B6 AND B7 SHALL BE ADJUSTED TO THEIR NULL SETTINGS (AS INDICATED BY MARKING ON RESOLVER SHAFT AND BODY)
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 800 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM NO. 9.
5. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE "B". PREPARE SURFACES IN ACCORDANCE WITH ND1002211 ITEM NO 20
6. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER + REDRAWN TORR NO. 15351	1/4/65	WR.
		REPLACES REV. A.		
C		REVISED PER TDRR 18564	4/27/65	WR
D		REVISED PER TDRR 20355	6/4/65	WR
E		REVISED PER TDRR 31909		
F		REVISED PER TDRR 3283	1-27-67	





SECTION A - A

REPLACES REV. A WITH CHANGES

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	21			2011933-011			SXT SHAFT DRIVE HARNESS, ASSY OF			
2	2	20			NAS1352C06-6			SCREW, CAP. SOC HD			
2	2	19		*	1011918-3			WASHER, CABLE CLAMP			
2	2	18		*	1000220-4			CLAMP, CABLE			
3	3	17		*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
3	3	16			2011868-1	54386910101		CLAMP, RIM CLENCHING			
6	6	15		*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
6	6	14			2011868-3	54386910103		CLAMP, RIM CLENCHING			
0	1	13			2011933-000	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
AR	AR	12			2011804-	79386910201 0206		WASHER, FLAT			
2	2	11		*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
2	2	10			2011355-2	573869110451		CLAMP, COLLAR			
1	1	9			2012035	33386910060		GEAR SPUR (74T-120P)			
1	1	8			2011297	33386910200		GEAR, SPUR (148T-120P)			
1	1	7			2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
1	1	6			2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
1	1	5			2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
1	1	4			2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
7	7	3		*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
1	1	2		*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1	1			2012380	85386911090		HOUSING, GEAR MACHINING ASSEMBLY OF			

QTY REQD — LIST OF PARTS AND MATERIALS

* PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E. DRAPALA DATE 11-12-64
CHECKED 11-12-64
APPROVAL 11-17-64
APPROVAL 11/12/64
NASA APPROVAL 1-6-65
MIT APPROVAL 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

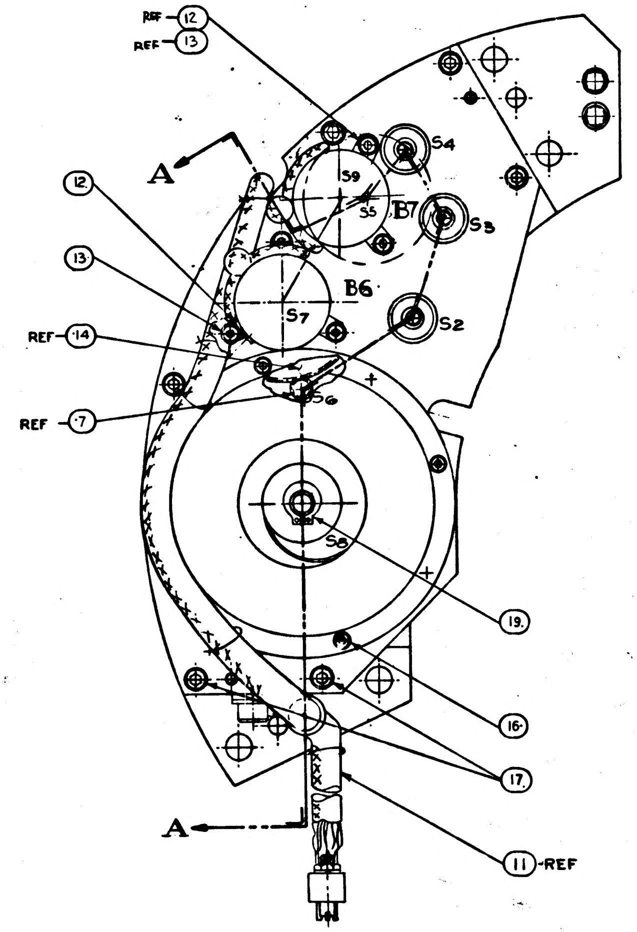
TITLE
SHAFT DRIVE GEARBOX
SXT, ASSEMBLY OF

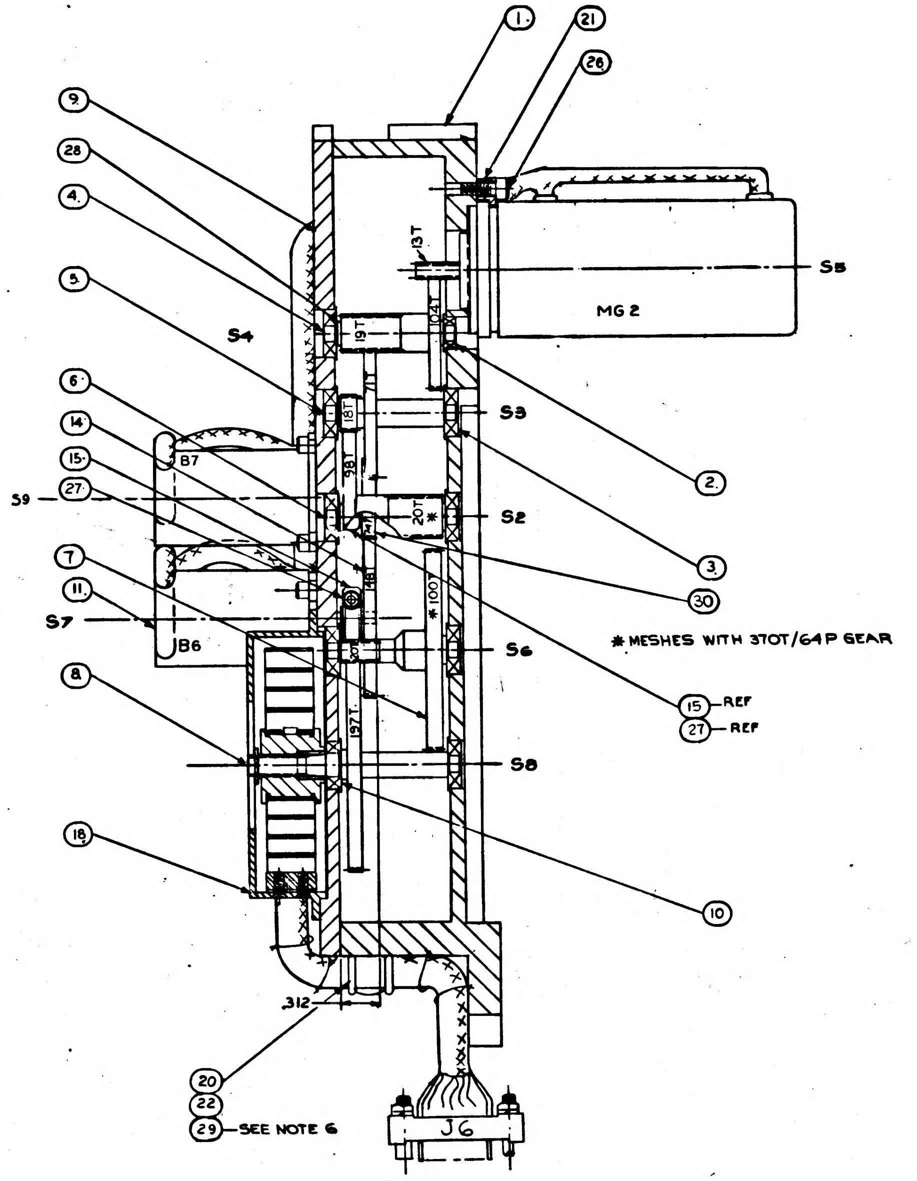
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011705

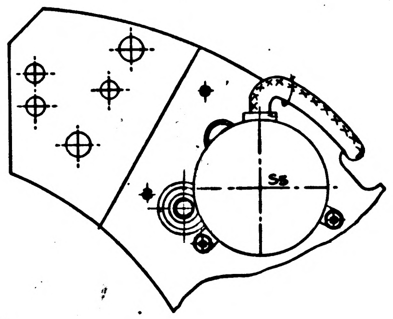
2011705

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FLAT WASHERS (ITEM 28) OF INCREMENTAL THICKNESS SHALL BE SELECTED AND INSERTED BETWEEN GEARSHAFT SHOULDERS AND BEARINGS TO LIMIT ENDPLAY TO .004 IN. MAX. AT SHAFTS S2, S3, S4, S6 AND S8. WHEN REQUIRED, THE FLAT WASHERS SHALL BE APPLIED ON THE PLATE END OF GEARSHAFTS.
3. RESOLVERS B6 AND B7 SHALL BE ADJUSTED TO THEIR NULL SETTINGS (AS INDICATED BY MARKING ON RESOLVER SHAFT AND BODY) BODIES WHEN THE SPRING, OF THE HOUSING AND SPRING ASSEMBLY (ITEM 18), IS IN THE UNLOADED ATTITUDE.
4. COMPLETE ASSEMBLY SHALL START WHEN THE MOTOR MG2 IS ENERGIZED WITH 4.0 VOLTS, 400 C.P.S. MAX. AND RUN CONTINUOUSLY AT 2.0 VOLTS MAX. IN EITHER DIRECTION, THROUGH 360° ROTATION OF ITEM (6).
5. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
6. VIBRATION PROOF ITEM 29 USING LOCKING COMPOUND GRADE 'EV' PER MIL-S-22473.
7. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.





SECTION A-A



REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SEE NOTE 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
30	1		2012035	33386910060		GEAR SPUR (74T-120P)			
29	1	NAS	1352C06-6			SCREW, CAP, SOC HD.			
28	AS REQD		2011804-	7938691 0201 0206		WASHER, FLAT			
27	2	*	1011625-11	74455151011		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
26	3	*	1011625-18	74455151018		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25									
24									
23									
22	1	*	1011918-3			WASHER, CABLE CLAMP			
21	3		2011868-1	54386910101		CLAMP, RIM CLENCHING			
20	1	*	1000220-4			CLAMP, CABLE			
19	1		MS16624-18			RING, RETAINING (WALDES TRUARC 5100-18)			
18	1		2011911	85386910480		HOUSING AND SPRING ASSEMBLY			
17	6	*	1011625-28	74455151028		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
16	4	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
15	2		2011355-2	57386910451		CLAMP, COLLAR			
14	1		2011297	33386910200		GEAR, SPUR (148T-120P)			
13	6	*	1011625-16	74455151016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
12	6		2011868-3	54386910103		CLAMP, RIM CLENCHING			
11	1		2011933	80386910020		SXT SHAFT DRIVE HARNESS, ASSY OF			
10	1	*	1011608-4	30025770120		BEARING, BALL, ANNULAR			
9	1		2011715	85386910130		PLATE BEARING AND PIN ASSY			
8	1		2011309	33386910210		GEARSHAFT (197T-120P)			
7	1		2011299	33386910220		GEARSHAFT (20T-120P, 100T-64P)			
6	1		2011298	33386910230		GEARSHAFT (20T-64P, 98T-72P)			
5	1		2011296	33386910190		GEARSHAFT (18T-72P, 71T-72P)			
4	1		2011295	33386910180		GEARSHAFT (19T-72P, 104T-120P)			
3	8	*	1011608-3	30025770082		BEARING, BALL, ANNULAR			
2	1	*	1011608-1	30025770080		BEARING, BALL, ANNULAR			
1	1		2011897	85386910120		HOUSING, GEAR (SEXTANT SHAFT DRIVE) ASSY OF			

LIST OF PARTS AND MATERIALS

*PURCHASED ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910490

DRAWN E. DRAPALA DATE 4-9-64
CHECKER J. SULLIVAN 6-1-64
APPROVAL E. [illegible] 7/23/64
APPROVAL E. Mayo 8/25/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT DRIVE GEARBOX, SXT, ASSEMBLY OF

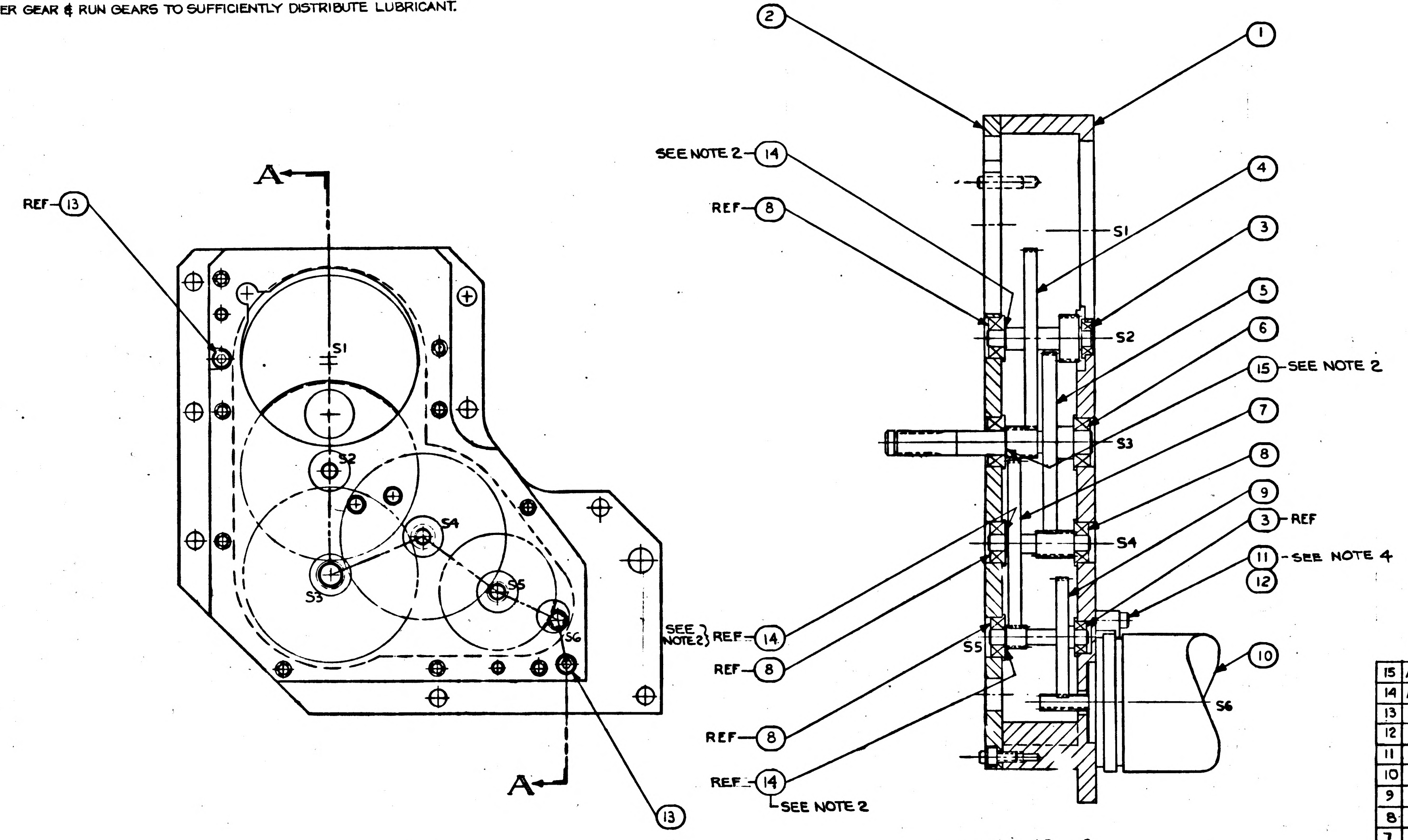
CODE IDENT NO.
SIZE E
NASA NUMBER 2011705
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011706 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13801	[illegible]	

REVISIONS 10952

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SELECT WASHERS TO PROVIDE .0005 TO .004 SHAFT END PLAY
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)
4. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE H. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
5. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	AR		2012351	7938691 0101 0103		WASHER, FLAT			
14	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
13	2	*	1011625-11	7445515 1011		SCREW, CAP. HEX SOC HD SELF-LOCKING			
12	3		2011868-6	54386910106		CLAMP, RIM CLENCHING			
11	3		NAS1352C03-5			SCREW, CAP, HEX SOC HD.			
10	1		2011892			SERVO MOTOR AND CONNECTOR, ASSY OF			
9	1		2011345	33386910050		GEARSHAFT (108T-120P) (19T-120P) S5			
8	4	*	1011608-2	30257700081		BEARING, BALL, ANNULAR			
7	1		2011348	33386910040		GEARSHAFT (18T-96P)(153T-120P) S4			
6	2	*	1011608-4	30257700120		BEARING, BALL, ANNULAR			
5	1		2011347	33386910030		GEARSHAFT (21T-96P)(130T-96P) S3			
4	1		2011346	33386910020		GEARSHAFT (33T-96P)(132T-96P) S2			
3	2	*	1011608-1	30257700080		BEARING, BALL, ANNULAR			
2	1		2011795	85386910080		PLATE AND PIN, ASSY OF			
1	1		2011596	52386910200		HOUSING, GEAR (SEXTANT TRUNNION DRIVE)			

LIST OF PARTS AND MATERIALS

MASTER

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910100
DRAWN E. DRAPALA DATE 1-15-64
CHECKED T. SULLIVAN 5-22-64
APPROVAL 6/1/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX
ASSEMBLY

CODE IDENT NO.
SIZE D
NASA NUMBER 2011706
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

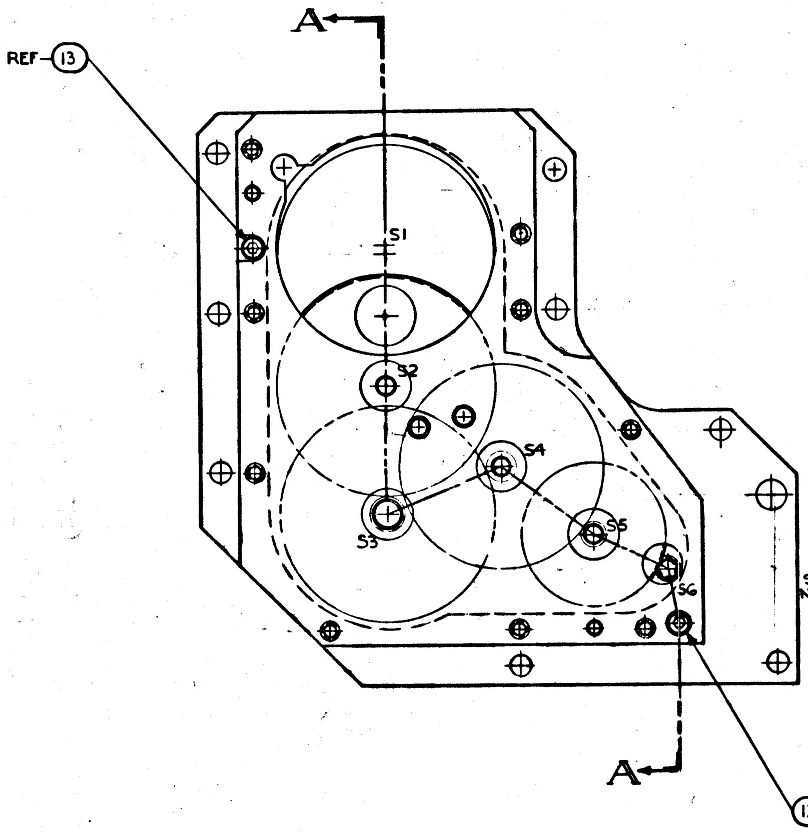
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

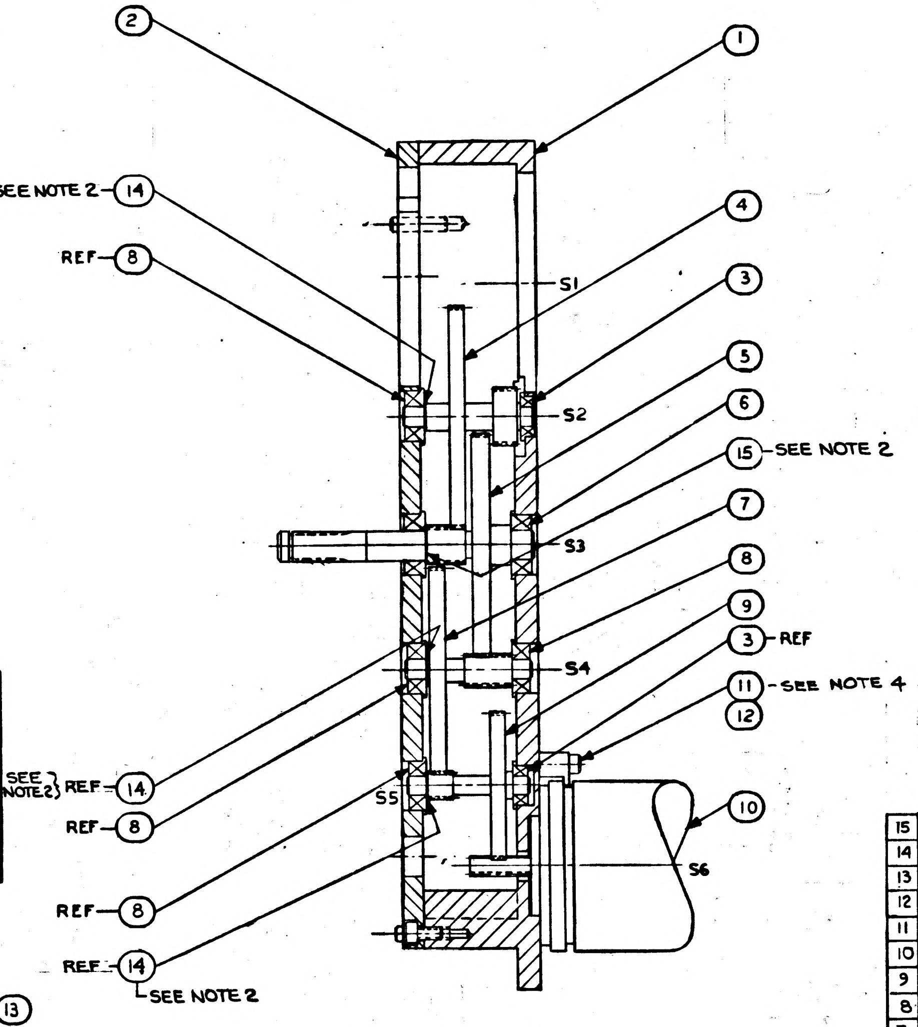
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SELECT WASHERS TO PROVIDE .0005 TO .004 SHAFT END PLAY
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)
4. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE H. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
5. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.

B	2011706

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13801	12/22/64	
B		REVISED PER TDRR NO. 15371	1/6/65	WK





SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION
15	AR		2012351	7938691 0101 0103		WASHER, FLAT		
14	AR		2011804-	7938691 0201 0206		WASHER, FLAT		
13	2		NAS1352C02LL4	7445515 7006		SCREW, CAP, HEX SOC HD SELF-LOCKING		
12	3		2011868-6	54386910106		CLAMP, RIM CLENCHING		
11	3		NAS1352C03-5			SCREW, CAP, HEX SOC HD.		
10	1		2011892			SERVO MOTOR AND CONNECTOR, ASSY OF		
9	1		2011345	33386910050		GEARSHAFT (108T-120P) (19T-120P) S5		
8	4	*	1011608-2	30257700081		BEARING, BALL, ANNULAR		
7	1		2011348	33386910040		GEARSHAFT (18T-96P)(153T-120P) S4		
6	2	*	1011608-4	30257700120		BEARING, BALL, ANNULAR		
5	1		2011347	33386910030		GEARSHAFT (21T-96P)(130T-96P) S3		
4	1		2011346	33386910020		GEARSHAFT (33T-96P)(132T-96P) S2		
3	2	*	1011608-1	30257700080		BEARING, BALL, ANNULAR		
2	1		2011795	85386910080		PLATE AND PIN, ASSY OF		
1	1		2011596	52386910200		HOUSING, GEAR (SEXTANT TRUNNION DRIVE)		

LIST OF PARTS AND MATERIALS

MASTER

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910100

DRAWN E. DRAPALA DATE 1-15-64
CHECKED J. SULLIVAN 5-22-64
APPROVAL 6/1/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX
ASSEMBLY

CODE IDENT NO. | SIZE D | NASA NUMBER 2011706
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF

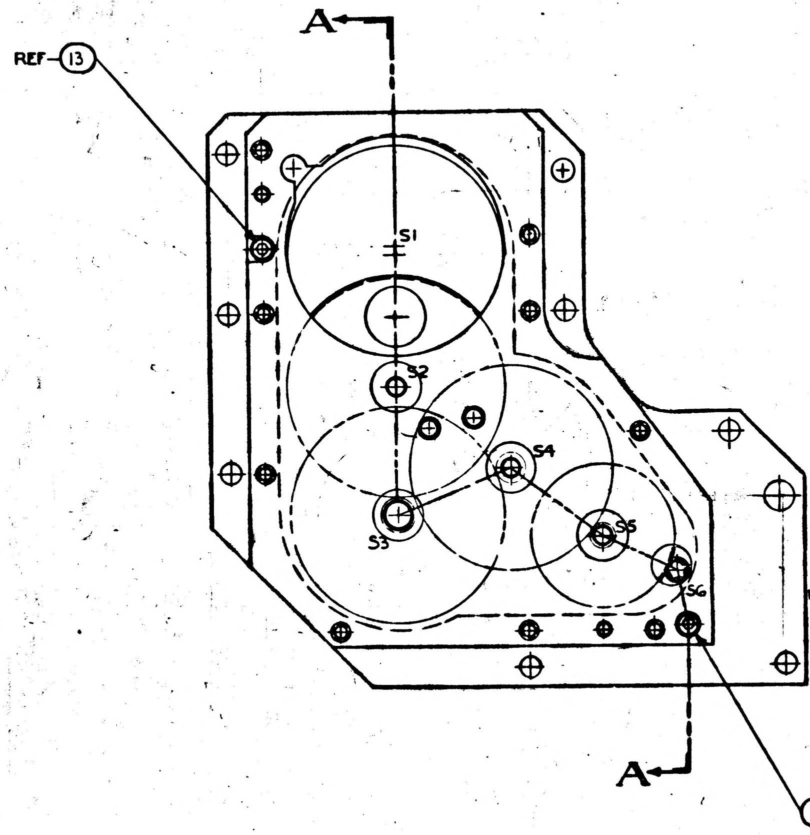
E-188

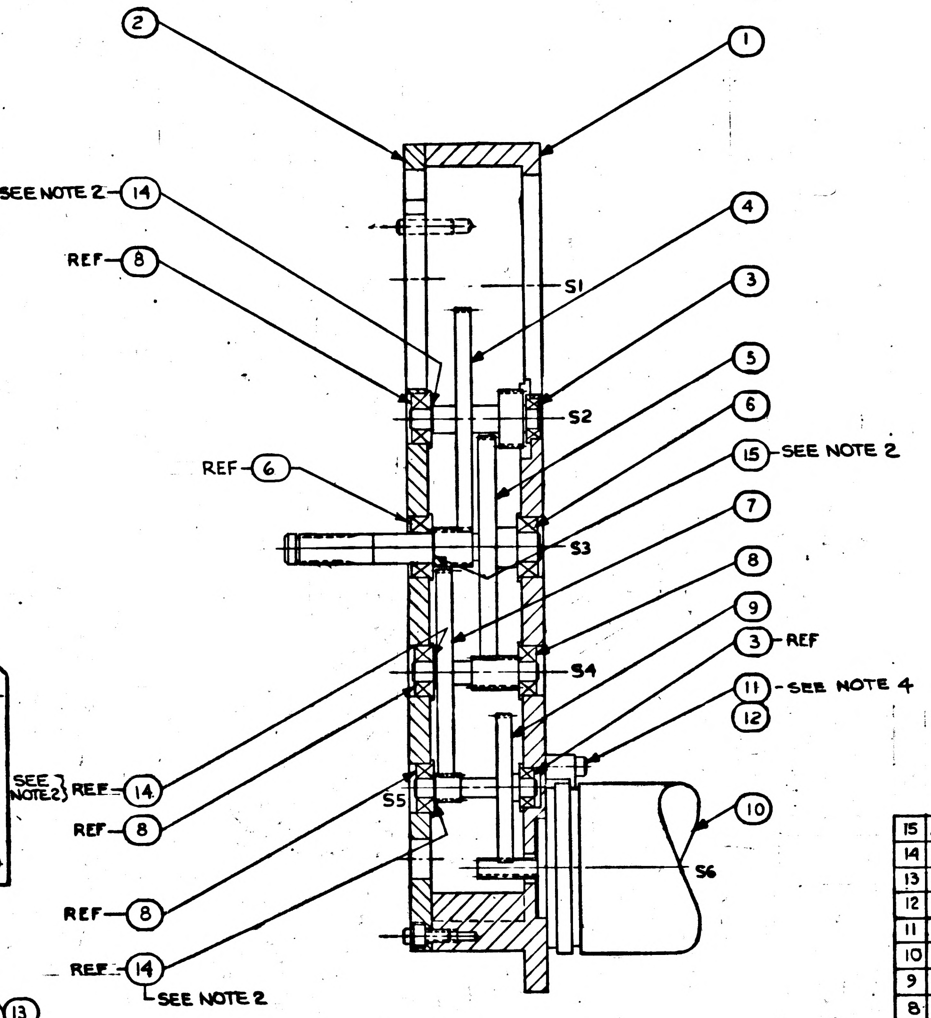
2011706 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13801	12/22/64	
B		REVISED PER TDRR NO. 15371	1/4/65	WK
C		REVISED PER TDRR NO. 18180	1/2/65	WK

REVISIONS 10952

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SELECT WASHERS TO PROVIDE .0005 TO .004 SHAFT END PLAY
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)
4.
5. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.





SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	AR		2012351	7938691 0101 0103		WASHER, FLAT			
14	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
13	2		NAS1352C02LL4	7445515 7006		SCREW, CAP, HEX SOC HD SELF-LOCKING			
12	3		2011868-6	54386910106		CLAMP, RIM CLENCHING			
11	3		1011625-18	74455151018		SCREW, CAP, HEX SOC HD,			
10	1		2011892			SERVO MOTOR AND CONNECTOR, ASSY OF			
9	1		2011345	33386910050		GEARSHAFT (108T-120P) (19T-120P) S6			
8	4	*	1011608-2	30257700081		BEARING, BALL, ANNULAR			
7	1		2011348	33386910040		GEARSHAFT (18T-96P)(153T-120P) S4			
6	2	*	1011608-4	30257700120		BEARING, BALL, ANNULAR			
5	1		2011347	33386910030		GEARSHAFT (21T-96P)(130T-96P) S3			
4	1		2011346	33386910020		GEARSHAFT (33T-96P)(132T-96P) S2			
3	2	*	1011608-1	30257700080		BEARING, BALL, ANNULAR			
2	1		2011795	85386910080		PLATE AND PIN, ASSY OF			
1	1		2011596	52386910200		HOUSING, GEAR (SEXTANT TRUNNION DRIVE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910100
DRAWN E. DRAPALA DATE 1-15-64
CHECKED T. SULLIVAN 5-22-64
APPROVAL 6/1/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL 14 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX
ASSEMBLY

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011706
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

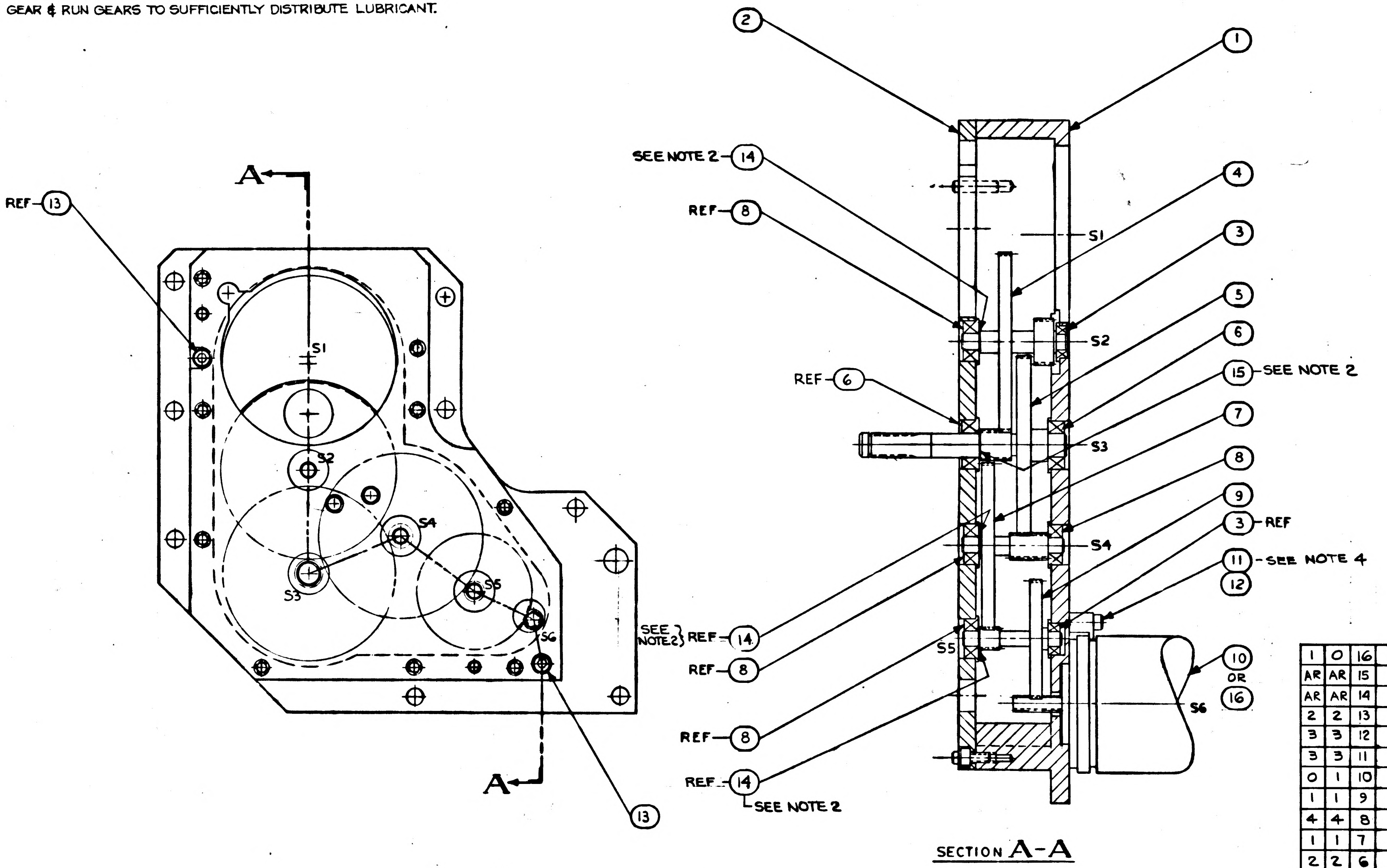
*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011706 D

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SELECT WASHERS TO PROVIDE .0005 TO .004 SHAFT END PLAY
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)
4.
5. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.

REVISIONS 10452				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13801	10/20/64	
B		REVISED PER TDRR NO. 15371	1/4/65	WK
C		REVISED PER TDRR NO. 18180	4/21/65	WK
D		REVISED PER TDRR 32824	1/27/67	



SECTION A-A

1	0	16			2011892-011			SERVO MOTOR AND CONNECTOR, ASSY OF			
AR	AR	15			2012351	7938691 0101 0103		WASHER, FLAT			
AR	AR	14			2011804-	7938691 0201 0206		WASHER, FLAT			
2	2	13			NAS1352C02LL4	7445515 7006		SCREW, CAP. HEX SCC HD SELF-LOCKING			
3	3	12			2011868-6	54386910106		CLAMP, RIM CLENCHING			
3	3	11			1011625-18	74455151018		SCREW, CAP, HEX SOC HD.			
0	1	10			2011892-000			SERVO MOTOR AND CONNECTOR, ASSY OF			
1	1	9			2011345	33386910050		GEARSHAFT (108T-120P) (19T-120P) S5			
4	4	8		*	1011608-2	30257700081		BEARING, BALL, ANNULAR			
1	1	7			2011348	33386910040		GEARSHAFT (18T-96P)(153T-120P) S4			
2	2	6		*	1011608-4	30257700120		BEARING, BALL, ANNULAR			
1	1	5			2011347	33386910030		GEARSHAFT (21T-96P)(130T-96P) S3			
1	1	4			2011346	33386910020		GEARSHAFT (33T-96P)(132T-96P) S2			
2	2	3		*	1011608-1	30257700080		BEARING, BALL, ANNULAR			
1	1	2			2011795	85386910080		PLATE AND PIN, ASSY OF			
1	1	1			2011596	52386910200		HOUSING, GEAR (SEXTANT TRUNNION DRIVE)			
011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
QTY REQD		LIST OF PARTS AND MATERIALS									

MASTER

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2012735	
2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910100
DRAWN E. DRAPALA DATE 1-15-64
CHECKED T. SULLIVAN 5-22-64
APPROVAL 6/1/64
APPROVAL 7/9/64
NASA APPROVAL 7-14-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE

TRUNNION DRIVE GEARBOX ASSEMBLY

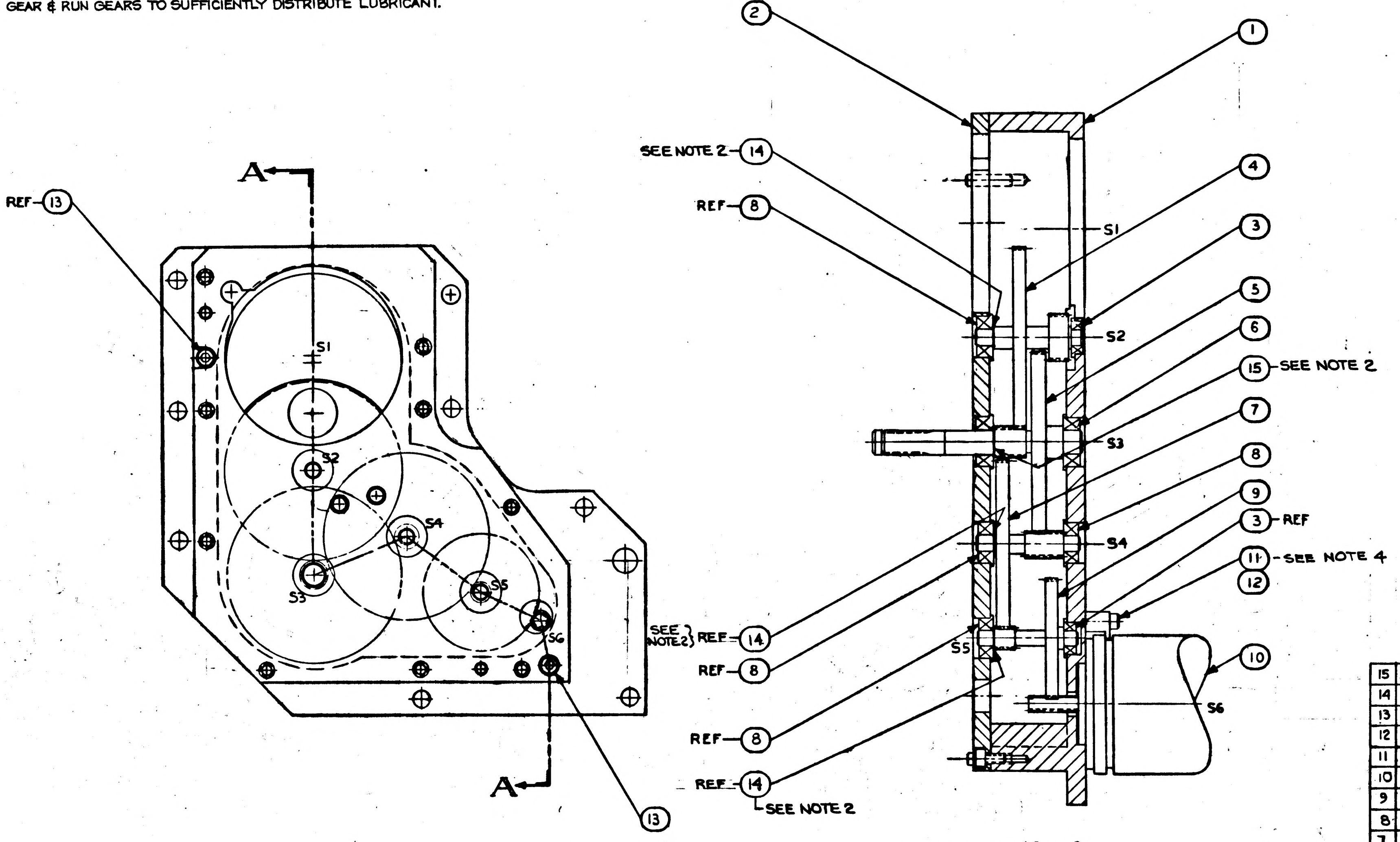
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011706
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011706 D

2011706

REVISIONS 109-2				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. LIMIT ENDPLAY TO .003 MAX.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)
4. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE H. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
5. USE LUBRICANT MIXTURE PREPARED PER ND1002077. APPLY TO GEAR TOOTH FACE 3 OR 4 DROPS APPROXIMATELY EQUALLY SPACED ON EVERY OTHER GEAR & RUN GEARS TO SUFFICIENTLY DISTRIBUTE LUBRICANT.



SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	AR		2012351	7938691 0101 0103		WASHER, FLAT			
14	AR		2011804-	7938691 0201 0206		WASHER, FLAT			
13	2	*	1011625-11	74455151011		SCREW, CAP, HEX SOC HD SELF-LOCKING			
12	3		2011868-6	54386910106		CLAMP, RIM CLENCHING			
11	3		NAS1352C03-5			SCREW, CAP, HEX SOC HD.			
10	1		2011892			SERVO MOTOR AND CONNECTOR, ASSY OF			
9	1		2011345	33386910050		GEARSHAFT (108T-120P) (19T-120P) S6			
8	4	*	1011608-2	30257700081		BEARING, BALL, ANNULAR			
7	1		2011348	33386910040		GEARSHAFT (18T-96P)(153T-120P) S4			
6	2	*	1011608-4	30257700120		BEARING, BALL, ANNULAR			
5	1		2011347	33386910030		GEARSHAFT (21T-96P)(130T-96P) S3			
4	1		2011346	33386910020		GEARSHAFT (33T-96P)(132T-96P) S2			
3	2	*	1011608-1	30257700080		BEARING, BALL, ANNULAR			
2	1		2011795	85386910080		PLATE AND PIN, ASSY OF			
1	1		2011596	52386910200		HOUSING, GEAR (SEXTANT TRUNNION DRIVE)			

LIST OF PARTS AND MATERIALS

MASTER

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910100
DRAWN E. DRAPALA DATE 1-15-64
CHECKED T. SULLIVAN 5-22-64
APPROVAL 6/1/64
APPROVAL E. Thorup 7/9/64
NASA APPROVAL W. J. [illegible] 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TRUNNION DRIVE GEARBOX
ASSEMBLY

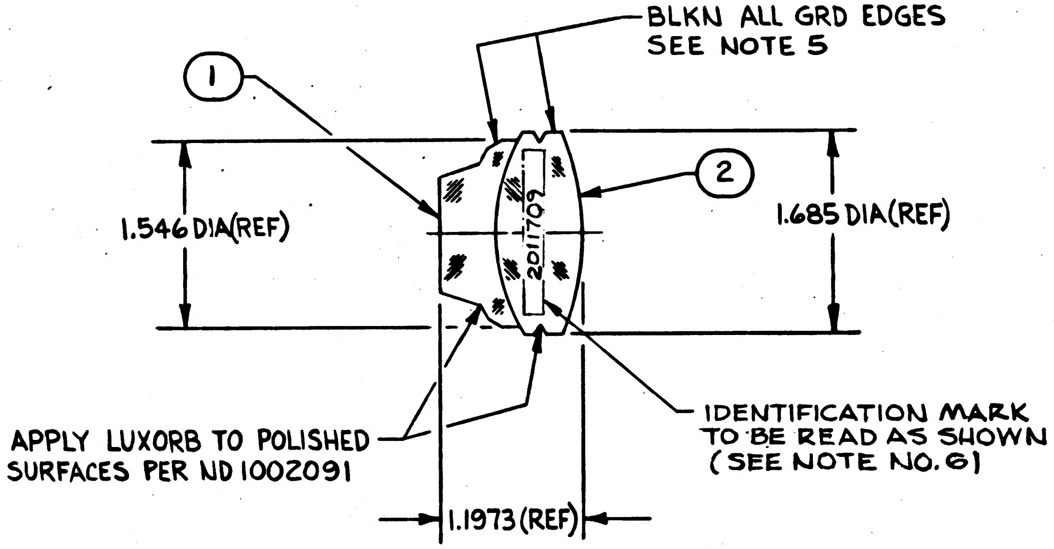
CODE IDENT NO.
SIZE D
NASA NUMBER 2011706
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011706

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS	TDRR 11491			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. CEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 USING ADHESIVE PER MIL-A-3920.
4. CTRG ERROR 3 MINUTES MAX.
5. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORD. WITH ND1002019.


BLKN ALL GRD EDGES
SEE NOTE 5
①
②
1.546 DIA(REF)
1.685 DIA(REF)
2011709
APPLY LUXORB TO POLISHED SURFACES PER ND1002091
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE NO. 6)
1.1973 (REF)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011658	28386910120		LENS, POSITIVE			
1	1		2011657	28386910110		LENS, NEGATIVE			

LIST OF PARTS AND MATERIALS

2011722	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910030

DRAWN R. BRUNELLE DATE 4-2-64
CHECKED [illegible] 5/14/64 J.S.
APPROVAL [illegible] 7/23/64
APPROVAL E. [illegible] 8/7/64
NASA APPROVAL [illegible] 8/12/64
MIT APPROVAL [illegible] 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, ASSY OF
(TELESCOPE OBJECTIVE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011709
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

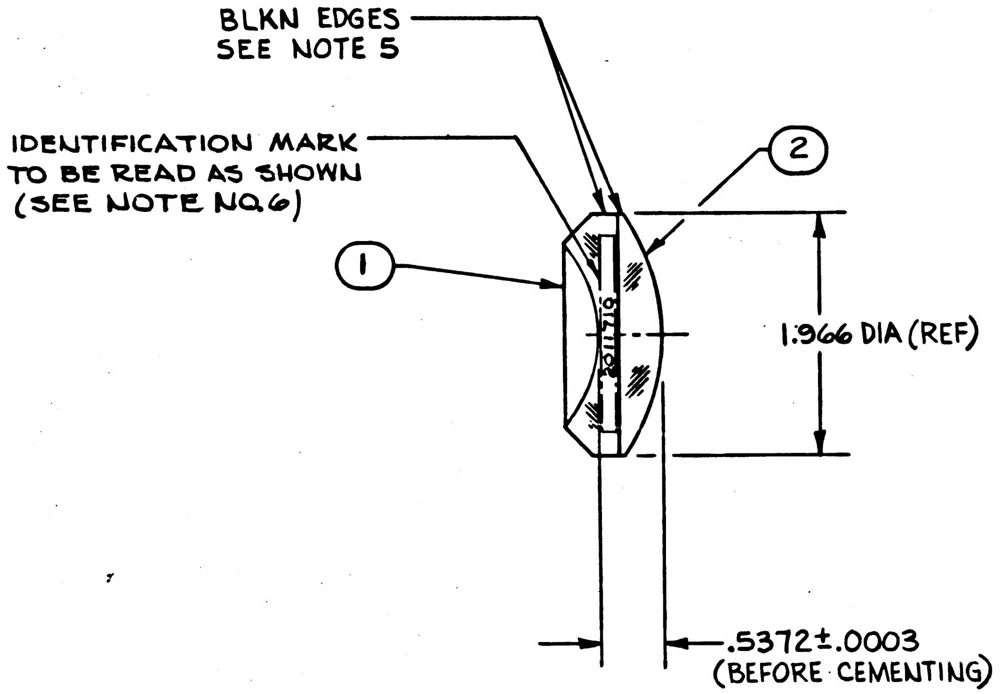
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011710

REVISIONS 11748

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. CEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.11 USING ADHESIVE PER MIL-A-3920.
4. CTRG ERROR ½ MINUTE MAX.
5. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.12 WITH BLACK INK PER FED. SPEC TT-I-528.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORD. WITH ND 100 2019.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011669	28386910330		LENS, POSITIVE			
1	1		2011664	28386910320		LENS, NEGATIVE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011732	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910090
DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/30/64 JFS
APPROVAL 7/27/64
APPROVAL E. 8/14/64
NASA APPROVAL
MIT APPROVAL 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, ASSY OF
(TELESCOPE RELAY)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011710
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

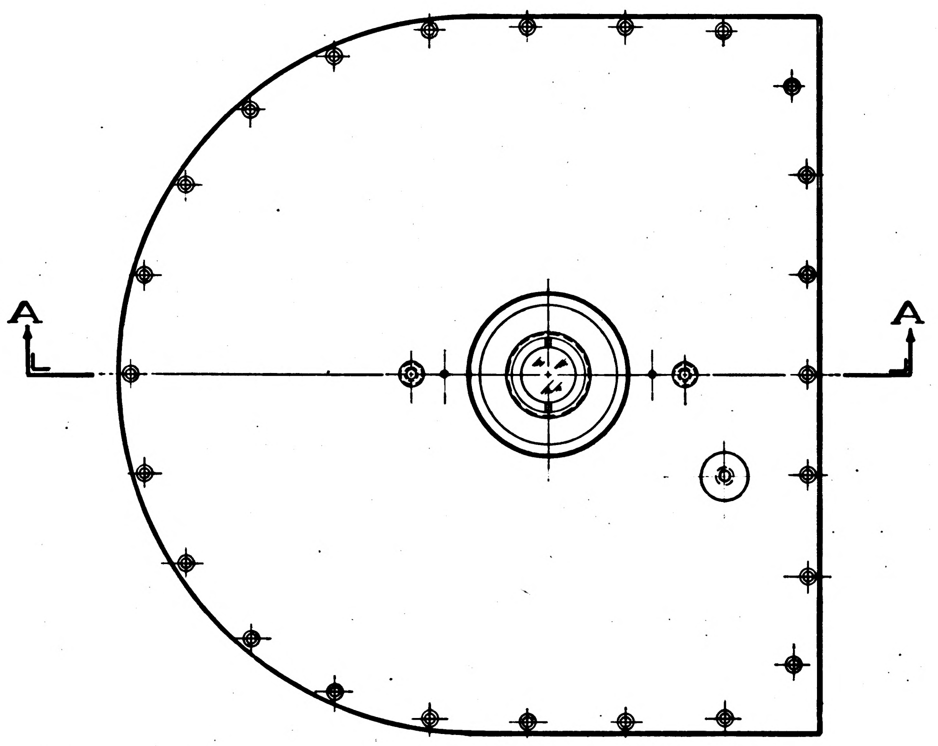
MASTER

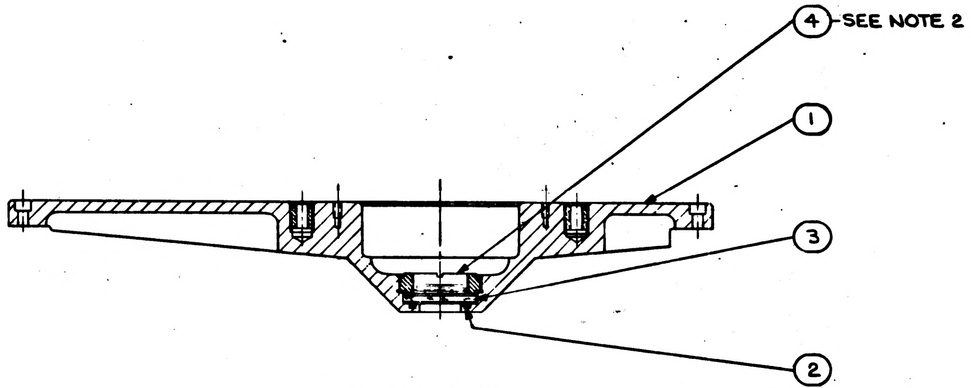
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSY USING ONE DROP OF LOCKING COMPOUND, GRADE "H" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. IDENTIFY USING NASA NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

2011711 A

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 22636	9/28/65	WK





SECTION A-A

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		2011588	57386910950		RING, RETAINING			
3	1		2011589	28386910410		WINDOW, GLASS			
2	1	*	1011768-16	74453043016		PACKING-PREFORMED			
1	1		2011586	85386910770		SEXTANT PANEL & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910760
DRAWN R. BRUNELLE DATE 4-14-64
CHECKED 4/22/64 JB
APPROVAL 7/-/64
APPROVAL 8/6/64
NASA APPROVAL 8/14/64
MIT APPROVAL 8/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

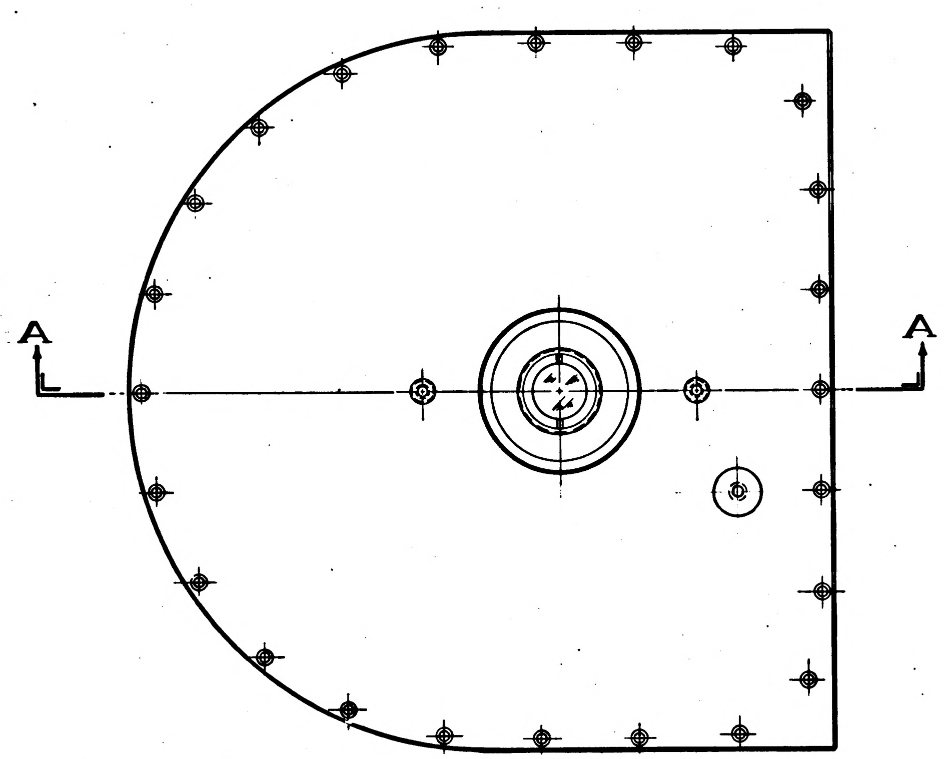
TITLE
PANEL ASSEMBLY,
SXT

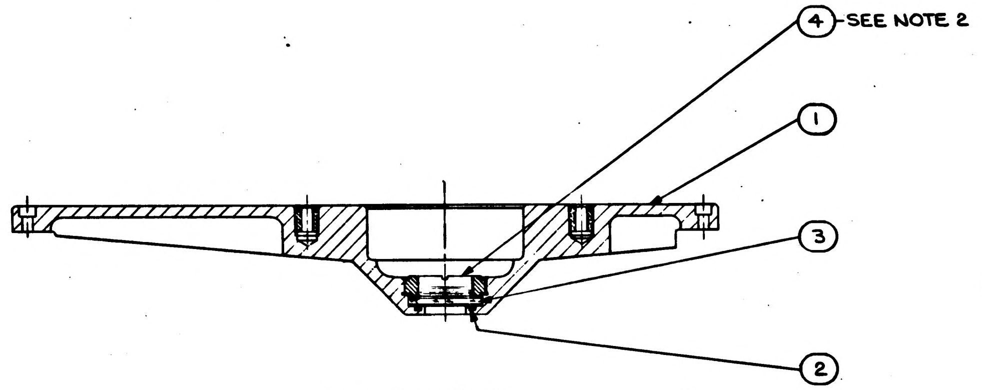
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011711
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011711

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSY USING ONE DROP OF LOCKING COMPOUND, GRADE "H" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. IDENTIFY USING NASA NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)





SECTION A-A

2011711

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		2011588	57386910950		RING, RETAINING			
3	1		2011589	28386910410		WINDOW, GLASS			
2	1	*	1011768-16	74453043016		PACKING-PREFORMED			
1	1		2011586	85386910770		SEXTANT PANEL & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

MASTER

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910760
DRAWN R. BRUNELLE DATE 4-14-64
CHECKED 4/22/64
APPROVAL 7/-/64
APPROVAL 8/6/64
NASA APPROVAL 8/14/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY,
SXT

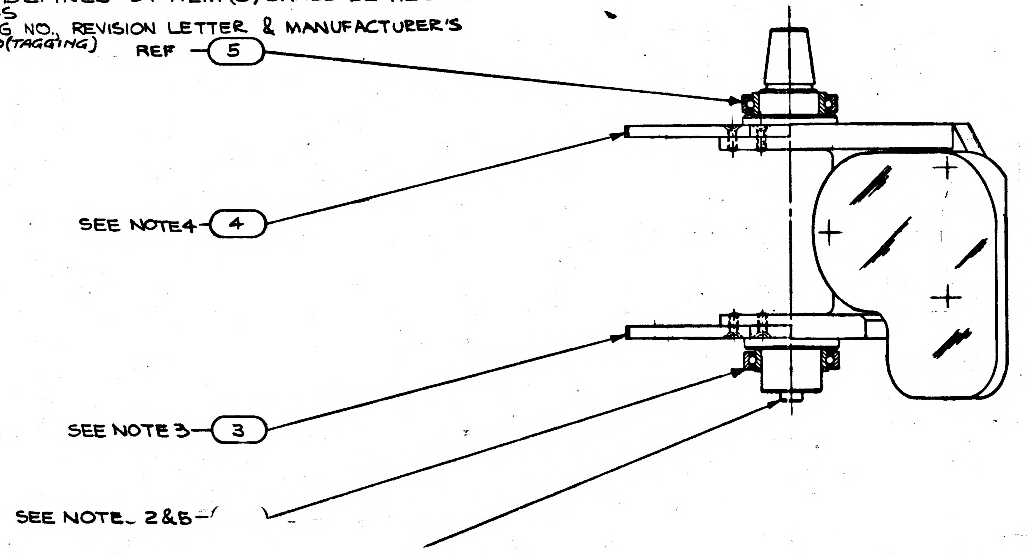
CODE IDENT NO.
SIZE D
NASA NUMBER 2011711
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

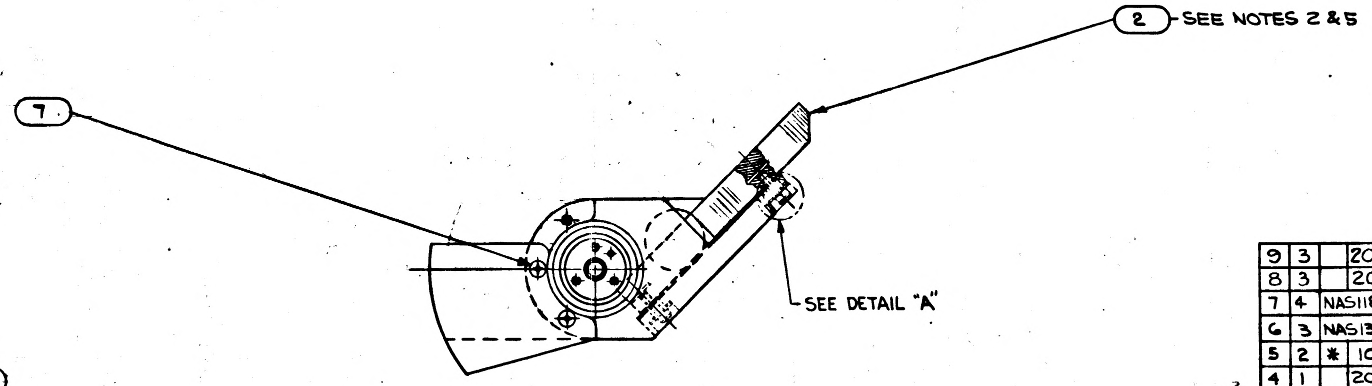
8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

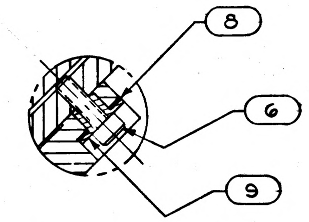
A 2011712

REVISIONS 1748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	4/1/65	WR.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)
3. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHTS ITEMS (3 & 4.) MATERIAL SHALL BE REMOVED UNIFORMLY BY IDENTICALLY MACHINING EACH COUNTERWEIGHT
4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM (2) AFTER MOUNTING SHALL BE WITHIN 1/4 FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM (2) WITH RESPECT TO THE AXIS DEFINED BY ITEM (5) SHALL BE HELD WITHIN 5 ARC SECONDS
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)







DETAIL "A"
SCALE 2/1

✱ PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION
9	3		2012458	57386911060		BUSHING, MIRROR		
8	3		2011213	59386910010		WASHER, WAVE		
7	4		NAS1189C0P5L	74455155009		SCREW, SELF-LOCKING, 100° FLAT HEAD		
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING		
5	2	✱	1011612	30295770480		BEARING, BALL, ANNULAR		
4	1		2012457	52386910830		COUNTERWEIGHT - L. H.		
3	1		2012456	52386910820		COUNTERWEIGHT - R.H		
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.		
1	1		2011258	52386910130		SHAFT, INDEX MIRROR, SXT HD.		

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050
DRAWN DATE 12-13-63
CHECKED C. 7-21-64
APPROVAL 7/22/64
APPROVAL 8/15/64
NASA APPROVAL
M.I.T APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT ASSEMBLY (SXT HEAD)

A

CODE IDENT NO. | SIZE D | NASA NUMBER 2011712
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

E-186

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

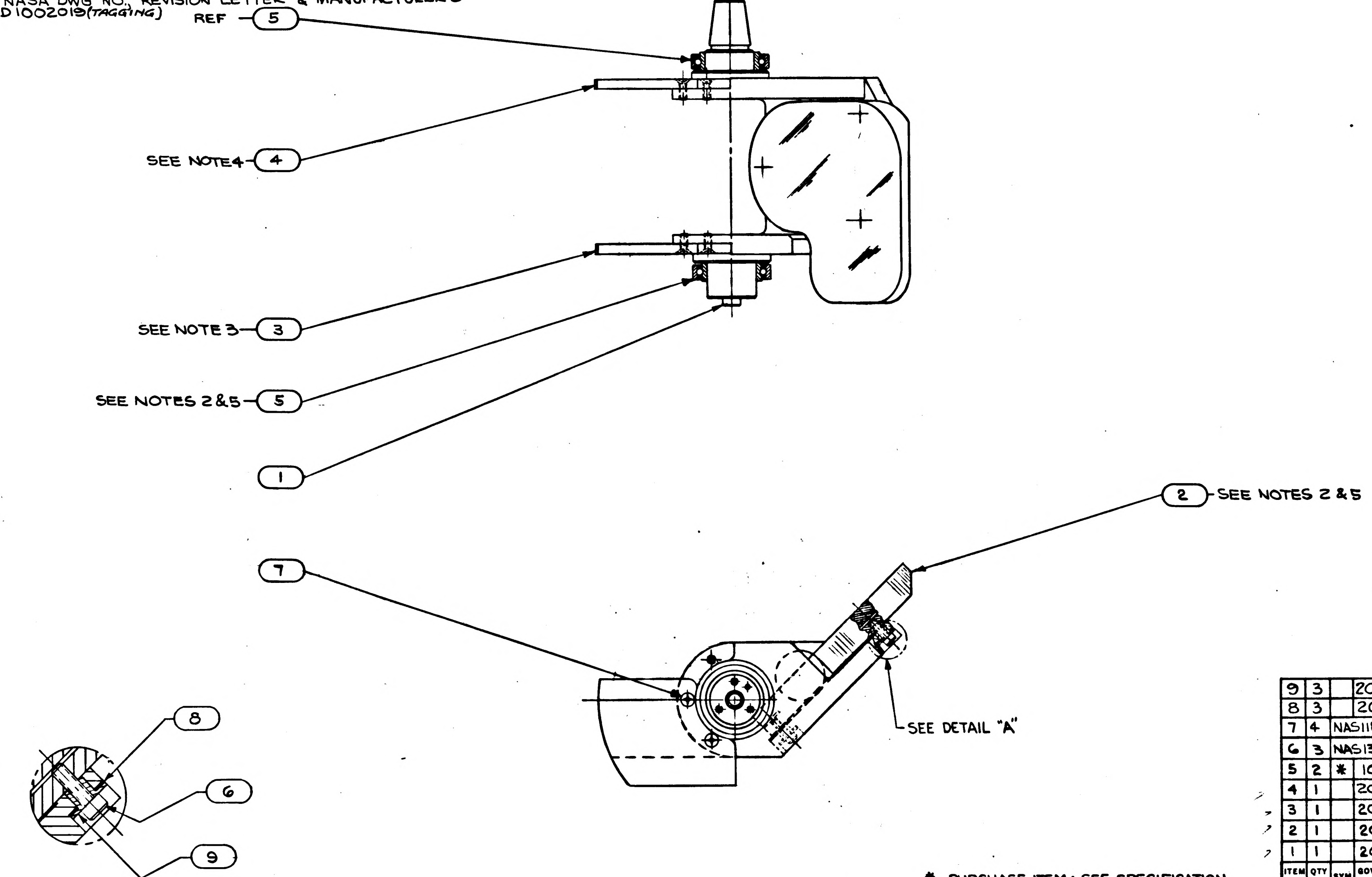
B 2011712

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	4/1/65	WR.
B		REVISED PER TDRR 19201	5/24/65	WR

REVISIONS 11748

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)
3. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHT ITEM 3.
4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM (2) AFTER MOUNTING SHALL BE WITHIN 1/4 FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM (2) WITH RESPECT TO THE AXIS DEFINED BY ITEM (5) SHALL BE HELD WITHIN 5 ARC SECONDS
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)



DETAIL "A"
SCALE 2/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	3		2012458	57386911060		BUSHING, MIRROR			
8	3		2011213	59386910010		WASHER, WAVE			
7	4		NAS1189C04P5L	74455155009		SCREW, SELF-LOCKING, 100° FLAT HEAD			
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
5	2	*	1011612	30295770480		BEARING, BALL, ANNULAR			
4	1		2012457	52386910830		COUNTERWEIGHT - L. H.			
3	1		2012456	52386910820		COUNTERWEIGHT - R.H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
1	1		2011258	52386910130		SHAFT, INDEX MIRROR, SXT HD.			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050

DRAWN J. Dillon DATE 12-17-63
CHECKED C. Lespatiff 7-21-64
APPROVAL G. Rinehimer 7/27/64
APPROVAL E. Thorup 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT ASSEMBLY (SXT HEAD)

CODE IDENT NO. 80230 SIZE D NASA NUMBER 2011712
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

2011712 | C

REVISIONS 1174?				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	1/7/65	w
B		REVISED PER TDRR 19201	5/26/65	w
C		REVISED PER TDRR 25076	1/11/66	wk

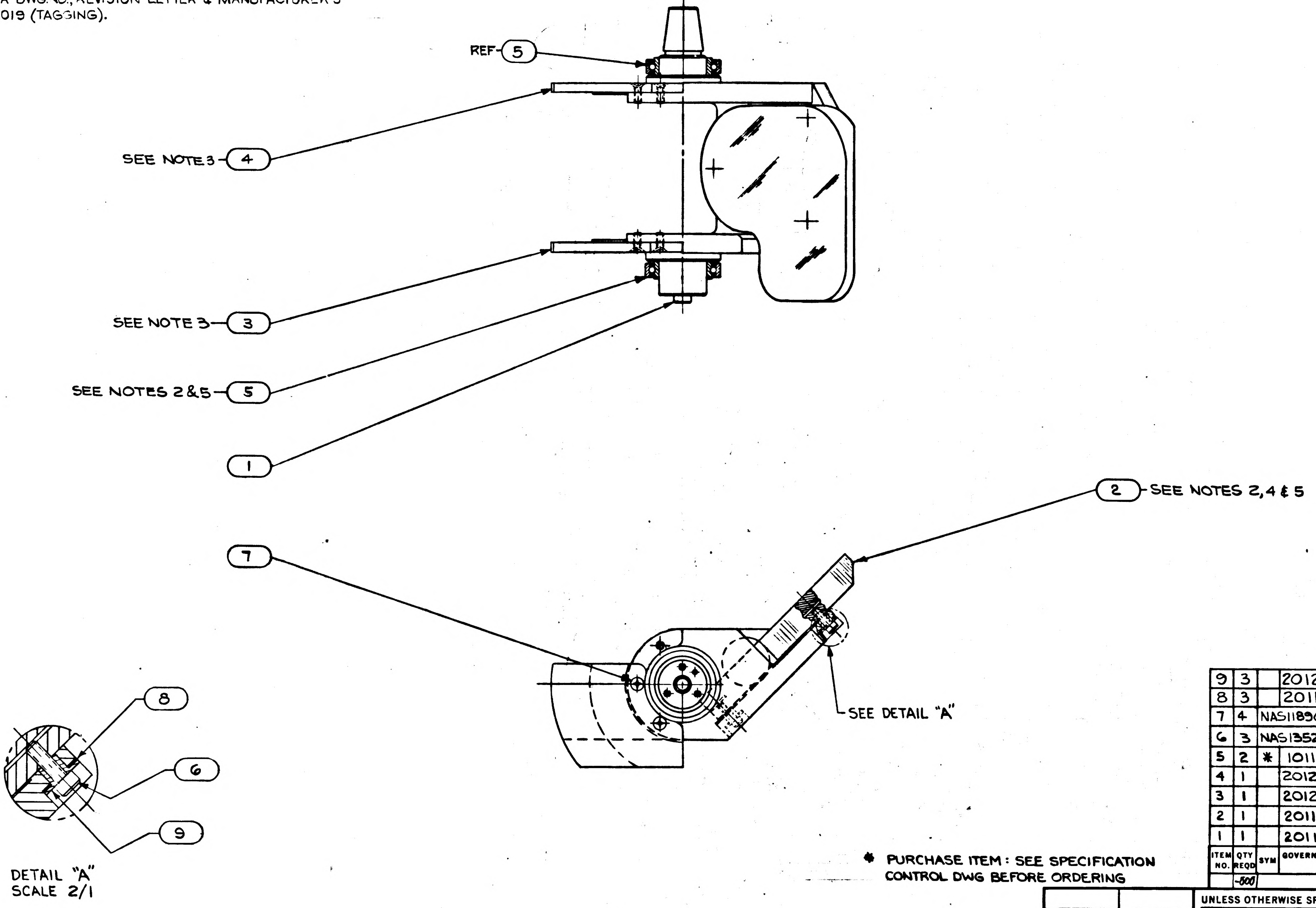
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)

3A. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHT ITEM 3.

3.B. AFER 3A IS ACCOMPLISHED, VIBRATION PROOF ITEM 7 IN BOTH ITEMS 3 & 4 USING GRADE "CV" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM 2 AFTER MOUNTING SHALL BE WITHIN ¼ FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS.
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM 2 WITH RESPECT TO THE AXIS DEFINED BY ITEM 5 SHALL BE HELD WITHIN 5 ARC SECONDS.
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).



* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	3		2012458	57386911060		BUSHING, MIRROR			
8	3		2011213	59386910010		WASHER, WAVE			
7	4		NAS1189C04P5	—"—		SCREW, 100° FLAT HEAD			
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
5	2	*	1011612	30295770480		BEARING, BALL, ANNULAR			
4	1		2012457	52386910830		COUNTERWEIGHT - L.H.			
3	1		2012456	52386910820		COUNTERWEIGHT - R.H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
1	1		2011258	52386910130		SHAFT, INDEX MIRROR, SXT HD.			
	-500	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
2012735	
2012722	
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN P5386910050

DRAWN [illegible] DATE 12-17-63
CHECKED C. [illegible] 7-21-64
APPROVAL [illegible] 7/22/64
APPROVAL [illegible] 8/15/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT
ASSEMBLY (SXT HEAD)

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011712
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

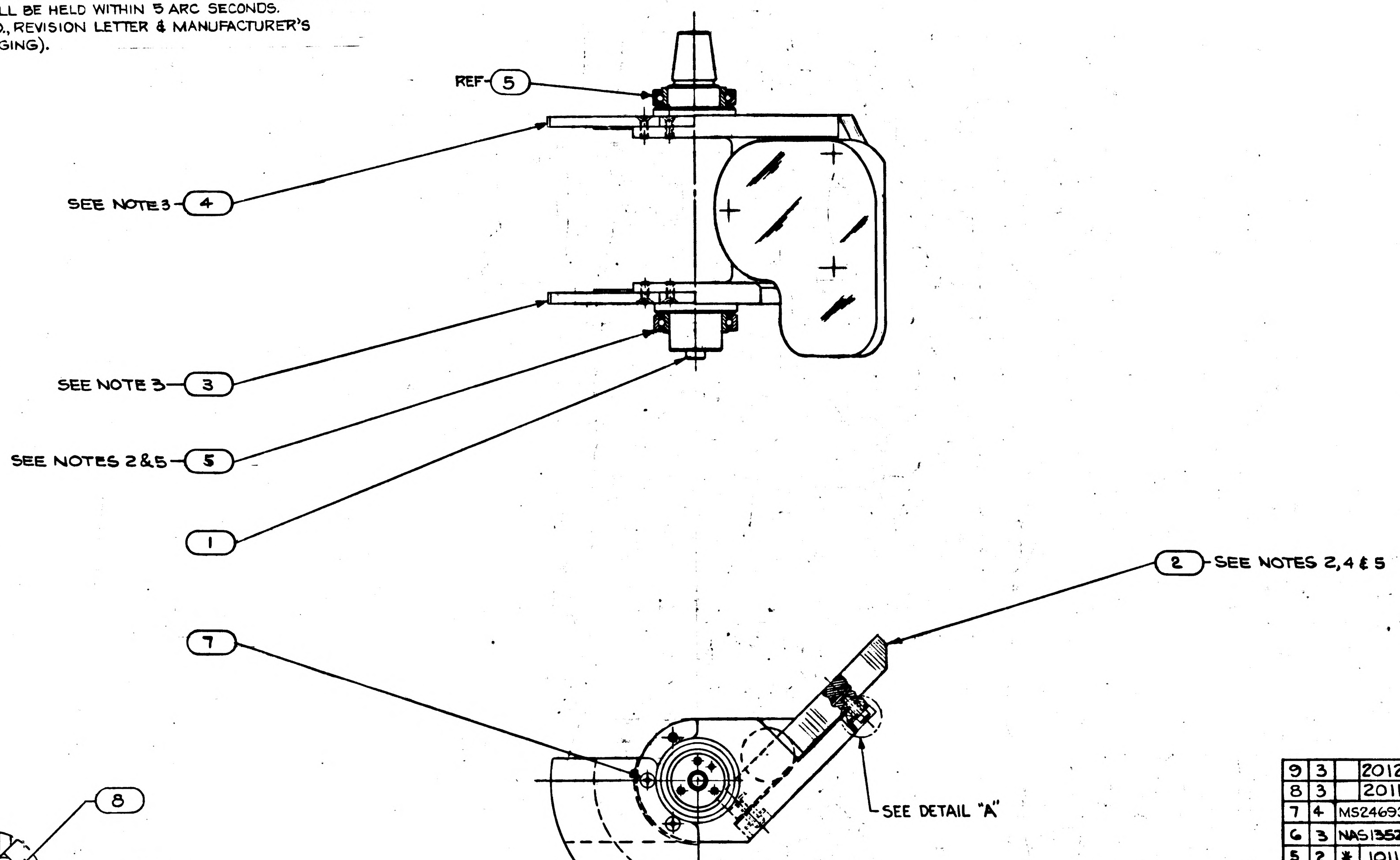
MASTER

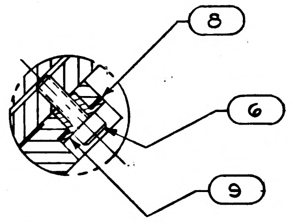
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)
3A. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHT ITEM 3.
3.B. AFER 3A IS ACCOMPLISHED, VIBRATION PROOF ITEM 7 IN BOTH ITEMS 3 & 4 USING GRADE "CV" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.
4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM 2 AFTER MOUNTING SHALL BE WITHIN 1/4 FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS.
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM 2 WITH RESPECT TO THE AXIS DEFINED BY ITEM 5 SHALL BE HELD WITHIN 5 ARC SECONDS.
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

2011712 D

REVISIONS 11748

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	1/7/65	wr
B		REVISED PER TDRR 19201	5/26/65	wr
C		REVISED PER TDRR 25076	1/11/66	wk
D		REVISED PER TDRR 27089	3/22/66	wk





DETAIL "A"
SCALE 2/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	3		2012458	57386911060		BUSHING, MIRROR			
8	3		2011213	59386910010		WASHER, WAVE			
7	4		MS24693-C3	—"—		SCREW, 100° FLAT HEAD			
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
5	2	*	1011612	30295770480		BEARING, BALL, ANNULAR			
4	1		2012457	52386910830		COUNTERWEIGHT - L.H.			
3	1		2012456	52386910820		COUNTERWEIGHT - R.H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
1	1		2011258	52386910130		SHAFT, INDEX MIRROR, SXT HD.			
	-500	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
2012735	
2012722	
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050
DRAWN DATE 12-12-63
CHECKED C. 7-21-64
APPROVAL 7/22/64
APPROVAL 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT ASSEMBLY (SXT HEAD)

CODE IDENT NO. 80230 | SIZE D | NASA NUMBER 2011712
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

2011712 E

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)

3A. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHT ITEM 3.

3B. AFER 3A IS ACCOMPLISHED, VIBRATION PROOF ITEM 7 IN BOTH ITEMS 3 & 4 USING GRADE "CV" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.

4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM 2 AFTER MOUNTING SHALL BE WITHIN ½ FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS.
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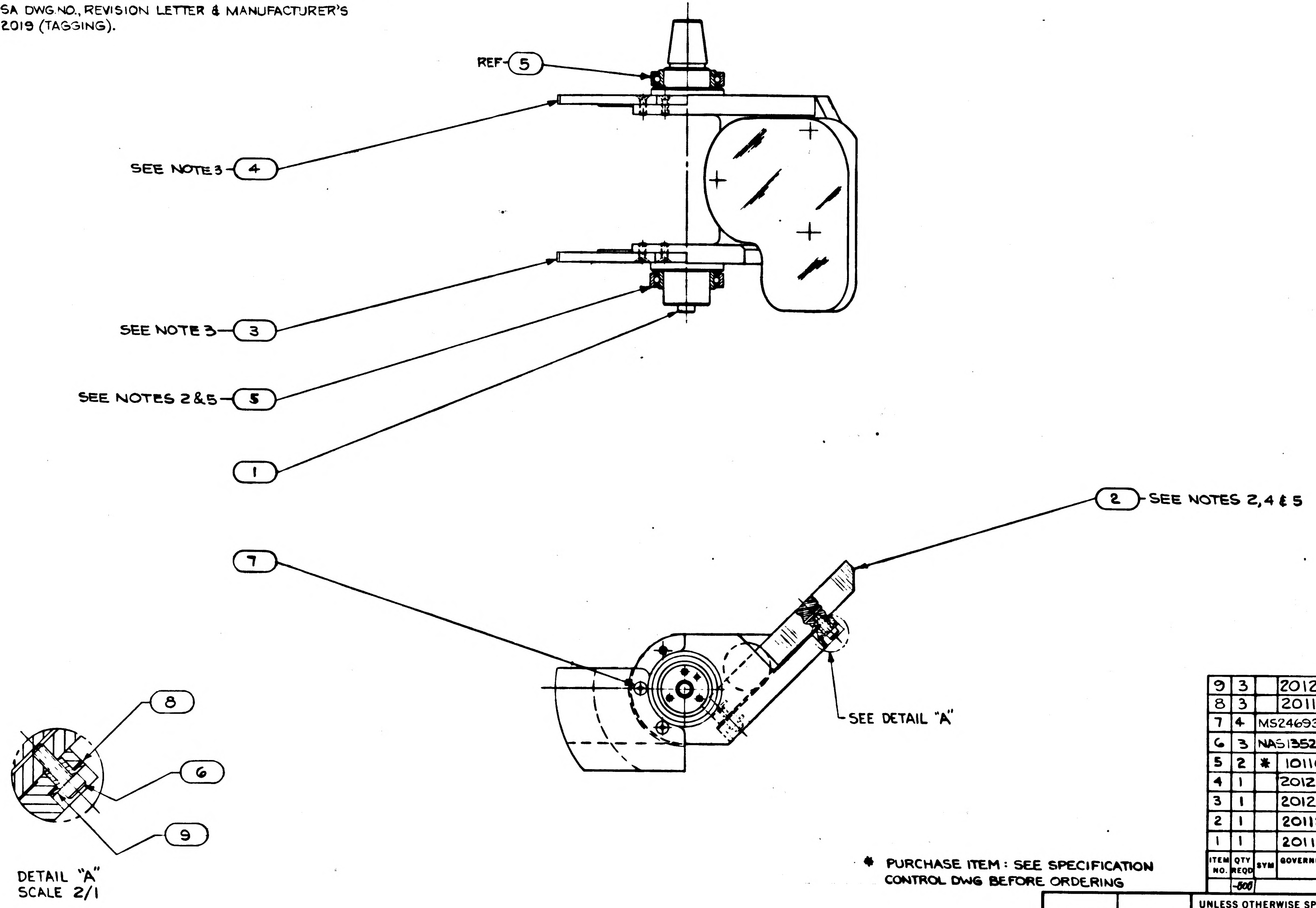
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	1/7/65	WK
B		REVISED PER TDRR 19201	5/26/65	WK
C		REVISED PER TDRR 25076	1/11/66	WK
D		REVISED PER TDRR 27089	3/22/66	WK
E		REVISED PER TDRR 3259	5/67 F.F.P.	



* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

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9	3		2012458	57386911060		BUSHING, MIRROR			
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7	4		MS24693-C3	—"—		SCREW, 100° FLAT HEAD			
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3	1		2012456	52386910820		COUNTERWEIGHT - R.H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
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	-500								

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012735	
2012722	
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
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MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050
DRAWN DATE 12-17-63
CHECKED 7-21-64
APPROVAL 7/23/64
APPROVAL 8/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT
ASSEMBLY (SXT HEAD)

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011712
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011712 E

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)

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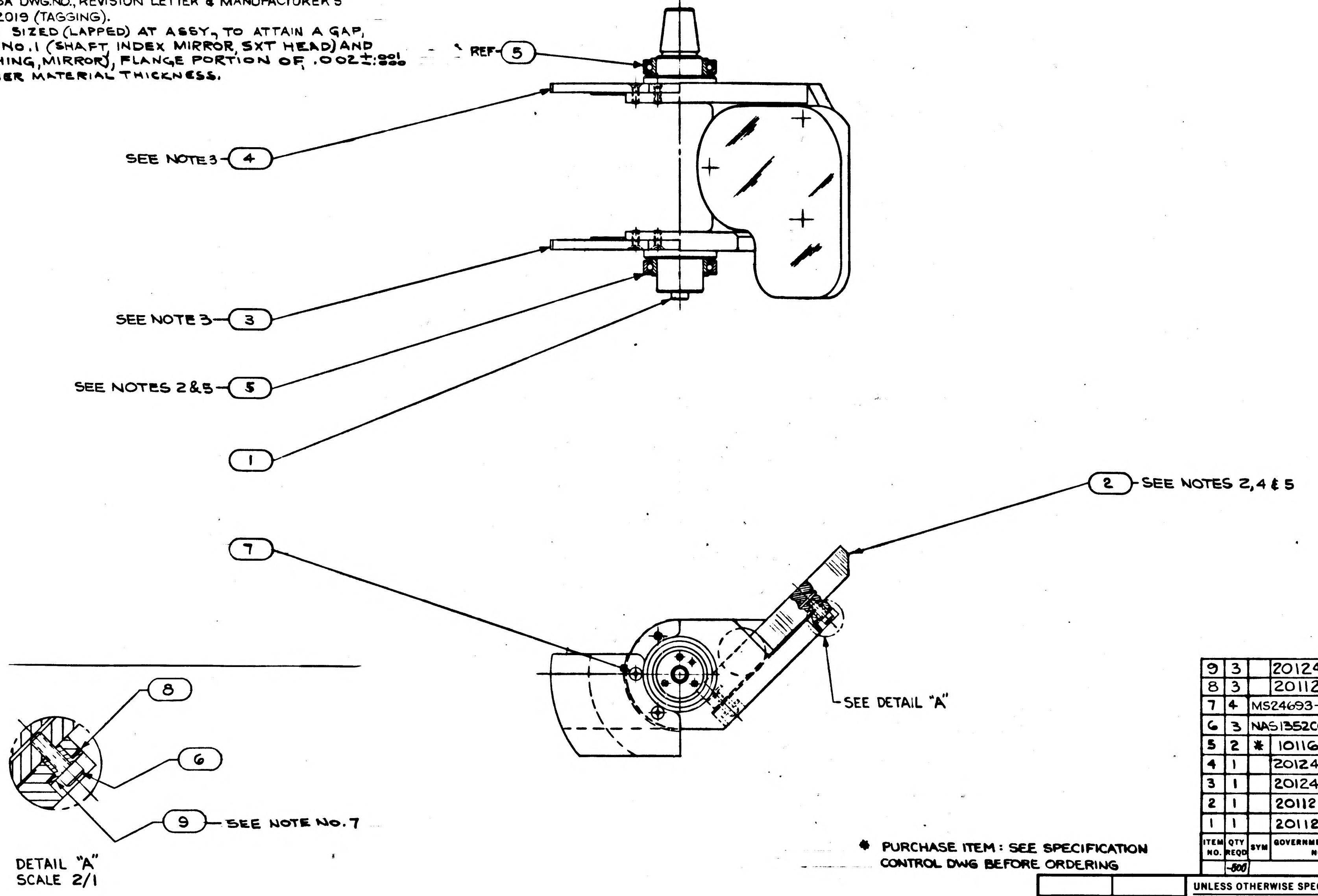
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM 2 WITH RESPECT TO THE AXIS DEFINED BY ITEM 5 SHALL BE HELD WITHIN 5 ARC SECONDS.
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
7. ITEM NO. 9 TO BE SIZED (LAPPED) AT ASSY, TO ATTAIN A GAP, BETWEEN ITEM No. 1 (SHAFT INDEX MIRROR, SXT HEAD) AND ITEM No. 9 (BUSHING, MIRROR), FLANGE PORTION OF $.002^{+.001}_{-.000}$ PLUS WAVE WASHER MATERIAL THICKNESS.

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15428	4/7/65	WR
B		REVISED PER TDRR 19201	5/26/65	WR
C		REVISED PER TDRR 25076	1/11/66	WR
D		REVISED PER TDRR 27089	3/22/66	WR
E		REVISED PER TDRR 32597	1/5/67 F.F.P.	JaB
F		REVISED PER TDRR 32738	1-19-67	JaB



✱ PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	3		2012458	57386911060		BUSHING, MIRROR			
8	3		2011213	59386910010		WASHER, WAVE			
7	4		MS24693-C3	—— # ——		SCREW, 100° FLAT HEAD			
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
5	2	✱	1011612	30295770480		BEARING, BALL, ANNULAR			
4	1		2012457	52386910830		COUNTERWEIGHT - L. H.			
3	1		2012456	52386910820		COUNTERWEIGHT - R. H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
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	-500	LIST OF PARTS AND MATERIALS							

NEXT ASSY	USED ON
2012735	
2012722	
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050

DRAWN J. S. Dillon DATE 12-17-63
CHECKED C. Lazaroff 7-21-64
APPROVAL G. Paulsen 7/23/64
APPROVAL E. Mhoney 8/15/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 8 Aug 64

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SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT ASSEMBLY (SXT HEAD)

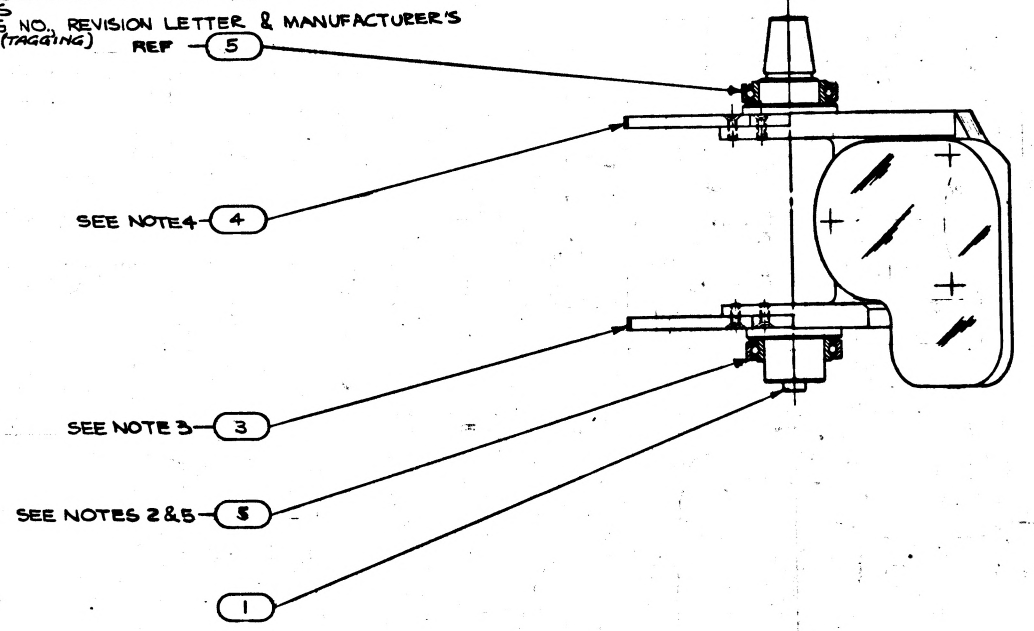
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011712
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

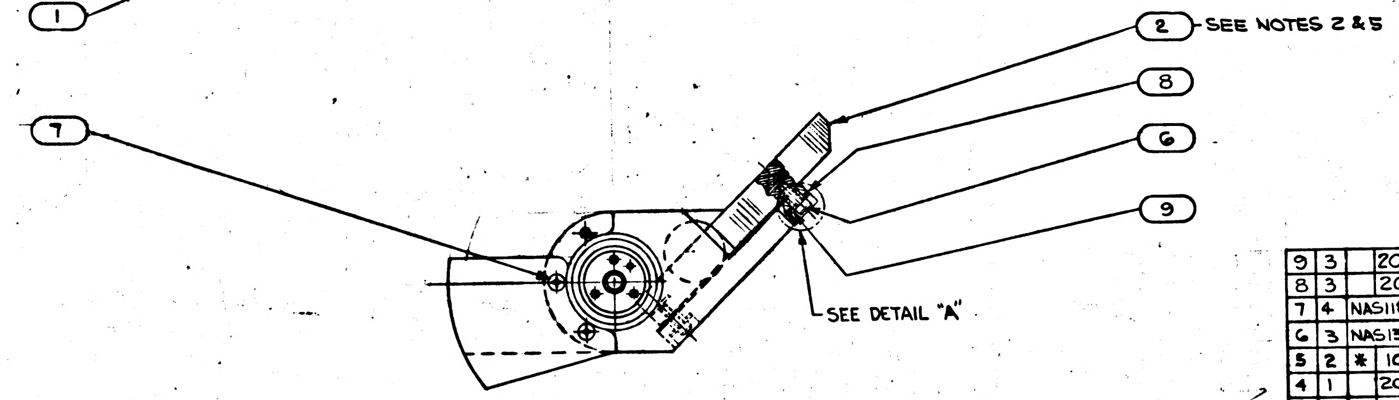
MASTER

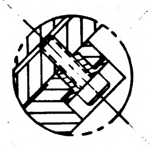
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. A RADIAL LINE THROUGH THE HIGH POINT OF THE INNER RACE OF EACH BEARING, ITEM (5) SHALL BE SIMILARLY ORIENTATED PARALLEL TO THE REFLECTING FACE OF ITEM (2)
3. STATIC BALANCE OF THE ASSEMBLY ABOUT ITS TRUNNION, WITHIN 0.1 INCH OUNCE, SHALL BE ACCOMPLISHED BY APPROPRIATE REDUCTION IN MASS OF COUNTERWEIGHTS ITEMS (3 & 4.) MATERIAL SHALL BE REMOVED UNIFORMLY BY IDENTICALLY MACHINING EACH COUNTERWEIGHT
4. THE FLATNESS OF THE REFLECTING SURFACE OF ITEM (2) AFTER MOUNTING SHALL BE WITHIN 1/4 FRINGE AT A WAVE LENGTH OF 5,461 ANGSTROMS
5. PARALLELISM OF THE REFLECTING SURFACE OF ITEM (2) WITH RESPECT TO THE AXIS DEFINED BY ITEM (5) SHALL BE HELD WITHIN 5 ARC SECONDS
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)







DETAIL "A"
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	3		2012458	57386911060		BUSHING, MIRROR			
8	3		2011213	59386910010		WASHER, WAVE			
7	4		NAS1189C0P5L	74455155009		SCREW, SELF-LOCKING, 100° FLAT HEAD			
6	3		NAS1352C04LL6	74455157014		SCREW, CAP, HEX SOC. HD, SELF-LOCKING			
5	2	*	1011612	30295770480		BEARING, BALL, ANNULAR			
4	1		2012457	52386910830		COUNTERWEIGHT - L. H.			
3	1		2012456	52386910820		COUNTERWEIGHT - R.H			
2	1		2011259	52386910140		MIRROR, INDEX, SXT HD.			
1	1		2011258	52386910130		SHAFT, INDEX MIRROR, SXT HD.			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910050

DRAWN [illegible] DATE [illegible]
CHECKED C. [illegible] 7-21-64
APPROVAL G. [illegible] 7/27/64
APPROVAL [illegible] 8/5/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INDEXING MIRROR & MOUNT
ASSEMBLY (SXT HEAD)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011712
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011713 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 18565		

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 16 AND TERMINAL LUGS, ITEM 5 IN ACCORDANCE WITH ND1002206.

4. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032
5. CONNECT CONDUCTORS A12C AND A24C TO RESPECTIVE SHIELDS (PER WIRING LEGEND) USING ITEM ⑭
6. APPLY ITEMS ⑪⑫, AND ⑬ TO LEADS.
7. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071
8. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.

9. PERFORM CONTINUITY CHECK.
10. PLACE ITEMS ⑫, AND ⑬ OVER CONTACTS AND LEADS AND SHRINK.
11. SHRINK ITEM ⑪ AND IDENTIFY ASSEMBLY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND-1002019.
12. POT IN ACCORDANCE WITH ND-1002240. METHOD "A" OR "B"
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
13. MARK REF DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND-1002019.
14. TERMINATE SHIELDED WIRE AS SHOWN IN DETAILS A & B.
15. ▭ SYMBOL ON HARNESS INDICATES APPROXIMATE LOCATION OF SOLDER SLEEVE

WIRING LEGEND

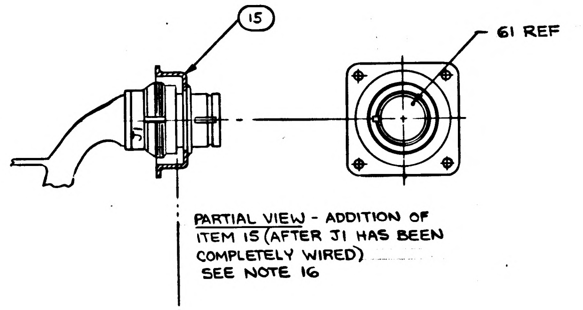
COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	YELLOW	17	12 IN.	J1-24	P2-A	8
A2	RED			J1-25	P2-B	
A3	YELLOW	17	15¾ IN.	J1-21	P5-A	8
A4	RED			J1-22	P5-B	
A5	YELLOW	18	15¾ IN.	J1-2	P5-C	8
A6	RED			J1-1	P5-D	
A7	GREEN			J1-3	P5-E	
A8	YELLOW	17	12 IN.	J1-30	P2-F	8
A9	RED			J1-31	P2-H	
A10	YELLOW	17	15¾ IN.	J1-27	P5-F	8
A11	RED			J1-28	P5-H	
A12	YELLOW	10	15¾ IN.			(8)
A12A	RED			J1-33	P5-J	
A12B	YELLOW			J1-34	P5-K	
A12C	YELLOW	8	2½ IN	A12-SHIELD	J1-35	
A13	YELLOW	17	15¾ IN.	J1-15	P5-M	8
A14	RED			J1-16	P5-P	
A15	YELLOW	17	15¾ IN.	J1-18	P5-N	8
A16	RED			J1-19	P5-L	
A17	YELLOW	17	15¾ IN.	J1-13	P5-S	8
A18	RED			J1-12	P5-R	
A19	YELLOW	17	15¾ IN.	J1-10	P5-U	8
A20	RED			J1-9	P5-T	

SEE DETAIL A & NOTE 5

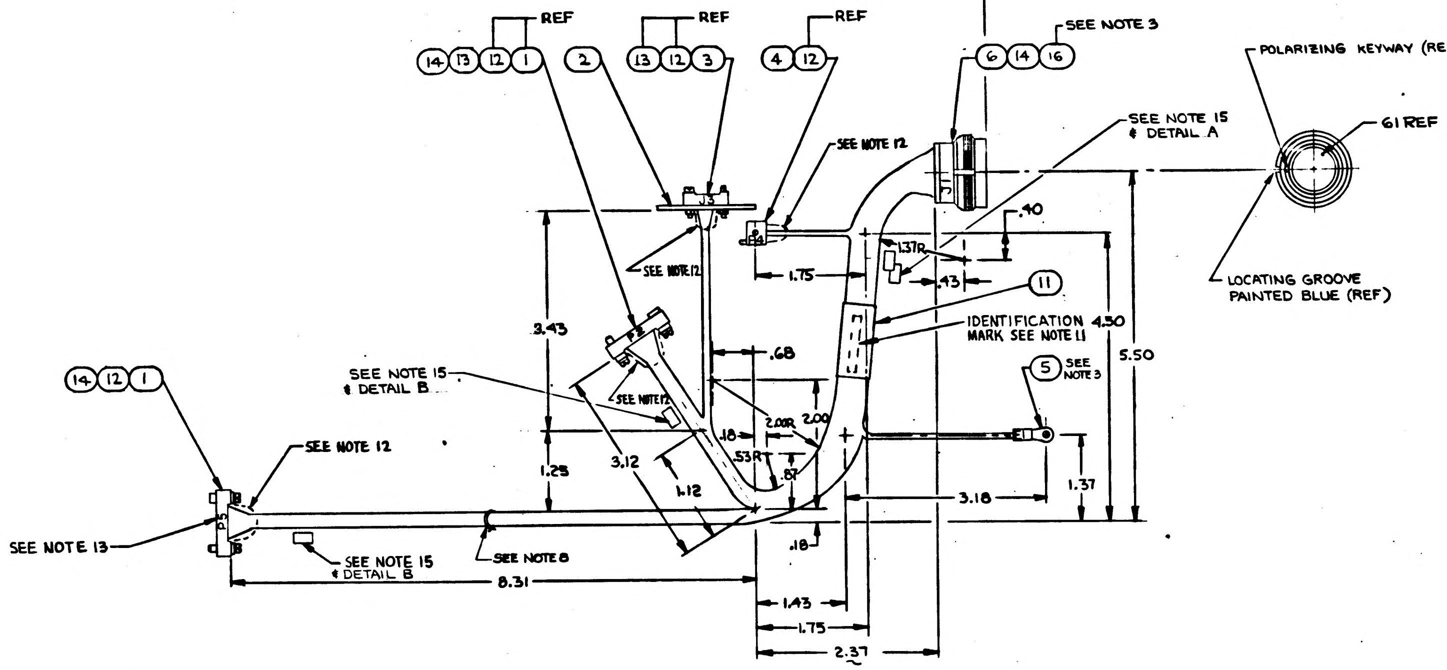
WIRING LEGEND

COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A21	YELLOW	18	12 IN.	J1-5	P2-C	8
A22	RED			J1-7	P2-D	
A23	GREEN			J1-6	P2-E	
A24	YELLOW	10	12 IN.			(8)
A24A	RED			J1-38	P2-J	
A24B	YELLOW			J1-39	P2-K	
A24C	YELLOW	8	2½ IN	A24-SHIELD	J1-37	
A25	YELLOW	17	12 IN.	J1-47	P2-M	8
A26	RED			J1-48	P2-P	
A27	YELLOW	17	12 IN.	J1-44	P2-R	8
A28	RED			J1-45	P2-S	
A29	YELLOW	17	12 IN.	J1-41	P2-T	8
A30	RED			J1-42	P2-U	
A31	YELLOW	17	12 IN.	J1-50	P2-N	8
A32	RED			J1-51	P2-L	
A33	YELLOW	17	3 IN.	J1-56	P4-B	8
A34	RED			J1-57	P4-A	
A35	YELLOW	17	12½ IN.	J1-53	J3-C	8
A36	RED			J1-54	J3-D	
A37	YELLOW	9	6½ IN	J1-59	E1	

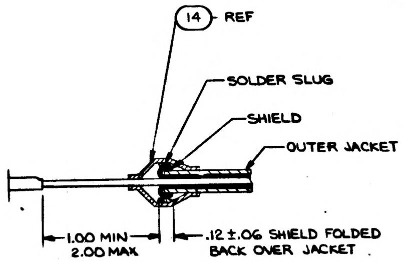
SEE DETAIL A & NOTE 5



PARTIAL VIEW - ADDITION OF ITEM 15 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 16

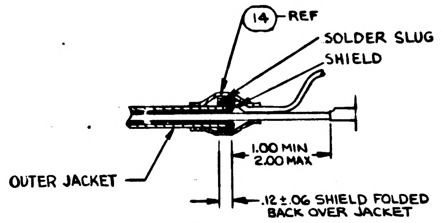


14 13 12 1 REF
2
13 12 3 REF
4 12 REF
6 14 16
SEE NOTE 3
POLARIZING KEYWAY (REF)
61 REF
SEE NOTE 15 & DETAIL A
SEE NOTE 12
J3
P4
SEE NOTE 12
1.75
1.37R
.40
.43
11
IDENTIFICATION MARK SEE NOTE 11
4.50
5.50
LOCATING GROOVE PAINTED BLUE (REF)
3.43
P2
.68
SEE NOTE 15 & DETAIL B
SEE NOTE 12
5 SEE NOTE 3
14 12 1
SEE NOTE 12
.18
2.00R
2.00
.53R
.87
1.25
3.12
1.12
3.18
1.37
SEE NOTE 13
P5
SEE NOTE 15 & DETAIL B
SEE NOTE 8
8.31
.18
1.43
1.75
2.37



14 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE
(TYP 2 PLACES)



14 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE
(TYP 2 PLACES)

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (36")			
17	1	*	1010789-003	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (200")			
16	41	*	1010770-2	—		SOCKETS, #22 CRIMP-TYPE			
15	1		2011798	85386910740		PLATE AND CONNECTOR, ASSY OF			
14	4	*	1010402-2	—		SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK			
13	6	*	1010490-054	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
12	38	*	1010490-060	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
11	1	*	1010490-277	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
10	1	*	1010789-012	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (36")			
9	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (7")			
8	1	*	1010789-001	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (12")			
7									
6	1	*	1010771-7	—		CONNECTOR, ELECT			
5	1		MS25036-1	—		TERMINAL, LUG, CRIMP STYLE, COPPER, INSULATED			
4	1	*	1011748-1	68502016401		CONNECTOR, ELECTRICAL (P4)			
3	1	*	1011646	68502017401		CONNECTOR, ELECTRICAL (J3)			
2	1		2011331	52386910600		PLATE, CONNECTOR MOUNTING			
1	2	*	1011758	68502018201		CONNECTOR, ELECTRICAL (P2)(P5)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± 1/2; DECIMALS ±.12; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910040
DRAWN [illegible] DATE 7-23-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL [illegible] 9-2-64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT BASE HARNESS ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011713
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 16 AND TERMINAL LUGS, ITEM 5 IN ACCORDANCE WITH ND1002206.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032
5. CONNECT CONDUCTORS A12C AND A24C TO RESPECTIVE SHIELDS (PER WIRING LEGEND) USING ITEM ⑭
6. APPLY ITEMS ⑪⑫, AND ⑬ TO LEADS.
7. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071
8. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.
9. PERFORM CONTINUITY CHECK.
10. PLACE ITEMS ⑫, AND ⑬ OVER CONTACTS AND LEADS AND SHRINK.
11. SHRINK ITEM ⑪ AND IDENTIFY ASSEMBLY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND-1002019.
12. POT IN ACCORDANCE WITH ND-1002240. METHOD 'A' OR 'B'
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
13. MARK REF DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND-1002019.
14. TERMINATE SHIELDED WIRE AS SHOWN IN DETAILS A & B.
15. ▭ SYMBOL ON HARNESS INDICATES APPROXIMATE LOCATION OF SOLDER SLEEVE

REVISIONS				12217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 18565	[illegible]	wk
B		REVISED PER TDRR 18877	[illegible]	wk

WIRING LEGEND

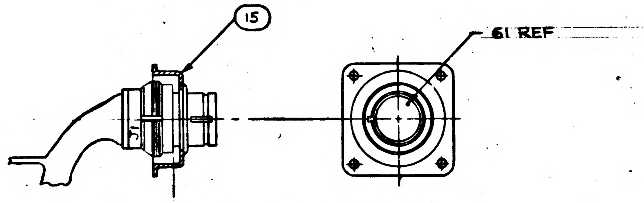
COND. NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	YELLOW	17	12 IN.	J1-24	P2-A	8
A2	RED			J1-25	P2-B	
A3	YELLOW	17	15¾ IN.	J1-21	P5-A	8
A4	RED			J1-22	P5-B	
A5	YELLOW	18	15¾ IN.	J1-2	P5-C	8
A6	RED			J1-1	P5-D	
A7	GREEN			J1-3	P5-E	
A8	YELLOW	17	12 IN.	J1-30	P2-F	8
A9	RED			J1-31	P2-H	
A10	YELLOW	17	15¾ IN.	J1-27	P5-F	8
A11	RED			J1-28	P5-H	
A12	YELLOW	10	15¾ IN.			(8)
A12A	RED			J1-33	P5-J	
A12B	YELLOW			J1-34	P5-K	
A12C	YELLOW	8	2½ IN	A12-SHIELD	J1-35	
A13	YELLOW	17	15¾ IN.	J1-15	P5-M	8
A14	RED			J1-16	P5-P	
A15	YELLOW	17	15¾ IN.	J1-18	P5-N	8
A16	RED			J1-19	P5-L	
A17	YELLOW	17	15¾ IN.	J1-13	P5-S	8
A18	RED			J1-12	P5-R	
A19	YELLOW	17	15¾ IN.	J1-10	P5-U	8
A20	RED			J1-9	P5-T	

SEE DETAIL A & NOTE 5

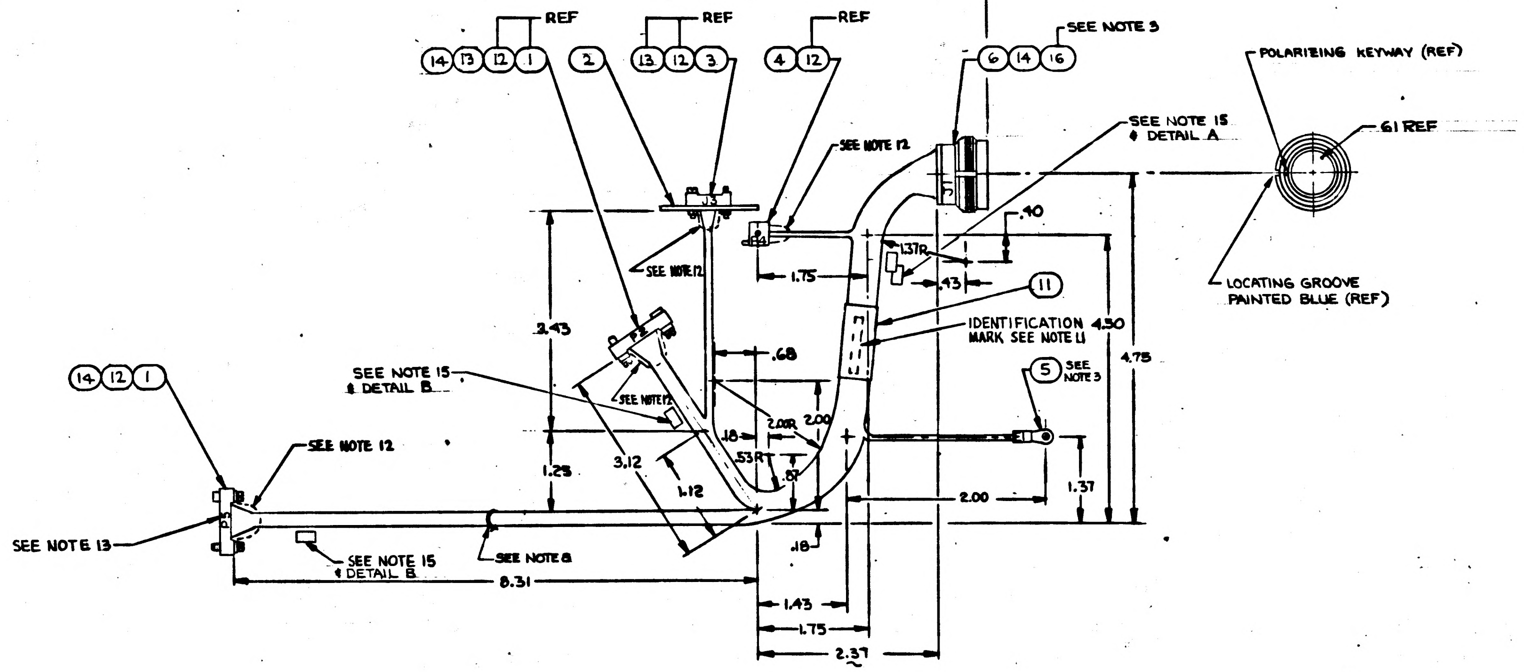
WIRING LEGEND

COND. NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A21	YELLOW	18	12 IN.	J1-5	P2-C	8
A22	RED			J1-7	P2-D	
A23	GREEN			J1-6	P2-E	
A24	YELLOW	10	12 IN.			(8)
A24A	RED			J1-38	P2-J	
A24B	YELLOW			J1-39	P2-K	
A24C	YELLOW	8	2½ IN	A24-SHIELD	J1-37	
A25	YELLOW	17	12 IN.	J1-47	P2-M	8
A26	RED			J1-48	P2-P	
A27	YELLOW	17	12 IN.	J1-44	P2-R	8
A28	RED			J1-45	P2-S	
A29	YELLOW	17	12 IN.	J1-41	P2-T	8
A30	RED			J1-42	P2-U	
A31	YELLOW	17	12 IN.	J1-50	P2-N	8
A32	RED			J1-51	P2-L	
A33	YELLOW	17	3 IN.	J1-56	P4-B	8
A34	RED			J1-57	P4-A	
A35	YELLOW	17	12½ IN.	J1-53	J3-C	8
A36	RED			J1-54	J3-D	
A37	YELLOW	9	6½ IN	J1-59	E1	

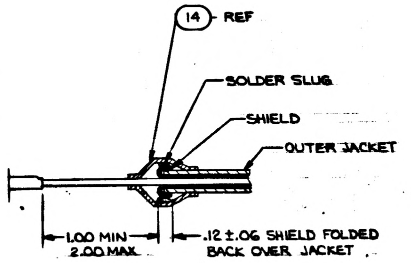
SEE DETAIL A & NOTE 5



PARTIAL VIEW - ADDITION OF ITEM 15 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 16

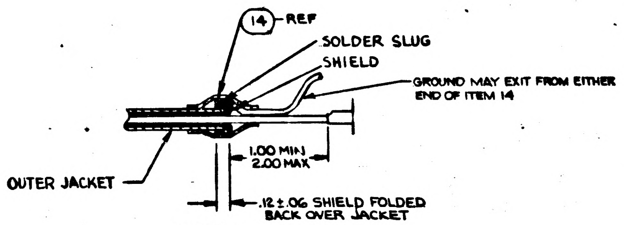


14 13 12 1 REF
2
13 12 3 REF
4 12 REF
6 14 16
SEE NOTE 3
POLARIZING KEYWAY (REF)
61 REF
SEE NOTE 15 & DETAIL A
SEE NOTE 12
J3
P4
P2
P5
J1
SEE NOTE 12
.40
1.37R
.43
1.75
11
IDENTIFICATION MARK SEE NOTE 11
4.30
4.75
LOCATING GROOVE PAINTED BLUE (REF)
2.43
.68
14 12 1
SEE NOTE 15 & DETAIL B
SEE NOTE 12
5 SEE NOTE 3
2.00R
2.00
.18
.53R
.87
1.25
3.12
1.12
SEE NOTE 12
2.00
1.37
SEE NOTE 13
SEE NOTE 15 & DETAIL B
SEE NOTE 8
8.31
.18
1.43
1.75
2.37



14 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE
(TYP 2 PLACES)



14 REF
SOLDER SLUG
SHIELD
GROUND MAY EXIT FROM EITHER END OF ITEM 14
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE
(TYP 2 PLACES)

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004	—*—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (36")			
17	1	*	1010789-003	—*—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (200")			
16	41	*	1010770-2	—*—		SOCKETS, #22, CRIMP-TYPE			
15	1		2011798	85386910740		PLATE AND CONNECTOR, ASSY OF			
14	4	*	1010402-2	—*—		SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK			
13	6	*	1010490-054	—*—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
12	38	*	1010490-060	—*—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
11	1	*	1010490-277	—*—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
10	1	*	1010789-012	—*—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (36")			
9	1	*	1010789-006	—*—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (7")			
8	1	*	1010789-001	—*—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (12")			
7									
6	1	*	1010771-7	—*—		CONNECTOR, ELECT			
5	1		MS25036-1	—*—		TERMINAL, LUG, CRIMP STYLE, COPPER, INSULATED			
4	1	*	1011748-1	68502016401		CONNECTOR, ELECTRICAL (P4)			
3	1	*	1011646	68502017401		CONNECTOR, ELECTRICAL (J3)			
2	1		2011331	52386910600		PLATE, CONNECTOR MOUNTING			
1	2	*	1011758-1	68502018201		CONNECTOR, ELECTRICAL (P2)(P5)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± 1/64; DECIMALS ± .12; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910040
DRAWN [illegible] DATE 1-23-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL [illegible] 1-21-65
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011713
SCALE 1/1
WEIGHT
CALC / ACTUAL
SHEET 1 OF 1

2011713 C

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 16 AND TERMINAL LUGS, ITEM 5 IN ACCORDANCE WITH ND1002206.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032
5. CONNECT CONDUCTORS A12C AND A24C TO RESPECTIVE SHIELDS (PER WIRING LEGEND) USING ITEM ⑭
6. APPLY ITEMS ⑪⑫, AND ⑬ TO LEADS.
7. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071
8. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.
9. PERFORM CONTINUITY CHECK.
10. PLACE ITEMS ⑫, AND ⑬ OVER CONTACTS AND LEADS AND SHRINK.
11. SHRINK ITEM ⑪ AND IDENTIFY ASSEMBLY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND-1002019.
12. POT IN ACCORDANCE WITH ND-1002240. METHOD "A" OR "B"
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
13. MARK REF DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND-1002019.
14. TERMINATE SHIELDED WIRE AS SHOWN IN DETAILS A & B.
15. ▭ SYMBOL ON HARNESS INDICATES APPROXIMATE LOCATION OF SOLDER SLEEVE

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 18565	[illegible]	wk
B		REVISED PER TDRR 18877	[illegible]	wk
C		REVISED PER TDRR 19769	[illegible]	wk

SEE DETAIL A & NOTE 5

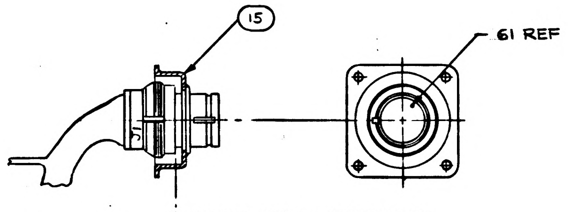
WIRING LEGEND

COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	YELLOW	17	12 IN.	J1-24	P2-A	8
A2	RED			J1-25	P2-B	
A3	YELLOW	17	15¾ IN.	J1-21	P5-A	8
A4	RED			J1-22	P5-B	
A5	YELLOW	18	15¾ IN.	J1-2	P5-C	8
A6	RED			J1-1	P5-D	
A7	GREEN			J1-3	P5-E	
A8	YELLOW	17	12 IN.	J1-30	P2-F	8
A9	RED			J1-31	P2-H	
A10	YELLOW	17	15¾ IN.	J1-27	P5-F	8
A11	RED			J1-28	P5-H	
A12	YELLOW	10	15¾ IN.			(8)
A12A	RED			J1-33	P5-J	
A12B	YELLOW			J1-34	P5-K	
A12C	YELLOW	8	2½ IN	A12-SHIELD	J1-35	
A13	YELLOW	17	15¾ IN.	J1-15	P5-M	8
A14	RED			J1-16	P5-P	
A15	YELLOW	17	15¾ IN.	J1-18	P5-N	8
A16	RED			J1-19	P5-L	
A17	YELLOW	17	15¾ IN.	J1-13	P5-S	8
A18	RED			J1-12	P5-R	
A19	YELLOW	17	15¾ IN.	J1-10	P5-U	8
A20	RED			J1-9	P5-T	

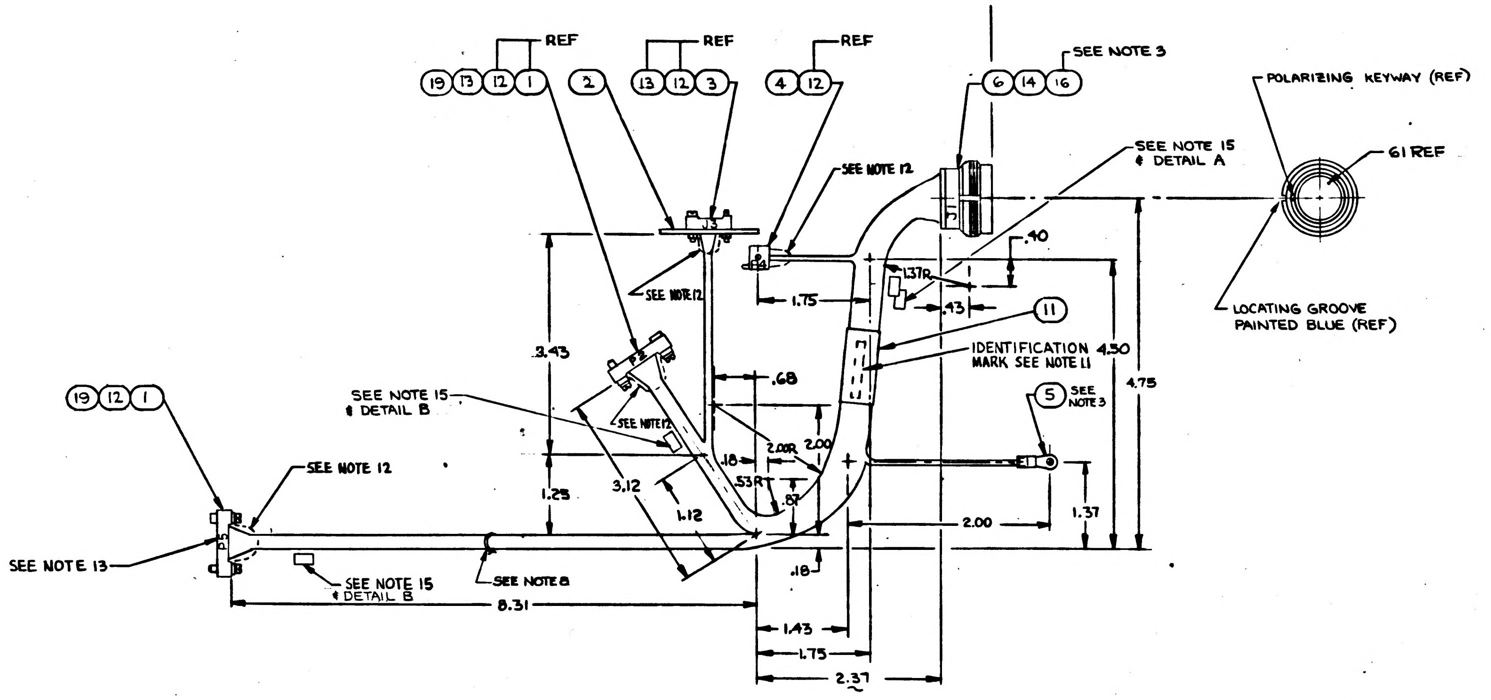
SEE DETAIL A & NOTE 5

WIRING LEGEND

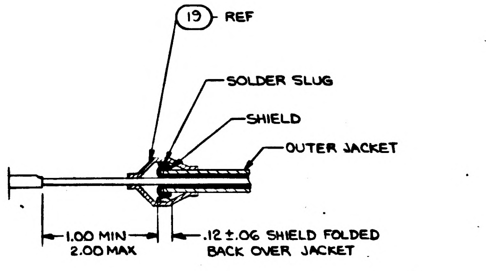
COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A21	YELLOW	18	12 IN.	J1-5	P2-C	8
A22	RED			J1-7	P2-D	
A23	GREEN			J1-6	P2-E	
A24	YELLOW	10	12 IN.			(8)
A24A	RED			J1-38	P2-J	
A24B	YELLOW			J1-39	P2-K	
A24C	YELLOW	8	2½ IN	A24-SHIELD	J1-37	
A25	YELLOW	17	12 IN.	J1-47	P2-M	8
A26	RED			J1-48	P2-P	
A27	YELLOW	17	12 IN.	J1-44	P2-R	8
A28	RED			J1-45	P2-S	
A29	YELLOW	17	12 IN.	J1-41	P2-T	8
A30	RED			J1-42	P2-U	
A31	YELLOW	17	12 IN.	J1-50	P2-N	8
A32	RED			J1-51	P2-L	
A33	YELLOW	17	3 IN.	J1-56	P4-B	8
A34	RED			J1-57	P4-A	
A35	YELLOW	17	12½ IN.	J1-53	J3-C	8
A36	RED			J1-54	J3-D	
A37	YELLOW	9	6½ IN	J1-59	E1	



PARTIAL VIEW - ADDITION OF ITEM 15 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 16

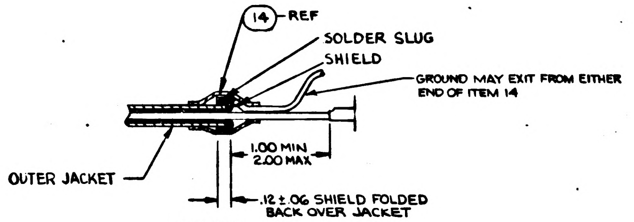


19 13 12 1 REF
2
13 12 3 REF
4 12 REF
6 14 16
SEE NOTE 3
POLARIZING KEYWAY (REF)
61 REF
LOCATING GROOVE PAINTED BLUE (REF)
SEE NOTE 12
SEE NOTE 15 & DETAIL A
J3
P4
P2
P5
.40
1.37R
1.75
.43
11
IDENTIFICATION MARK SEE NOTE 11
4.50
4.75
5 SEE NOTE 3
3.43
.68
SEE NOTE 15 & DETAIL B
2.00R
2.00
.18
.53R
.87
3.12
1.12
1.25
1.37
2.00
19 12 1
SEE NOTE 12
SEE NOTE 13
SEE NOTE 15 & DETAIL B
SEE NOTE 8
8.31
.18
1.43
1.75
2.37



19 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE
(TYP 2 PLACES)



14 REF
SOLDER SLUG
SHIELD
GROUND MAY EXIT FROM EITHER END OF ITEM 14
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE
(TYP 2 PLACES)

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
19	2	*	1010402-1			SLEEVING, SOLDER, ELECT. COND INSUL., HEAT SHRINKABLE			
18	1	*	1010789-004	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (36")			
17	1	*	1010789-003	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (200")			
16	41	*	1010770-2	—		SOCKETS, #22, CRIMP-TYPE			
15	1		2011798	85386910740		PLATE AND CONNECTOR, ASSY OF			
14	2	*	1010402-2	—		SLEEVE, SOLDER, ELECT. COND, INSUL, HEAT SHRINK			
13	6	*	1010490-054	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
12	38	*	1010490-060	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
11	1	*	1010490-277	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
10	1	*	1010789-012	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (36")			
9	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (7")			
8	1	*	1010789-001	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (12")			
7									
6	1	*	1010771-7	—		CONNECTOR, ELECT			
5	1		MS25036-1	—		TERMINAL, LUG, CRIMP STYLE, COPPER, INSULATED			
4	1	*	1011748-1	68502016401		CONNECTOR, ELECTRICAL (P4)			
3	1	*	1011646	68502017401		CONNECTOR, ELECTRICAL (J3)			
2	1		2011331	52386910600		PLATE, CONNECTOR MOUNTING			
1	2	*	1011758-1	68502018201		CONNECTOR, ELECTRICAL (P2)(P5)			

LIST OF PARTS AND MATERIALS

2011713 C

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .12	± 5°

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910040

DRAWN DATE 7-23-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL 1-21-65
APPROVAL 8/31/69
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT BASE HARNESS
ASSEMBLY

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011713

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011713 D

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 16 AND TERMINAL LUGS, ITEM 5 IN ACCORDANCE WITH ND1002206.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032
5. CONNECT CONDUCTORS A12C AND A24C TO RESPECTIVE SHIELDS (PER WIRING LEGEND) USING ITEM ⑭
6. APPLY ITEMS ⑪⑫, AND ⑬ TO LEADS.
7. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071
8. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.
9. PERFORM CONTINUITY CHECK.
10. PLACE ITEMS ⑫, AND ⑬ OVER CONTACTS AND LEADS AND SHRINK.
11. SHRINK ITEM ⑪ AND IDENTIFY ASSEMBLY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND-1002019.
12. POT IN ACCORDANCE WITH ND-1002240. METHOD "A" OR "B"
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
13. MARK REF DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND-1002019.
14. TERMINATE SHIELDED WIRE AS SHOWN IN DETAILS A & B.
15. ▭ SYMBOL ON HARNESS INDICATES APPROXIMATE LOCATION OF SOLDER SLEEVE

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 18565	[illegible]	wk
B		REVISED PER TDRR 18877	[illegible]	wk
C		REVISED PER TDRR 19769	[illegible]	wk
D		REVISED PER TDRR 24639	[illegible]	wk

WIRING LEGEND

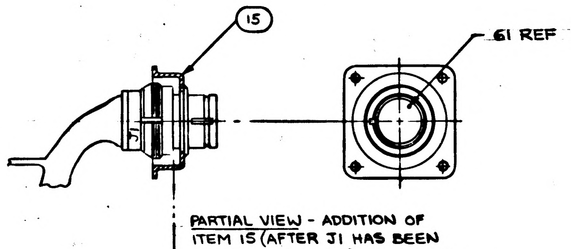
SEE DETAIL A & NOTE 5 (A12C)

COND NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	YELLOW	17	12 IN.	J1-24	P2-A	8
A2	RED			J1-25	P2-B	
A3	YELLOW	17	15¾ IN.	J1-21	P5-A	8
A4	RED			J1-22	P5-B	
A5	YELLOW	18	15¾ IN.	J1-2	P5-C	8
A6	RED			J1-1	P5-D	
A7	GREEN			J1-3	P5-E	
A8	YELLOW	17	12 IN.	J1-30	P2-F	8
A9	RED			J1-31	P2-H	
A10	YELLOW	17	15¾ IN.	J1-27	P5-F	8
A11	RED			J1-28	P5-H	
A12	YELLOW	10	15¾ IN.			(8)
A12A	RED			J1-33	P5-J	
A12B	YELLOW			J1-34	P5-K	
A12C	YELLOW	8	2½ IN	A12-SHIELD	J1-35	
A13	YELLOW	17	15¾ IN.	J1-15	P5-M	8
A14	RED			J1-16	P5-P	
A15	YELLOW	17	15¾ IN.	J1-18	P5-N	8
A16	RED			J1-19	P5-L	
A17	YELLOW	17	15¾ IN.	J1-13	P5-S	8
A18	RED			J1-12	P5-R	
A19	YELLOW	17	15¾ IN.	J1-10	P5-U	8
A20	RED			J1-9	P5-T	

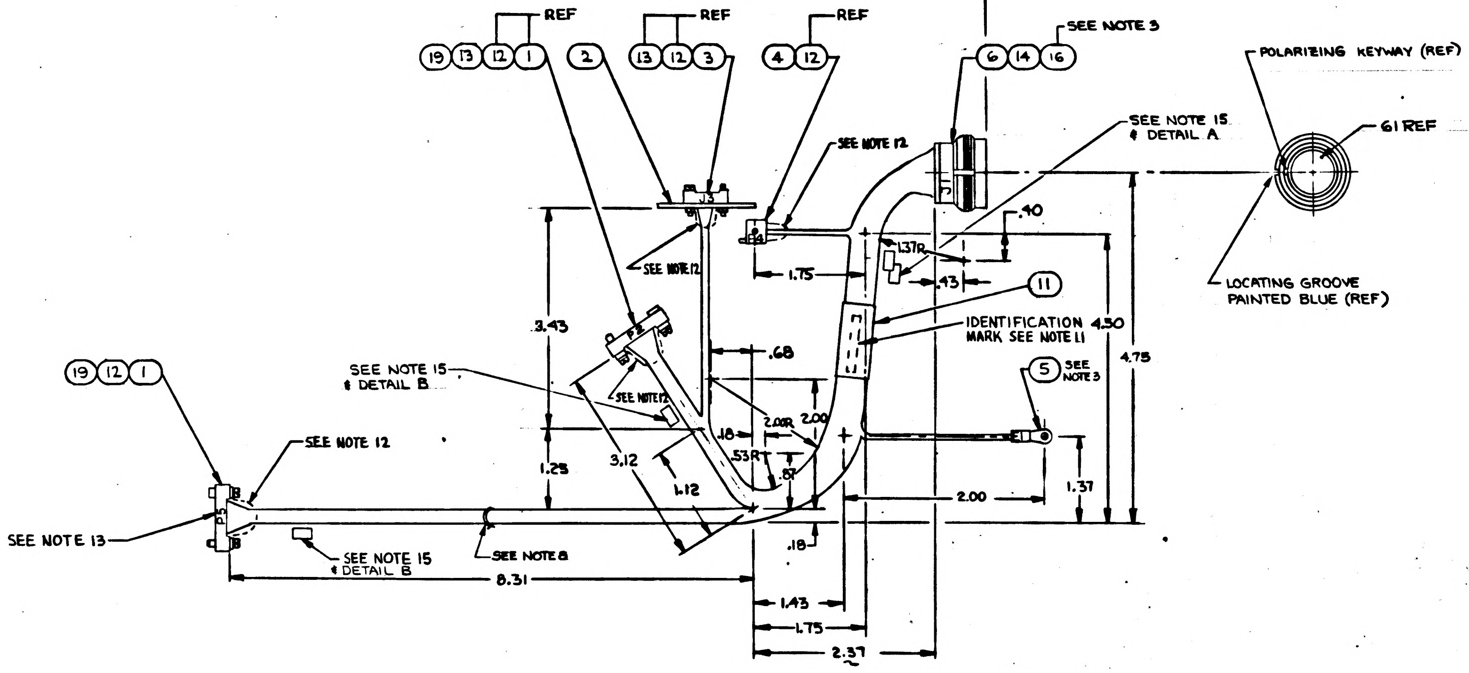
WIRING LEGEND

SEE DETAIL A & NOTE 5 (A24C)

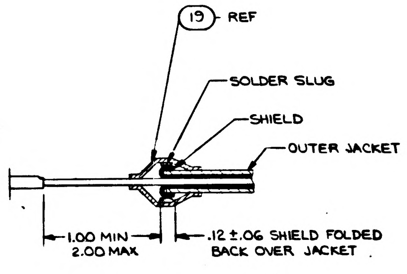
COND NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A21	YELLOW	18	12 IN.	J1-5	P2-C	8
A22	RED			J1-7	P2-D	
A23	GREEN			J1-6	P2-E	
A24	YELLOW	10	12 IN.			(8)
A24A	RED			J1-38	P2-J	
A24B	YELLOW			J1-39	P2-K	
A24C	YELLOW	8	2½ IN	A24-SHIELD	J1-37	
A25	YELLOW	17	12 IN.	J1-47	P2-M	8
A26	RED			J1-48	P2-P	
A27	YELLOW	17	12 IN.	J1-44	P2-R	8
A28	RED			J1-45	P2-S	
A29	YELLOW	17	12 IN.	J1-41	P2-T	8
A30	RED			J1-42	P2-U	
A31	YELLOW	17	12 IN.	J1-50	P2-N	8
A32	RED			J1-51	P2-L	
A33	YELLOW	17	3 IN.	J1-56	P4-B	8
A34	RED			J1-57	P4-A	
A35	YELLOW	17	12½ IN.	J1-53	J3-C	8
A36	RED			J1-54	J3-D	
A37	YELLOW	9	6½ IN	J1-59	E1	



PARTIAL VIEW - ADDITION OF ITEM 15 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 16

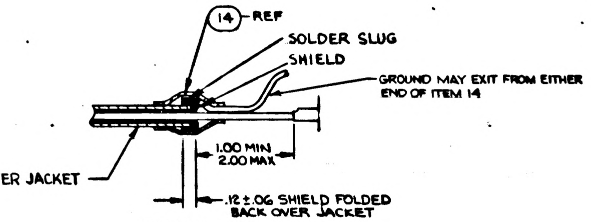


SEE DETAIL A & NOTE 5
19 13 12 1 REF
2
13 12 3 REF
4 12 REF
6 14 16 SEE NOTE 3
POLARIZING KEYWAY (REF)
.61 REF
LOCATING GROOVE PAINTED BLUE (REF)
SEE NOTE 15 & DETAIL A
SEE NOTE 12
SEE NOTE 12
SEE NOTE 12
SEE NOTE 12
J3
P4
P2
P5
J1
.40
1.37R
1.75
.43
11
IDENTIFICATION MARK SEE NOTE 11
4.30
4.75
3.43
.68
SEE NOTE 15 & DETAIL B
2.00R
2.00
.18
.53R
.87
3.12
1.12
1.25
5 SEE NOTE 3
1.37
2.00
19 12 1
SEE NOTE 12
SEE NOTE 13
SEE NOTE 15 & DETAIL B
SEE NOTE 8
8.31
.18
1.43
1.75
2.37



19 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE
(TYP 2 PLACES)



14 REF
SOLDER SLUG
SHIELD
GROUND MAY EXIT FROM EITHER END OF ITEM 14
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ±.06 SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE
(TYP 2 PLACES)

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
19	2	*	1010402-1			SLEEVING, SOLDER, ELECT. COND INSUL., HEAT SHRINKABLE			
18	1	*	1010789-004	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (36")			
17	1	*	1010789-003	—		WIRE, ELECT, EXTRUDED TYPE, POLYMIDE COATED (200")			
16	41	*	1010770-2	—		SOCKETS, #22, CRIMP-TYPE			
15	1		2011798	85386910740		PLATE AND CONNECTOR, ASSY OF			
14	2	*	1010402-2	—		SLEEVE, SOLDER, ELECT. COND INSUL, HEAT SHRINK			
13	6	*	1010490-054	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
12	38	*	1010490-060	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
11	1	*	1010490-277	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
10	1	*	1010789-012	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (36")			
9	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (7")			
8	1	*	1010789-001	—		WIRE, ELECT, EXTRUDED TYPE, POLYIMIDE COATED (12")			
7									
6	1	*	1010771-007	—		CONNECTOR, ELECT			
5	1		MS25036-1	—		TERMINAL, LUG, CRIMP STYLE, COPPER. INSULATED			
4	1	*	1011748-1	68502016401		CONNECTOR, ELECTRICAL (P4)			
3	1	*	1011646	68502017401		CONNECTOR, ELECTRICAL (J3)			
2	1		2011331	52386910600		PLATE, CONNECTOR MOUNTING			
1	2	*	1011758-1	68502018201		CONNECTOR, ELECTRICAL (P2)(P5)			

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ½ DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910040
DRAWN [illegible] DATE 7-23-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL [illegible] 9-2-64
APPROVAL E. [illegible] 9/3/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011713
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011713 D

2011713

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS 221

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390.
3. CONDUCTOR NO. SHALL BE MARKED ON EACH WIRE PER ND-1002019. SPACING OF CONDUCTOR IDENTIFICATION SHALL BE EVERY TWO (2) INCHES, MAXIMUM. SPIRALING OF THE MARKINGS IS ALLOWED.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032
5. CONNECT CONDUCTORS A12C AND A24C TO RESPECTIVE SHIELDS (PER WIRING LEGEND) USING ITEM ⑭
6. APPLY ITEMS ⑪ ⑫, AND ⑬ TO LEADS.
7. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH SN 60 WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
8. LACE CONDUCTORS, USING ITEM ⑦, IN ACCORDANCE WITH ND-1002032.
9. PERFORM CONTINUITY CHECK.
10. PLACE ITEMS ⑫, AND ⑬ OVER CONTACTS AND LEADS AND SHRINK.
11. SHRINK ITEM ⑪ AND IDENTIFY ASSEMBLY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND-1002019.
12. POT IN ACCORDANCE WITH ND-1002009, METHOD C.
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
13. MARK REF DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND-1002019.
14. TERMINATE SHIELDED WIRE AS SHOWN IN DETAILS A & B.
15. ▭ SYMBOL ON HARNESS INDICATES APPROXIMATE LOCATION OF SOLDER SLEEVE
16. INSTALL CRIMP STYLE TERMINALS, ITEM 16 IN ACCORDANCE WITH ND1002206.

WIRING LEGEND

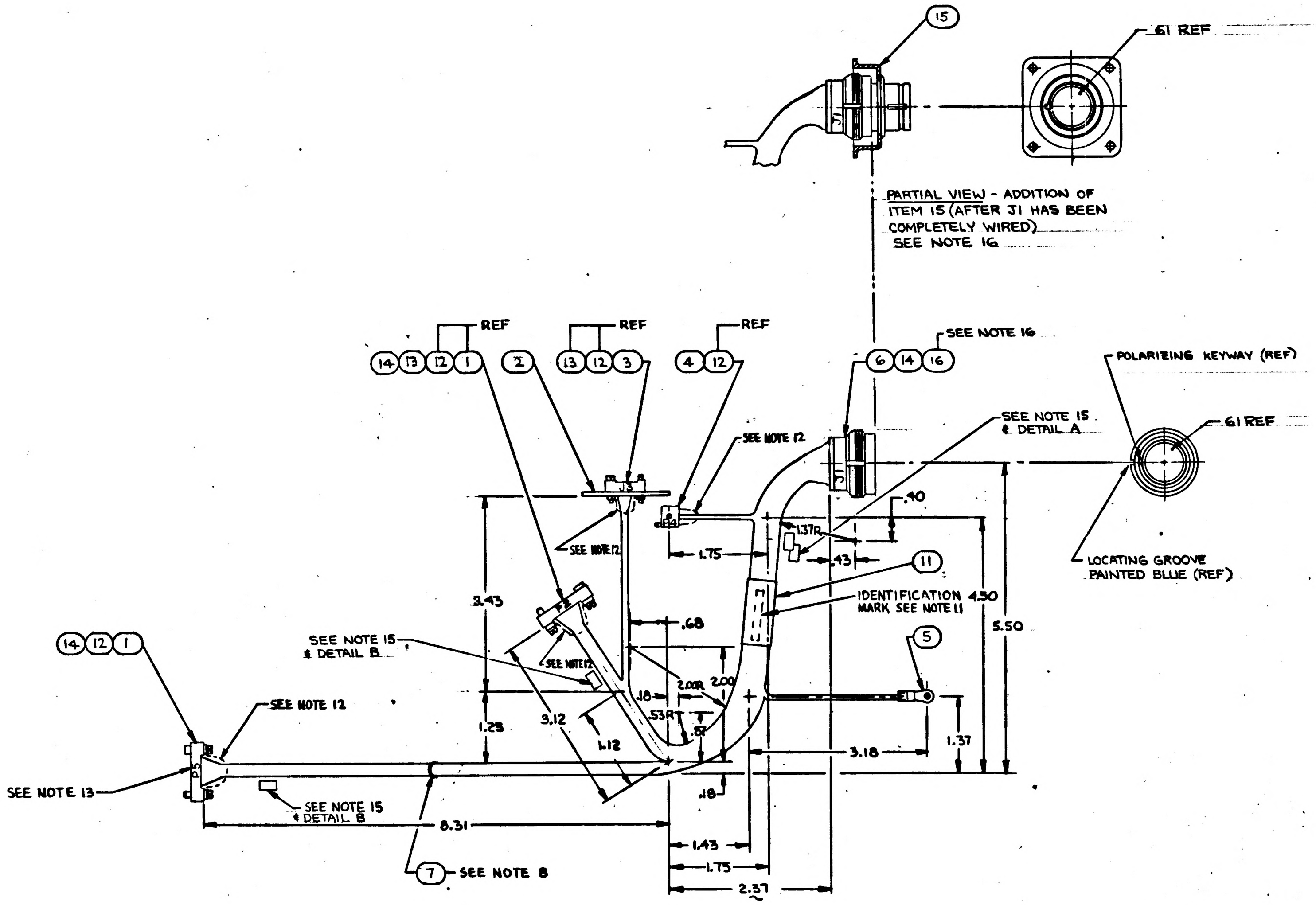
COND NO.	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	WHITE	8	12 IN	J1-24	P2-A	8
A2			12 IN	J1-25	P2-B	
A3			15¾ IN	J1-21	P5-A	8
A4			15¾ IN	J1-22	P5-B	
A5			15¾ IN	J1-2	P5-C	8
A6			15¾ IN	J1-1	P5-D	
A7			15¾ IN	J1-3	P5-E	
A8			12 IN	J1-30	P2-F	8
A9			12 IN	J1-31	P2-H	
A10			15¾ IN	J1-27	P5-F	8
A11		8	15¾ IN	J1-28	P5-H	
A12	WHITE	10	15¾ IN			(8)
A12A**	BLUE		15¾ IN	J1-33	P5-J	
A12B**	BROWN		15¾ IN	J1-34	P5-K	
A12C**	WHITE	8	2½ IN	A12-SHIELD	J1-35	
A13	WHITE		15¾ IN	J1-15	P5-M	8
A14				J1-16	P5-P	
A15				J1-18	P5-N	8
A16				J1-19	P5-L	
A17				J1-13	P5-S	8
A18				J1-12	P5-R	
A19				J1-10	P5-U	8
A20	WHITE	8	15¾ IN	J1-9	P5-T	

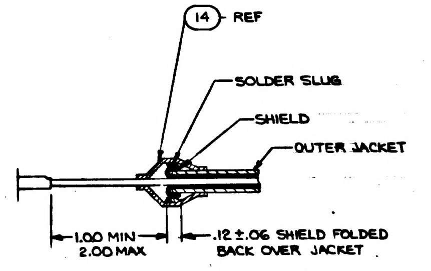
SEE DETAIL A

WIRING LEGEND

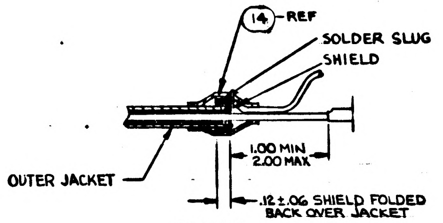
COND NO.	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A21	WHITE	8	12 IN	J1-5	P2-C	8
A22		8		J1-7	P2-D	
A23		8		J1-6	P2-E	
A24	WHITE	10				(8)
A24A**	BLUE			J1-38	P2-J	
A24B**	BROWN		12 IN	J1-39	P2-K	
A24C**	WHITE	8	2½ IN	A24-SHIELD	J1-37	
A25	WHITE	8	12 IN	J1-47	P2-M	8
A26				J1-48	P2-P	
A27				J1-44	P2-R	8
A28				J1-45	P2-S	
A29				J1-41	P2-T	8
A30				J1-42	P2-U	
A31				J1-50	P2-N	8
A32			12 IN	J1-51	P2-L	
A33			3 IN	J1-56	P4-B	8
A34			3 IN	J1-57	P4-A	
A35			12½ IN	J1-53	J3-C	8
A36		8	12½ IN	J1-54	J3-D	
A37	WHITE	9	6½ IN	J1-59	E1	

SEE DETAIL A


15
.61 REF
PARTIAL VIEW - ADDITION OF ITEM 15 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 16
14 13 12 1 REF
2
13 12 3 REF
4 12 REF
6 14 16 SEE NOTE 16
POLARIZING KEYWAY (REF)
.61 REF
SEE NOTE 15 & DETAIL A
SEE NOTE 12
J3
P4
SEE NOTE 12
.40
1.37R
1.75
.43
11
IDENTIFICATION MARK SEE NOTE 11
4.50
5.50
LOCATING GROOVE PAINTED BLUE (REF)
3.43
P2
.68
SEE NOTE 15 & DETAIL B
SEE NOTE 12
14 12 1
SEE NOTE 12
2.00R
2.00
.18
.53R
.87
5
3.12
1.12
1.25
3.18
1.37
P5
SEE NOTE 13
SEE NOTE 15 & DETAIL B
.18
8.31
1.43
1.75
2.37
7 SEE NOTE 8


14 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN
2.00 MAX
.12 ± .06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE
(TYP 2 PLACES)


14 REF
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN
2.00 MAX
.12 ± .06 SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE
(TYP 2 PLACES)

** CONDUCTOR NUMBER FOR REFERENCE ONLY - WIRE SHALL NOT BE MARKED

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

PENDING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
16	41	*	1010770-2	—		SOCKETS, #22, CRIMP-TYPE			
15	1		2011798	85386910740		PLATE AND CONNECTOR, ASSY OF			
14	4	*	1010402-2	—		SLEEVE, SOLDER, ELECT. COND, INSUL, HEAT SHRINK			
13	6	*	1010490-054	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
12	38	*	1010490-060	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
11	1	*	1010490-277	—		INSULATION-SLEEVING ELECTRICAL, HEAT SHRINKABLE			
10	1	*		—		WIRE, (28")			
9	1	*		—		WIRE, (7")			
8	1	*		—		WIRE, (40')			
7	AR	*	1011753-1	—		TAPE, LACING & TYING			
6	1	*	1010771-7	—		CONNECTOR, ELECT			
5	1		MS25086-1	—		TERMINAL, LUG, CRIMP STYLE, COPPER, INSULATED			
4	1	*	1011748-1	68502016401		CONNECTOR, ELECTRICAL (P4)			
3	1	*	1011646	68502017401		CONNECTOR, ELECTRICAL (J3)			
2	1		2011331	52386910600		PLATE, CONNECTOR MOUNTING			
1	2	*	1011758	68502018201		CONNECTOR, ELECTRICAL (P2)(P5)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ; DECIMALS ± .12 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910040
DRAWN DATE 7-23-64
CHECKED T. SULLIVAN 8-27-64
APPROVAL 8-27-64
APPROVAL E. Thorup 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT BASE HARNESS
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 2011713
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

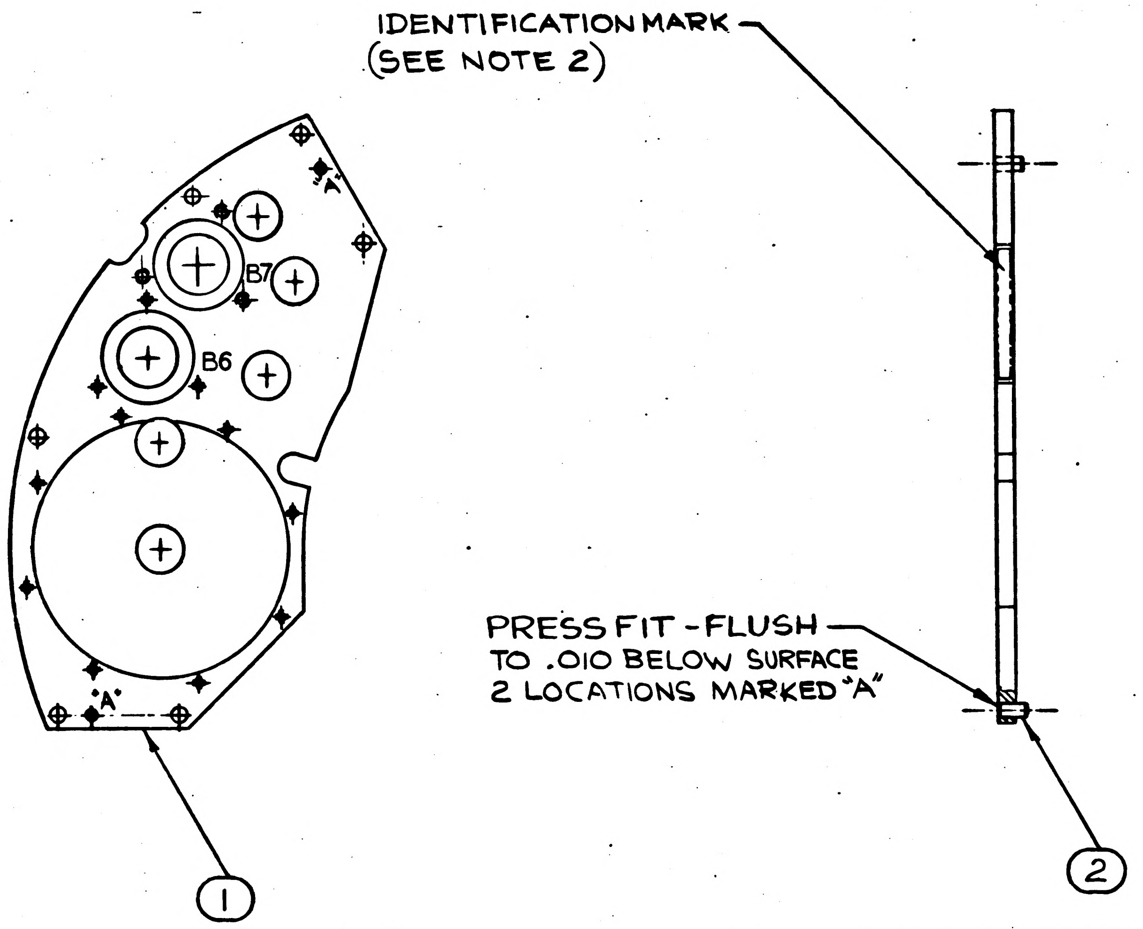
2011713

2011715

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES.

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019.



IDENTIFICATION MARK (SEE NOTE 2)
B7
B6
"A"
"A"
PRESS FIT - FLUSH TO .010 BELOW SURFACE 2 LOCATIONS MARKED "A"
1
2

2011715

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2		MS16555-609	74444030009		PIN, DOWEL			
1	1		2011301	52386910240		PLATE, BEARING (SEXTANT SHAFT DRIVE)			

LIST OF PARTS AND MATERIALS

2011705	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910130

DRAWN E. DRAPALA DATE 4-8-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL 7/27/64
APPROVAL 8/19/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE BEARING
AND PIN, ASSY OF

CODE IDENT NO. | SIZE C | NASA NUMBER 2011715
SCALE 1:1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

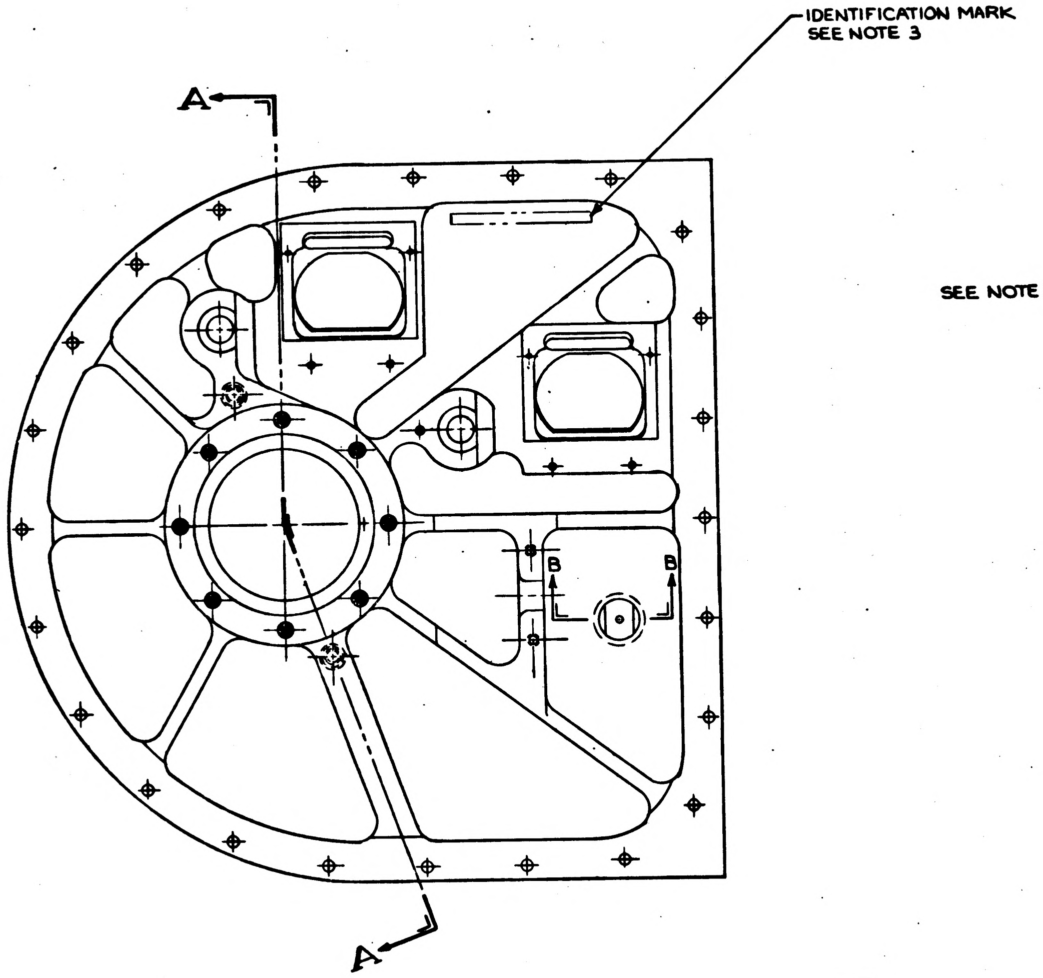
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

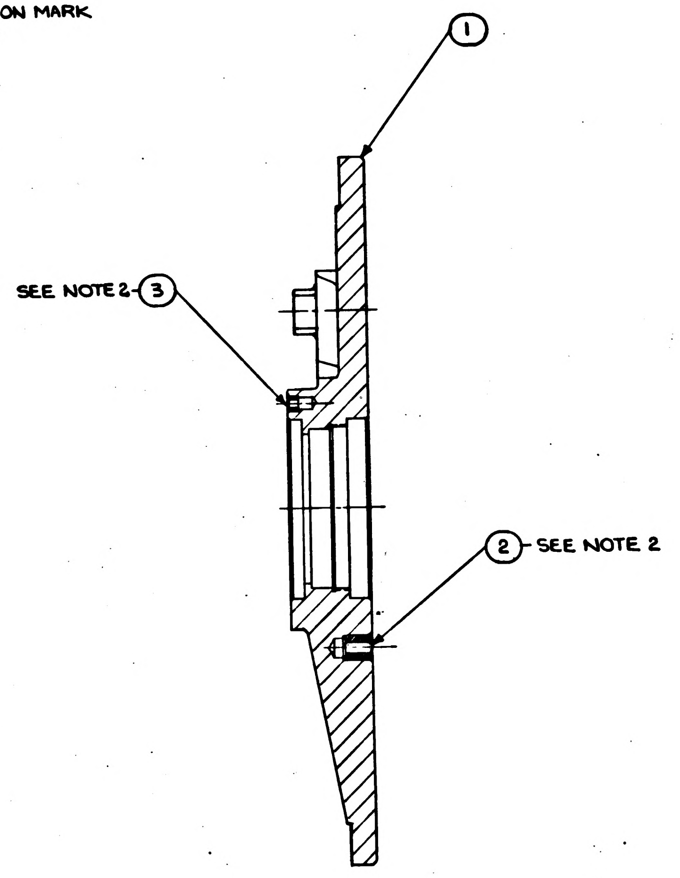
G | A | 2011717

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F8	REVISED PER TDRR* 16915	2/24/65	WR

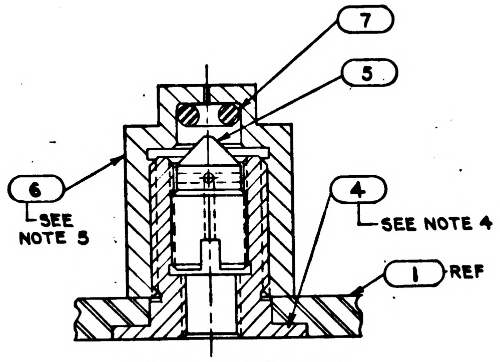
REVISIONS TDRR 12119

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEMS ② & ③ IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM ④ TO ITEM ① USING ITEM ⑧ AND CURE AT 150° ± 3°F FOR 2 HOURS.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑥ TO ITEM ④ IN ACCORDANCE WITH ND1002211 USING MIL-S-22473 GRADE (HV)





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

MASTER

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
6	1		2012034	57386911160		HOUSING, GAS INJECTION			
5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
1	1		2011696	52386910590		PANEL, TELESCOPE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN F. Schiller DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 7/23/64
APPROVAL E. Thomas 8/22/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

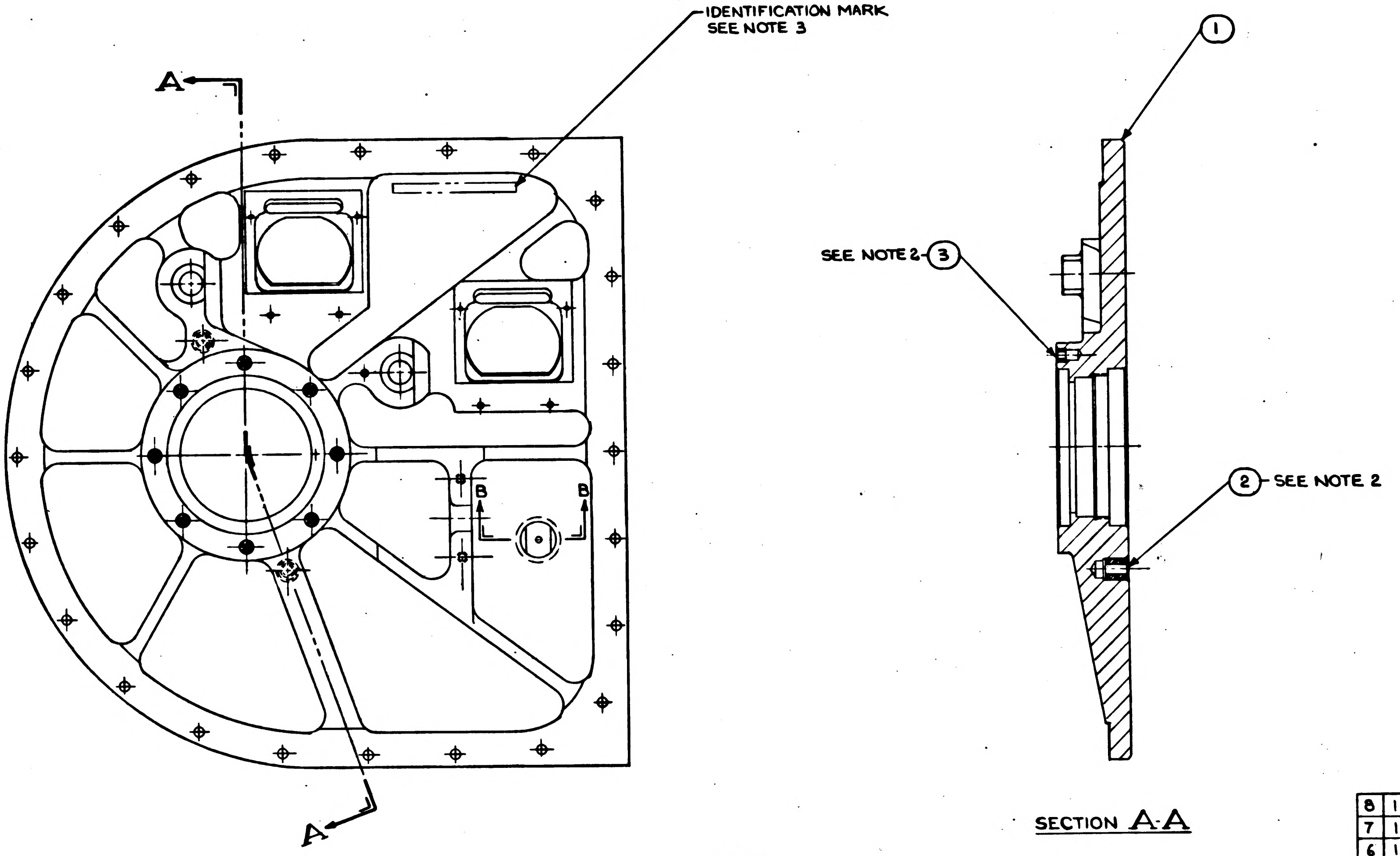
CODE IDENT NO.
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011717 A

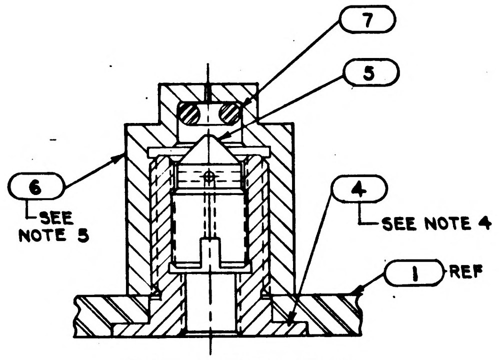
B 2011717

REVISIONS		DRR 12119		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F-8	REVISED PER TDRR* 16915	4/26/65	WK
B		REVISED PER TDRR 18566	4/27/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEMS ② & ③ IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM ④ TO ITEM ① USING ITEM ⑧ IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑥ TO ITEM ④ IN ACCORDANCE WITH ND1002211 USING MIL-S-22473 GRADE (HV)



SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
6	1		2012034	57386911160		HOUSING, GAS INJECTION			
5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
1	1		2011696	52386910590		PANEL, TELESCOPE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN J. Schiller DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 7/23/64
APPROVAL E. Thorup 8/22/64
NASA APPROVAL
MIT APPROVAL 28 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT, ASSY OF

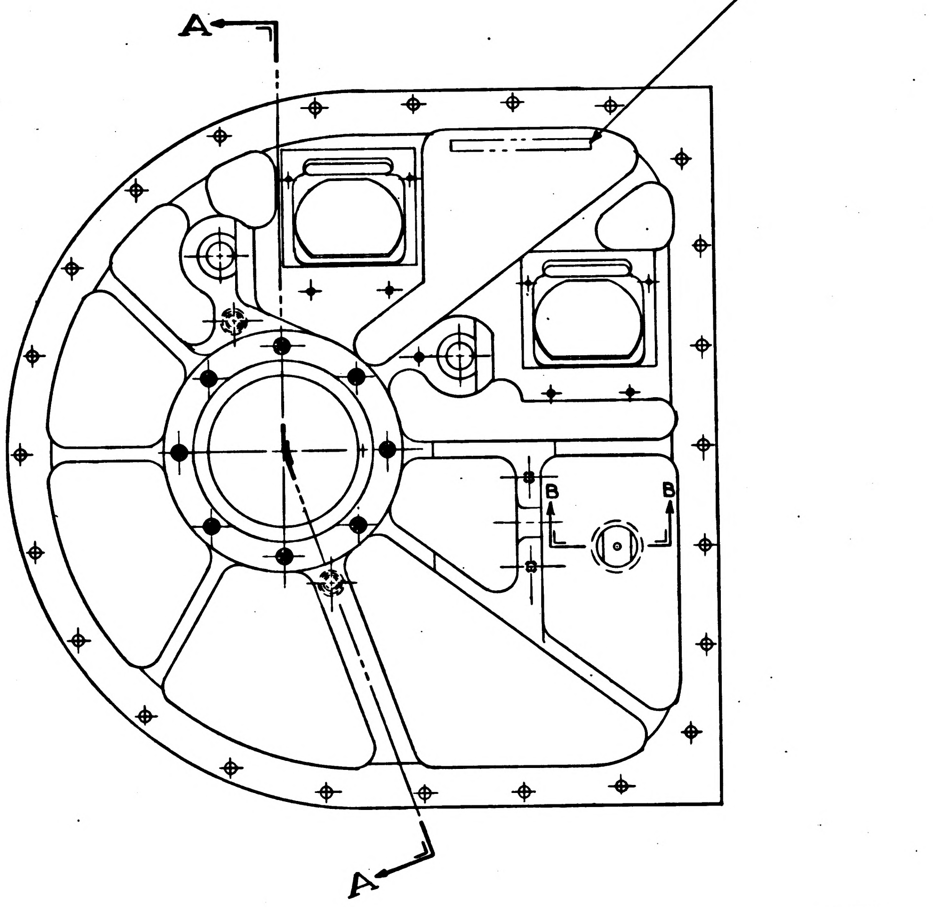
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

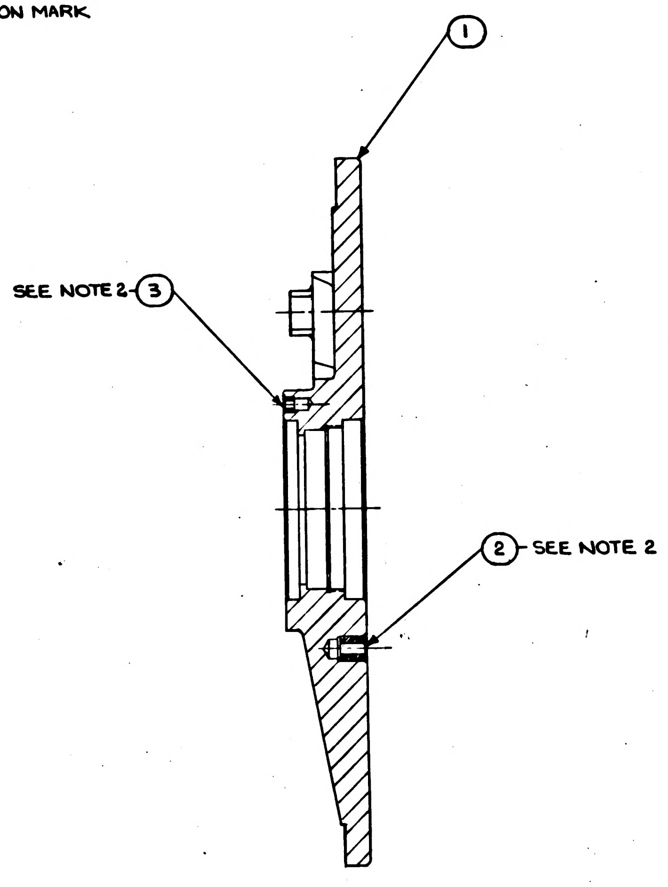
2011717 B

C. 2011717

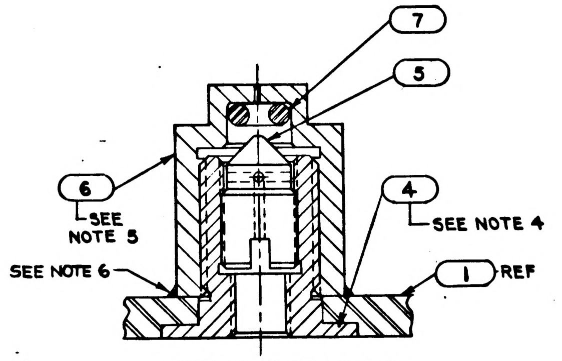
REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F-8	REVISED PER TDRR* 16915	2/24/65	WK
B		REVISED PER TDRR 18566	4/27/65	WK
C		REVISED PER TDRR 18867	5/11/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEMS ② & ③ IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM ④ TO ITEM ① USING ITEM ⑧ IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑥ TO ITEM ④ IN ACCORDANCE WITH ND1002211 USING MIL-S-22473 GRADE (HV)
6. AN .062 MAX. FILLET OF ITEM ⑧ IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
6	1		2012034	57386911160		HOUSING, GAS INJECTION			
5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
1	1		2011696	52386910590		PANEL, TELESCOPE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN J. Schiller DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 7/23/64
APPROVAL E. Thomas 8/22/64
NASA APPROVAL
MIT APPROVAL 28 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

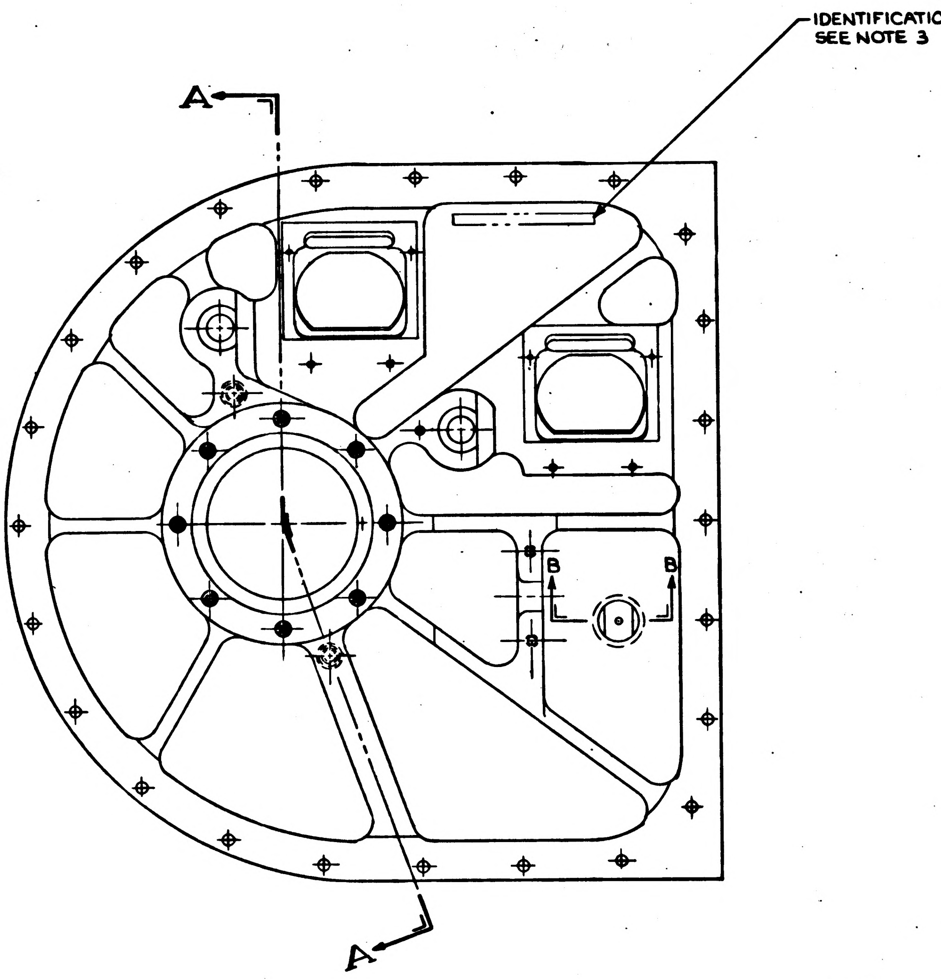
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

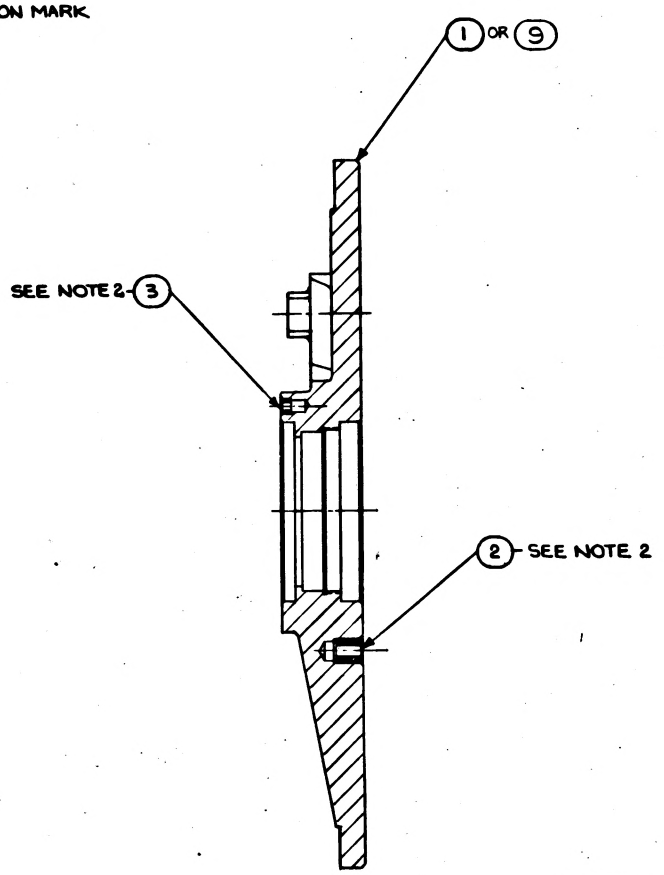
2011717 D

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEMS ② & ③ IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM ④ TO ITEM ① USING ITEM ⑧ IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM ⑥ TO ITEM ④ IN ACCORDANCE WITH ND1002211 USING MIL-S-22473 GRADE (HV)
6. AN .062 MAX. FILLET OF ITEM ⑧ IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.

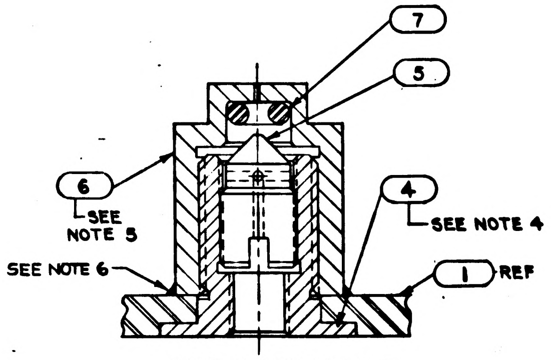
REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F-8	REVISED PER TDRR 16915	2/24/65	WK
B		REVISED PER TDRR 18566	4/27/65	WK
C		REVISED PER TDRR 18867	5/11/65	WK
D		REVISED PER TDRR 22651	9/28/65	WK





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	9			2012671	52386911010		PANEL, TELESCOPE			
1	1	8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
1	1	7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
1	1	6	1		2012034	57386911160		HOUSING, GAS INJECTION			
1	1	5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
1	1	4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
8	8	3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2	2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
0	1	1	1		2011696	52386910590		PANEL, TELESCOPE			

NEXT ASSY	2011784
USED ON	2011000
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN F. Schuller DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 2/3/64
APPROVAL E. Thomas 8/22/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

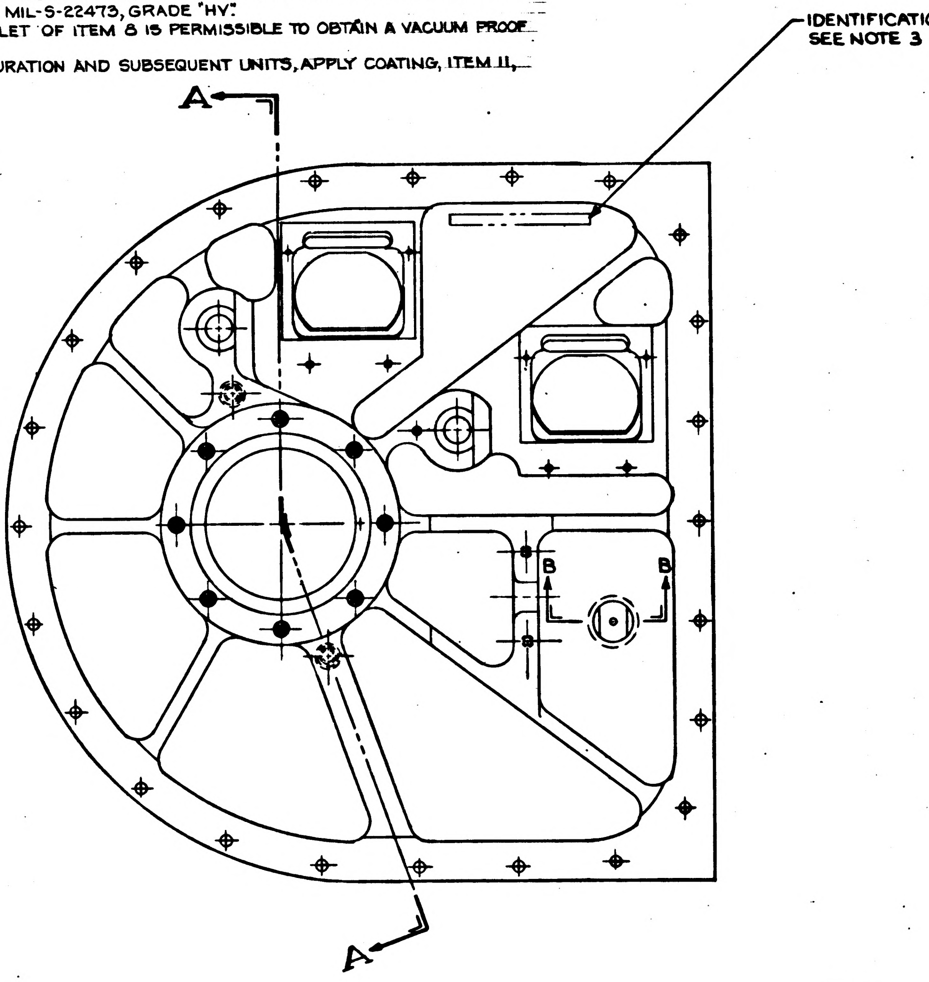
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

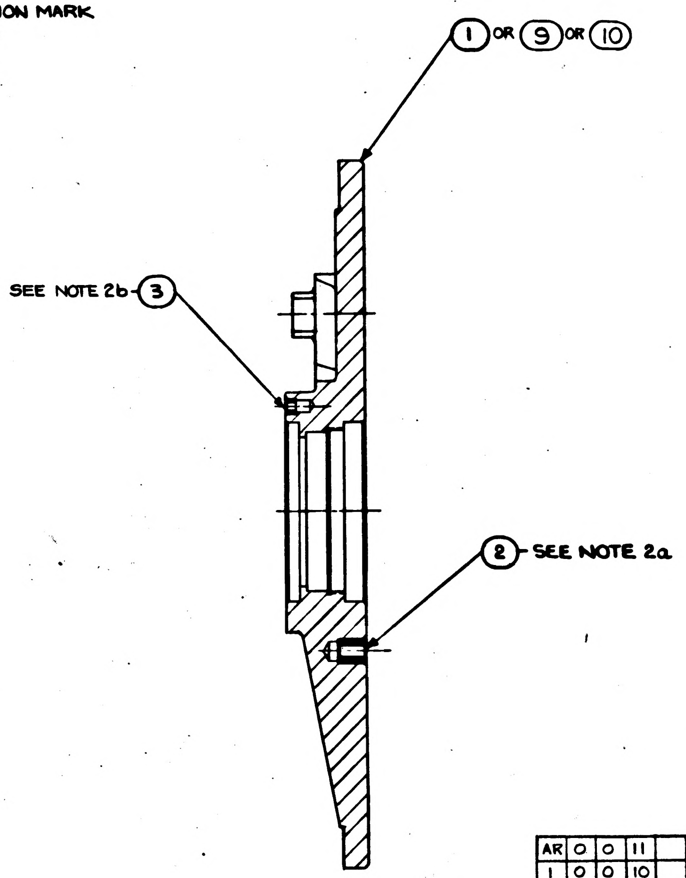
2011717 | E

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F-8	REVISED PER TDRR 16915	2/24/65	WK
B		REVISED PER TDRR 18566	4/27/65	WK
C		REVISED PER TDRR 18867	5/11/65	WK
D		REVISED PER TDRR 22651	9/28/65	WK
E		REVISED PER TDRR 29154	5-24-66	

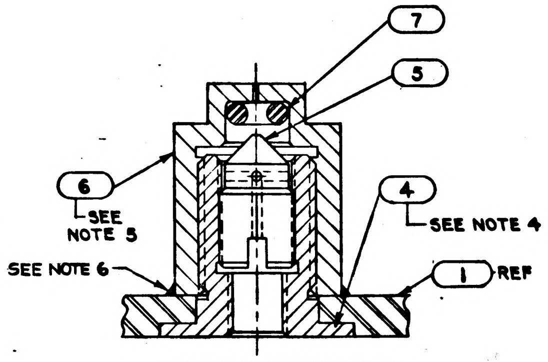
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. a) PRIOR TO INSTALLING ITEM 2, COAT ENTIRE OUTSIDE SURFACES OF ITEM 2 WITH ZINC CHROMATE PRIMER IN ACCORDANCE WITH MIL-P-8585. WHILE PRIMER COAT IS IN WET CONDITION, INSTALL ITEM 2 IN ACCORDANCE WITH ND1002121. WHILE IN WET CONDITION, WIPE CLEAN ANY PRIMER WHICH MAY APPEAR AT SURFACE OF INTERFACE OF ITEM 2 AND PANEL.
   b) INSTALL ITEM 3 IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM 4 TO ITEM 1 OR 9 OR 10, USING ITEM 8 IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM 6 TO ITEM 4 IN ACCORDANCE WITH ND1002211 USING MIL-S-22473, GRADE "HV".
6. AN .062 MAX. FILLET OF ITEM 8 IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.
7. FOR -021 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING, ITEM 11, IN ACCORDANCE WITH ND1002291 TO SURFACES INDICATED EXCEPT WHERE NOTED.
8. MARKING: FILL ENGRAVED CHARACTERS PER ND1002130 (WHITE) AFTER PAINTING.





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

MASTER

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
AR	0	0	11			1012543-003	74471482003		COATING KIT, LIGHT-DIFFUSING			
1	0	0	10			2012728	52386911090		PANEL, TELESCOPE			
0	1	0	9			2012671	52386911010		PANEL, TELESCOPE			
1	1	1	8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
1	1	1	7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
1	1	1	6	1		2012034	57386911160		HOUSING, GAS INJECTION			
1	1	1	5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
1	1	1	4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
8	8	8	3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2	2	2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
0	0	1	1	1		2011696	52386910590		PANEL, TELESCOPE			

QTY REQD
LIST OF PARTS AND MATERIALS

2011784	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN J. Schiller DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 7/23/64
APPROVAL E. Mar 7/22/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

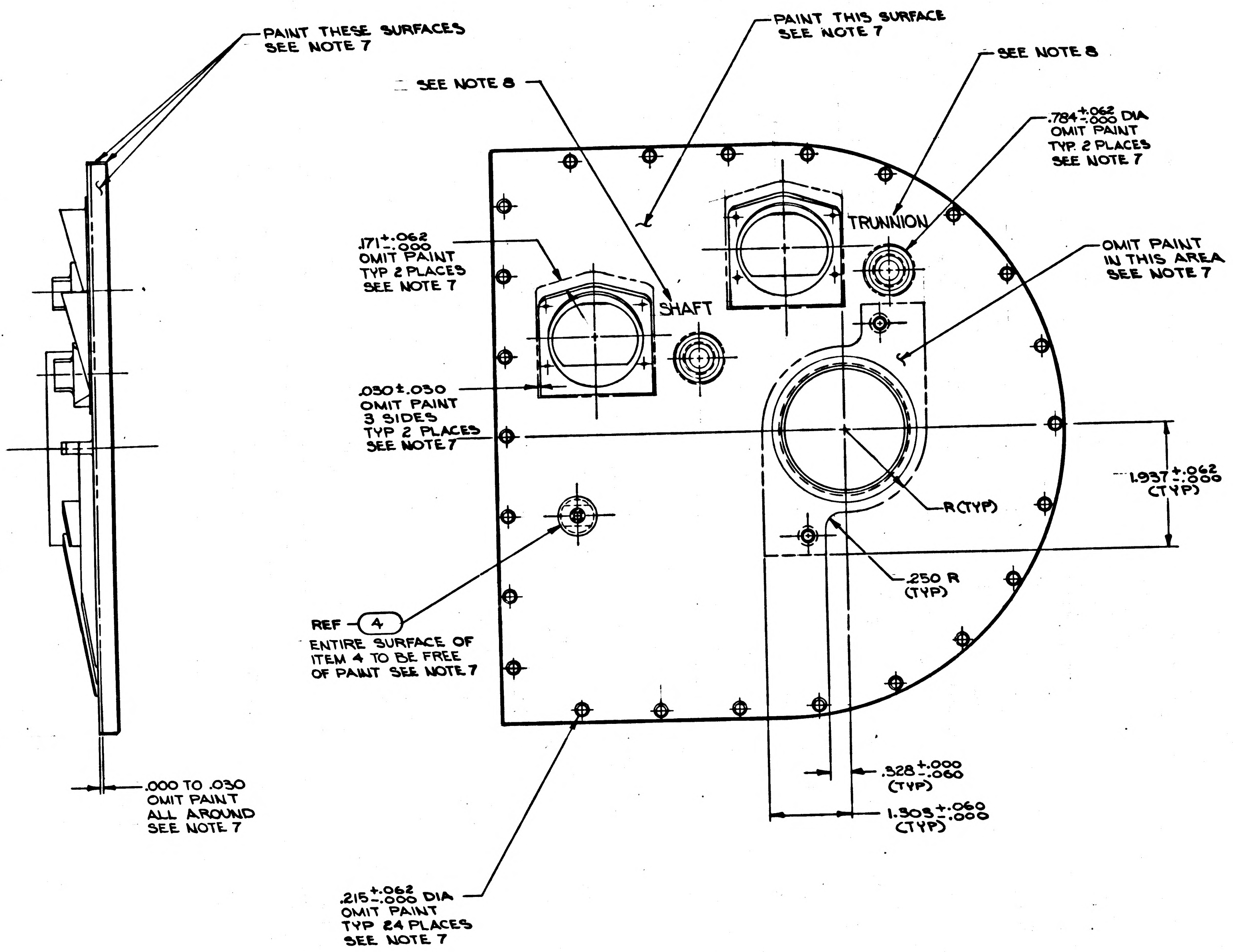
TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 2

2011717 E

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
E		THIS SHEET ADDED PER TDRR 29154	5/24/66	

NOTES
SEE SHEET 1



PAINT THESE SURFACES SEE NOTE 7
PAINT THIS SURFACE SEE NOTE 7
SEE NOTE 8
SEE NOTE 8
.784 +.062 -.000 DIA OMIT PAINT TYP 2 PLACES SEE NOTE 7
TRUNNION
SHAFT
.171 +.062 -.000 OMIT PAINT TYP 2 PLACES SEE NOTE 7
OMIT PAINT IN THIS AREA SEE NOTE 7
.030 ±.030 OMIT PAINT 3 SIDES TYP 2 PLACES SEE NOTE 7
1.937 +.062 -.000 (TYP)
R(TYP)
.250 R (TYP)
REF 4 ENTIRE SURFACE OF ITEM 4 TO BE FREE OF PAINT SEE NOTE 7
.000 TO .030 OMIT PAINT ALL AROUND SEE NOTE 7
.328 +.000 -.060 (TYP)
1.303 +.060 -.000 (TYP)
.215 +.062 -.000 DIA OMIT PAINT TYP 24 PLACES SEE NOTE 7

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN Bukowski DATE 28Mar66
CHECKED F. Raymond 4-1-66
APPROVAL
APPROVAL L. Thorup 4-4-66
NASA APPROVAL
MIT APPROVAL McMurly 5-24-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011717
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 2

AD-1380

2011717 E

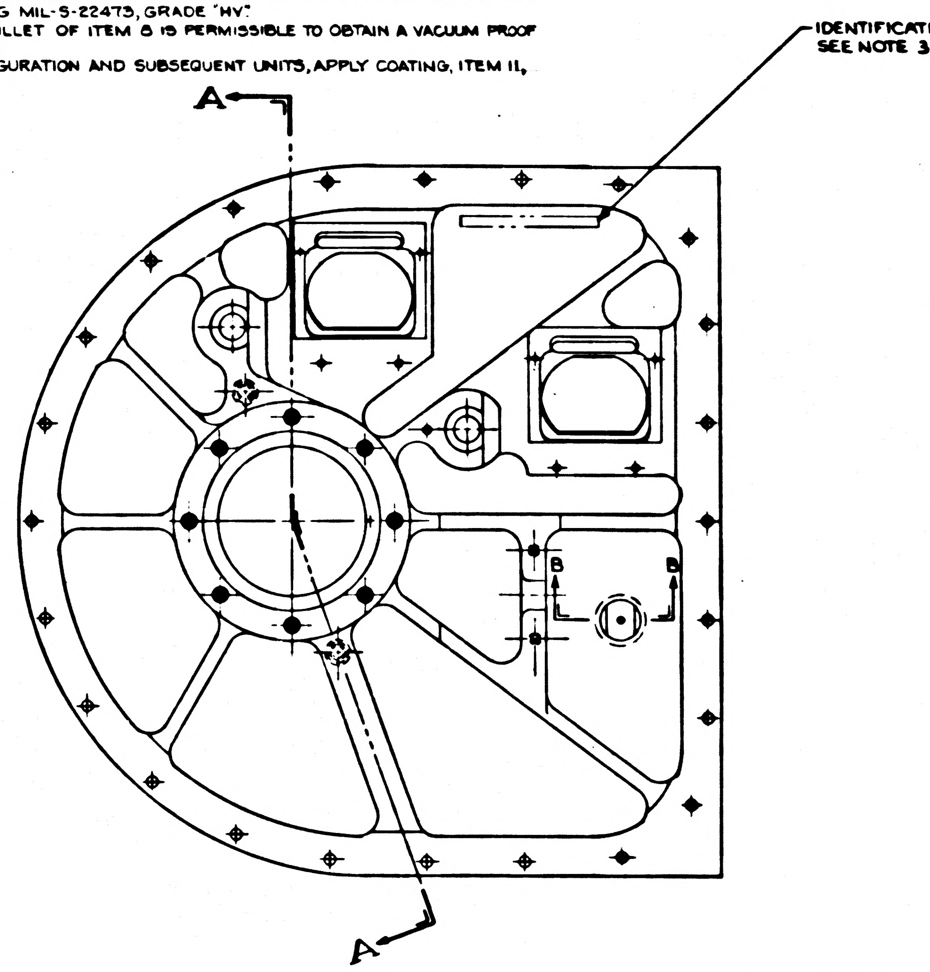
NOTES:

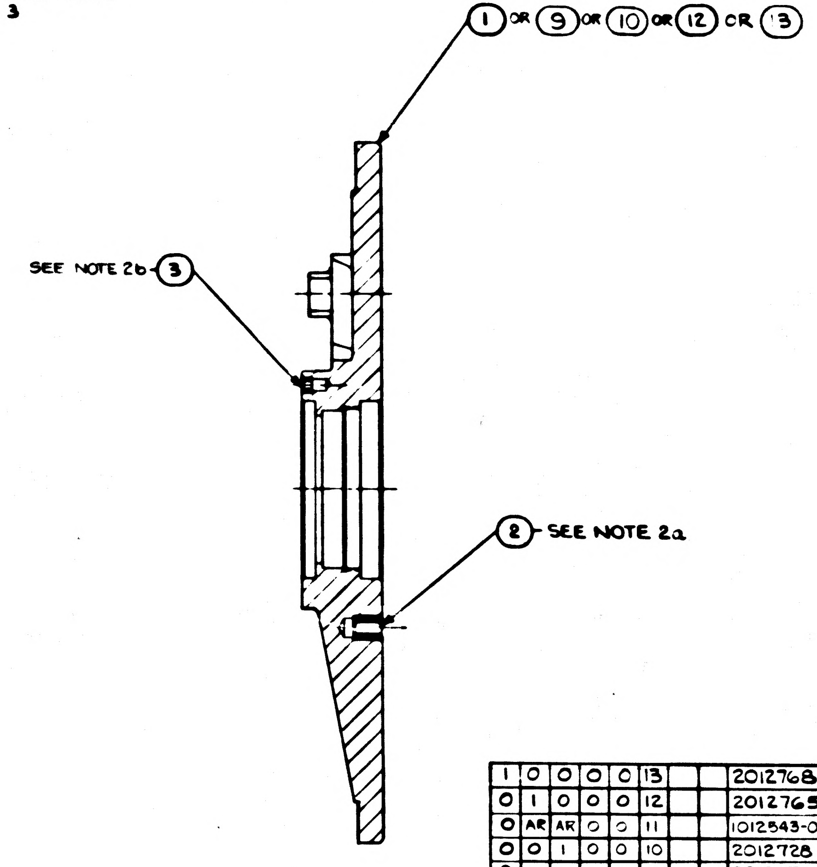
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. a) PRIOR TO INSTALLING ITEM 2, COAT ENTIRE OUTSIDE SURFACES OF ITEM 2 WITH ZINC CHROMATE PRIMER IN ACCORDANCE WITH MIL-P-8585. WHILE PRIMER COAT IS IN WET CONDITION, INSTALL ITEM 2 IN ACCORDANCE WITH ND1002121. WHILE IN WET CONDITION, WIPE CLEAN ANY PRIMER WHICH MAY APPEAR AT SURFACE OF INTERFACE OF ITEM 2 AND PANEL.
   b) INSTALL ITEM 3 IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.
4. VACUUM SEAL ITEM 4 TO ITEM 1 OR 9 OR 10 OR 12, USING ITEM 8 IN ACCORDANCE WITH ND1002219.
5. VACUUM SEAL AND VIBRATION PROOF ITEM 6 TO ITEM 4 IN ACCORDANCE WITH ND1002211 USING MIL-S-22473, GRADE "HV".
6. AN .062 MAX. FILLET OF ITEM 8 IS PERMISSIBLE TO OBTAIN A VACUUM PROOF ASSEMBLY.
7. FOR -021 CONFIGURATION AND SUBSEQUENT UNITS, APPLY COATING, ITEM 11, IN ACCORDANCE WITH ND1002291 TO SURFACES INDICATED EXCEPT WHERE NOTED.
8. MARKING: FILL ENGRAVED CHARACTERS PER ND1002150 (WHITE) AFTER PAINTING.

G

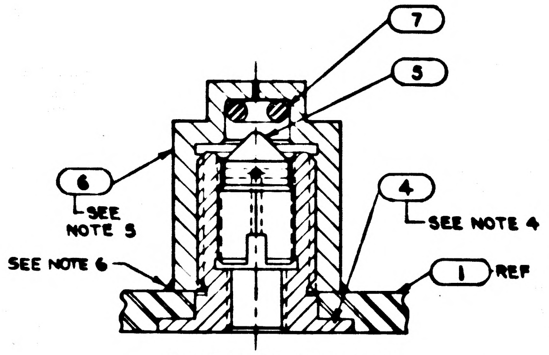
2011717 G

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	F B	REVISED PER TDRR 16915	4/24/65	WK
B		REVISED PER TDRR 18566	4/27/65	WK
C		REVISED PER TDRR 18867	5/11/65	WK
D		REVISED PER TDRR 22651	6/16/65	WK
E		REVISED PER TDRR 29154	[illegible]	[illegible]
F		REVISED PER TDRR 32820	1/27/67	[illegible]
G		REVISED PER TDRR 35997	11/27/68	[illegible]





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

QTY REQD														
1	0	0	0	0	13			2012768			PANEL, TELESCOPE			
0	1	0	0	0	12			2012765			PANEL, TELESCOPE			
0	AR	AR	0	0	11			1012543-003	74471482003		COATING KIT, LIGHT DIFFUSING			
0	0	1	0	0	10			2012728	52386911090		PANEL, TELESCOPE			
0	0	0	1	0	9			2012671	52386911010		PANEL, TELESCOPE			
1	1	1	1	1	8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
1	1	1	1	1	7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
1	1	1	1	1	6	1		2012034	57386911160		HOUSING, GAS INJECTION			
1	1	1	1	1	5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
1	1	1	1	1	4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
8	8	8	8	8	3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2	2	2	2	2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
0	0	0	0	1	1	1		2011696	52386910590		PANEL, TELESCOPE			
041	031	021	011	000	ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011784	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570

DRAWN DATE 7-21-64
CHECKED 7-23-64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

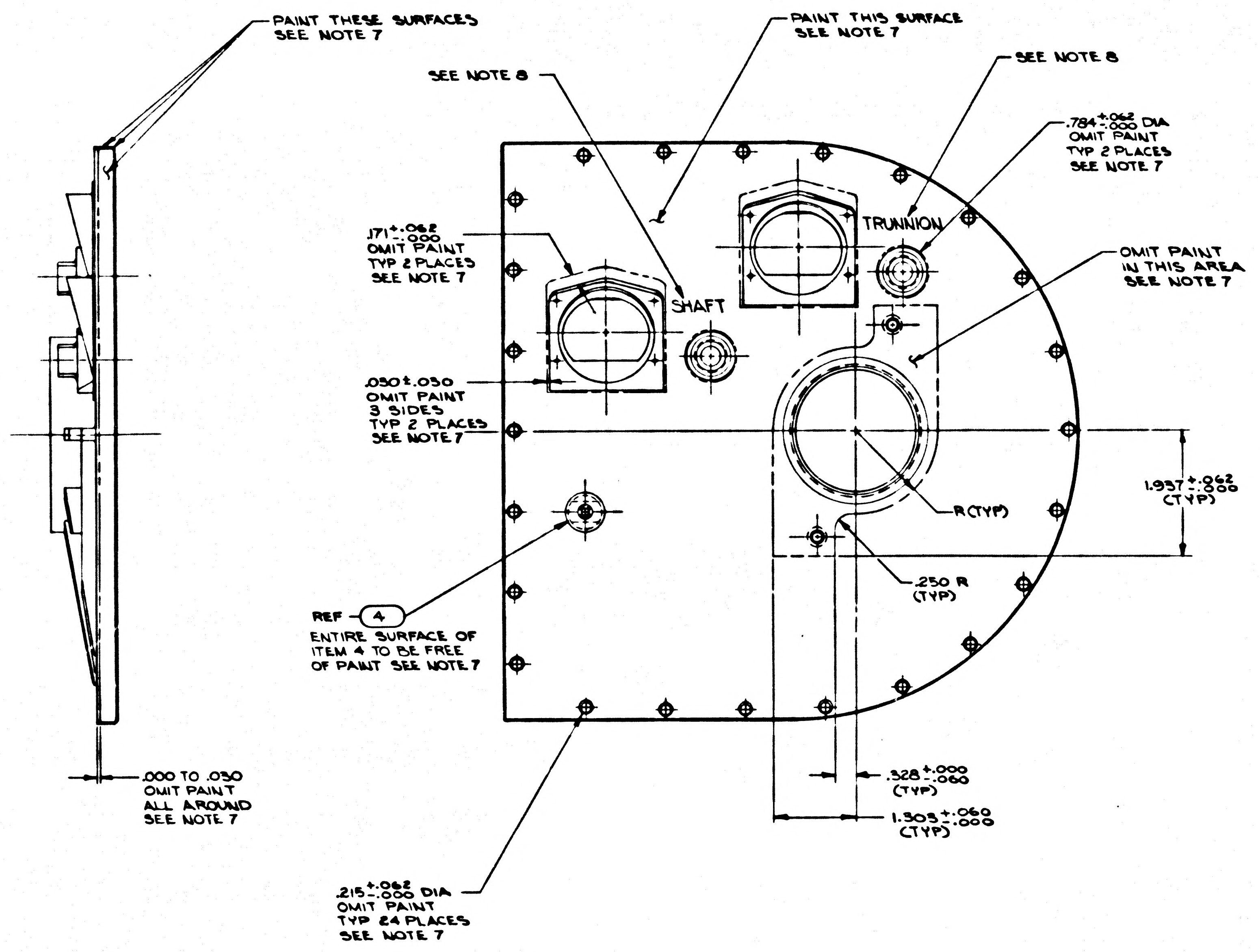
CODE IDENT NO	SIZE	NASA NUMBER
80230	D	2011717

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 2

NOTES
SEE SHEET 1

G 2011717

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
E		THIS SHEET ADDED PER TDRR 29754		
F		REVISED PER TDRR 32820	1/27/67	
G		REVISED PER TDRR 35997	4/29/66	



PAINT THESE SURFACES SEE NOTE 7
PAINT THIS SURFACE SEE NOTE 7
SEE NOTE 8
SEE NOTE 8
.784 +.062 -.000 DIA OMIT PAINT TYP 2 PLACES SEE NOTE 7
.171 +.062 -.000 OMIT PAINT TYP 2 PLACES SEE NOTE 7
TRUNNION
SHAFT
OMIT PAINT IN THIS AREA SEE NOTE 7
.050±.030 OMIT PAINT 3 SIDES TYP 2 PLACES SEE NOTE 7
1.937 +.062 -.000 (TYP)
R(TYP)
.250 R (TYP)
REF 4
ENTIRE SURFACE OF ITEM 4 TO BE FREE OF PAINT SEE NOTE 7
.000 TO .030 OMIT PAINT ALL AROUND SEE NOTE 7
.328 +.000 -.060 (TYP)
1.303 +.060 -.000 (TYP)
.215 +.062 -.000 DIA OMIT PAINT TYP 24 PLACES SEE NOTE 7

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN Bulgach DATE
CHECKED F. Raymond
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT
ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011717

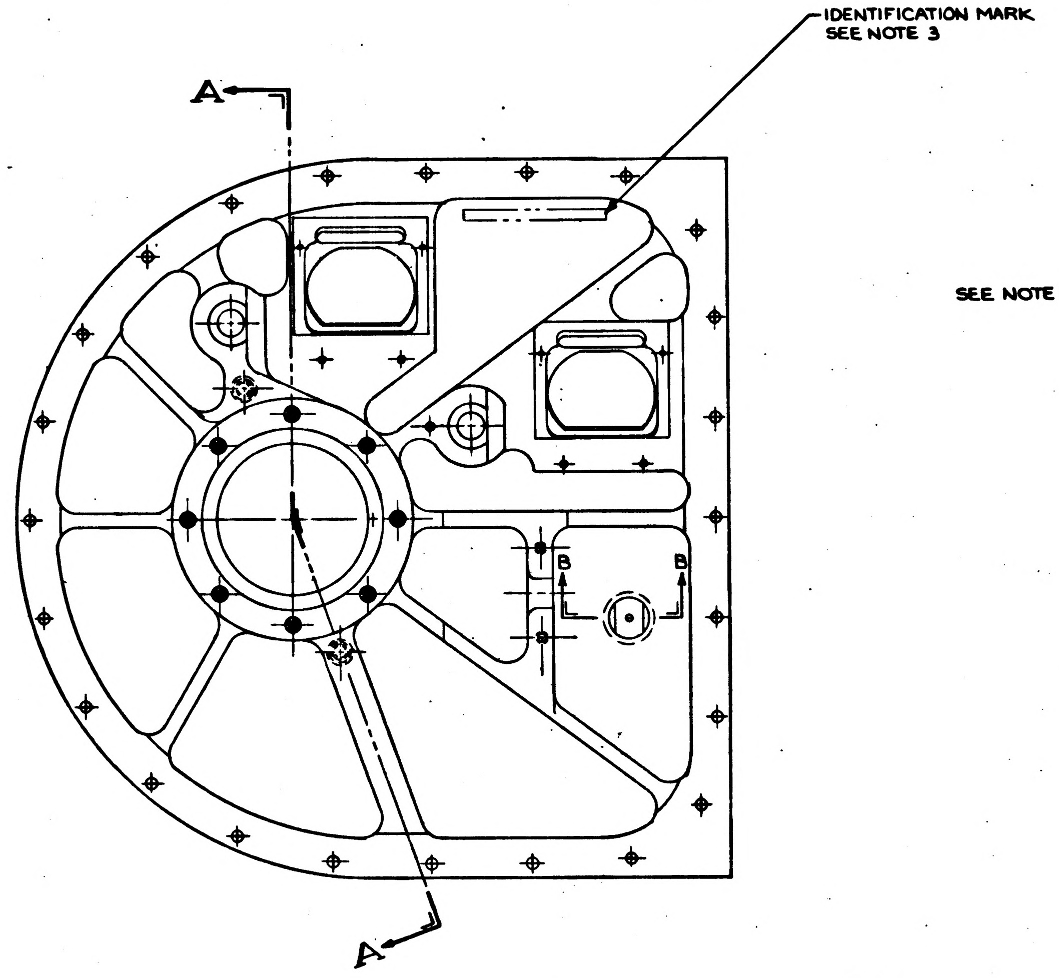
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 2 OF 2

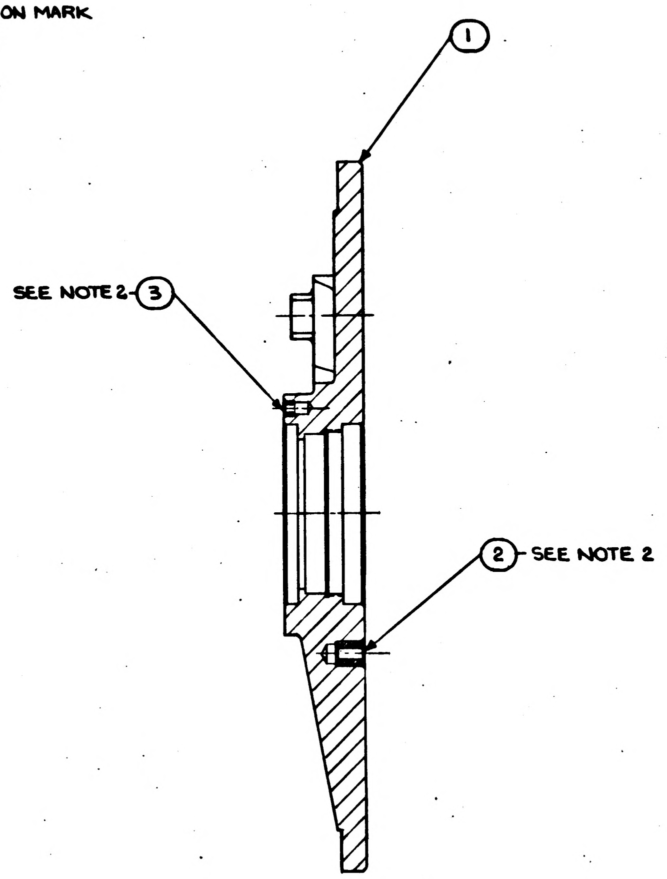
2011717

REVISIONS TDRB 12119

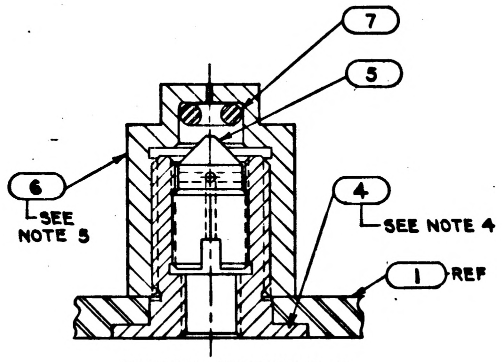
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. INSTALL ITEMS ② & ③ IN ACCORDANCE WITH ND1002121.
3. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
4. CEMENT ITEM ④ TO ITEM ① USING ITEM ⑧ AND CURE AT 150° ± 3° F. FOR 2 HOURS
5. VIBRATION PROOF ITEM ⑥ TO ITEM ④ IN ACCORDANCE WITH MIL-S-22473 GRADE (H)





SECTION A-A



PARTIAL SECTION B-B
SCALE 4/1

MASTER

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	1	*	1011541	74471435001		ADHESIVE, EPOXY			
7	1	*	1011768-4	74453043004		PACKING, PREFORMED			
6	1		2012034	57386911160		HOUSING, GAS INJECTION			
5	1		2012033	57386911150		VALVE, THREADED, GAS INJECTION			
4	1		2012032	57386911140		ADAPTER, THREADED, GAS INJECTION			
3	8	*	1000115-2	—		INSERT, THREADED, SELF LOCKING			
2	2		NAS1394C-3	—		INSERT, THREADED, NON SELF LOCKING			
1	1		2011696	52386910590		PANEL, TELESCOPE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910570
DRAWN J. Schulle DATE 7-21-64
CHECKED J. SULLIVAN 7-23-64
APPROVAL 7/22/64
APPROVAL E. Morey 7/22/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE PANEL & INSERT,
ASSY OF

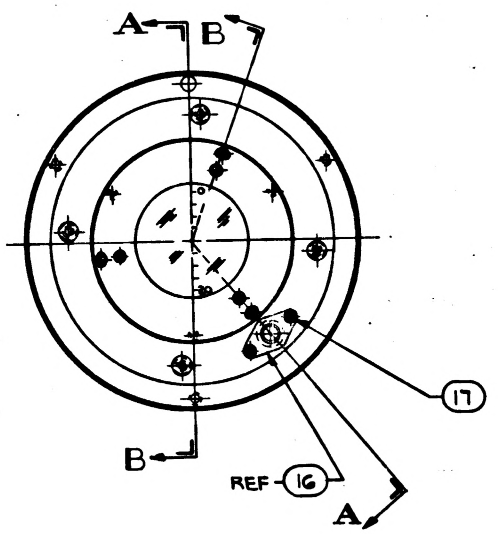
CODE IDENT NO. SIZE D NASA NUMBER 2011717
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

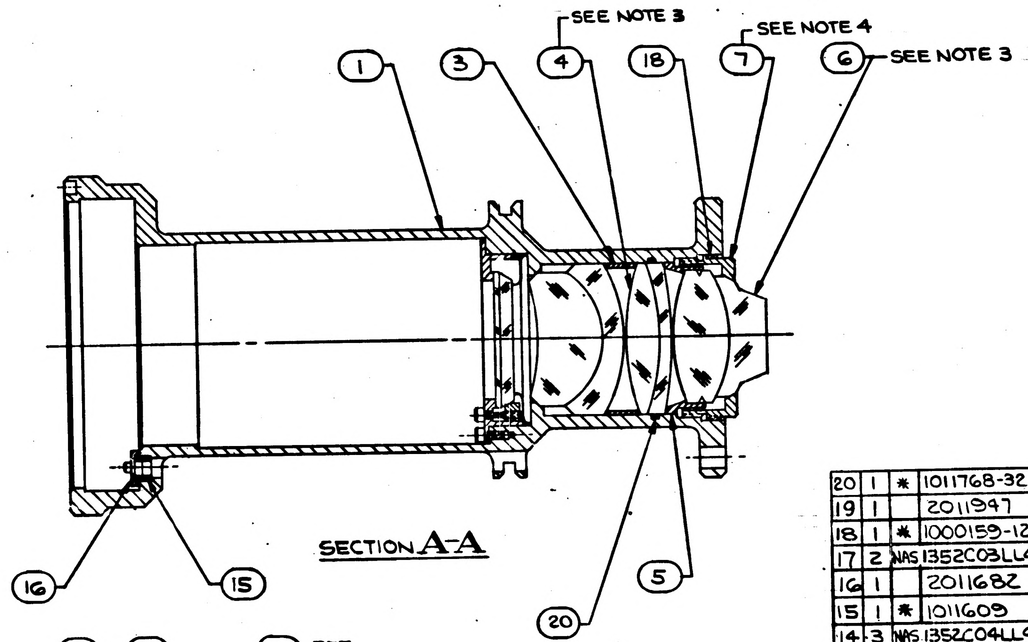
A | 2011722

REVISIONS TDRR 11109

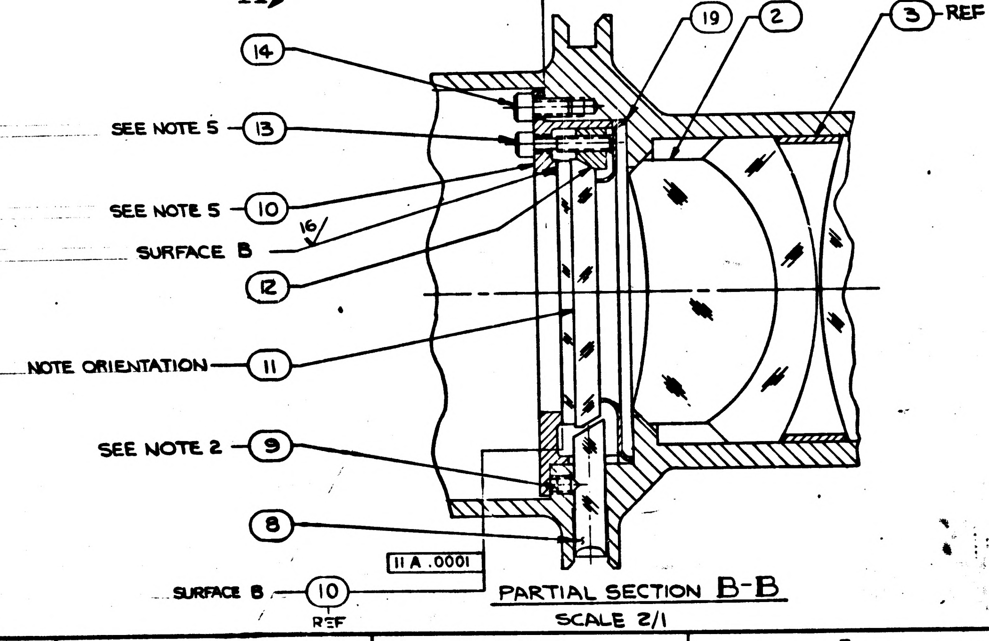
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16880	12/15 64	9 March 1965 wk

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. TIGHTEN ITEM 9 UNTIL MOVEMENT OF ITEM 8 IS LESS THAN .015. SECURE ITEM 9 WITH LOCKING COMPOUND OF MIL-S-22473, GRADE "E". PER ND 1002211
3. A MINIMUM AIR GAP OF .002 SHALL BE MAINTAINED AT ASSEMBLY BETWEEN ITEMS 4 & 6. SELECT SPACER, ITEM 5, TO SATISFY THIS REQUIREMENT.
4. THERE SHALL BE NO MORE THAN JUST PERCEPTIBLE STRAIN WITHOUT CONCENTRATIONS WHEN OPTICS ARE SECURED WITH ITEM 7 TIGHT.
5. ITEM 10 SHALL BE MACHINED AT ASSEMBLY (SURFACE "B" ONLY) TO LOCATE THE RETICLE PLANE OF ITEM 11 AT THE FOCUSED IMAGE OF A COLLIMATED TARGET, WITH NO APPARENT PARALLAX, AS PROJECTED THROUGH THE OBJECTIVE SYSTEM FORMED BY ITEMS 2, 4 & 6. SECURE ITEM 11 WITH ITEMS 12 & 13 ONLY SUFFICIENTLY TIGHT TO ASSURE THAT ITEM 11 IS SEATED ON ITEM 10.
6. AFTER MACHINING ITEM 10, ANODIZE, CHROMIC ACID (DYED BLACK) PER MIL-A-8625, TYPE I. (KPS 1005A.150 TYPE I, CLASS 2) PRIOR TO ASSY WITH ITEMS 11, 12 & 13.
7. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)





SECTION A-A



PARTIAL SECTION B-B
SCALE 2/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
20	1	*	1011768-32	74453043032		PACKING, PREFORMED			
19	1		2011947	56386910170		WASHER, SPRING			
18	1	*	1000159-12	—		PACKING, PREFORMED "O" RING			
17	2	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC. HD. - SELF-LOCKING			
16	1		2011682	52386910400		PLATE, BEARING RETAINER			
15	1	*	1011609	30105770120		BEARING, BALL, ANNULAR (DUPLEX DF)			
14	3	NAS	1352C04LL4	74455157013		SCREW, CAP, SOC. HD - SELF-LOCKING			
13	3		2011688	48386910010		SCREW, CAP, SOC. HD, CAPTIVE			
12	3		2011691	57386910300		RETAINER, RETICLE			
11	1		2011760	76386910040		RETICLE, ASSY (SCT)			
10	1		2011692	57386910290		MOUNT RETICLE			
9	3	AN	565BC4H2	—		SETSCREW-HEXAGON, SOCKET, HEADLESS			
8	3		2011693	25386910080		ROD, LIGHT TRANSMITTING			
7	1		2011659	57386910280		RING, LOCKING, LENS			
6	1		2011709	76386910030		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
5	1		2011661	57386910270		SPACER, LENS			
4	1		2011708	76386910020		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
3	1		2011660	57386910260		SPACER, LENS			
2	1		2011707	76386910010		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
1	1		2011729	85386910310		OUTER TELESCOPE TUBE, PIN & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910300
DRAWN R. BRUNELLE DATE 4-2-64
CHECKED C. LEINZ (CRT) 7/13/64
APPROVAL Ruschmann 7/15/64
APPROVAL E. Thomp 7/15/64
NASA APPROVAL
MIT APPROVAL W. Kappler 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OUTER TELESCOPE TUBE ASSY

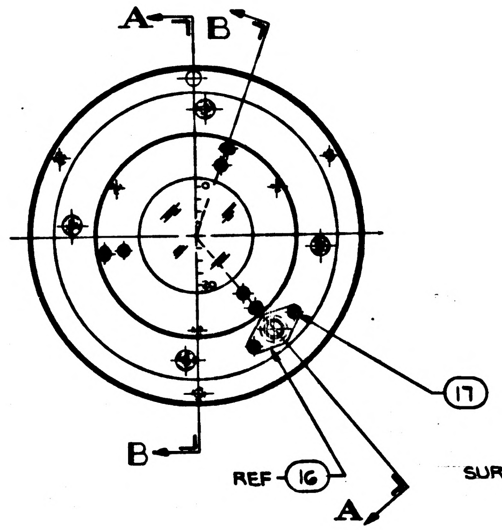
CODE IDENT NO.
SIZE D
NASA NUMBER 2011722
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

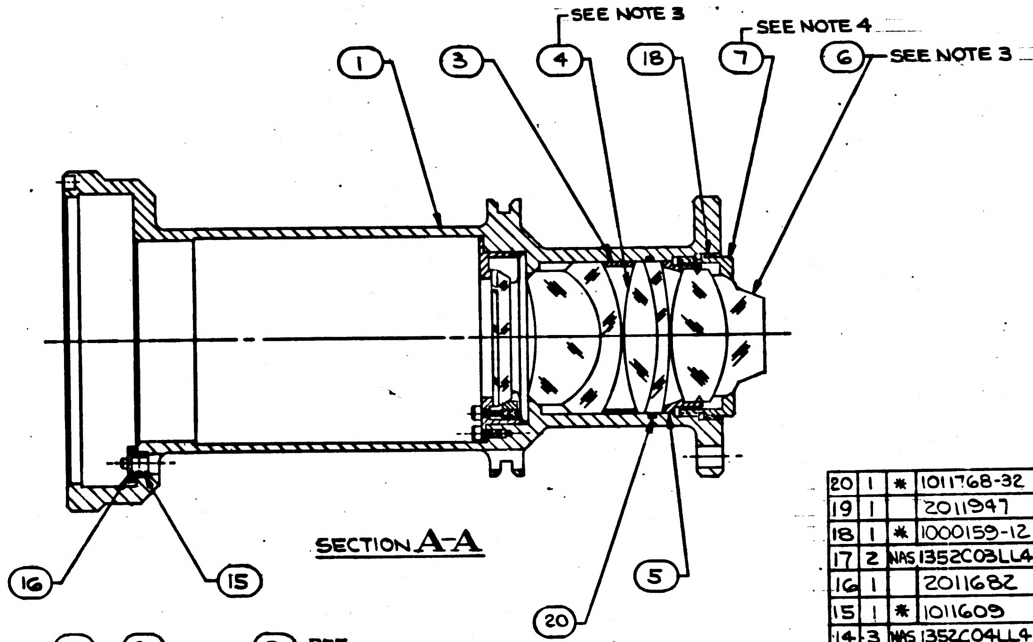
2011722

SYM	ZONE	REVISIONS: TDRR 11109 DESCRIPTION	DATE	APPROVAL

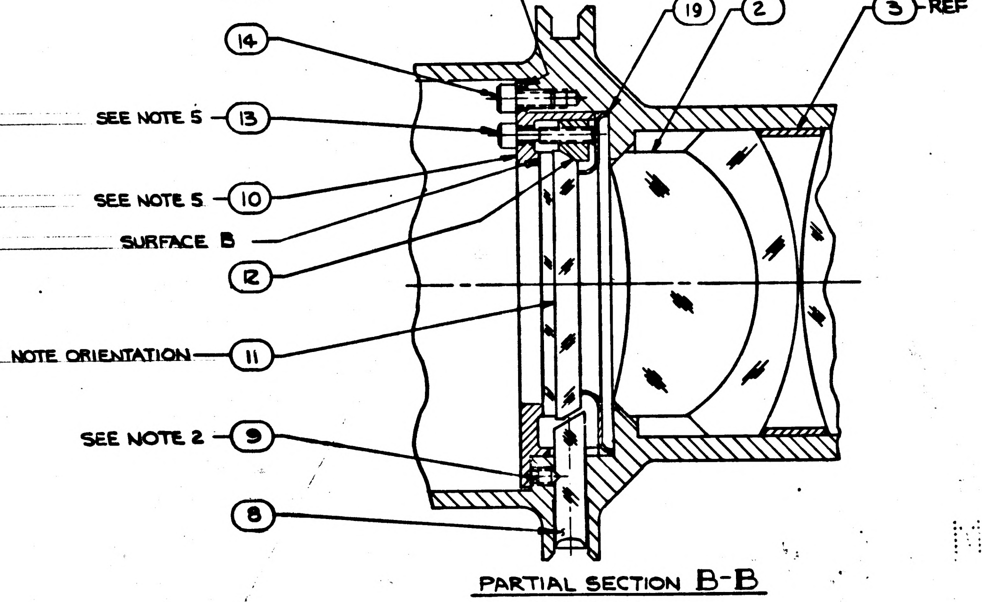
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. TIGHTEN ITEM 9 UNTIL MOVEMENT OF ITEM 8 IS LESS THAN .015. SECURE ITEM 9 WITH LOCKING COMPOUND OF MIL-S-22473, GRADE "E". PER ND 1002211
3. A MINIMUM AIR GAP OF .002 SHALL BE MAINTAINED AT ASSEMBLY BETWEEN ITEMS 4 & 6. SELECT SPACER, ITEM 5, TO SATISFY THIS REQUIREMENT.
4. THERE SHALL BE NO MORE THAN JUST PERCEPTIBLE STRAIN WITHOUT CONCENTRATIONS WHEN OPTICS ARE SECURED WITH ITEM 7 TIGHT.
5. ITEM 10 SHALL BE MACHINED AT ASSEMBLY (SURFACES "A" & "B") TO LOCATE THE RETICLE PLANE OF ITEM 11 AT THE FOCUSED IMAGE OF A COLLIMATED TARGET, WITH NO APPARENT PARALLAX, AS PROJECTED THROUGH THE OBJECTIVE SYSTEM FORMED BY ITEMS 2, 4 & 6. SECURE ITEM 11 WITH ITEMS 12 & 13 ONLY SUFFICIENTLY TIGHT TO ASSURE THAT ITEM 11 IS SEATED ON ITEM 10.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)





SECTION A-A



PARTIAL SECTION B-B

SCALE 2/1

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
20	1	*	1011768-32	74453043032		PACKING, PREFORMED			
19	1		2011947	56386910170		WASHER, SPRING			
18	1	*	1000159-12	—		PACKING, PREFORMED "O" RING			
17	2	NAS	1352C03LL4	74455157009		SCREW, CAP, SOC. HD. - SELF-LOCKING			
16	1		2011682	52386910400		PLATE, BEARING RETAINER			
15	1	*	1011609	30105770120		BEARING, BALL, ANNULAR (DUPLEX DF)			
14	3	NAS	1352C04LL4	74455157013		SCREW, CAP, SOC. HD - SELF-LOCKING			
13	3		2011688	48386910010		SCREW, CAP, SOC. HD, CAPTIVE			
12	3		2011691	57386910300		RETAINER, RETICLE			
11	1		2011760	76386910040		RETICLE, ASSY (SCT)			
10	1		2011692	57386910290		MOUNT RETICLE			
9	3	AN	565BC4H2	—		SETSCREW-HEXAGON, SOCKET, HEADLESS			
8	3		2011693	25386910080		ROD, LIGHT TRANSMITTING			
7	1		2011659	57386910280		RING, LOCKING, LENS			
6	1		2011709	76386910030		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
5	1		2011661	57386910270		SPACER, LENS			
4	1		2011708	76386910020		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
3	1		2011660	57386910260		SPACER, LENS			
2	1		2011707	76386910010		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
1	1		2011729	85386910310		OUTER TELESCOPE TUBE, PIN & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910300

DRAWN E. BRUNELLE DATE 4-2-64
CHECKED CLUNE (CRT) 7/13/64
APPROVAL F. Ruschmann 7/15/64
APPROVAL E. Maus 7/15/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OUTER TELESCOPE TUBE ASSY

CODE IDENT NO. | SIZE D | NASA NUMBER 2011722

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

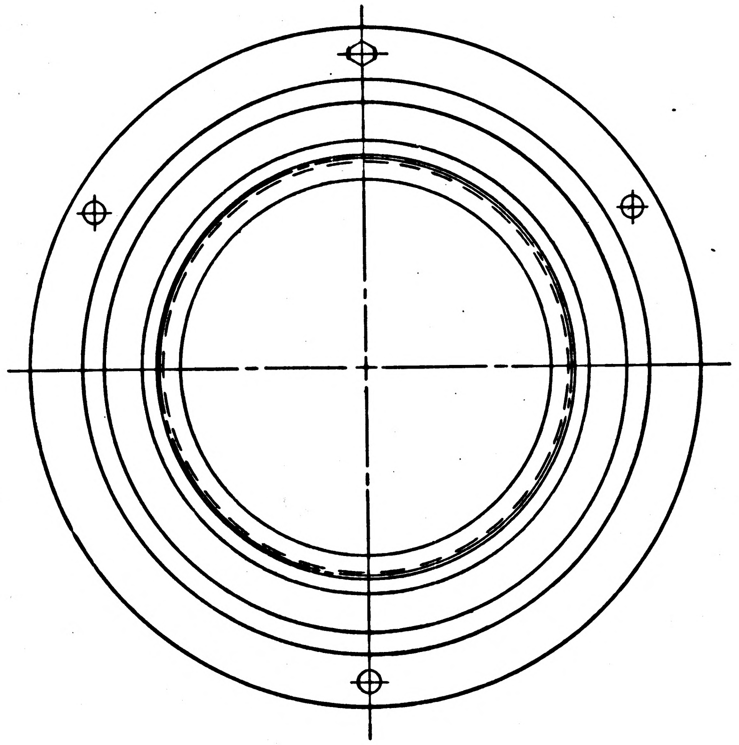
INCHES

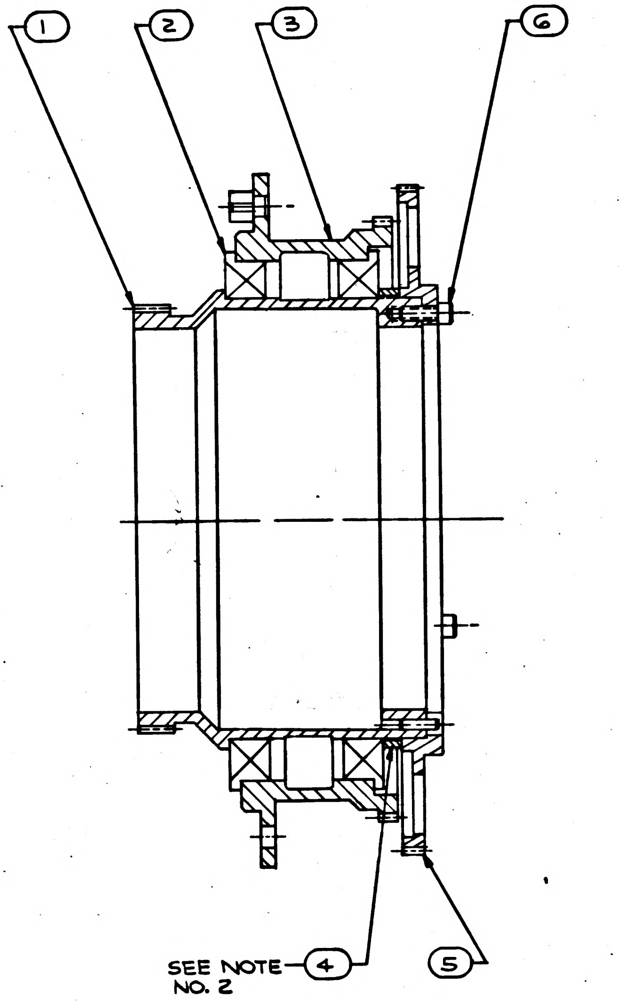
2011723 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR No. 13146	30 Sept 64	wk

REVISIONS 12217

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 4 SHALL BE ADJUSTED AT ASSEMBLY BY MACHINING TO PROVIDE AN AXIAL END PLAY OF .0002 TO .0010 UNDER A 5 LB ±.5 LB REVERSING THRUST LOAD.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)





ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	3	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF-LOCKING			
5	1		2011656	33386910260		GEAR, TRUNNION DRIVE (400T-96P)			
4	1		2011683-1 THRU -9	7938691 0501 THRU 0509		SPACER			
3	1		2011718	85386910520		SHAFT DRIVE GEAR & PIN, ASSY OF			
2	2	*	1012506-1			BEARING, BALL, ANNULAR (FLANGED)			
1	1		2011719	85386910510		TRUNNION DRIVE GEAR & PIN, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910500

DRAWN R. BRUNELLE DATE 4-9-63
CHECKED 4/20/64
APPROVAL 7/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DRIVE GEAR CLUSTER,
ASSEMBLY OF

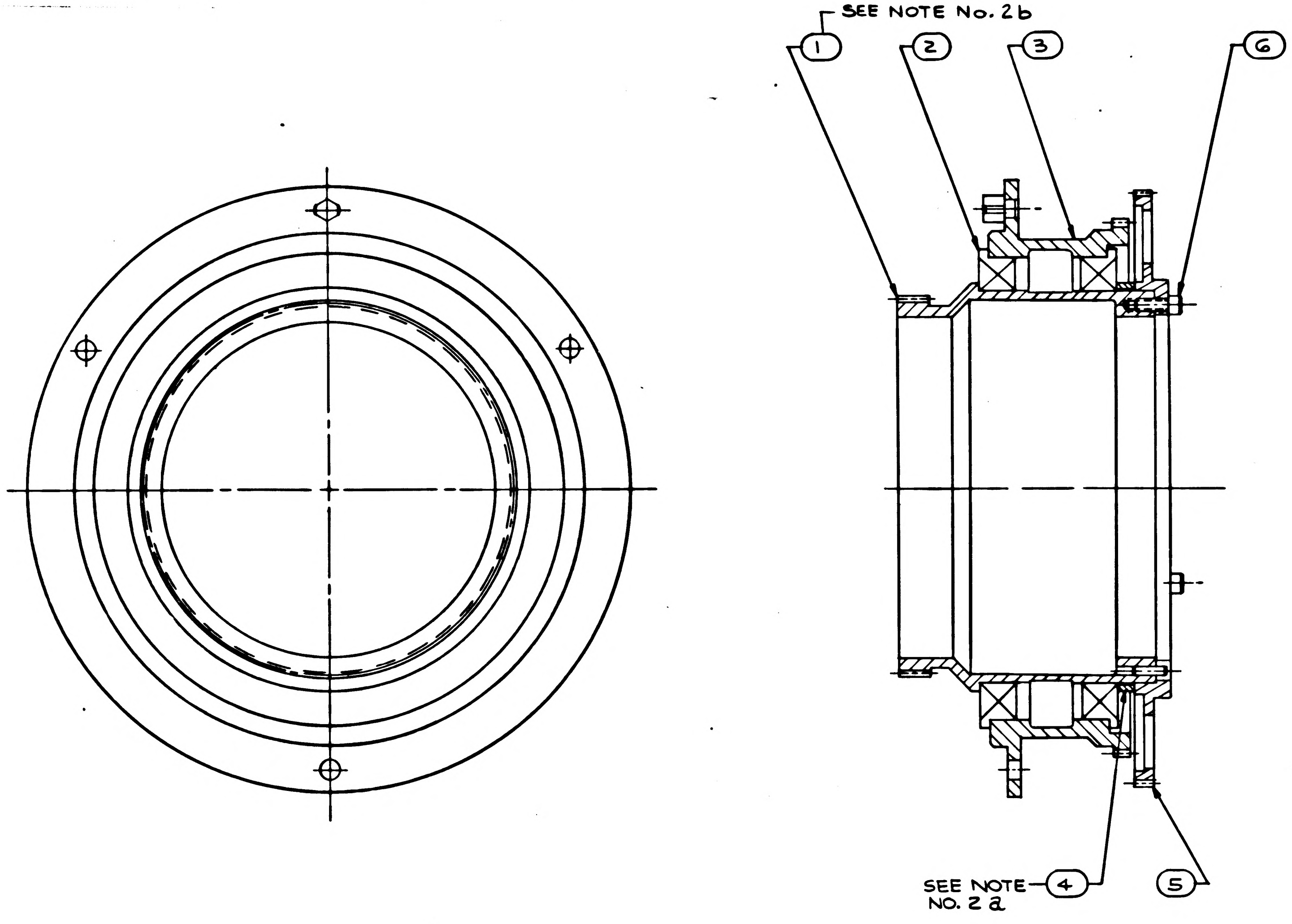
CODE IDENT NO.
SIZE D
NASA NUMBER 2011723
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET OF

MASTER

2011723 B

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR No. 13146	30 Apr 64	
B		REVISED PER TDRR 31651	[illegible]	

NOTES:-
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2a. ITEM 4 SHALL BE ADJUSTED AT ASSEMBLY BY MACHINING TO PROVIDE AN AXIAL END PLAY OF .0002 TO .0010 UNDER A 5 LB ± .5 LB REVERSING THRUST LOAD.
b. ITEM 1 MAY BE MACHINED TO ACHIEVE A .0001 TO .0003 NON-INTERFERENCE FIT BETWEEN ITEM No. 1 AND No. 2.
3. IDENTIFY USING NASA DWG No., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	3	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF-LOCKING			
5	1		2011656	33386910260		GEAR, TRUNNION DRIVE (400T-96P)			
4	1		2011683-1 THRU -9	7938691 2501 THRU 2509		SPACER			
3	1		2011718	85386910520		SHAFT DRIVE GEAR & PIN, ASSY OF			
2	2	*	1012506-1			BEARING, BALL, ANNULAR (FLANGED)			
1	1		2011719	85386910510		TRUNNION DRIVE GEAR & PIN, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2012736	
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910500

DRAWN R. BRUNELLE DATE 4-9-64
CHECKED 4/20/64
APPROVAL
APPROVAL E. Murray 4/21/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DRIVE GEAR CLUSTER, ASSEMBLY OF

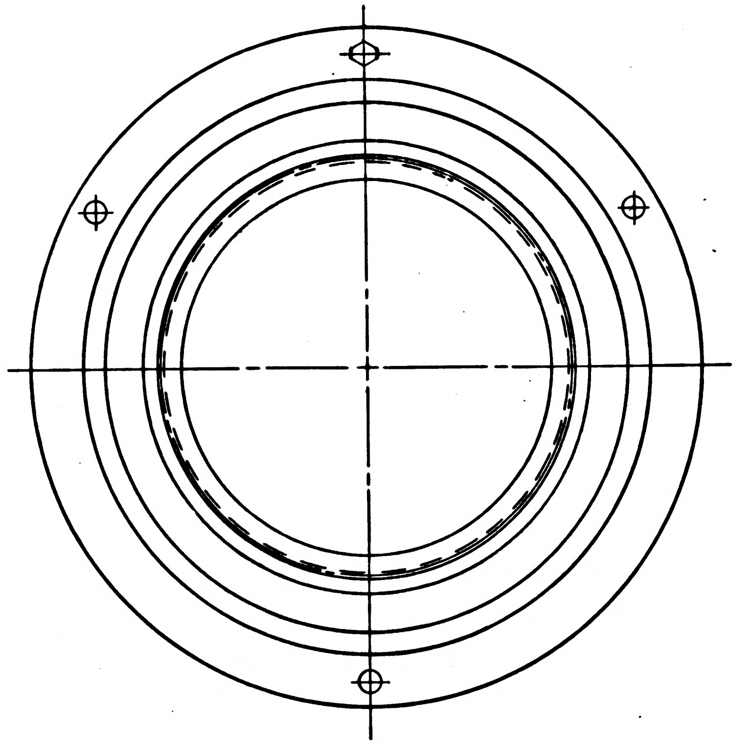
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011723
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

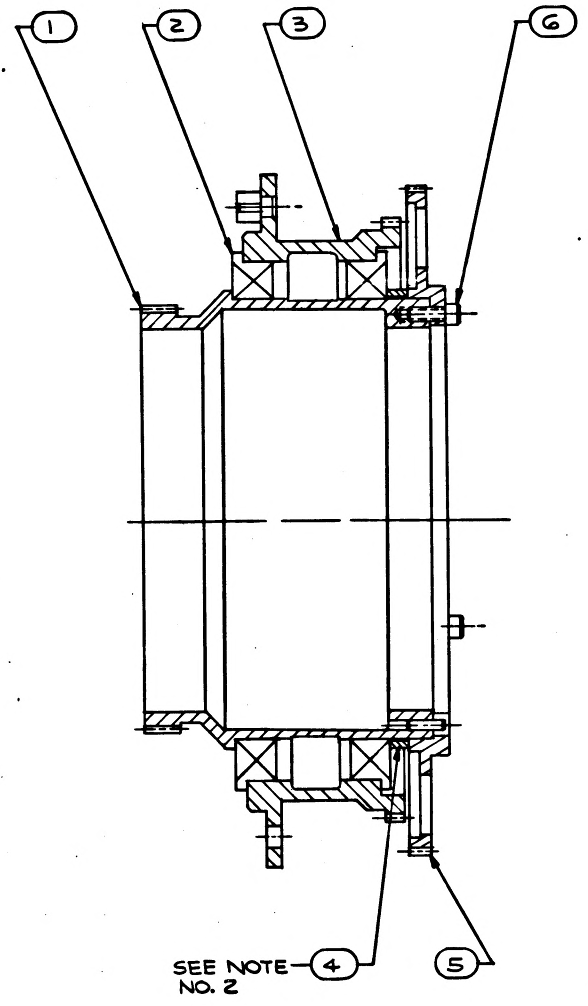
2011723 B

2011723

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM 4 SHALL BE ADJUSTED AT ASSEMBLY BY MACHINING TO PROVIDE AN AXIAL END PLAY OF .0002 TO .0010 UNDER A 5 LB ± .5 LB REVERSING THRUST LOAD.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)





ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	3	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF-LOCKING			
5	1		2011656	33386910260		GEAR, TRUNNION DRIVE (400T-96P)			
4	1		2011683-1 THRU -5	7938691 0501 THRU 0505		SPACER			
3	1		2011718	85386910520		SHAFT DRIVE GEAR & PIN, ASSY OF			
2	2	*	1011607-1	30205771760		BEARING, BALL, ANNULAR (FLANGED)			
1	1		2011719	85386910510		TRUNNION DRIVE GEAR & PIN, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910500

DRAWN R. BRUNELLE DATE 4-9-64
CHECKED 4/20/64
APPROVAL 7/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
DRIVE GEAR CLUSTER, ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011723
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A	2011724

REVISIONS - TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15849	1/27/65	WK

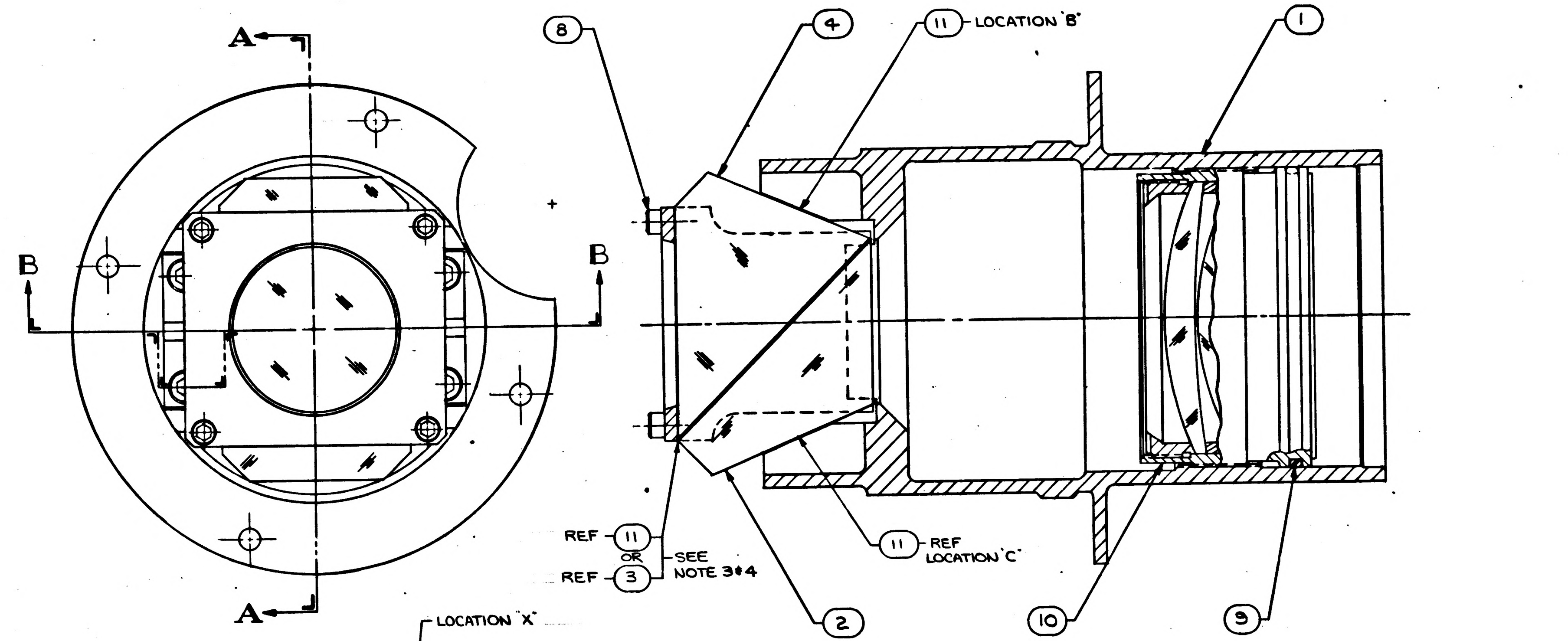
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SELECT ITEM 3 IN ACCORDANCE WITH TABLE, FROM DIMENSION "A" WHICH SHALL BE DETERMINED FROM AVERAGE OF MEASUREMENTS AT LOCATIONS "X" & "Y". DIMENSION "A" IS TAKEN WITH ITEM 7 OMITTED AND WITH ONE THICKNESS OF LENS TISSUE (.002 THICK) BETWEEN ITEMS 2 & 4. INDIUM FOIL, ITEM 11, IS OMITTED AT THE POINT OF MEASUREMENT, BUT INCLUDED AT LOCATIONS B & C.
3. FOR DIMENSION "A" EXCEEDING .026, ITEM 3 MUST BE USED AS SHOWN IN PARTIAL SECTION B-B AT LOCATIONS "X" & "Y" AND INCLINED PLANE. WHEN USED AT LOCATIONS "X" & "Y" ITEM 3 SHALL BE EXTENDED PAST ITEM 7 EQUALLY ON EACH SIDE. NO INDIUM FOIL, ITEM 11, IS TO BE USED AT LOCATIONS "X" & "Y" WHEN ITEM 3 IS USED AT THESE POINTS.
4. BEFORE ADDITION OF ITEM 10, CHECK ASSEMBLY FOR RESOLUTION AND STRAIN.

NOTES (CONT'D)

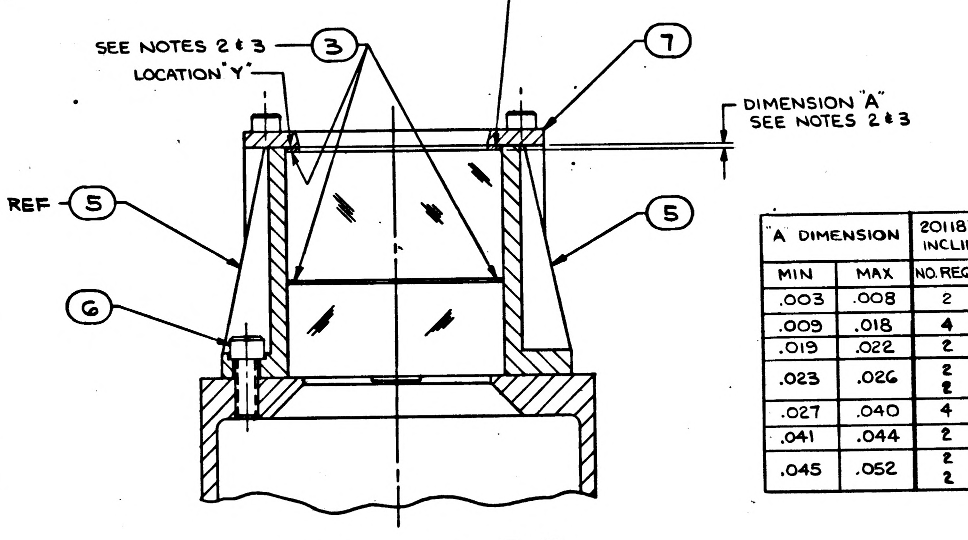
4a) STRAIN PATTERN UNDER POLARISCOPE EXAMINATION SHALL SHOW NO MORE THAN FAINT GRADUATION OF COLOR.

b) RESOLUTION SHALL BE NO MORE THAN 10 (TEN) ARC SECONDS AT THE SAME FOCUS FOR PATTERNS PARALLEL TO BOTH THE "A" AND "B" SECTION DESIGNATIONS ON THIS DRAWING.

5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



SECTION A-A



PARTIAL SECTION B-B

"A" DIMENSION		2011837 SPRING INCLINED PLANE		2011837 SPRING AT X OR Y	
MIN	MAX	NO. REQD	DASH NO.	NO. REQD	DASH NO.
.003	.008	2	-1		
.009	.018	4	-1		
.019	.022	2	-2		
.023	.026	2 2	-1 -2		
.027	.040	4	-1	2	-2
.041	.044	2	-2	2	-2
.045	.052	2 2	-1 -2	2 2	-1 -2

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	AR	*	1011777	60035158001		INDIUM FOIL			
10	1		2011792	85386910410		HOUSING & LENS, ASSY OF			
9	1	*	1011768-30	74453043030		PACKING, PREFORMED			
8	4	NAS	1352C04LL4	74455157013		SCREW, CAP, SOC HD-SELF-LOCKING			
7	1		2011674	52386910540		PLATE, PECHAN PRISM			
6	4	NAS	1352C06LL6	74455157019		SCREW, CAP, SOC. HD-SELF-LOCKING			
5	2		2011675	52386910530		BRACKET, PECHAN PRISM RETAINER			
4	1		2011170	28386910220		PRISM, TELESCOPE BODY			
3	AR		2011837-1-2	58386910030 0040		SPRING, PRISM SPACER			
2	1		2011169	28386910210		PRISM, TELESCOPE BODY			
1	1		2011653	57386910470		TUBE, TELESCOPE, INNER			

LIST OF PARTS AND MATERIALS

2011724 A

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910430
DRAWN R. BRUNELLE DATE 4-7-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL E. Ruschmann 7/15/64
APPROVAL E. [illegible] 7/15/64
NASA APPROVAL
MIT APPROVAL 2/[illegible]/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INNER TELESCOPE TUBE,
ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011724
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

	2011724

REVISIONS - TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

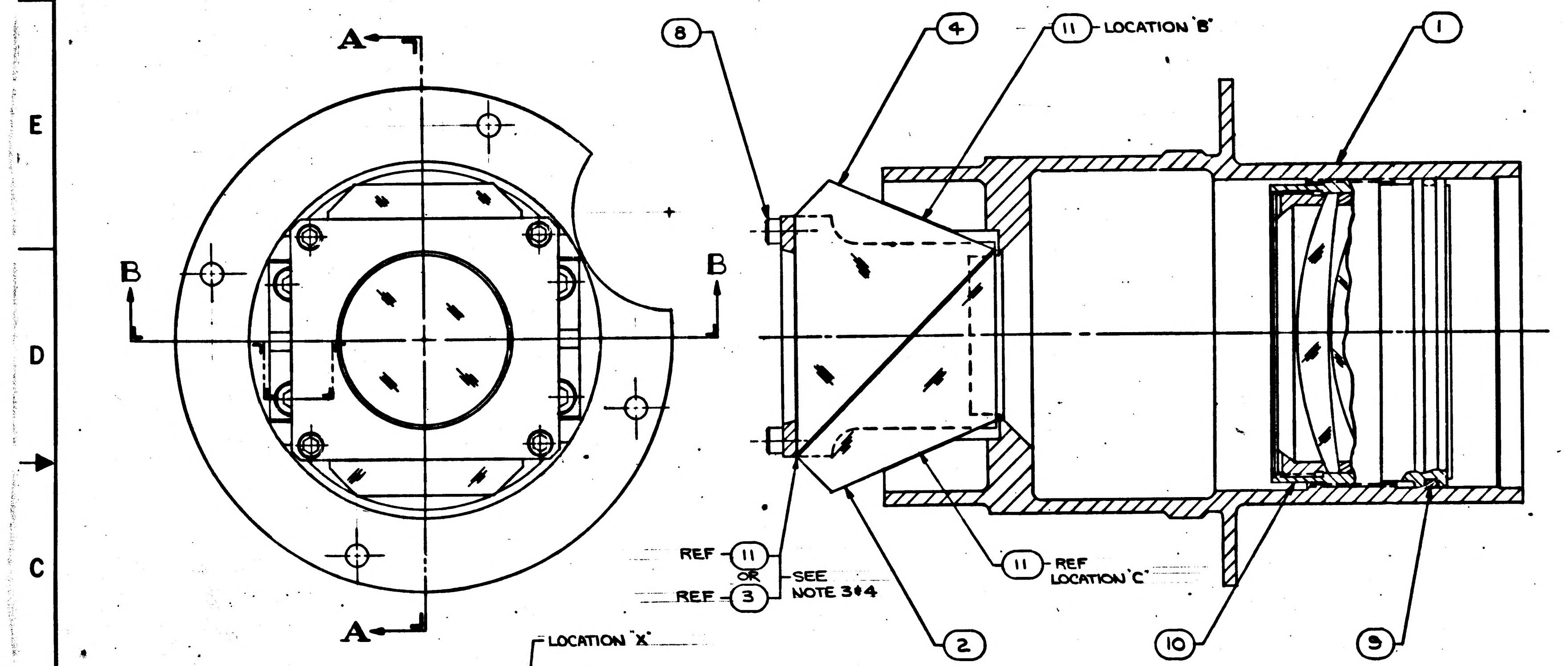
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SELECT ITEM 3 IN ACCORDANCE WITH TABLE, FROM DIMENSION "A" WHICH SHALL BE DETERMINED FROM AVERAGE OF MEASUREMENTS AT LOCATIONS "X" & "Y". DIMENSION "A" IS TAKEN WITH ITEM 7 OMITTED AND WITH ONE THICKNESS OF LENS TISSUE (.002 THICK) BETWEEN ITEMS 2 & 4. INDIUM FOIL, ITEM 11, IS OMITTED AT THE POINT OF MEASUREMENT, BUT INCLUDED AT LOCATIONS B & C.
3. FOR DIMENSION "A" EXCEEDING .026, ITEM 3 MUST BE USED AS SHOWN IN PARTIAL SECTION B-B AT LOCATIONS "X" & "Y" AND INCLINED PLANE. WHEN USED AT LOCATIONS "X" & "Y" ITEM 3 SHALL BE EXTENDED PAST ITEM 7 EQUALLY ON EACH SIDE. NO INDIUM FOIL, ITEM 11, IS TO BE USED AT LOCATIONS "X" & "Y" WHEN ITEM 3 IS USED AT THESE POINTS.
4. BEFORE ADDITION OF ITEM 10, CHECK ASSEMBLY FOR RESOLUTION AND STRAIN.

NOTES (CONT'D)

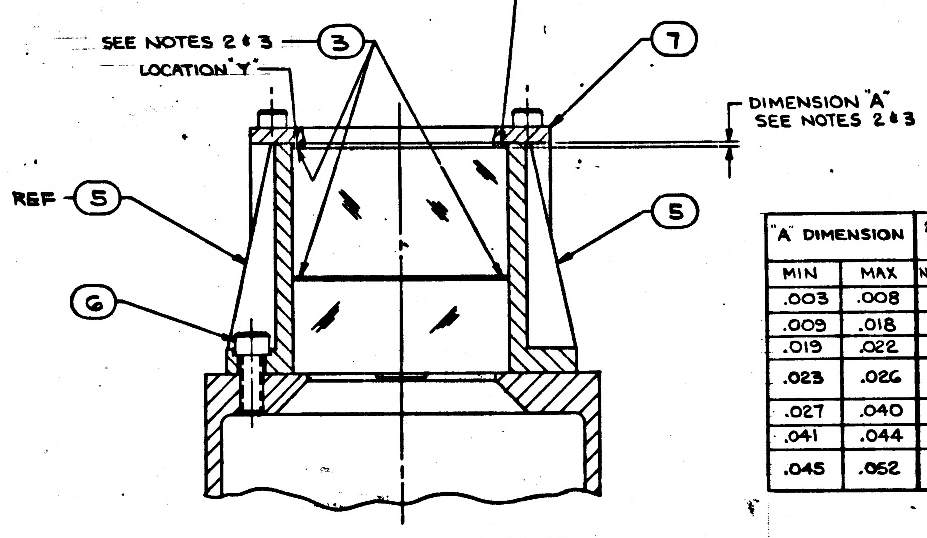
4a) STRAIN PATTERN UNDER POLARISCOPE EXAMINATION SHALL SHOW NO MORE THAN FAINT GRADUATION OF COLOR.

b) RESOLUTION SHALL BE NO MORE THAN 10 (TEN) ARC SECONDS AT THE SAME FOCUS FOR PATTERNS PARALLEL TO BOTH THE "A" AND "B" SECTION DESIGNATIONS ON THIS DRAWING.

5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



SECTION A-A



PARTIAL SECTION B-B

"A" DIMENSION		2011837 SPRING INCLINED PLANE		2011837 SPRING AT X OR Y	
MIN	MAX	NO. REQD	DASH NO.	NO. REQD	DASH NO.
.003	.008	1	-1		
.009	.018	2	-1		
.019	.022	1	-2		
.023	.026	1 1	-1 -2		
.027	.040	2	-1	1	-2
.041	.044	1	-2	1	-2
.045	.052	1 1	-1 -2	1 1	-1 -2

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	AR	*	1011777	60035158001		INDIUM FOIL			
10	1		2011792	85386910410		HOUSING & LENS, ASSY OF			
9	1	*	1011768-30	74453043030		PACKING, PREFORMED			
8	4	NAS	1352C04LL4	74455157013		SCREW, CAP, SOC HD-SELF-LOCKING			
7	1		2011674	52386910540		PLATE, PECHAN PRISM			
6	4	NAS	1352C06LL6	74455157019		SCREW, CAP, SOC. HD-SELF-LOCKING			
5	2		2011675	52386910530		BRACKET, PECHAN PRISM RETAINER			
4	1		2011170	28386910220		PRISM, TELESCOPE BODY			
3	AR		2011837-1 -2	5838691 0030 0040		SPRING, PRISM SPACER			
2	1		2011169	28386910210		PRISM, TELESCOPE BODY			
1	1		2011653	57386910470		TUBE, TELESCOPE, INNER			

LIST OF PARTS AND MATERIALS

2011724

NEXT ASSY	USED ON
2011880	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910430

DRAWN R. BRUNELLE DATE 4-7-64
CHECKED C. LEWIS (CRE) 7/13/64
APPROVAL E. Ruschmann 7/15/64
APPROVAL [illegible] 7/15/64
NASA APPROVAL
MIT APPROVAL [illegible] 2/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INNER TELESCOPE TUBE,
ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011724
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

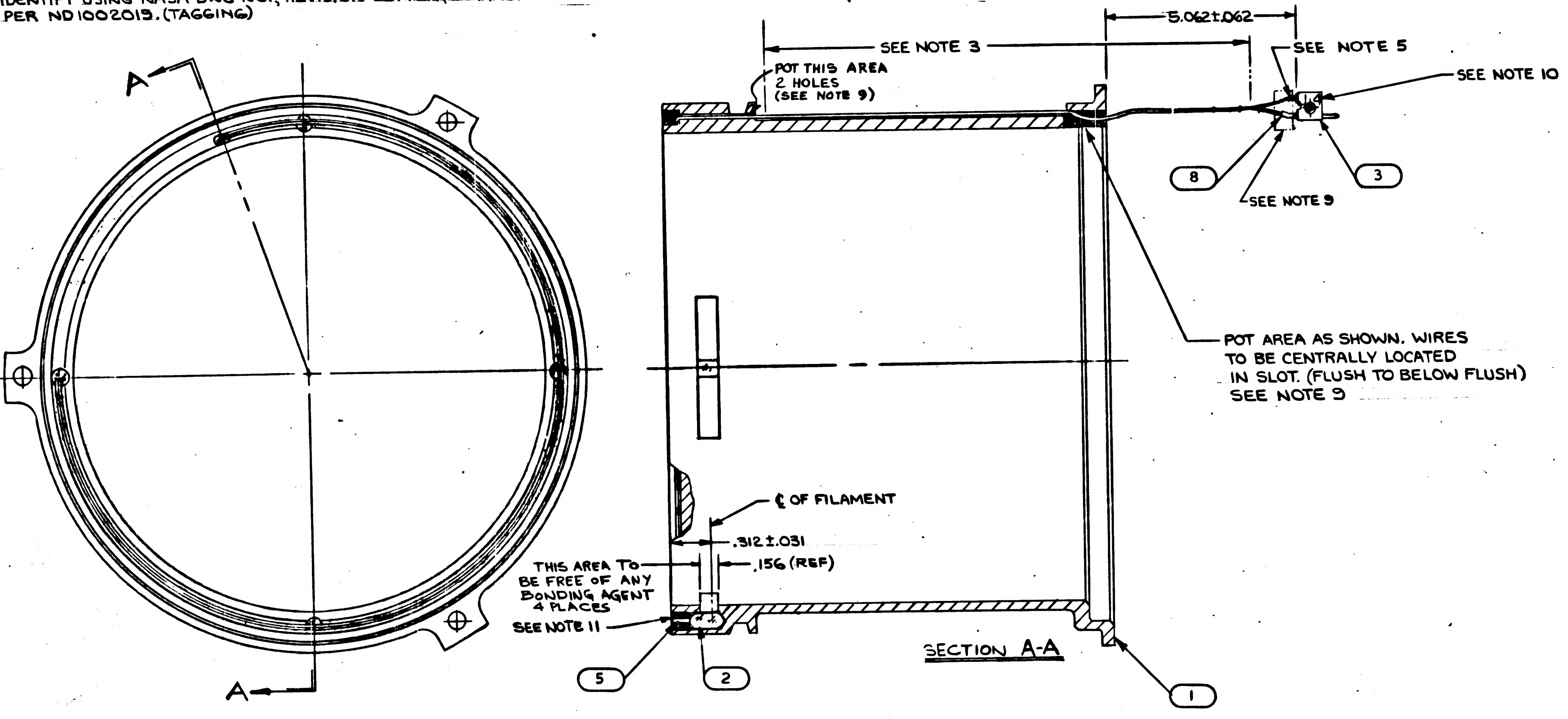
INCHES
0 1 2

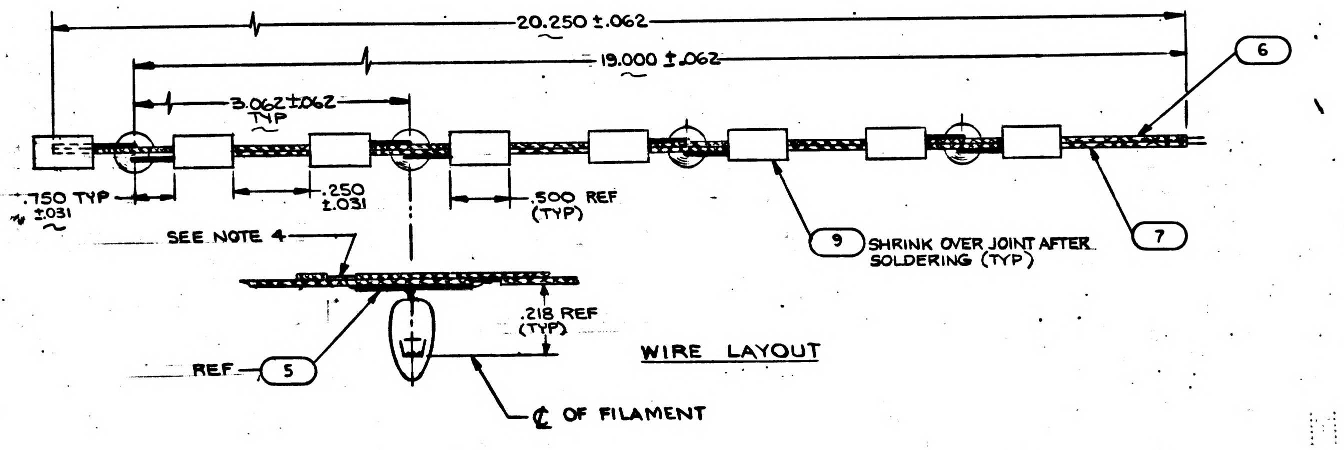
A	2011731

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16674	2/24/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 1012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. SLIDE ITEM 8 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 8 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND1002240 METHOD "A" OR "B". POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .125
10. MARK REFERENCE DESIGNATIONS .094 ±.016 HIGH IN ACCORDANCE WITH ND1002019.
11. FILL UP GROOVE, FLUSH OR .031 ABOVE, USING POTTING COMPOUND IN ACCORDANCE WITH ND1002240 METHOD "B"
12. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

WIRING LEGEND			
COLOR	ITEM NO.	FROM	TO
BLACK	6	BLACK	J4-B
RED	7	RED	J4-A


A
A
SEE NOTE 3
POT THIS AREA 2 HOLES (SEE NOTE 9)
5.062±.062
SEE NOTE 5
SEE NOTE 10
8
3
SEE NOTE 9
POT AREA AS SHOWN. WIRES TO BE CENTRALLY LOCATED IN SLOT. (FLUSH TO BELOW FLUSH) SEE NOTE 9
℄ OF FILAMENT
.312±.031
.156 (REF)
THIS AREA TO BE FREE OF ANY BONDING AGENT 4 PLACES
SEE NOTE 11
5
2
1
SECTION A-A


20.250±.062
19.000±.062
3.062±.062 TYP
6
.750 TYP ±.031
.250 ±.031
.500 REF (TYP)
9
SHRINK OVER JOINT AFTER SOLDERING (TYP)
7
SEE NOTE 4
.218 REF (TYP)
REF
5
℄ OF FILAMENT

WIRE LAYOUT

*PURCHASE ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	8	*	1010490-112	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	2	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
7	AR	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	AR	*	1006776-25	—		INSULATION, SLEEVING ELECTRICAL			
4									
3	1	*	1011748-2	68502016402		CONNECTOR, ELECTRICAL (J4)			
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011689	57386910720		HOUSING, LAMP			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910530
DRAWN R. BRUNELLE DATE 4-9-64
CHECKED CLEMZ (QC) 7/13/64
APPROVAL F. Ruschmann 7/14/64 GEC
APPROVAL E. Thony 7/14/64
NASA APPROVAL
MIT APPROVAL 2/24/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING AND LAMP,
ASSEMBLY OF

CODE IDENT NO. SIZE D NASA NUMBER 2011731
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011731

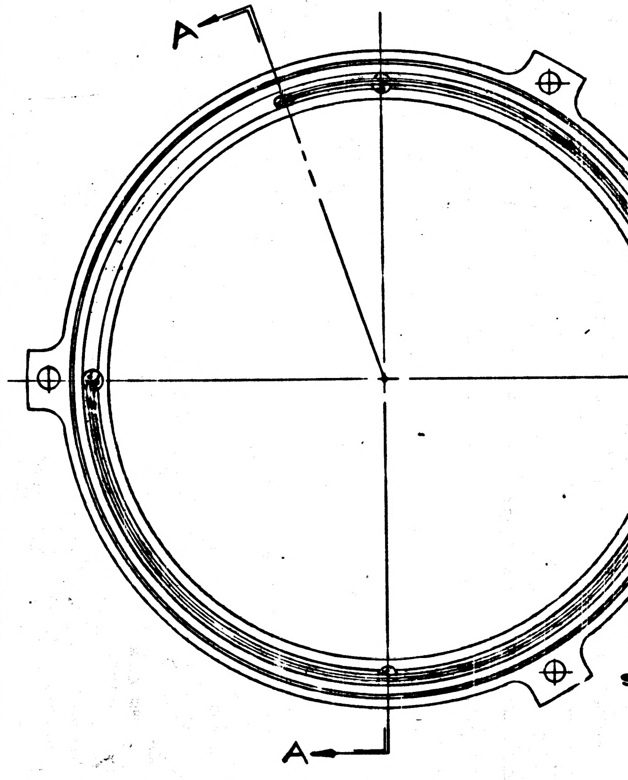
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 1012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. SLIDE ITEM 8 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 8 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240 METHOD "A" OR "B". POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .125
10. MARK REFERENCE DESIGNATIONS .094 ±.016 HIGH IN ACCORDANCE WITH ND1002015.
11. FILL UP GROOVE, FLUSH OR .031 ABOVE, USING POTTING COMPOUND IN ACCORDANCE WITH ND1002240 METHOD "B".
12. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)

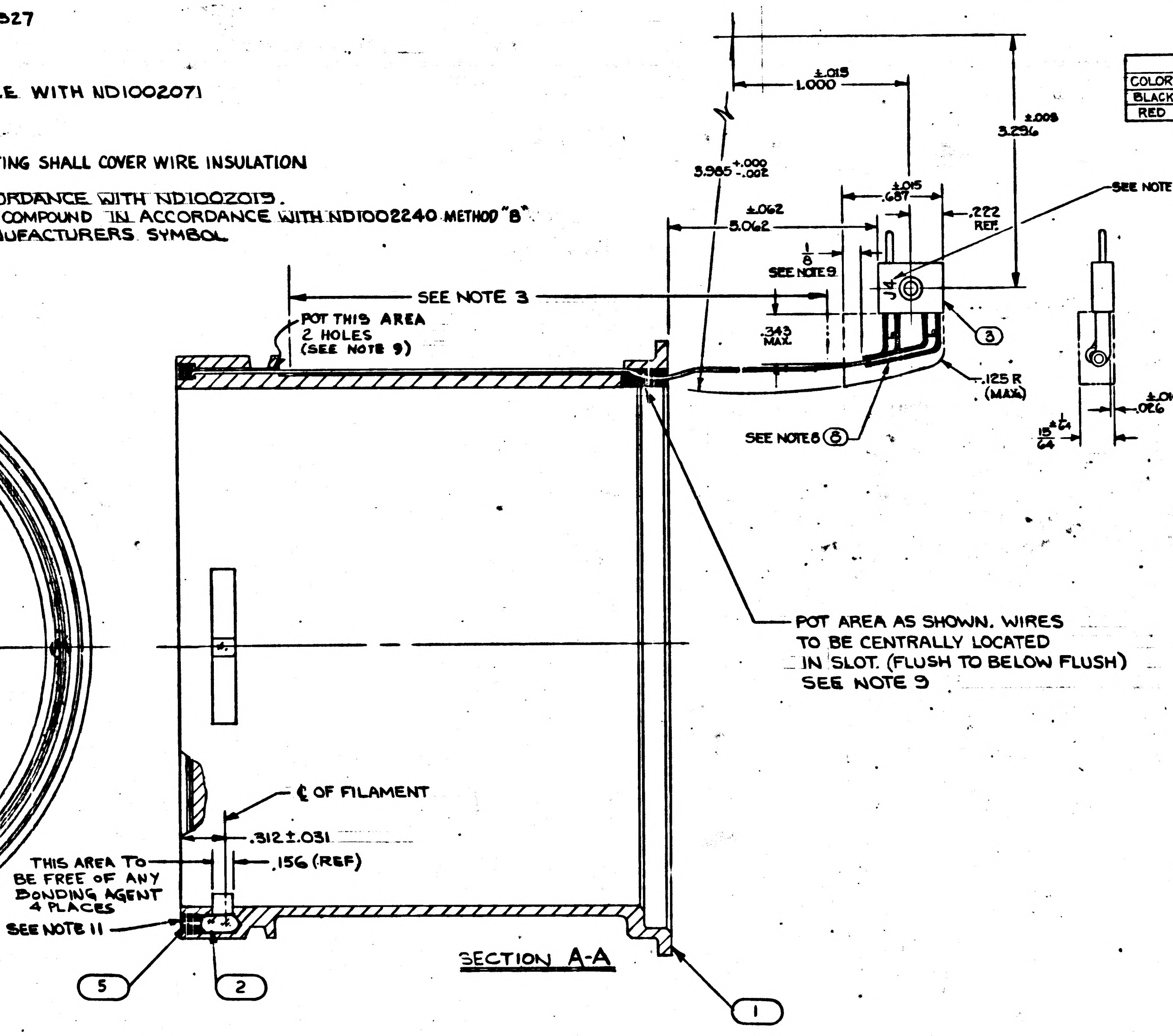
B	2011731

WIRING LEGEND			
COLOR	ITEM NO.	FROM	TO
BLACK	6	BLACK	J4-B
RED	7	RED	J4-A

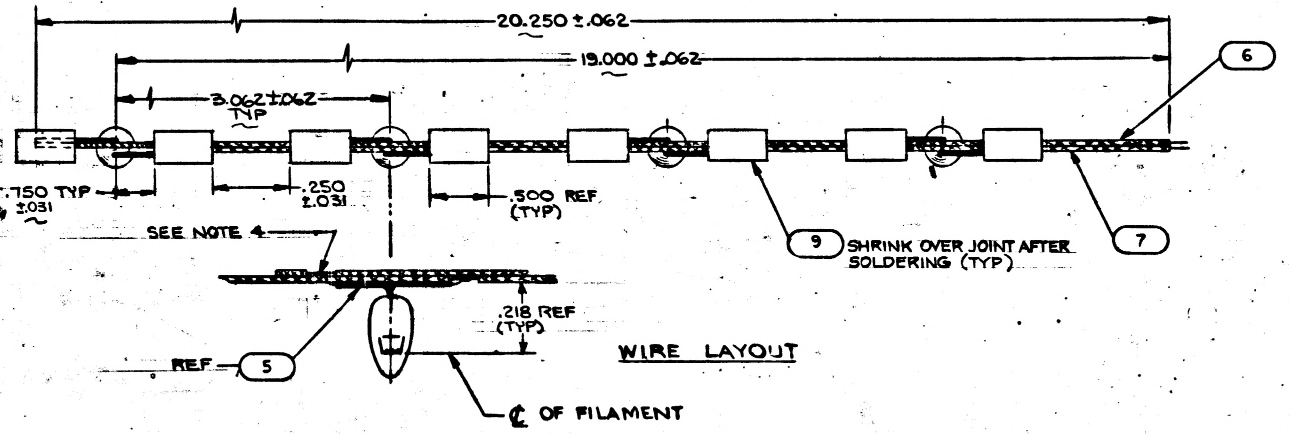
REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16674	2/24/65	
B		REVISED PER TDRR 18015	4/13/65	





SEE NOTE 3
POT THIS AREA
2 HOLES
(SEE NOTE 9)
1.000 ±.015
3.296 ±.005
3.965 +.002 -.002
.687 ±.015
.222 REF.
5.062 ±.062
1/8
SEE NOTE 9
SEE NOTE 10
J4
3
.343 MAX.
.125 R (MAX)
SEE NOTE 8
.026 ±.010
15/64 ±1/64
POT AREA AS SHOWN. WIRES TO BE CENTRALLY LOCATED IN SLOT. (FLUSH TO BELOW FLUSH) SEE NOTE 9
℄ OF FILAMENT
.312 ±.031
.156 (REF)
THIS AREA TO BE FREE OF ANY BONDING AGENT 4 PLACES
SEE NOTE 11
5
2
1
SECTION A-A



20.250 ±.062
19.000 ±.062
3.062 ±.062 TYP
6
.750 TYP ±.031
.250 ±.031
.500 REF (TYP)
9
SHRINK OVER JOINT AFTER SOLDERING (TYP)
7
SEE NOTE 4
.218 REF (TYP)
REF
5
WIRE LAYOUT
℄ OF FILAMENT

* PURCHASE ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	8	*	1010490-112	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	2	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
7	AR	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	AR	*	1006776-25	—		INSULATION, SLEEVING ELECTRICAL			
4									
3	1	*	1011748-2	68502016402		CONNECTOR, ELECTRICAL (J4)			
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011689	57386910720		HOUSING, LAMP			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910530
DRAWN R. BRUNELLE DATE 4-9-64
CHECKED C. Lewiz (QC) 7/13/64
APPROVAL F. Ruschmann 7/14/64 GEC
APPROVAL E. Mourey 7/14/64
NASA APPROVAL
MIT APPROVAL 2/24/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING AND LAMP,
ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011731
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B 2011731

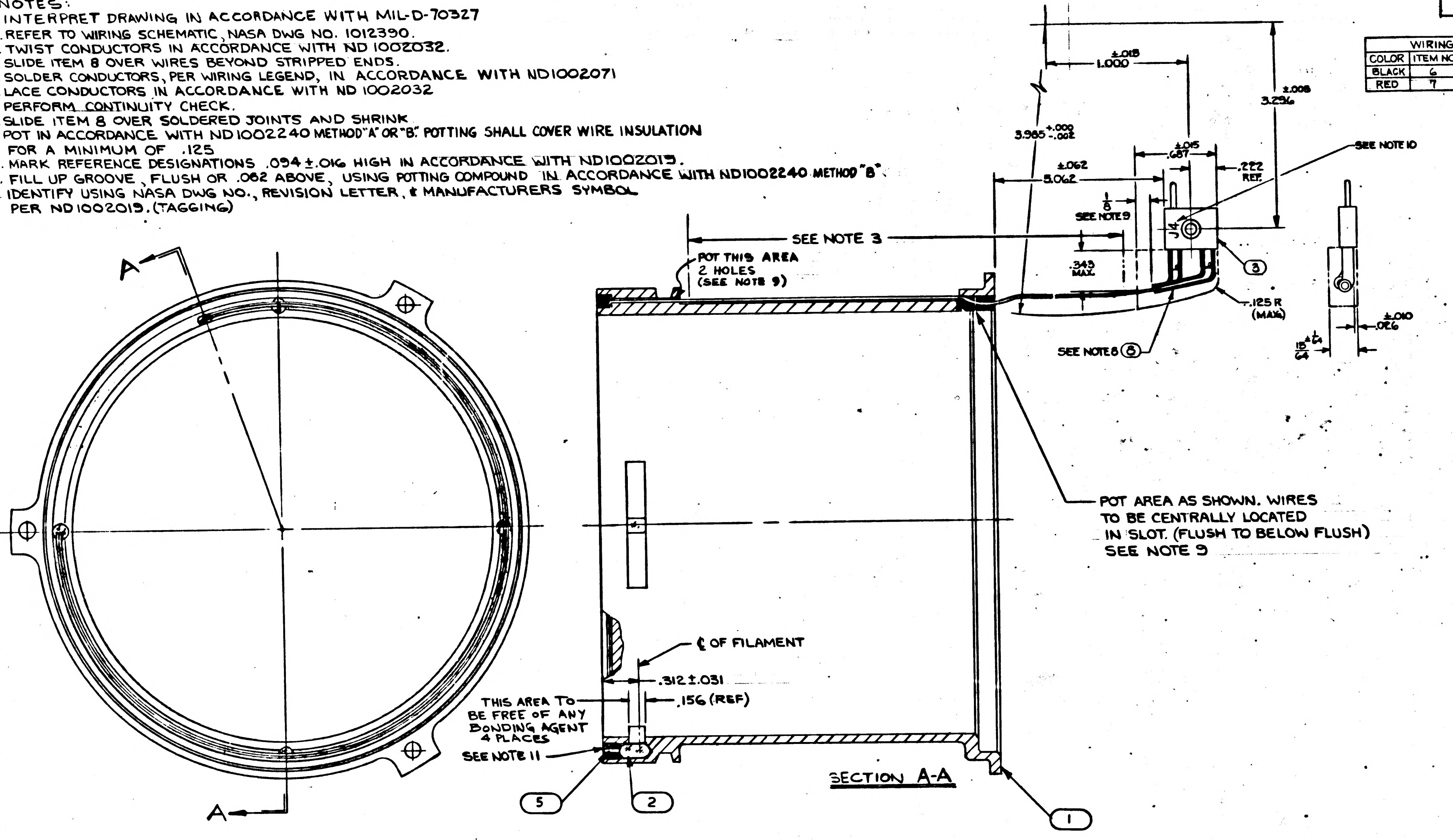
2011731 C

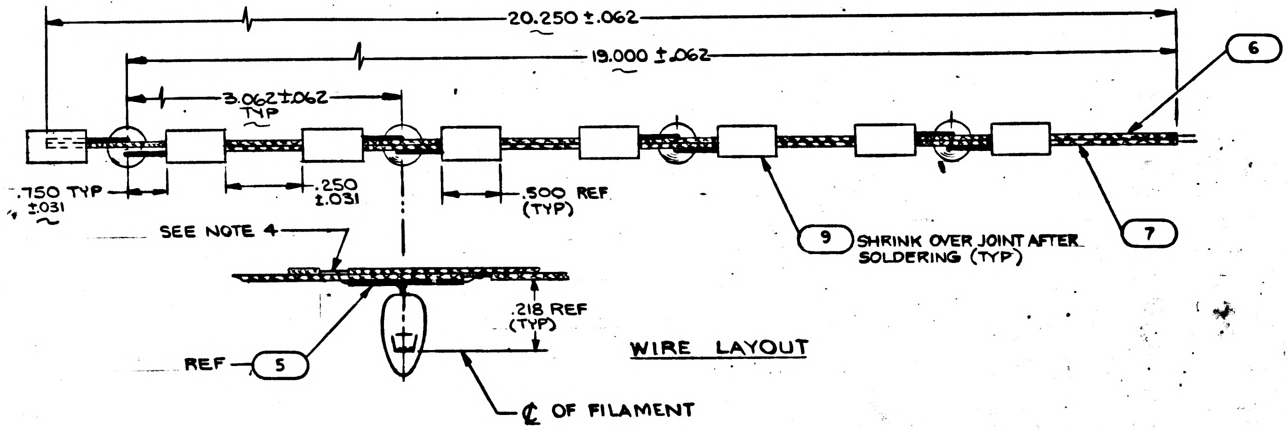
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 1012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. SLIDE ITEM 8 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 8 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND1002240 METHOD "A" OR "B". POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .125
10. MARK REFERENCE DESIGNATIONS .094 ± .016 HIGH IN ACCORDANCE WITH ND1002015.
11. FILL UP GROOVE, FLUSH OR .062 ABOVE, USING POTTING COMPOUND IN ACCORDANCE WITH ND1002240 METHOD "B".
12. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002015. (TAGGING)

WIRING LEGEND			
COLOR	ITEM NO.	FROM	TO
BLACK	6	BLACK	J4-B
RED	7	RED	J4-A

REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16674	2/24/65	WH
B		REVISED PER TDRR 18015	4/13/65	wk
C		REVISED PER TDRR 26053	2/15/66	GK


A
A
SEE NOTE 3
POT THIS AREA 2 HOLES (SEE NOTE 9)
±.018 1.000
±.008 3.296
3.985 +.000 -.002
±.015 .687
±.062 5.062
.222 REF.
1/8 SEE NOTE 9
.343 MAX.
SEE NOTE 10
J4
3
.125 R (MAX)
SEE NOTE 8 8
±.010 .026
15/64 ±1/64
POT AREA AS SHOWN. WIRES TO BE CENTRALLY LOCATED IN SLOT. (FLUSH TO BELOW FLUSH) SEE NOTE 9
℄ OF FILAMENT
.312 ± .031
.156 (REF)
THIS AREA TO BE FREE OF ANY BONDING AGENT 4 PLACES
SEE NOTE 11
5
2
SECTION A-A
1


20.250 ± .062
19.000 ± .062
3.062 ± .062 TYP
6
.750 TYP ±.031
.250 ±.031
.500 REF (TYP)
SEE NOTE 4
9 SHRINK OVER JOINT AFTER SOLDERING (TYP)
7
.218 REF (TYP)
REF 5
℄ OF FILAMENT
WIRE LAYOUT

* PURCHASE ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	8	*	1010490-112	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	2	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
7	AR	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	AR	*	1006776-25	—		INSULATION, SLEEVING ELECTRICAL			
4									
3	1	*	1011748-2	68502016402		CONNECTOR, ELECTRICAL (J4)			
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011689	57386910720		HOUSING, LAMP			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 85386910530
DRAWN R. BRUNELLE DATE 4-9-64
CHECKED CLEMZ (QC) 7/13/64
APPROVAL F. Fischmann 7/14/64 QEC
APPROVAL E. Morris 7/14/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING AND LAMP, ASSEMBLY OF

CODE IDENT NO. 80230 | SIZE D | NASA NUMBER 2011731
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011731 C

MASTER

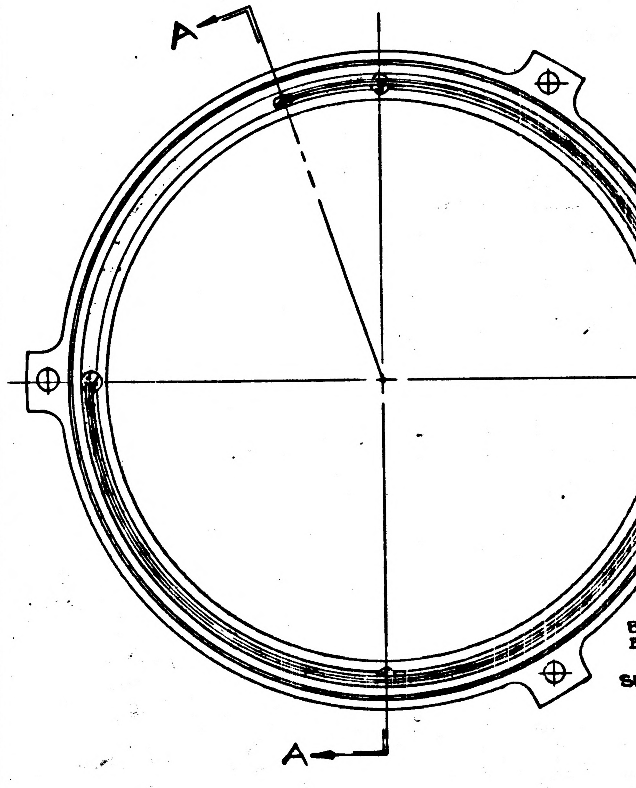
2011731

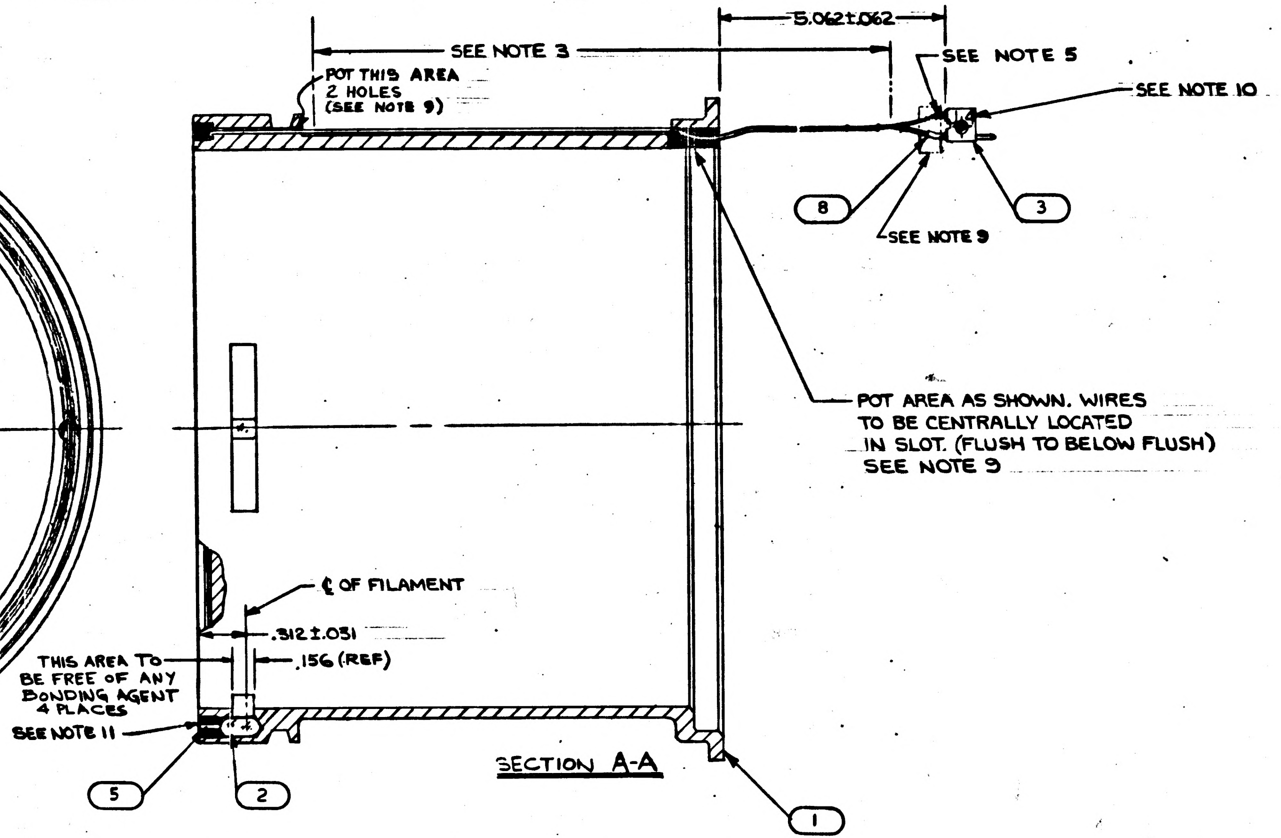
REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 1012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. SLIDE ITEM 8 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRP2, PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 4, IN ACCORDANCE WITH ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 8 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002005, METHOD "C". POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .125 ±.031 INCH.
10. MARK REFERENCE DESIGNATIONS .094 ±.016 HIGH IN ACCORDANCE WITH ND1002019.
11. FILL UP GROOVE, FLUSH OR .031 ABOVE, USING BONDING AGENT, IN ACCORDANCE WITH ND1002004.
12. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

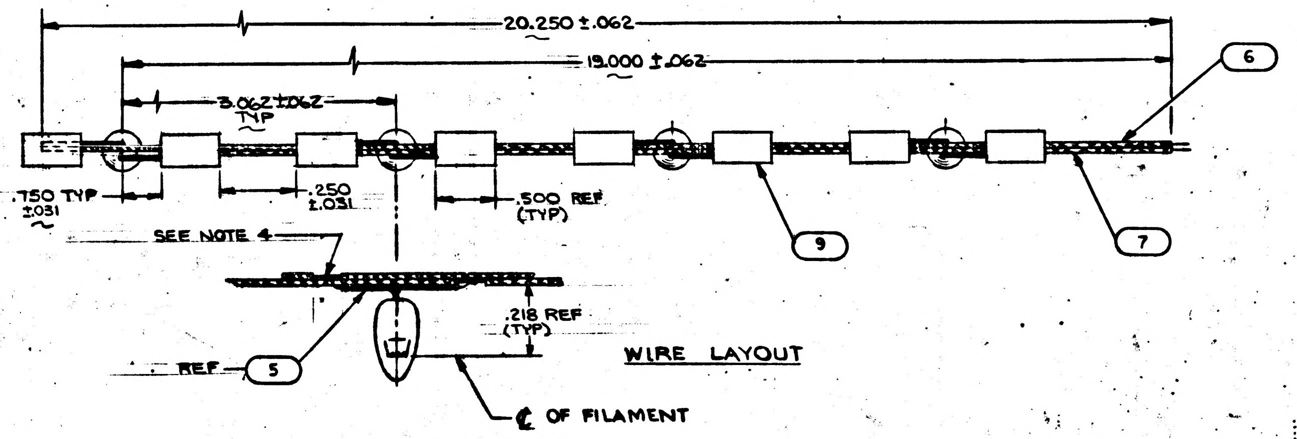
WIRING LEGEND			
COLOR	ITEM NO.	FROM	TO
BLACK	6	BLACK	J4-B
RED	7	RED	J4-A





SEE NOTE 3
POT THIS AREA 2 HOLES (SEE NOTE 9)
5.062±.062
SEE NOTE 5
SEE NOTE 10
8
3
SEE NOTE 9
POT AREA AS SHOWN. WIRES TO BE CENTRALLY LOCATED IN SLOT. (FLUSH TO BELOW FLUSH) SEE NOTE 9
℄ OF FILAMENT
.312±.051
.156 (REF)
THIS AREA TO BE FREE OF ANY BONDING AGENT 4 PLACES
SEE NOTE 11
5
2
1

SECTION A-A



20.250 ±.062
19.000 ±.062
3.062±.062 TYP
6
.750 TYP ±.031
.250 ±.031
.500 REF (TYP)
9
7
SEE NOTE 4
.218 REF (TYP)
REF
5
℄ OF FILAMENT

WIRE LAYOUT

✱ PURCHASE ITEM
SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	8	✱	1010490-112	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	2	✱	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
7	AR	✱	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	AR	✱	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	AR	✱	1006776-25	—		INSULATION, SLEEVING ELECTRICAL			
4	AR	✱	1011753	60035142001		TAPE, LACING AND TYING			
3	1	✱	1011748-2	68502016402		CONNECTOR, ELECTRICAL (J4)			
2	4		MS24367-715	—		LAMP, INCANDESCENT			
1	1		2011689	57386910720		HOUSING, LAMP			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910530

DRAWN R. BRUNELLE DATE 4-9-64
CHECKED CLEMZ (QC) 7/13/64
APPROVAL F. Ruschmann 7/14/64
APPROVAL E. Manny 7/14/64
NASA APPROVAL
MIT APPROVAL 2/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING AND LAMP,
ASSEMBLY OF

CODE IDENT NO. | SIZE D | NASA NUMBER 2011731
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011731

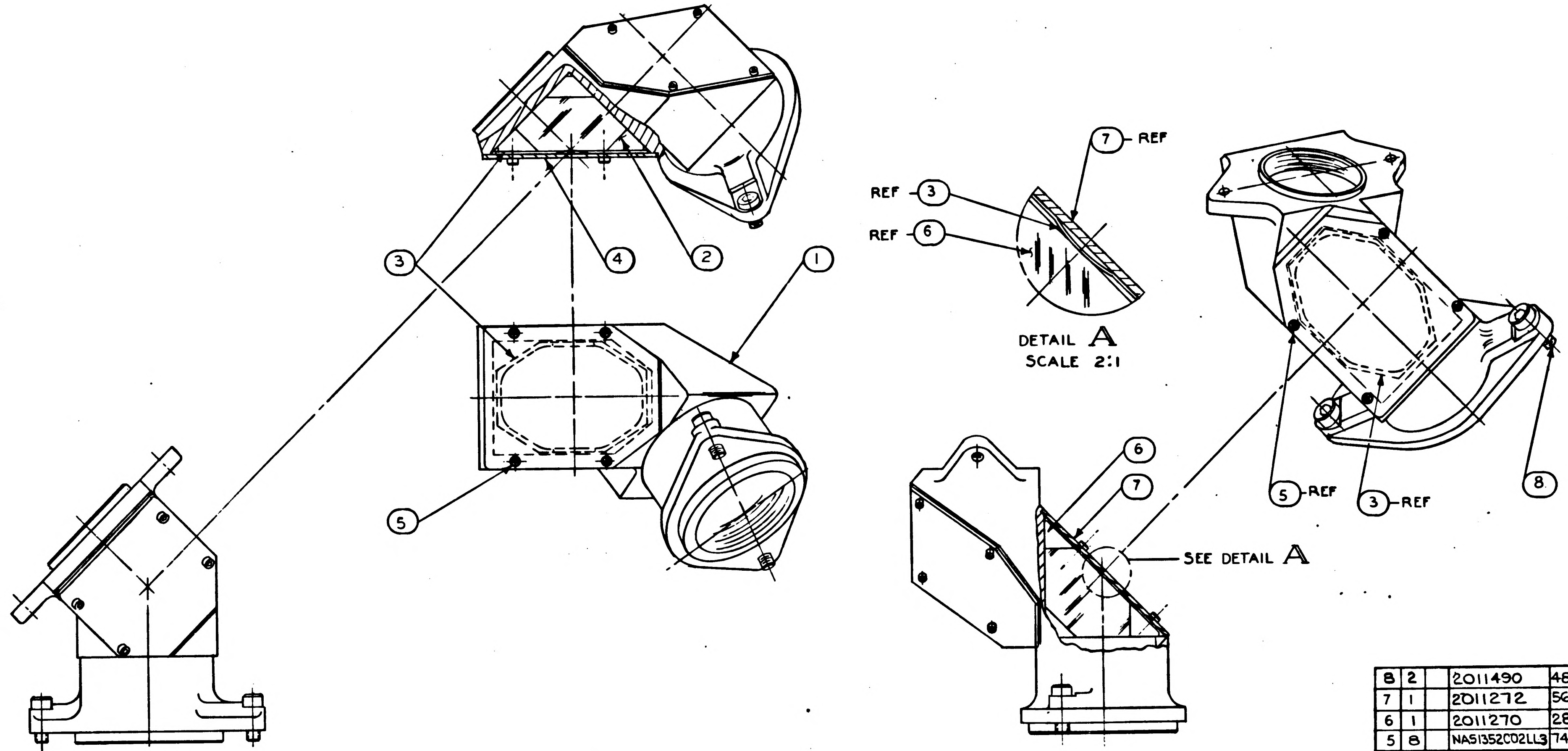
MASTER

2011734 A

REVISIONS TDRR ...09				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 19074	5/14/65	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING)



2011734A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	2		2011490	48386910090		SCREW, CAPTIVE HEX SOCKET HEAD			
7	1		2011272	56386910350		PLATE, COVER PRISM HOUSING			
6	1		2011270	28386910270		PRISM, LARGE SCT EYEPIECE			
5	8		NAS1352C02LL3	74455157006		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
4	1		2011271	56386910340		PLATE, COVER PRISM HOUSING			
3	2		2011883	56386910360		SPRING, ELLIPTICAL SCT PRISM			
2	1		2011269	28386910260		PRISM, SMALL SCT EYEPIECE			
1	1		2011257	50386910020		HOUSING SCT PRISM			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910540

DRAWN F. J. Muller 4-9-64
CHECKED C. Lewis (CRR) 7/13/64
APPROVAL E. Kuchmann 7/14/64
APPROVAL E. Thoma 7/14/64
NASA APPROVAL
MIT APPROVAL 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SCT PRISM,
ASSY OF

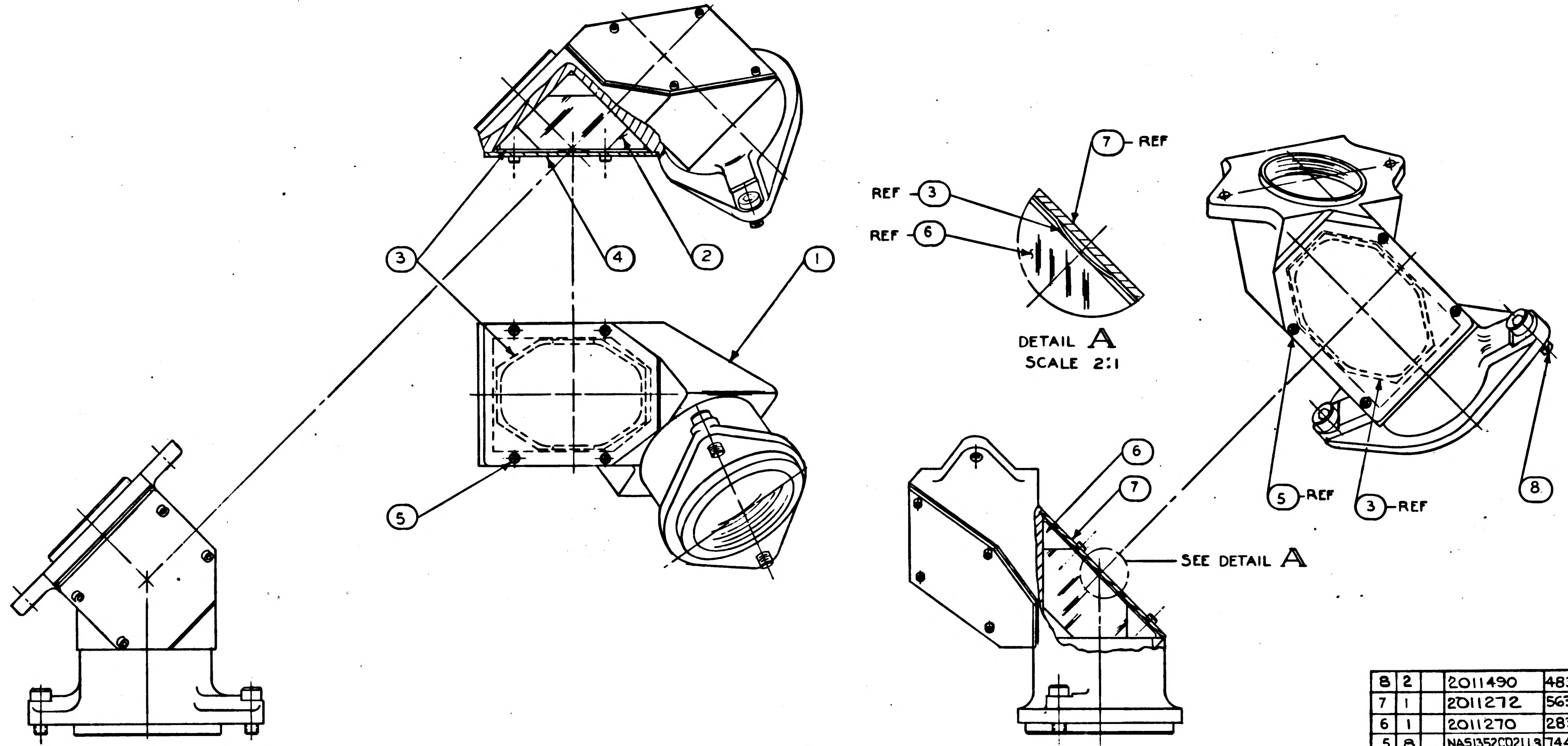
CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011734

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

B	2011734

REVISIONS TDRR 1109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 19074	5/18/65	WR
B		REVISED PER TDRR 20201	6/1/65	WR

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING)



2011734B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	2		2011490	48386910090		SCREW, CAPTIVE HEX SOCKET HEAD			
7	1		2011272	56386910350		PLATE, COVER PRISM HOUSING			
6	1		2011270	28386910270		PRISM, LARGE SCT EYEPIECE			
5	8		NAS1352C02LL3	74455157006		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
4	1		2011271	56386910340		PLATE, COVER PRISM HOUSING			
3	2		2011883	56386910360		SPRING, ELLIPTICAL SCT PRISM			
2	1		2011269	28386910260		PRISM, SMALL SCT EYEPIECE			
1	1		2011257	50386910020		HOUSING SCT PRISM			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012612	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910540
DRAWN F. J. Miller 4-9-64
CHECKED C. Lenz (CRR) 7/13/64
APPROVAL E. Ruschmann 7/14/64
APPROVAL E. Thomas 7/14/64
NASA APPROVAL
MIT APPROVAL 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

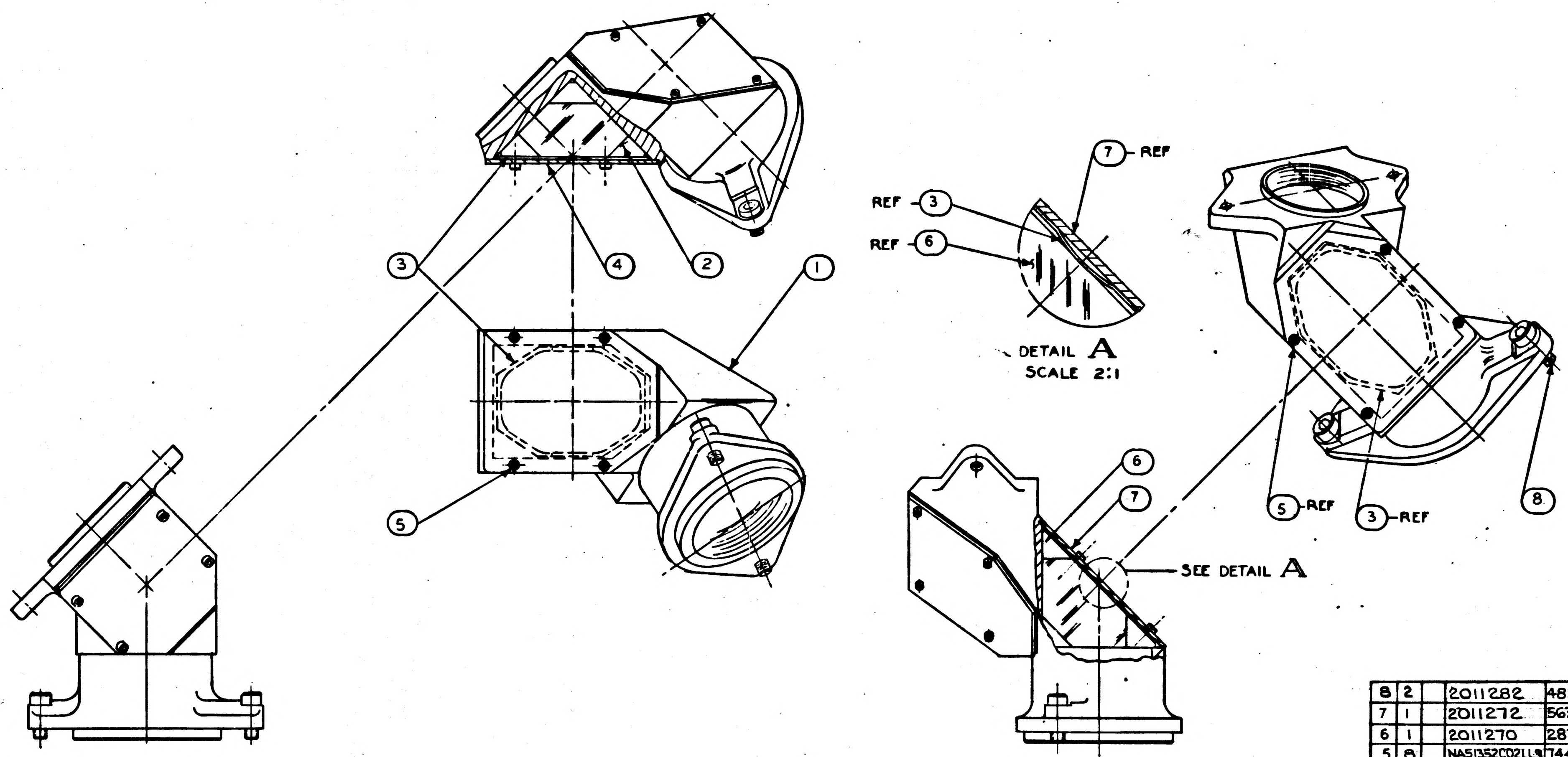
TITLE
HOUSING, SCT PRISM,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011734
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011734

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	2		2011282	48386910040		SCREW, CAPTIVE HEX SOCKET HEAD			
7	1		2011272	56386910350		PLATE, COVER PRISM HOUSING			
6	1		2011270	28386910270		PRISM, LARGE SCT EYEPIECE			
5	8		NAS1352C02LL9	74455157006		SCREW, CAP, SOCKET HEAD SELF-LOCKING			
4	1		2011271	56386910340		PLATE, COVER PRISM HOUSING			
3	2		2011883	56386910360		SPRING, ELLIPTICAL SCT PRISM			
2	1		2011269	28386910260		PRISM, SMALL SCT EYEPIECE			
1	1		2011257	50386910020		HOUSING SCT PRISM			

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910540
DRAWN 4-9-64
CHECKED C. Lenz (CEE) 7/13/64
APPROVAL E. Ruchmann 7/14/64
APPROVAL 7/14/64
NASA APPROVAL
MIT APPROVAL 7/21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, SCT PRISM, ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011734
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

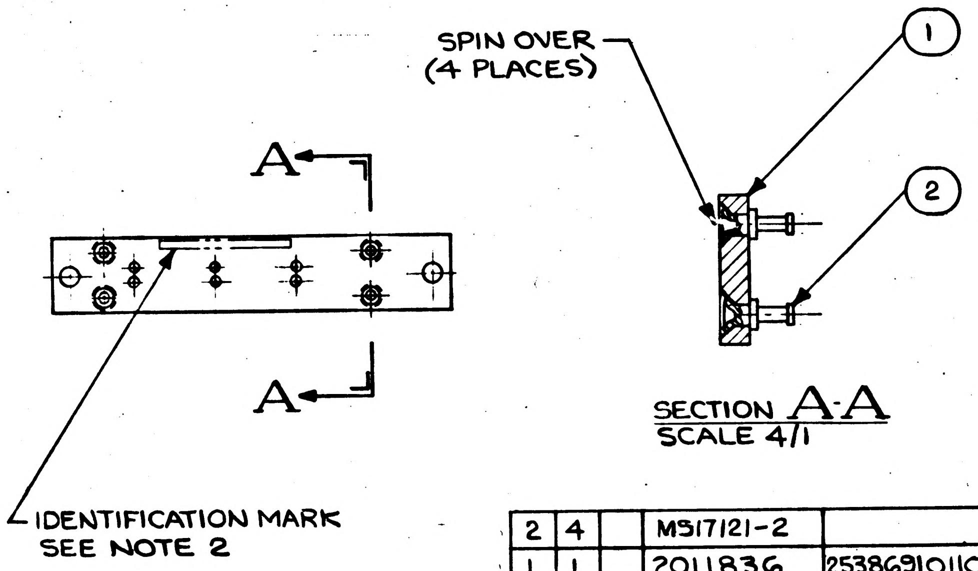
MASTER

2011734

2011736

REVISIONS 11748			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.



MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	4		MS17121-2			TERMINAL			
1	1		2011836	25386910110		BOARD, TERMINAL			

LIST OF PARTS AND MATERIALS

2011900	2011000
NEXT ASSY	USED ON
APPLICATION	

ACTUAL SIZE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910610

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/28/64 J.F.S.
APPROVAL 7/27/64
APPROVAL 8/19/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TERMINAL BOARD,
ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011736
SCALE 2/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

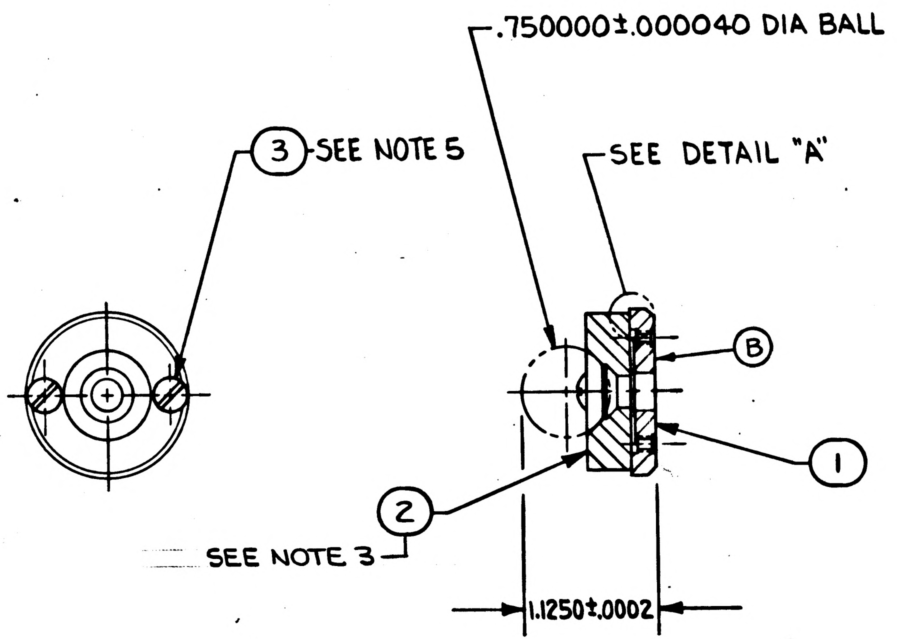
K+E E-183

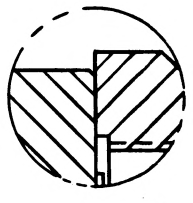
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011738

SYM	ZONE	REVISIONS 10952 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. LAP INTERFACE OF ITEMS ① & ② TO OBTAIN AREA CONTACT OF NOT LESS THAN 75%. AFTER LAPPING SERIALIZE PARTS TO INSURE THE MATCHING OF LAPPED PARTS AFTER LUBRICATION.
3. ~~APPLY ITEM ④ SOLID FILM LUBRICANT TO LAPPED SURFACE OF ITEM ② PER ND1002216.~~
4. ~~GRIND OR LAP SURFACE "B" TO OBTAIN DIMENSION INDICATED AFTER APPLICATION OF LUBRICATION FILM.~~
5. ~~AFTER GRINDING OR LAPPING IS COMPLETED, VIBRATION PROOF ITEM ③ AS PER MIL-S-22473 GRADE C.~~
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MFRS SYMBOL PER ND 1002019 (BAGGING).





DETAIL "A"
SCALE 4/1

2011738

✱ PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	AR	✱	1012049	74471442001		LUBRICANT DRY FILM (EXTREME ENVIRONMENT)			
3	2		2011571	57386910890		SCREW, SHOULDER			
2	1		2011568	57386910860		INSERT, BALL MOUNT, PLANE			
1	1		2011567	57386910850		INSERT, BALL MOUNT, PLANE BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910660

DRAWN V. AMATO DATE 4-10-64
CHECKED C. LEINZ (CRF) 7/13/64
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT, PLANE, ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011738
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-184

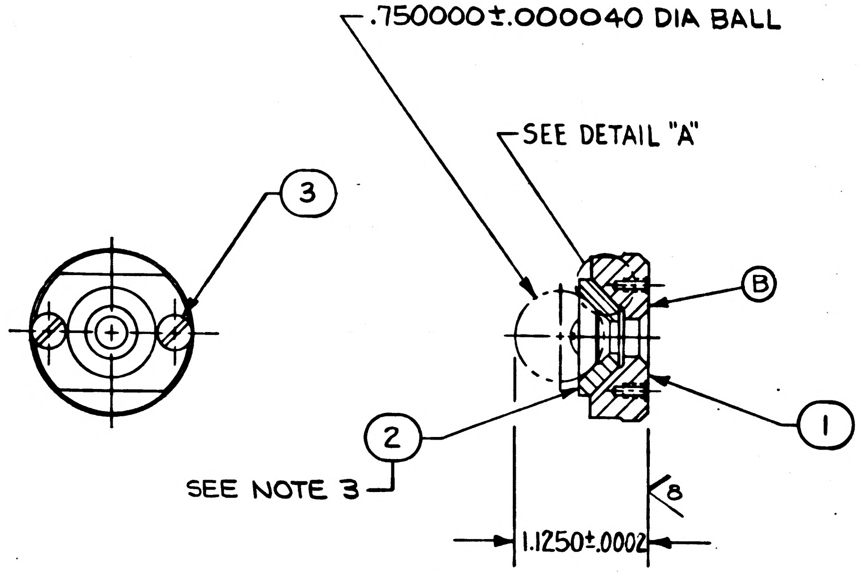
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

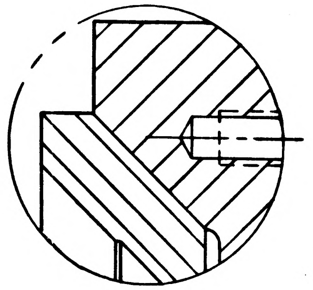
2011739 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		"REVISED PER TDRR" 15196	29 Jul 64	WL

REVISIONS 10952

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. LAP INTERFACE OF ITEMS ① & ② TO 8 TO OBTAIN AREA CONTACT OF NOT LESS THAN 75%. AFTER LAPPING SERIALIZE PARTS TO INSURE THE MATCHING OF LAPPED PARTS AFTER LUBRICATION.
3. APPLY ITEM ④ SOLID FILM LUBRICANT TO LAPPED SURFACE OF ITEM ② PER ND1002216, METHOD I. APPLY LOAD OF 500 POUNDS FOR FILM COMPACTION.
4. GRIND OR LAP SURFACE "B" TO OBTAIN DIMENSION INDICATED AFTER APPLICATION OF LUBRICATION FILM.
5.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).
7. AFTER COMPLETION OF GRINDING OR LAPPING, PASSIVATE ITEM ① ONLY IN ACCORDANCE WITH MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.1 (KPS-1005 I.200).





DETAIL "A"
SCALE 4/1

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	AR	*	1012049	74471442001		LUBRICANT DRY FILM (EXTREME ENVIRONMENT)			
3	2		2011571	57386910890		SCREW, SHOULDER			
2	1		2011570	57386910880		INSERT, BALL MOUNT, LINE			
1	1		2011569	57386910870		INSERT, BALL MOUNT, LINE BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910670

DRAWN V. AMATO DATE 4-10-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT,
LINE, ASSY OF

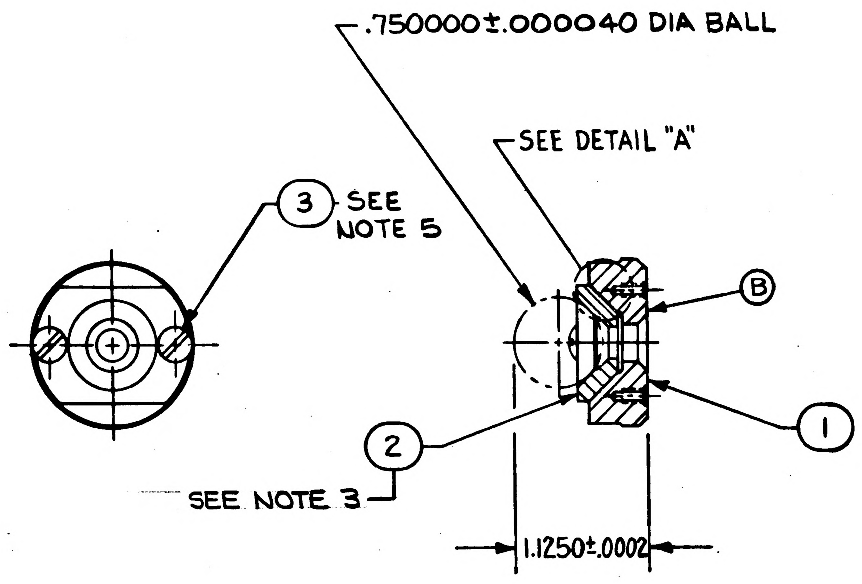
CODE IDENT NO.
SIZE C
NASA NUMBER 2011739
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

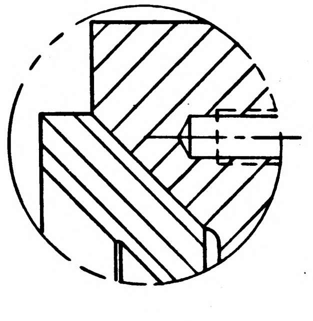
E-154

2011739

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. LAP INTERFACE OF ITEMS ① & ② TO OBTAIN AREA CONTACT OF NOT LESS THAN 75%. AFTER LAPPING SERIALIZE PARTS TO INSURE THE MATCHING OF LAPPED PARTS AFTER LUBRICATION.
3. ~~APPLY ITEM ④ SOLID FILM LUBRICANT TO LAPPED SURFACE OF ITEM ② PER ND1002216.~~
4. ~~GRIND OR LAP SURFACE "B" TO OBTAIN DIMENSION INDICATED AFTER APPLICATION OF LUBRICATION FILM.~~
5. ~~AFTER GRINDING OR LAPPING IS COMPLETED VIBRATION PROOF ITEM ③ AS PER MIL-S-22473 GRADE C.~~
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (BAGGING).





DETAIL "A"
SCALE 4/1

✱ PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	AR	✱	1012049	74471442001		LUBRICANT DRY FILM (EXTREME ENVIRONMENT)			
3	2		2011571	57386910890		SCREW, SHOULDER			
2	1		2011570	57386910880		INSERT, BALL MOUNT, LINE			
1	1		2011569	57386910870		INSERT, BALL MOUNT, LINE BASE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011889	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910670

DRAWN V. AMATO DATE 4-10-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL E. Ruchmann 7/13/64
APPROVAL E. Morup 7/13/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSERT, BALL MOUNT, LINE, ASSY OF

CODE IDENT NO. SIZE C NASA NUMBER 2011739

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011739

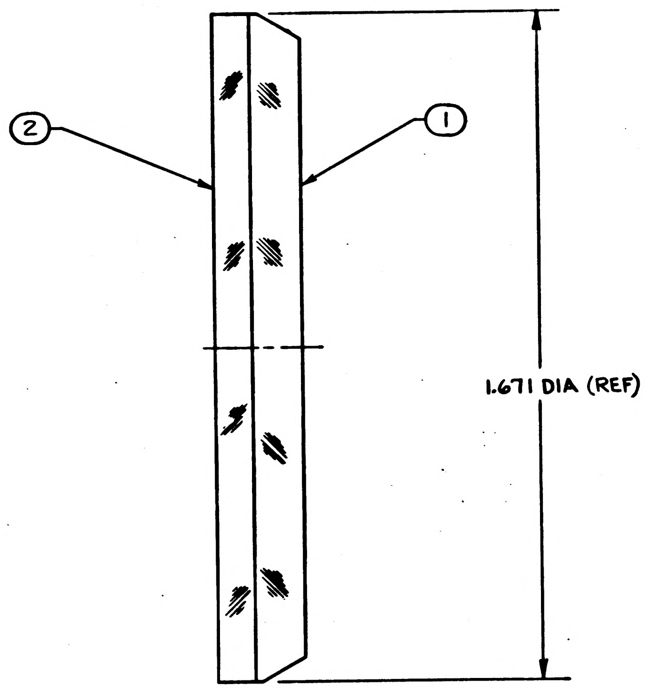
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011760

REVISIONS TDRR 11491

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. CEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 USING ADHESIVE PER MIL-A-3920.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (BAGGING)



2011760

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011761	28386910190		WINDOW, RETICLE, ELEMENT, SCT			
1	1		2011806	28386910200		RETICLE, ELEMENT, ENGRAVED, SCT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011722	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910040
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/15/64 JS
APPROVAL 2/17/64
APPROVAL E. Mong 8/10/64
NASA APPROVAL 8/14/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE ASSEMBLY,
SCT

CODE IDENT NO.
SIZE D
NASA NUMBER 2011760
SCALE 5/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

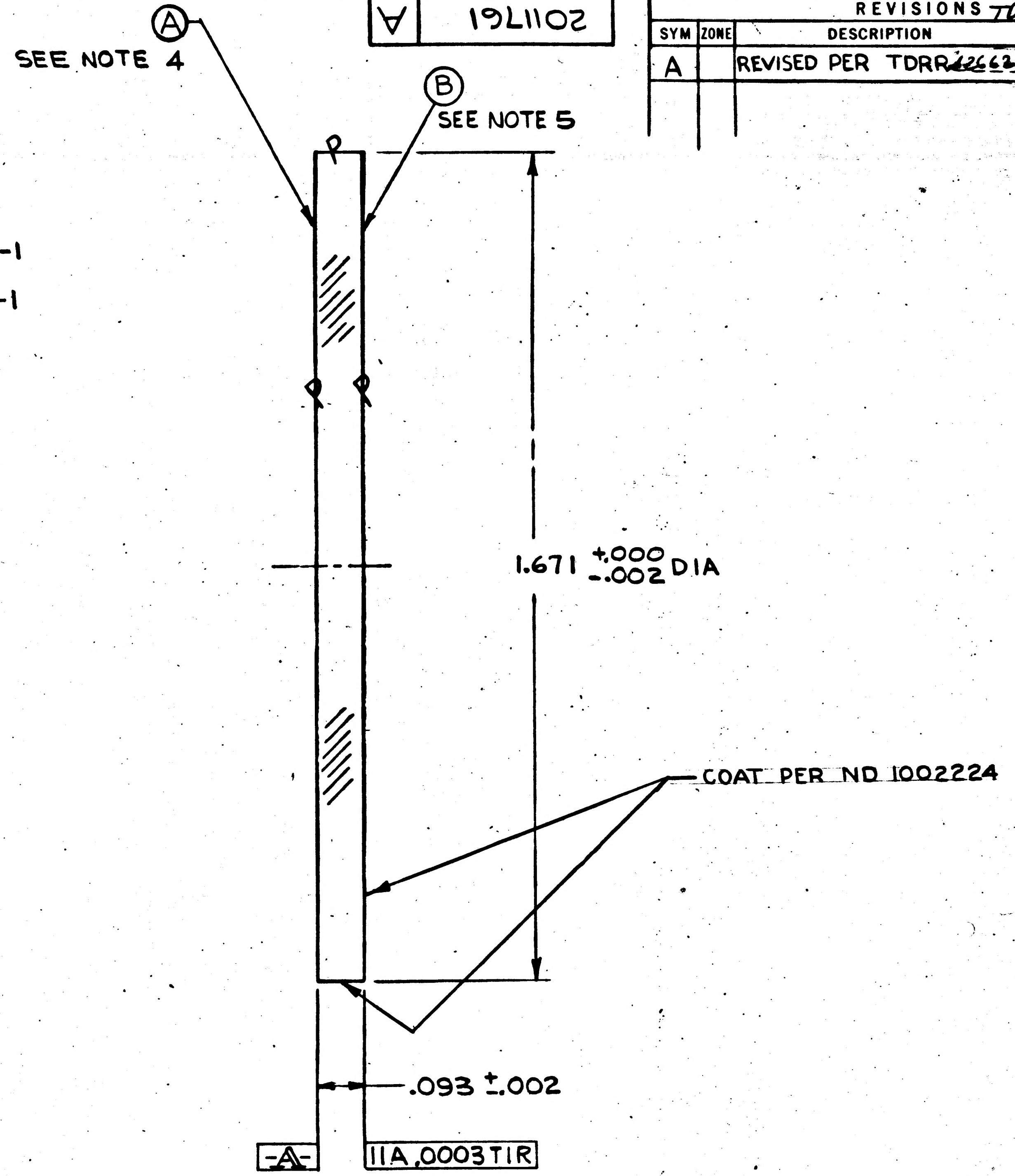
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

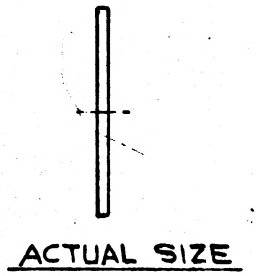
A 2011761

REVISIONS ~~TDRR 09890~~				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12662	9/17/64	

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3- GLASS-BSC 2 OR EQUIVALENT FLATNESS 5λ AT 5461Å.
4- SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA (REF) 10-1 OUTER ZONE 10-5.
5- SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA (REF) 10-1 OUTER ZONE 10-5.
6- SURFACES MARKED "P" POLISHED.




ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011760	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910190
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/27/64 J.S.
APPROVAL 5/28/64
APPROVAL E. Kharp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

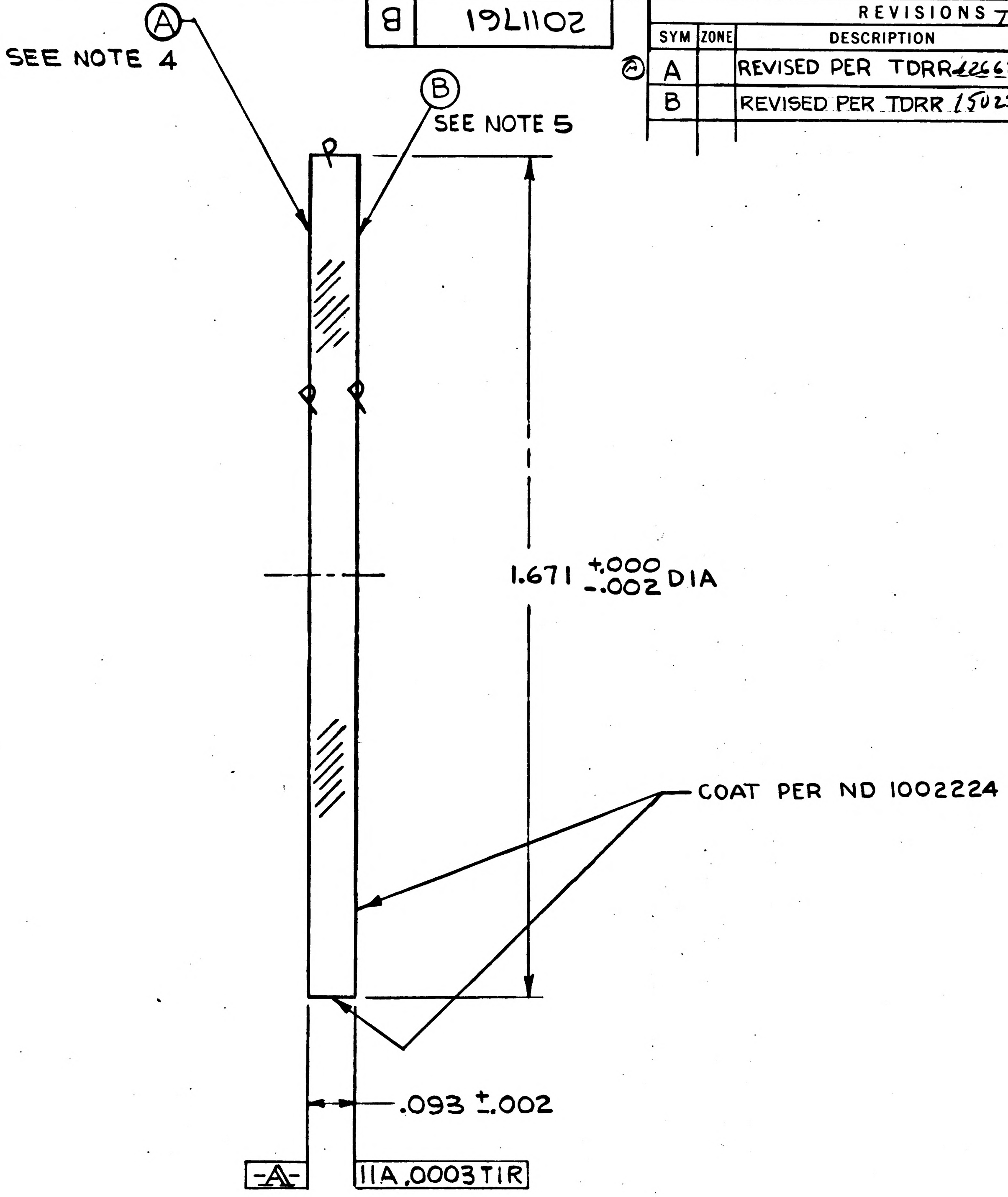
TITLE
WINDOW, RETICLE, ELEMENT, SCT

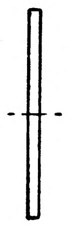
CODE IDENT NO.
SIZE C
NASA NUMBER 2011761
SCALE 5:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B | 2011761

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12662	9/17/64	
B		REVISED PER TDRR 15023		WK.

NOTES:
1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3- GLASS 517-645 GRADE B, FINE ANNEALED FLATNESS 5λ AT 5461Å.
4- SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2 OUTER ZONE 10-5.
5- SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA 10-1 OUTER ZONE 10-5.
6- SURFACES MARKED "P" POLISHED.
7- IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (BAGGING).





ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910190
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/27/64 J-S
APPROVAL 5/27/64
APPROVAL E. Throup 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WINDOW, RETICLE, ELEMENT, SCT

CODE IDENT NO.
SIZE C
NASA NUMBER 2011761
SCALE 5:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

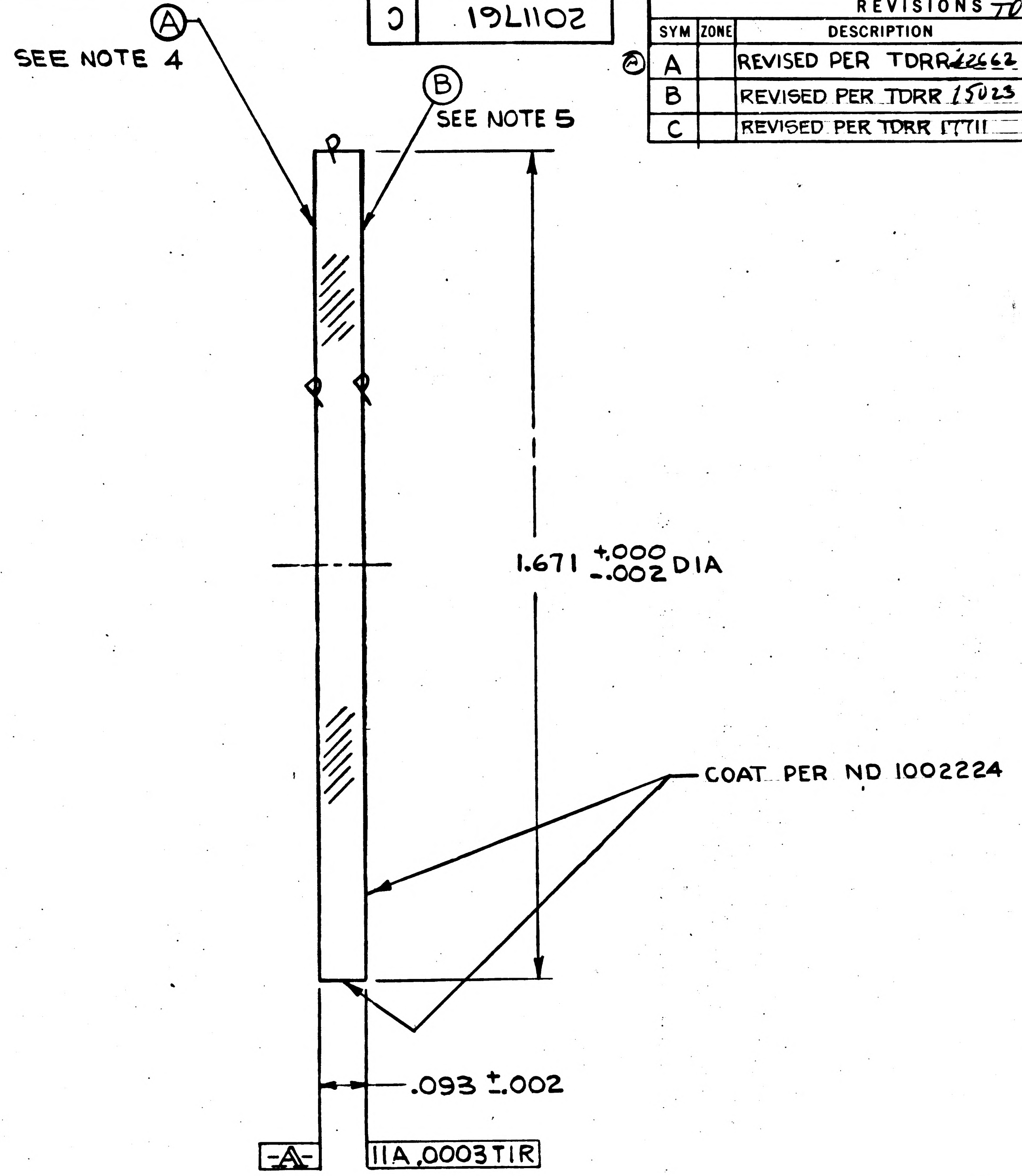
2011761 A

E-154

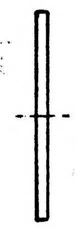
NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3- GLASS 517-645 GRADE B, FINE ANNEALED FLATNESS 5λ AT 5461Å.
4- SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2 OUTER ZONE 10-5.
5- SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA 10-1 OUTER ZONE 20-5.
6- SURFACES MARKED "P" POLISHED.
7- IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019 (BAGGING).

C 2011761



REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
Ⓐ A		REVISED PER TDRR 22662	9/17/64	
B		REVISED PER TDRR 15023	22Dec64	WK.
C		REVISED PER TDRR 17711	4/2/65	WK.



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910190

DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/27/64 J.S.
APPROVAL 5/29/64
APPROVAL E. 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE WINDOW, RETICLE, ELEMENT, SCT

CODE IDENT NO.
SIZE C
NASA NUMBER 2011761
SCALE 5:1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

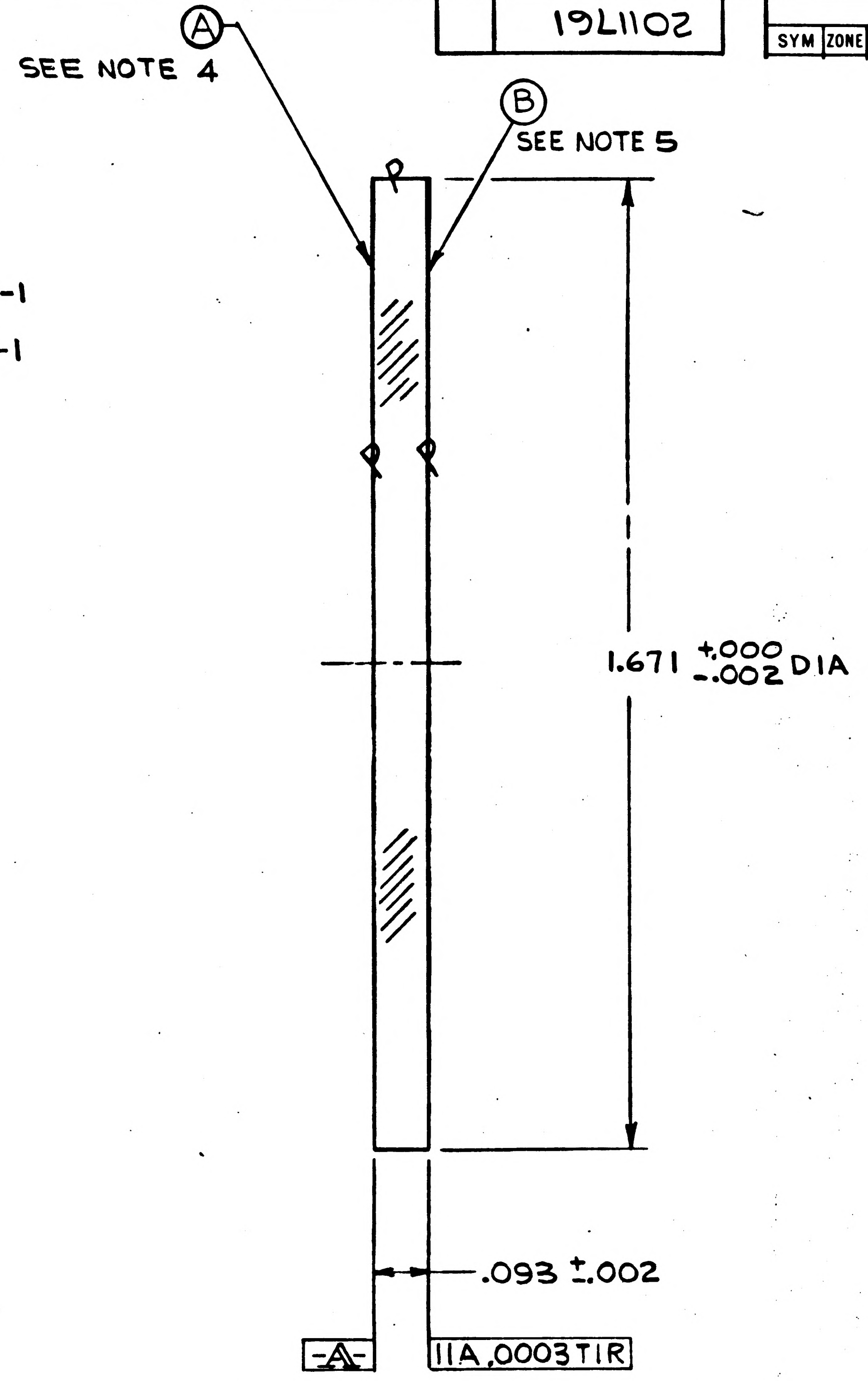
2011761 C

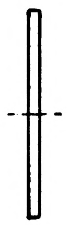
2011761

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1- INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2- ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3- GLASS-BSC 2 OR EQUIVALENT FLATNESS 5λ AT 5461Å.
4- SURFACE QUALITY Ⓐ INNER ZONE=1.1240 DIA (REF) 10-1 OUTER ZONE 10-5.
5- SURFACE QUALITY Ⓑ INNER ZONE=1.1240 DIA (REF) 10-1 OUTER ZONE 10-5.
6- SURFACES MARKED "P" POLISHED.




ACTUAL SIZE

2011761

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011760	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910190

DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/27/64 JFS
APPROVAL J. Rosenman 5/29/64
APPROVAL E. Thoup 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WINDOW, RETICLE,
ELEMENT, SCT

CODE IDENT NO. | SIZE C | NASA NUMBER 2011761
SCALE 5:1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

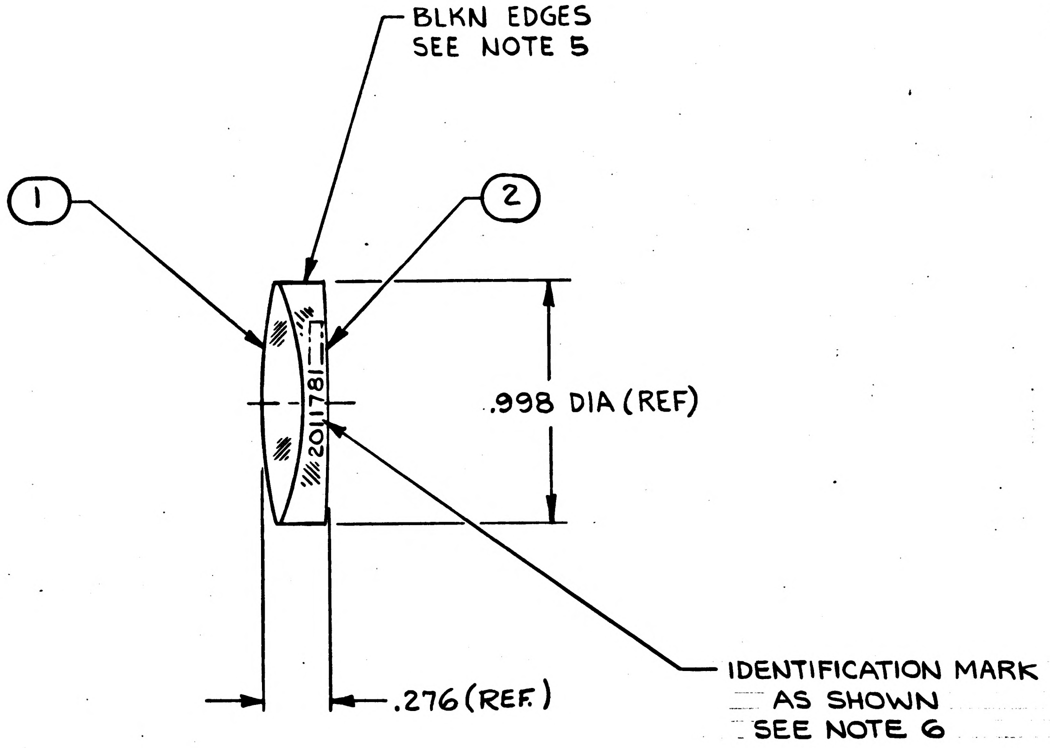
K+E E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011781

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. CEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 USING ADHESIVE PER MIL-A-3920.
4. CTRG ERROR 2 MINUTES MAX.
5. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 BLKING MATL: BLACK INK PER FED. SPEC TT-I-528
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011857	28386910440		LENS, NEGATIVE			
1	1		2011856	28386910430		LENS, POSITIVE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 76386910120
DRAWN V. AMATO DATE 4-16-64
CHECKED 3/21/64
APPROVAL 7/22/64
APPROVAL 8/10/64
NASA APPROVAL 8/12/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, ASSY OF
(SEXTANT EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011781
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

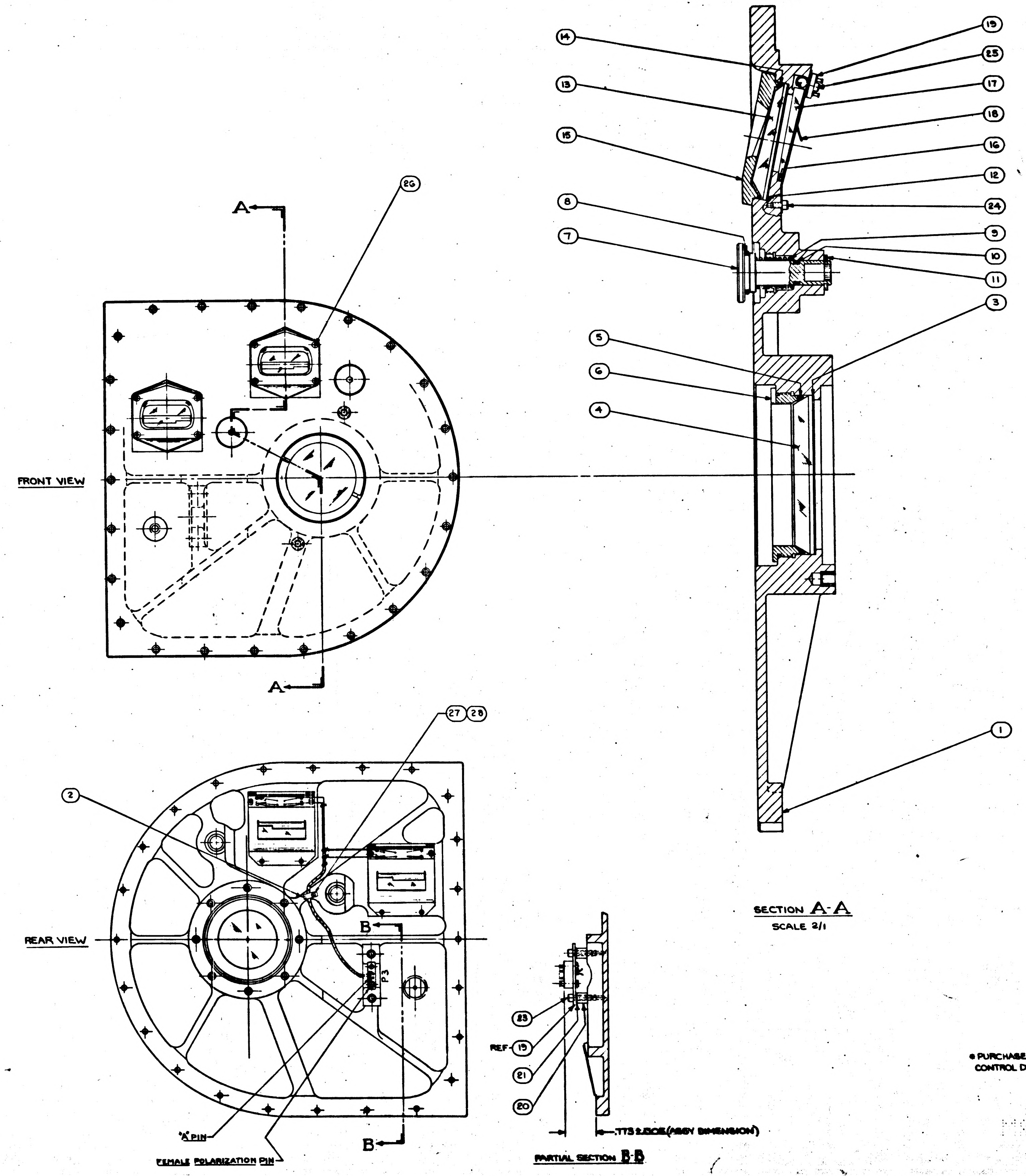
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER NDI002015. (TAGGING)

2011784 | A

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 12846	9-17-6	WK.



* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
28	1		NAS1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
27	1		MS 15795-302			WASHER, FLAT			
26	8		NAS1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25	4		NAS1352C01LL3	74455157002		↕			
24	4		NAS1352C01LL2	74455157001		↕			
23	2		NAS1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
22				—					
21	AR		2011885	45386910040		SHIM			
20	2		2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
19	1		2011913	85386910590		LAMP AND HARNESS, ASSY OF			
18	2		2011826	56386910370		PLATE, MASK			
17	2		2011828	23386910310		WEDGE, ILLUMINATING			
16	2		2011830	26386910040		GASKET, WEDGE, BOTTOM			
15	2		2011695	52386010580		BEZEL			
14	2	*	1011768-28	74453043028		PACKING, PREFORMED			
13	2		2011829	28386910300		WINDOW, GLASS			
12	2		2011831	26386910030		GASKET, WINDOW			
11	2	*	1011770-3	74453044003		RING, RETAINING			
10	2	*	1011768-8	74453043008		PACKING, PREFORMED			
9	2		2011821	56386910380		SPRING, HELICAL, COMPRESSION			
8	2	*	1011768-14	74453043014		PACKING, PREFORMED			
7	2		2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
6	1		2011808	57386910760		RING, RETAINING			
5	1	*	1011768-32	74453043032		PACKING, PREFORMED			
4	1		2011816	28386910290		WINDOW, GLASS			
3	1		2011809	26386910020		GASKET, WINDOW			
2	1		1000220-3			CLAMP, CABLE			
1	1		2011717	85386910570		TELESCOPE PANEL & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650
DRAWN R. BRUNELLE DATE 4-10-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT
SHEET 1 OF 1

MASTER

2011784 A

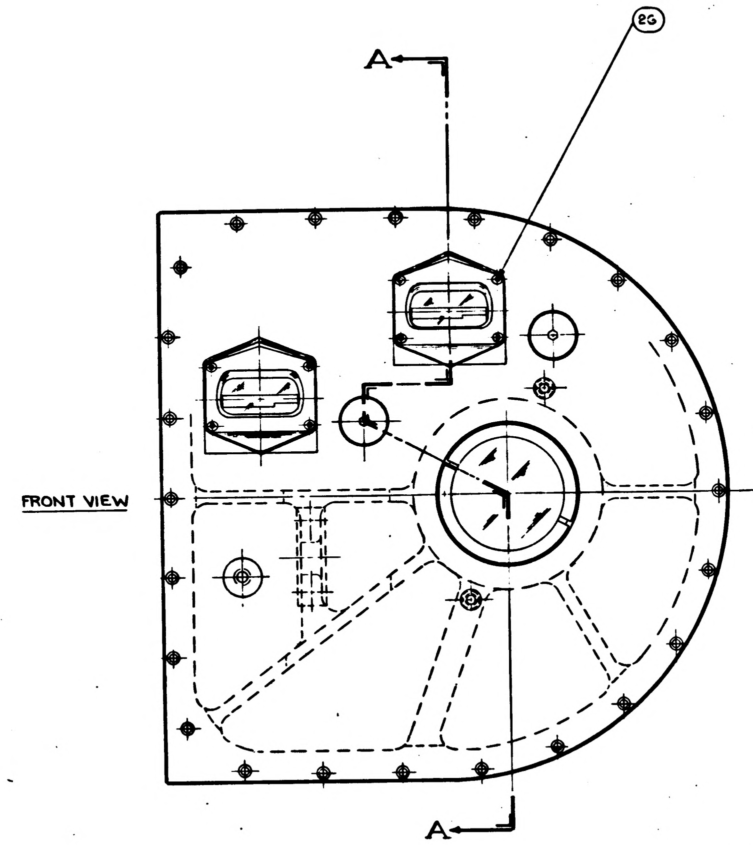
B 2011784

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO12846	9-17-64	W.K.
B		REVISED PER TDRR 18016	4/13/65	WK.

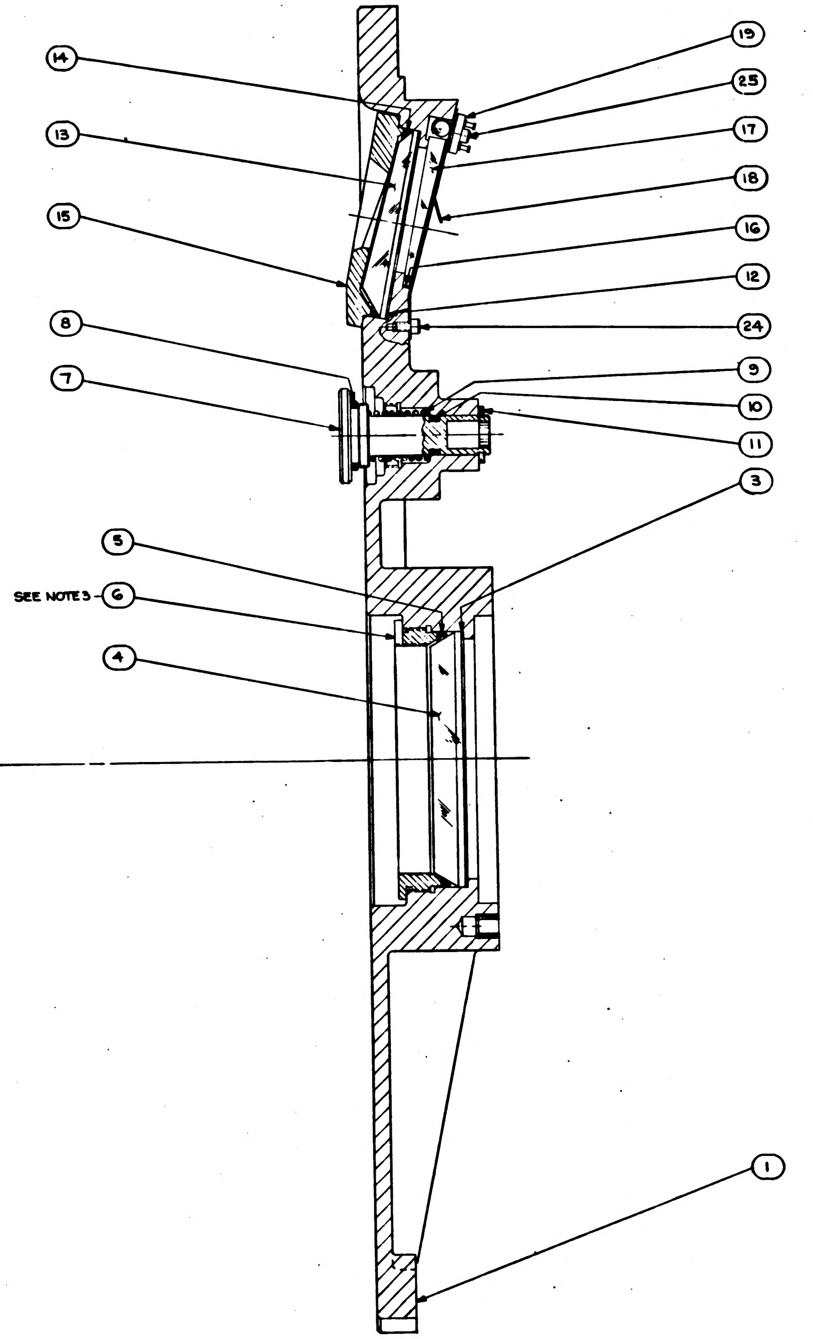
REVISIONS TDRR 12117

NOTES:

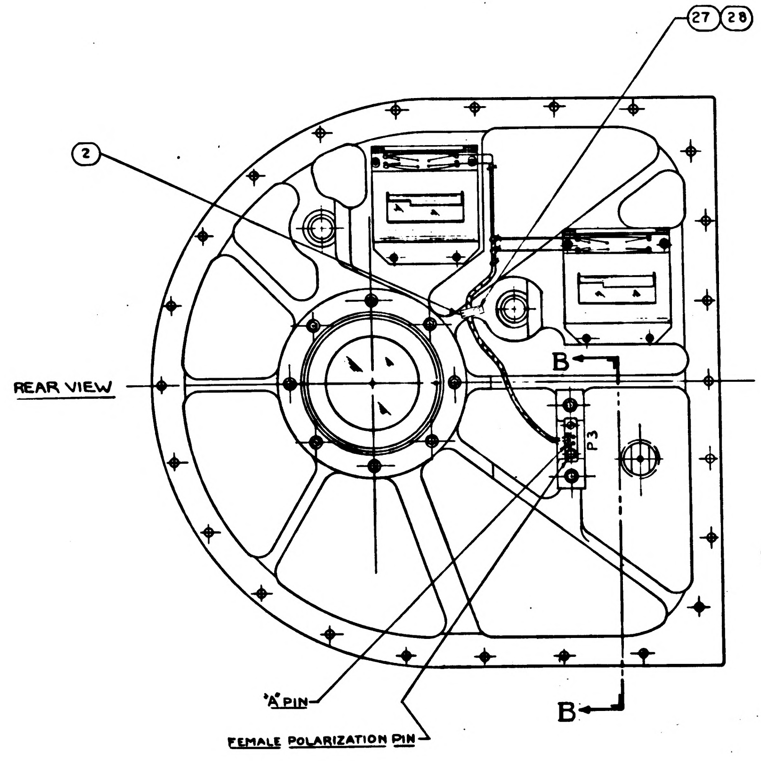
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)
3. VIBRATION PROOF ITEM 6 (2011808) BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.



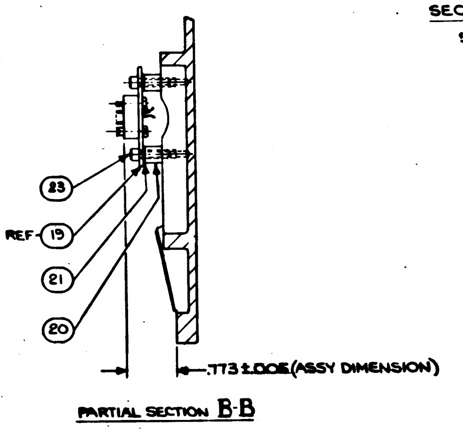
FRONT VIEW



SECTION A-A
SCALE 2/1



REAR VIEW



PARTIAL SECTION B-B

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
28	1		NAS 1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
27	1		MS 15795-302			WASHER, FLAT			
26	8		NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25	4		NAS 1352C01LL3	74455157002		↕			
24	4		NAS 1352C01LL2	74455157001		↕			
23	2		NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
22				—					
21	AR		2011885	45386910040		SHIM			
20	2		2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
19	1		2011913	85386910590		LAMP AND HARNESS, ASSY OF			
18	2		2011826	56386910370		PLATE, MASK			
17	2		2011828	28386910310		WEDGE, ILLUMINATING			
16	2		2011830	26386910040		GASKET, WEDGE, BOTTOM			
15	2		2011699	52386910580		BEZEL			
14	2	*	1011768-28	74453043028		PACKING, PREFORMED			
13	2		2011829	28386910300		WINDOW, GLASS			
12	2		2011831	26386910030		GASKET, WINDOW			
11	2	*	1011770-3	74453044003		RING, RETAINING			
10	2	*	1011768-8	74453043008		PACKING, PREFORMED			
9	2		2011821	56386910380		SPRING, HELICAL, COMPRESSION			
8	2	*	1011768-14	74453043014		PACKING, PREFORMED			
7	2		2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
6	1		2011808	57386910760		RING, RETAINING			
5	1	*	1011768-32	74453043032		PACKING, PREFORMED			
4	1		2011816	28386910290		WINDOW, GLASS			
3	1		2011809	26386910020		GASKET, WINDOW			
2	1		1000220-3			CLAMP, CABLE			
1	1		2011717	85386910570		TELESCOPE PANEL & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

2011784B

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650
DRAWN R. BRUNELLE DATE 4-10-64
CHECK 7/1/64
APPROVAL 7/1/64
APPROVAL 8/22/64
NASA APPROVAL
MIT APPROVAL 25/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

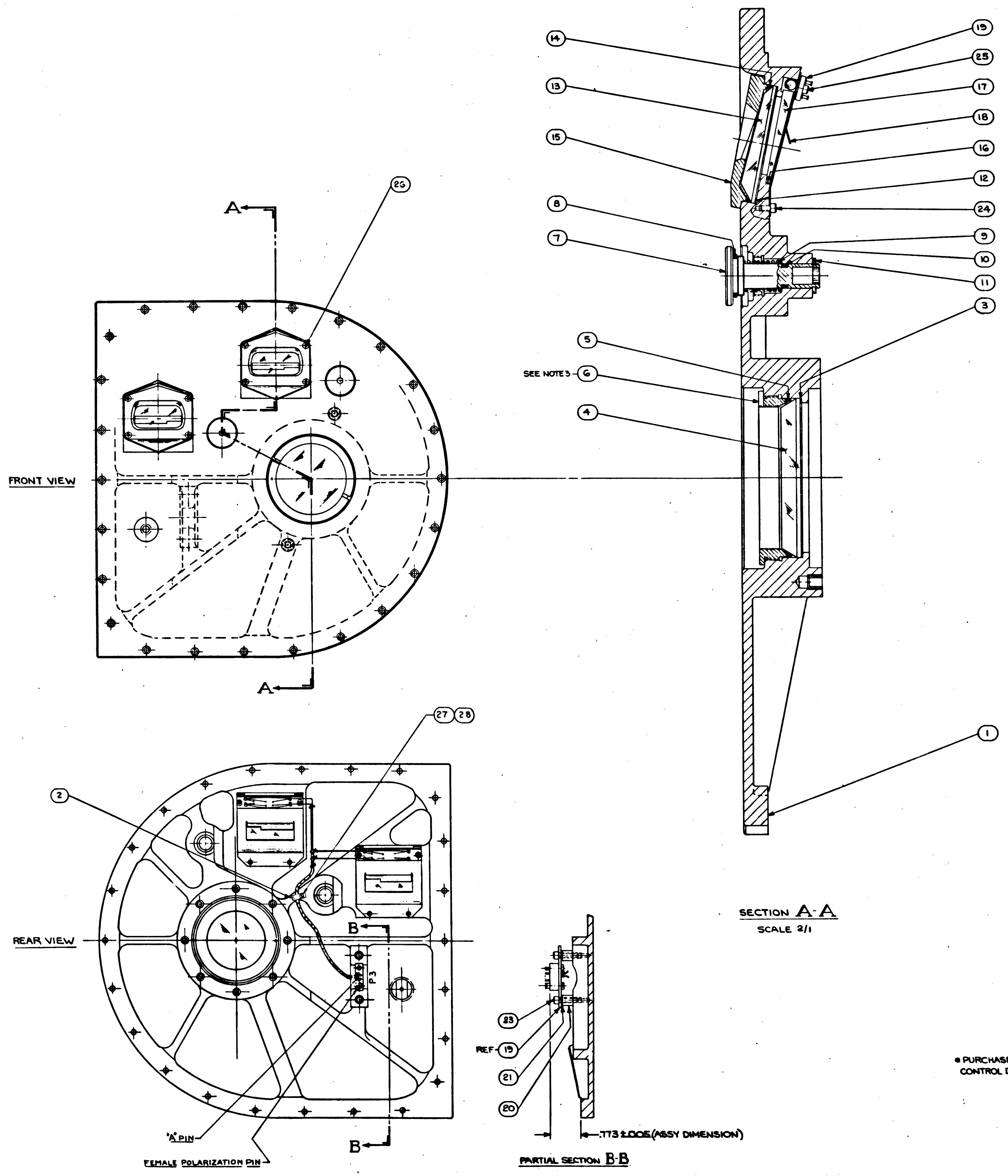
2011784 C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)
3. VIBRATION PROOF ITEM 6 (2011808) BY APPLYING LOCKING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/3 OF LAST THREAD PER ND1002211.
4. APPLY THIN FILM OF ITEM 29 TO ITEMS 5, 8 & 10 AND REMOVE ALL EXCESS PRIOR TO INSTALLATION. THIS IS DONE BY WIPING "O" RINGS WITH LENS TISSUE UNTIL NO GREASE IS EVIDENT ON TISSUE.

REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO12874	9-17-64	[illegible]
B		REVISED PER TDRR 18016	4/13/65	[illegible]
C		REVISED PER TDRR 19770	[illegible]	[illegible]



* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
29	AR		1012051	74471445001		GREASE SILICONE			
28	1		NAS 1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
27	1		MS 15795-302			WASHER, FLAT			
26	8		NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25	4		NAS 1352C01LL3	74455157002		↕			
24	4		NAS 1352C01LL2	74455157001		↕			
23	2		NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
22				—					
21	AR		2011885	45386910040		SHIM			
20	2		2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
19	1		2011913	85386910590		LAMP AND HARNESS, ASSY OF			
18	2		2011826	56386910370		PLATE, MASK			
17	2		2011828	28386910310		WEDGE, ILLUMINATING			
16	2		2011830	26386910040		GASKET, WEDGE, BOTTOM			
15	2		2011699	52386910580		BEZEL			
14	2	*	1011768-28	74453043028		PACKING, PREFORMED			
13	2		2011829	28386910300		WINDOW, GLASS			
12	2		2011831	26386910030		GASKET, WINDOW			
11	2	*	1011770-3	74453044003		RING, RETAINING			
10	2	*	1011768-8	74453043008		PACKING, PREFORMED			
9	2		2011821	56386910380		SPRING, HELICAL, COMPRESSION			
8	2	*	1011768-14	74453043014		PACKING, PREFORMED			
7	2		2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
6	1		2011808	57386910760		RING, RETAINING			
5	1	*	1011768-32	74453043032		PACKING, PREFORMED			
4	1		2011816	28386910290		WINDOW, GLASS			
3	1		2011809	26386910020		GASKET, WINDOW			
2	1		1000720-3			CLAMP, CABLE			
1	1		2011717	85386910570		TELESCOPE PANEL & INSERT, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650

DRAWN R. BRUNELLE DATE 4-10-64
CHECK [illegible] 7/1/64
APPROVAL [illegible] 7/1/64
APPROVAL [illegible] 8/22/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 2 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)
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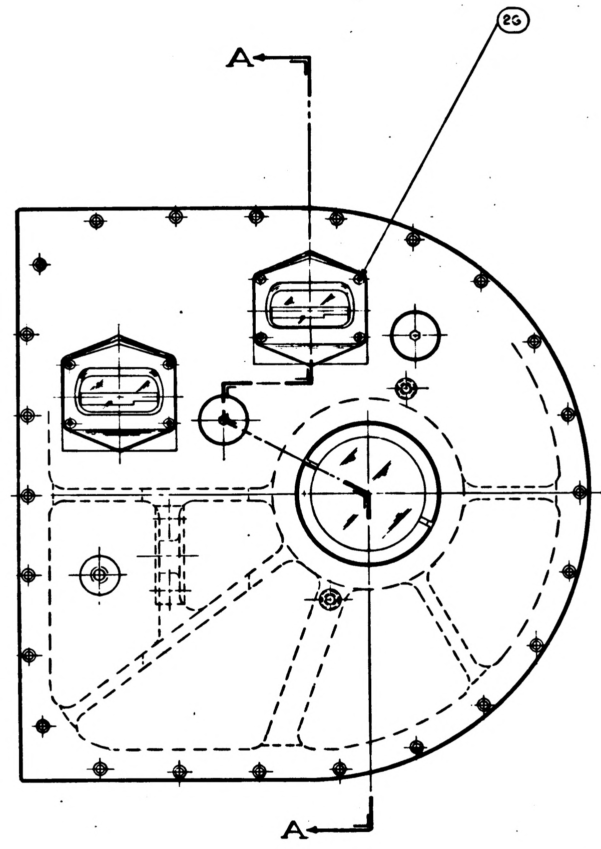
4. APPLY THIN FILM OF ITEM 29 TO ITEMS 5, 8 & 10 AND REMOVE ALL EXCESS PRIOR TO INSTALLATION. THIS IS DONE BY WIPING "O" RINGS WITH LENS TISSUE UNTIL NO GREASE IS EVIDENT ON TISSUE.

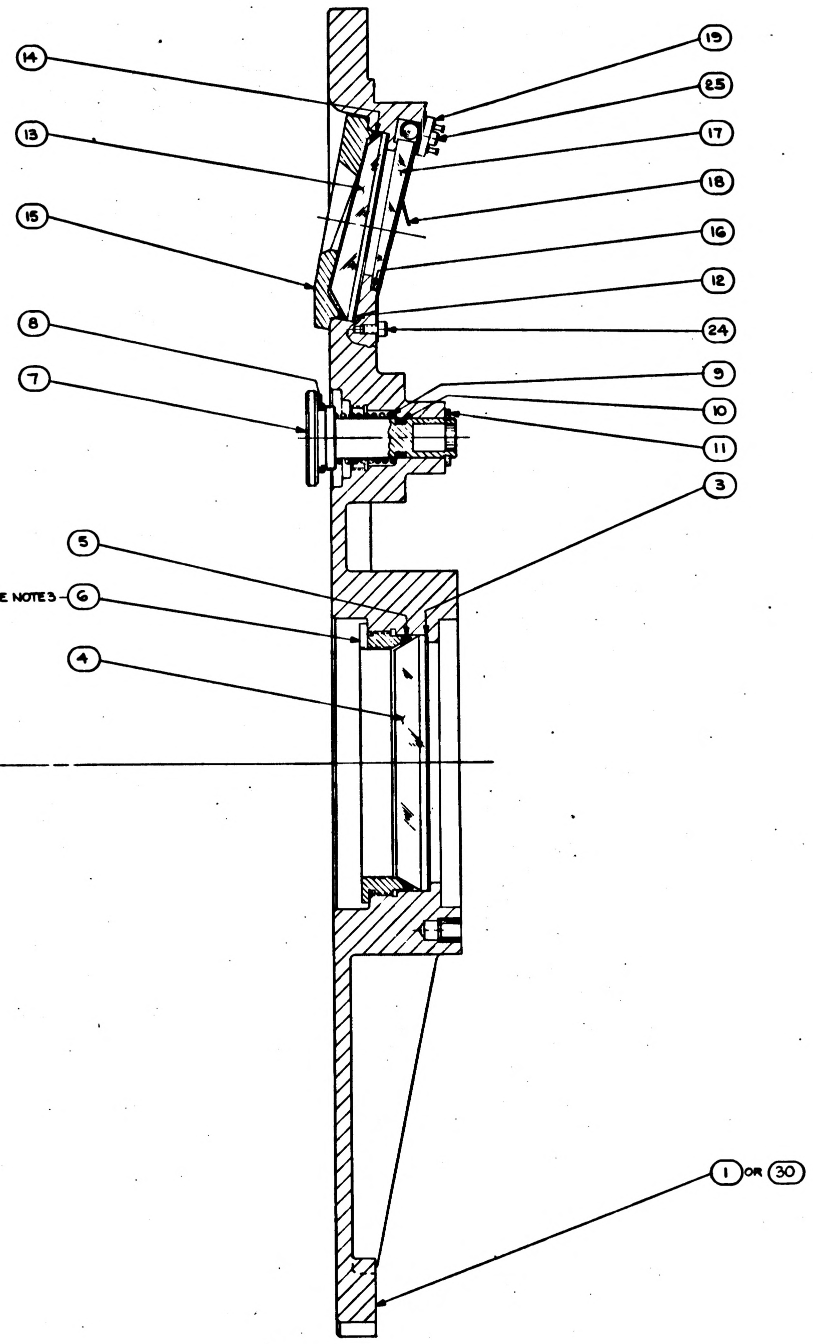
D | 2011784

REVISIONS TDRR 12114

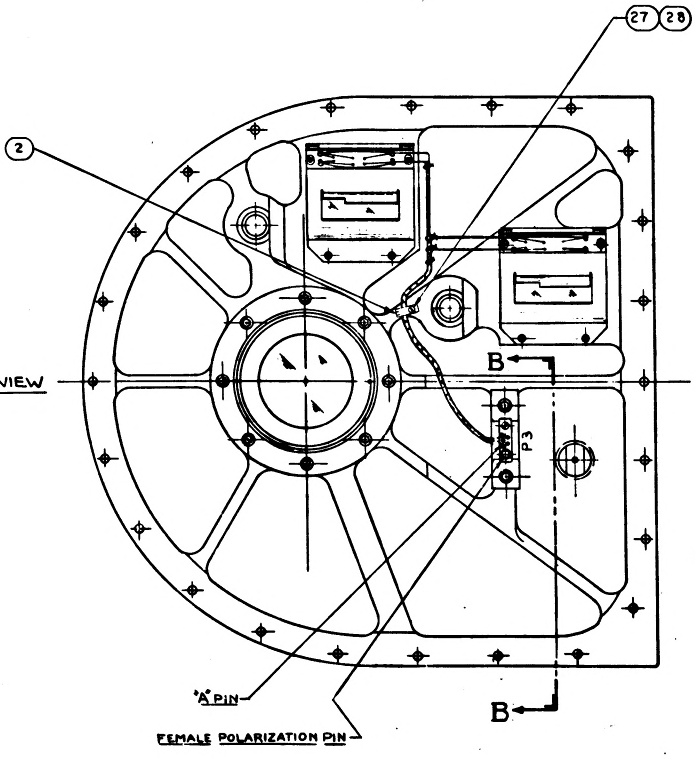
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO/12846	9-17-[illegible]	[illegible]
B		REVISED PER TDRR 18016	4/13/[illegible]	[illegible]
C		REVISED PER TDRR 19770	[illegible]	[illegible]
D		REVISED PER TDRR 22652	[illegible]	[illegible]



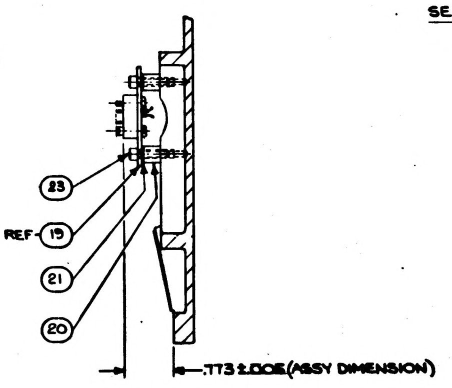
FRONT VIEW



SECTION A-A
SCALE 2/1



REAR VIEW



PARTIAL SECTION B-B

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	30			2011717-011			PANEL TELESCOPE & INSERT, ASSY OF			
AR	AR	29			1012051	74471445001		GREASE SILICONE			
1	1	28			NAS 1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
1	1	27			MS 15795-302			WASHER, FLAT			
8	8	26			NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
4	4	25			NAS 1352C01LL3	74455157002		↕			
4	4	24			NAS 1352C01LL2	74455157001		↕			
2	2	23			NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
		22				—•—					
AR	AR	21			2011885	45386910040		SHIM			
2	2	20			2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
1	1	19			2011913	85386910590		LAMP AND HARNESS, ASSY OF			
2	2	18			2011826	56386910370		PLATE, MASK			
2	2	17			2011828	28386910310		WEDGE, ILLUMINATING			
2	2	16			2011830	26386910040		GASKET, WEDGE, BOTTOM			
2	2	15			2011699	52386910580		BEZEL			
2	2	14		*	1011768-28	74453043028		PACKING, PREFORMED			
2	2	13			2011829	28386910300		WINDOW, GLASS			
2	2	12			2011831	26386910030		GASKET, WINDOW			
2	2	11		*	1011770-3	74453044003		RING, RETAINING			
2	2	10		*	1011768-8	74453043008		PACKING, PREFORMED			
2	2	9			2011821	56386910380		SPRING, HELICAL, COMPRESSION			
2	2	8		*	1011768-14	74453043014		PACKING, PREFORMED			
2	2	7			2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
1	1	6			2011808	57386910760		RING, RETAINING			
1	1	5		*	1011768-32	74453043032		PACKING, PREFORMED			
1	1	4			2011816	28386910290		WINDOW, GLASS			
1	1	3			2011809	26386910020		GASKET, WINDOW			
1	1	2			1000220-3			CLAMP, CABLE			
0	1	1			2011717	85386910510		TELESCOPE PANEL & INSERT, ASSY OF			

QTY REQD

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ -	+ -	+ -

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650

DRAWN R. BRUNELLE DATE [illegible]-10-64
CHECK [illegible] 7/1/64
APPROVAL [illegible] 7/3/64
APPROVAL [illegible] 3/22/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 2 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011784 F

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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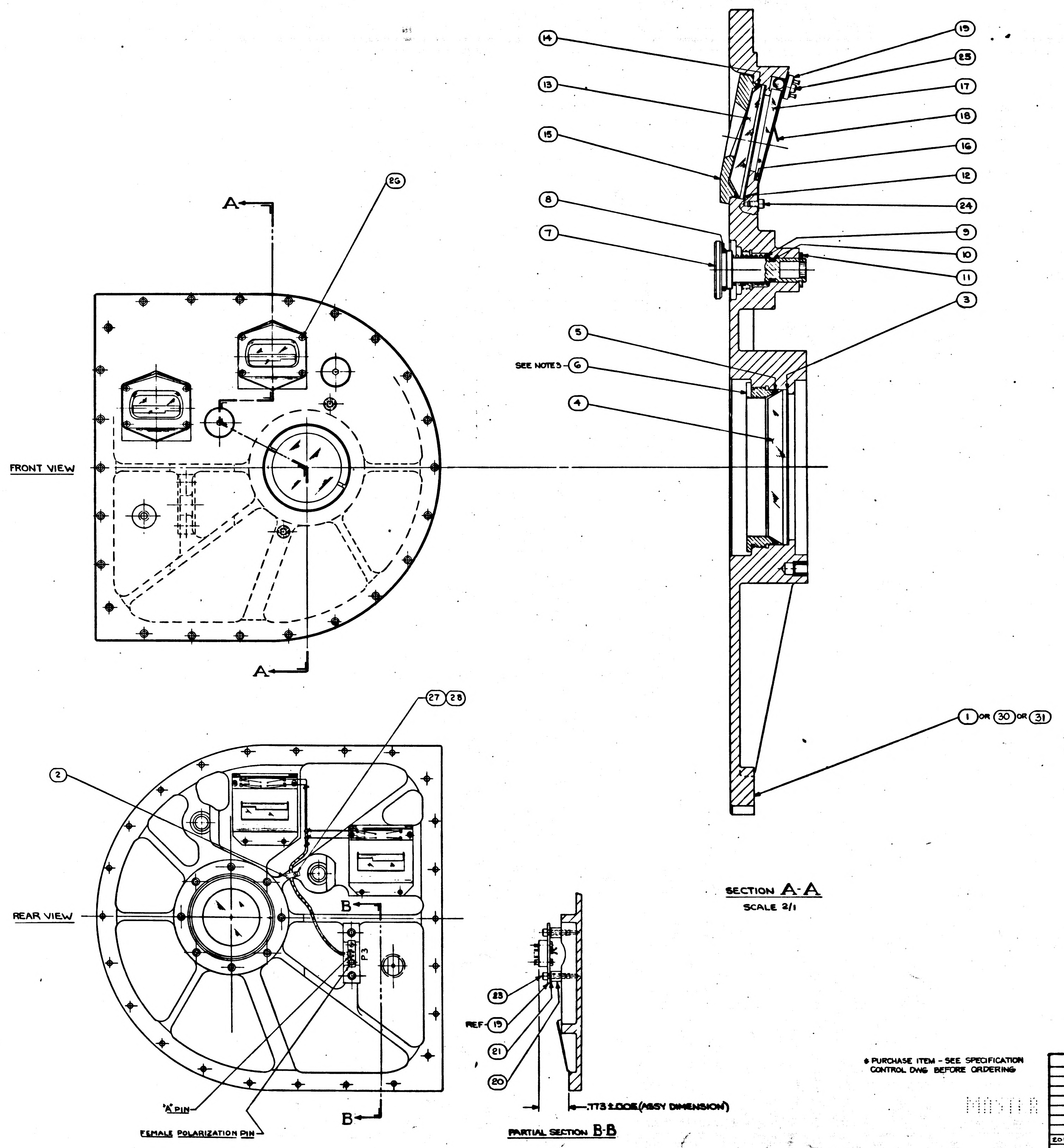
4. APPLY THIN FILM OF ITEM 29 TO ITEMS 5, 8 & 10 AND REMOVE ALL EXCESS PRIOR TO INSTALLATION.

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO12844	5-17-[illegible]	wK
B		REVISED PER TDRR 18016	4/13/6[illegible]	wK
C		REVISED PER TDRR 19770	[illegible]	wK
D		REVISED PER TDRR 22652	[illegible]	wK
E		REVISED PER TDRR 29146	6-13-[illegible]	[illegible]
F		REVISED PER TDRR 30086	[illegible]	[illegible]



* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	31			2011717-021			PANEL TELESCOPE & INSERT, ASSY OF			
0	1	0	30			2011717-011			PANEL TELESCOPE & INSERT, ASSY OF			
AR	AR	AR	29			1012051	74471445001		GREASE SILICONE			
1	1	1	28			NAS 1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
1	1	1	27			MS 15795-302			WASHER, FLAT			
8	8	8	26			NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
4	4	4	25			NAS 1352C01LL3	74455157002		↕			
4	4	4	24			NAS 1352C01LL2	74455157001		↕			
2	2	2	23			NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
			22				—					
AR	AR	AR	21			2011885	45386910040		SHIM			
2	2	2	20			2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
1	1	1	19			2011913	85386910590		LAMP AND HARNESS, ASSY OF			
2	2	2	18			2011826	56386910370		PLATE, MASK			
2	2	2	17			2011828	28386910310		WEDGE, ILLUMINATING			
2	2	2	16			2011830	26386910040		GASKET, WEDGE, BOTTOM			
2	2	2	15			2011699	52386910580		BEZEL			
2	2	2	14		*	1011768-28	74453043028		PACKING, PREFORMED			
2	2	2	13			2011829	28386910300		WINDOW, GLASS			
2	2	2	12			2011831	26386910030		GASKET, WINDOW			
2	2	2	11		*	1011770-3	74453044003		RING, RETAINING			
2	2	2	10		*	1011768-8	74453043008		PACKING, PREFORMED			
2	2	2	9			2011821	56386910380		SPRING, HELICAL, COMPRESSION			
2	2	2	8		*	1011768-14	74453043014		PACKING, PREFORMED			
2	2	2	7			2011823	57386910770		SHAFT, MANUAL ADJUSTMENT			
1	1	1	6			2011808	57386910760		RING, RETAINING			
1	1	1	5		*	1011768-32	74453043032		PACKING, PREFORMED			
1	1	1	4			2011816	28386910290		WINDOW, GLASS			
1	1	1	3			2011809	26386910020		GASKET, WINDOW			
1	1	1	2			1000220-3			CLAMP, CABLE			
0	0	1	1			2011717-000	85386910510		TELESCOPE PANEL & INSERT, ASSY OF			

QTY REQ'D

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650

DRAWN R. BRUNELLE DATE 4-10-64
CHECK [illegible]
APPROVAL [illegible] 7/2/64
APPROVAL E. Thomp 8/21/64
NASA APPROVAL
MIT APPROVAL W Craft 2 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011784 F

2011784 G

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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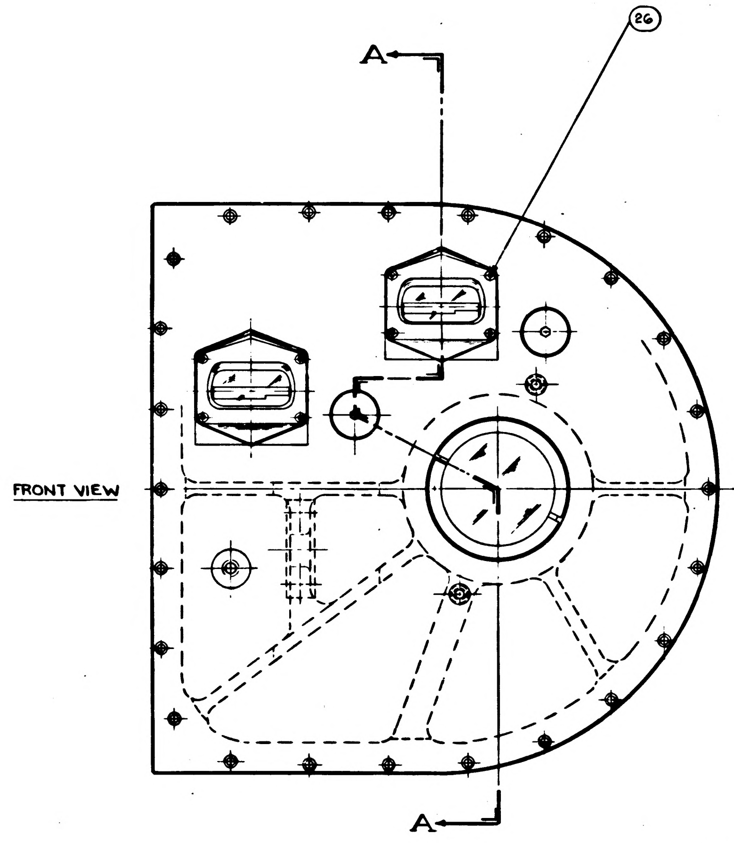
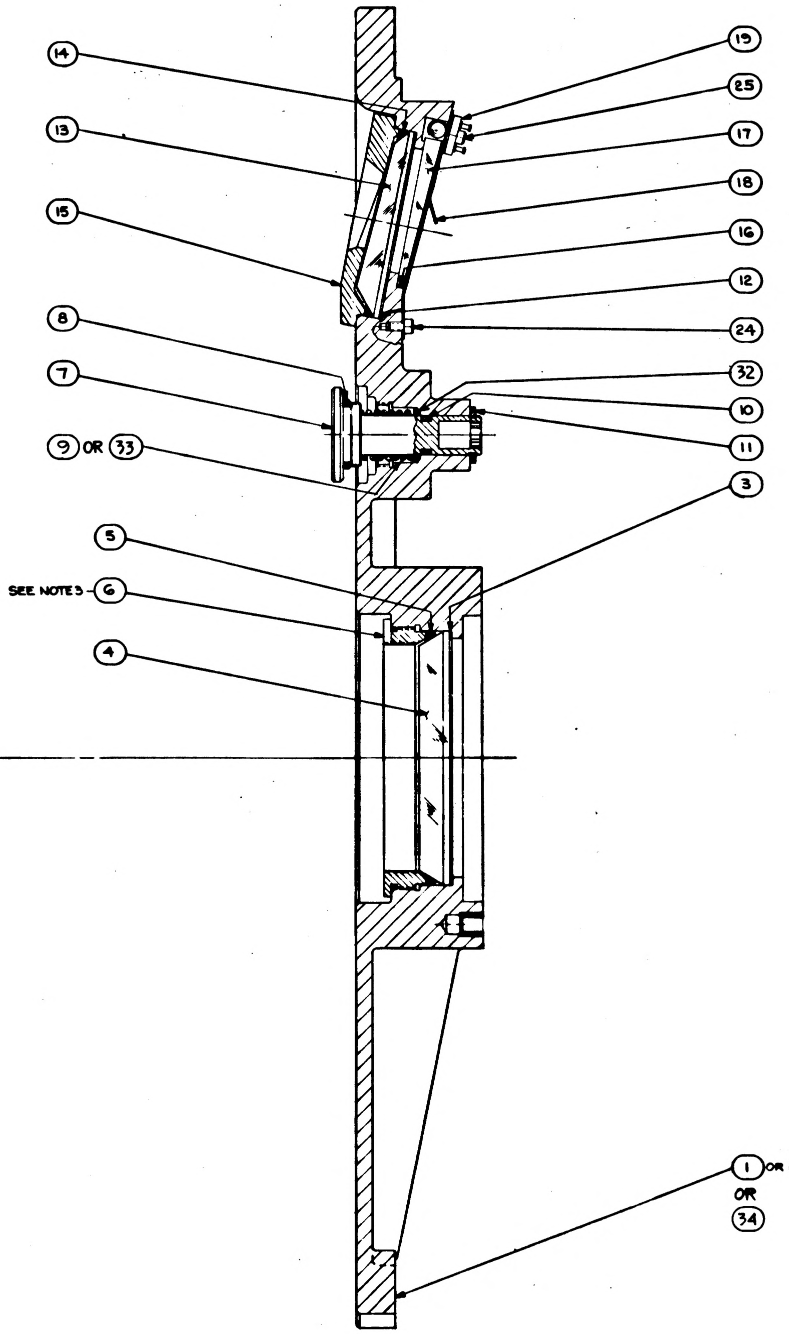
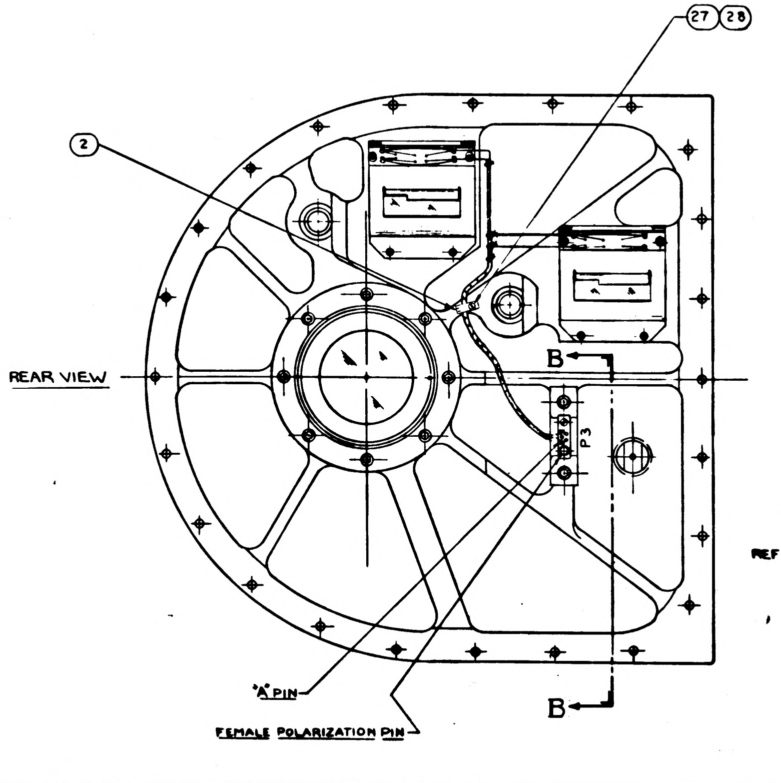
REVISIONS TDRR 12119

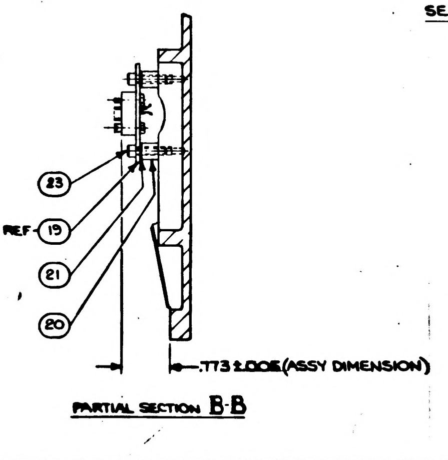
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO12846	9-17	
B		REVISED PER TDRR 18016	4/13/65	WR
C		REVISED PER TDRR 19770		WR
D		REVISED PER TDRR 22652		WR
E		REVISED PER TDRR 29146	6-1-66	
F		REVISED PER TDRR 30036		
G		REVISED PER TDRR 32819	4-27-67	





SECTION A-A
SCALE 2/1





PARTIAL SECTION B-B

031	021	011	000	ITEM NO.	QTY REQ'D	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	34			2011717-031			PANEL TELESCOPE & INSERT, ASSY OF			
2	0	0	0	33			2012759	56386910700		SPRING, HELICAL, COMPRESSION			
2	0	0	0	32			2012752	45386910260		SPACER			
0	1	0	0	31			2011717-021			PANEL TELESCOPE & INSERT, ASSY OF			
0	0	1	0	30			2011717-011			PANEL TELESCOPE & INSERT, ASSY OF			
AR	AR	AR	AR	29			1012051	74471445001		GREASE SILICONE			
1	1	1	1	28			NAS 1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
1	1	1	1	27			MS 15795-302			WASHER, FLAT			
8	8	8	8	26			NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
4	4	4	4	25			NAS 1352C01LL3	74455157002		↕			
4	4	4	4	24			NAS 1352C01LL2	74455157001		↕			
2	2	2	2	23			NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
				22				—					
AR	AR	AR	AR	21			2011885	45386910040		SHIM			
2	2	2	2	20			2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
1	1	1	1	19			2011913	85386910590		LAMP AND HARNESS, ASSY OF			
2	2	2	2	18			2011826	56386910370		PLATE, MASK			
2	2	2	2	17			2011828	28386910310		WEDGE, ILLUMINATING			
2	2	2	2	16			2011830	26386910040		GASKET, WEDGE, BOTTOM			
2	2	2	2	15			2011699	52386910580		BEZEL			
2	2	2	2	14		*	1011768-28	74453043028		PACKING, PREFORMED			
2	2	2	2	13			2011829	28386910300		WINDOW, GLASS			
2	2	2	2	12			2011831	26386910030		GASKET, WINDOW			
2	2	2	2	11		*	1011770-3	74453044003		RING, RETAINING			
2	2	2	2	10		*	1011768-8	74453043008		PACKING, PREFORMED			
0	2	2	2	9			2011821	56386910380		SPRING, HELICAL, COMPRESSION			
2	2	2	2	8		*	1011768-14	74453043014		PACKING, PREFORMED			
2	2	2	2	7			2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
1	1	1	1	6			2011808	57386910760		RING, RETAINING			
1	1	1	1	5		*	1011768-32	74453043032		PACKING, PREFORMED			
1	1	1	1	4			2011816	28386910290		WINDOW, GLASS			
1	1	1	1	3			2011809	26386910020		GASKET, WINDOW			
1	1	1	1	2			1000220-3			CLAMP, CABLE			
0	0	0	1	1			2011717-000	85386910510		TELESCOPE PANEL & INSERT, ASSY OF			

QTY REQ'D

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650

DRAWN R. BRUNELLE DATE 2-10-64
CHECK
APPROVAL
APPROVAL 8/27/64
NASA APPROVAL
MIT APPROVAL 2-26-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT
CALC
ACTUAL
SHEET 1 OF 1

2011784 G

2011784

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TDER 12119

NOTES:
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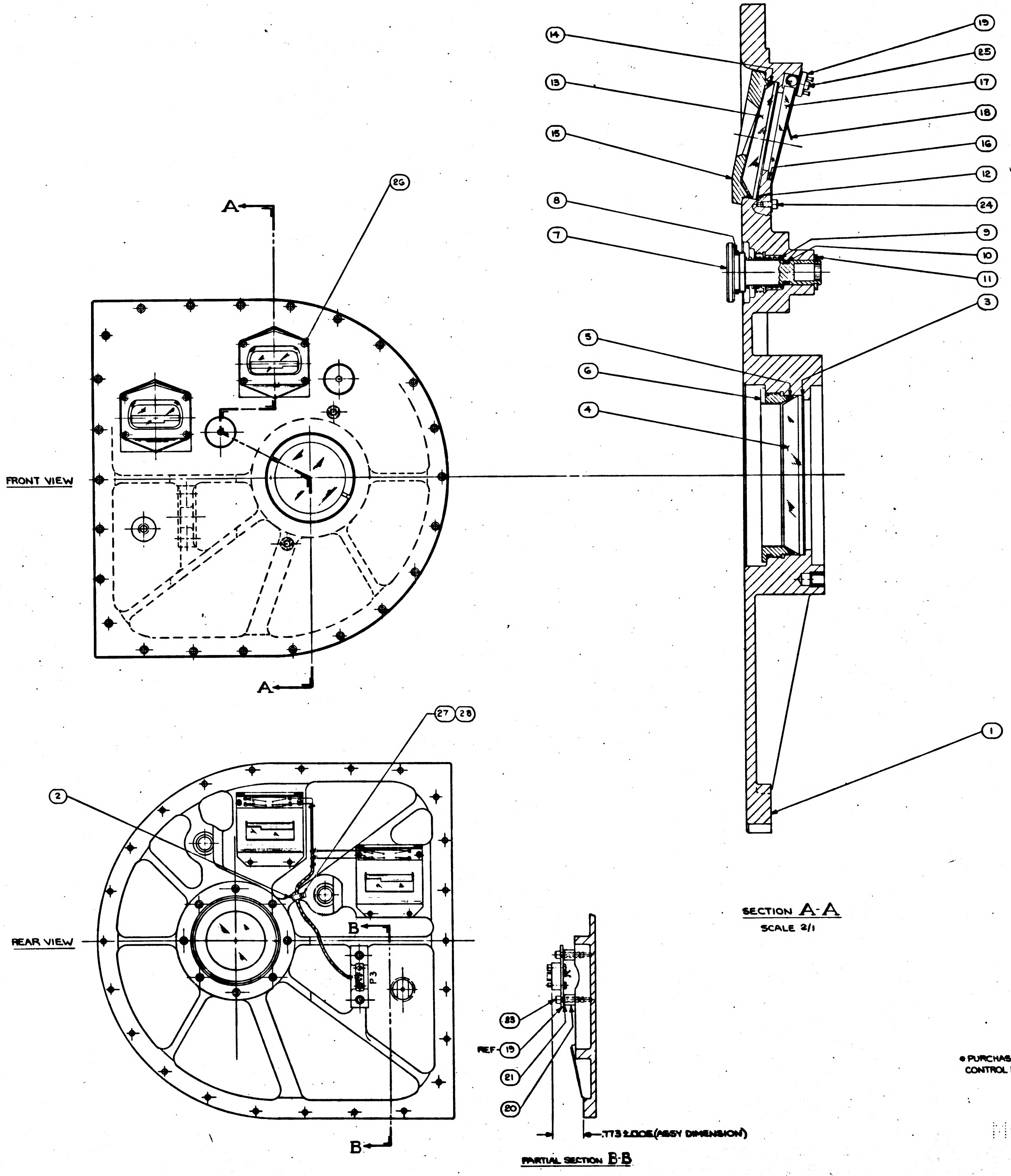

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
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27	1		MS 15795-302			WASHER, FLAT			
26	8		NAS 1352C02LL3	74455157005		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
25	4		NAS 1352C01LL3	74455157002		↕			
24	4		NAS 1352C01LL2	74455157001		↕			
23	2		NAS 1352C06LL8	74455157020		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
22				—					
21	AR		2011885	45386910090		SHIM			
20	2		2011886	45386910030		SPACER, CONNECTOR MTG. PLATE			
19	1		2011913	85386910590		LAMP AND HARNESS, ASSY OF			
18	2		2011826	56386910370		PLATE, MASK			
17	2		2011828	28386910310		WEDGE, ILLUMINATING			
16	2		2011830	26386910040		GASKET, WEDGE, BOTTOM			
15	2		2011699	52386910580		BEZEL			
14	2	*	1011768-28	74453043028		PACKING, PREFORMED			
13	2		2011829	28386910300		WINDOW, GLASS			
12	2		2011831	26386910030		GASKET, WINDOW			
11	2	*	1011770-3	74453044003		RING, RETAINING			
10	2	*	1011768-8	74453043008		PACKING, PREFORMED			
9	2		2011821	56386910380		SPRING, HELICAL, COMPRESSION			
8	2	*	1011768-14	74453043014		PACKING, PREFORMED			
7	2		2011820	57386910770		SHAFT, MANUAL ADJUSTMENT			
6	1		2011808	57386910760		RING, RETAINING			
5	1	*	1011768-32	74453043032		PACKING, PREFORMED			
4	1		2011816	28386910290		WINDOW, GLASS			
3	1		2011809	26386910020		GASKET, WINDOW			
2	1		1000220-3			CLAMP, CABLE			
1	1		2011717	85386910570		TELESCOPE PANEL - INSERT, ASSY OF			

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910650
DRAWN E. BRUNELLE DATE 4-10-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PANEL ASSEMBLY
(SCT)

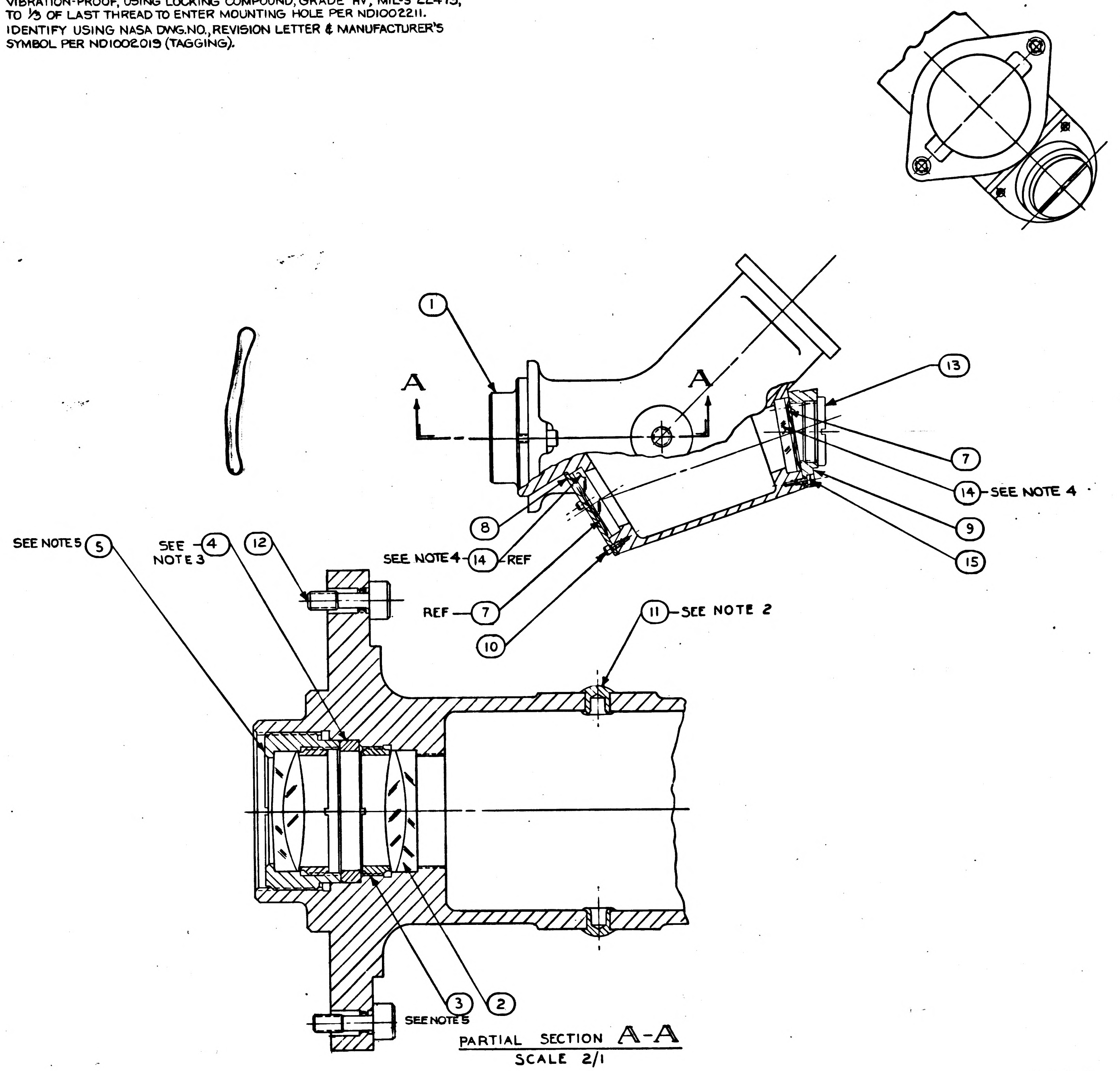
CODE IDENT NO.
SIZE E
NASA NUMBER 2011784
SCALE 1/1 & 2/1
WEIGHT
CALC
ACTUAL
SHEET 1 OF 1

MASTER

A	2011786

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15361	1/4/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑪ TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. ITEM ④ TO BE GROUND TO SUIT OPTICAL ALIGNMENT REQUIREMENTS FOR THE OPTICAL UNIT FINAL ASSEMBLY DWG 2011000
4. ITEMS ⑭ TO BE MOUNTED WITH REFLECTIVE SURFACES FACED INWARD.
5. VIBRATION-PROOF, USING LOCKING COMPOUND, GRADE "HV", MIL-S-22473, TO 1/3 OF LAST THREAD TO ENTER MOUNTING HOLE PER ND1002211.
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).



PARTIAL SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
14	2		2012162	28386910520		MIRROR			
13	1		2012124	57386911070		PLUG			
12	2		2011282	48386910040		SCREW, CAPTIVE, HEX, SOCKET HEAD			
11	2		MS16535-338	———		RIVET, TUBULAR OVAL HEAD			
10	3		NAS 1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	1		2012195	52386910670		PLATE, COVER, MIRROR			
8	1		2011680	52386910680		PLATE, COVER, MIRROR			
7	2		2011685	56386910470		WASHER, WAVE			
6									
5	1		2011794	85386910840		HOLDER AND LENS, ASSY OF			
4	1		2011665	57386910970		RING, SPACER			
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011781	76386910120		LENS, ASSY OF			
1	1		2011640	52386910690		HOUSING, MIRROR (SEXTANT EYEPIECE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ———
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910820
DRAWN V. AMATO DATE 4-17-64
CHECKED C. LEINZ (OEE) 7/13/64
APPROVAL F. Ruschmann 7/14/64 QEC
APPROVAL E. Marys 7/19/64
NASA APPROVAL
MIT APPROVAL W. Wright 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

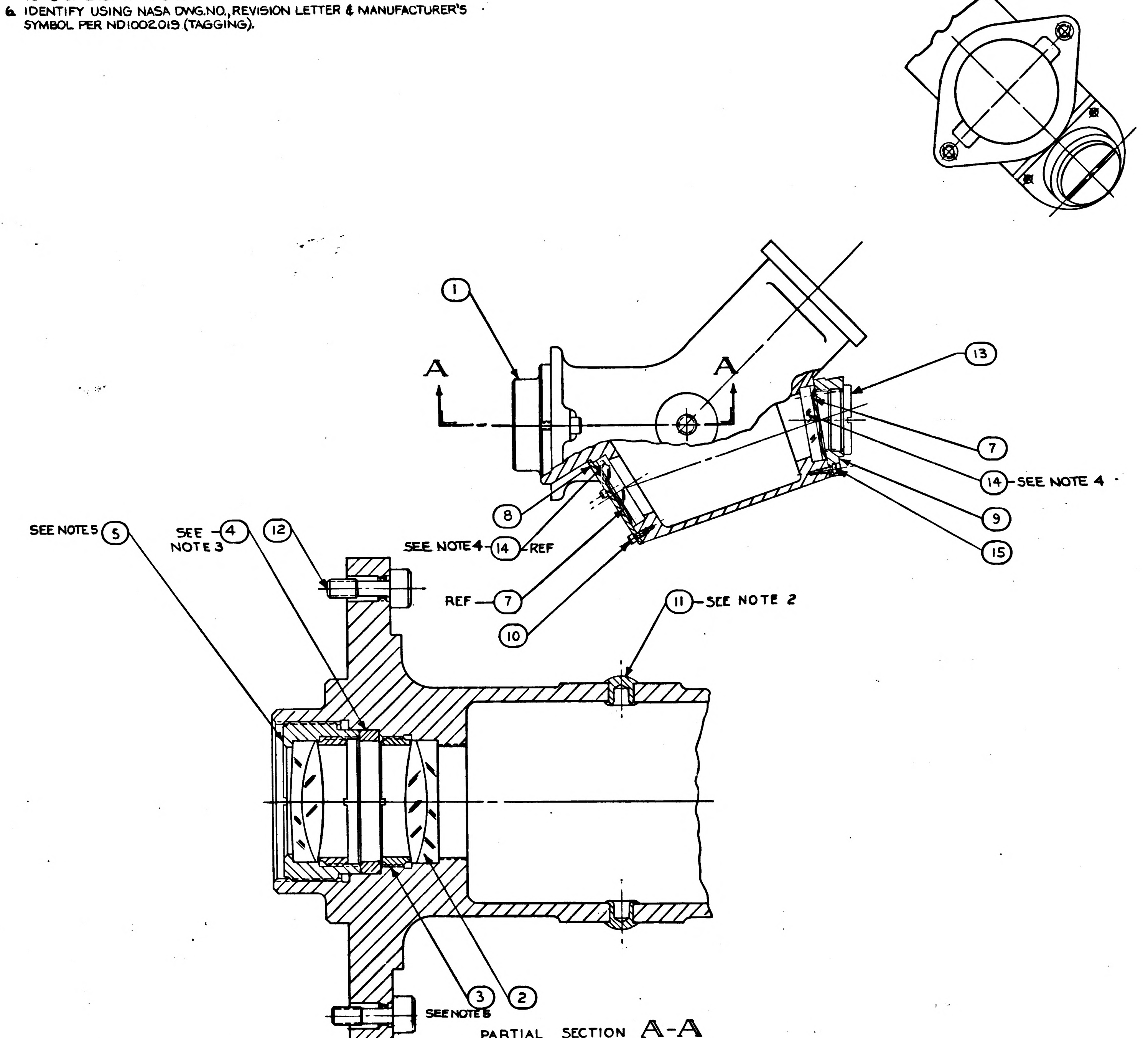
TITLE
MIRROR HOUSING ASSY
(SEXTANT EYEPIECE)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011786
SCALE 1/1 & 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑪ TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. ITEM ④ TO BE GROUND TO SUIT OPTICAL ALIGNMENT REQUIREMENTS FOR THE OPTICAL UNIT FINAL ASSEMBLY DWG 2011000
4. ITEMS ⑭ TO BE MOUNTED WITH REFLECTIVE SURFACES FACED INWARD.
5. VIBRATION-PROOF, USING LOCKING COMPOUND, GRADE "HV", MIL-S-22473, TO 1/3 OF LAST THREAD TO ENTER MOUNTING HOLE PER ND1002211.
6. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

REVISIONS DRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15361	1/4/65	WK
B		REVISED PER TDRR 19075	5/11/65	WK



PARTIAL SECTION A-A
SCALE 2/1

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
14	2		2012162	28386910520		MIRROR			
13	1		2012124	57386911070		PLUG			
12	2		2011490	48386910090		SCREW, CAPTIVE, HEX, SOCKET HEAD			
11	2		MS16535-338	—		RIVET, TUBULAR OVAL HEAD			
10	3		NAS 1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	1		2012195	52386910670		PLATE, COVER, MIRROR			
8	1		2011680	52386910680		PLATE, COVER, MIRROR			
7	2		2011685	56386910470		WASHER, WAVE			
6									
5	1		2011794	85386910840		HOLDER AND LENS, ASSY OF			
4	1		2011665	57386910970		RING, SPACER			
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011781	76386910120		LENS, ASSY OF			
1	1		2011640	52386910690		HOUSING, MIRROR (SEXTANT EYEPIECE)			

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910820

DRAWN V. AMATO DATE 4-17-64
CHECKED C. Leins (CRF) 7/13/64
APPROVAL F. Ruschmann 7/14/64 CEC
APPROVAL E. Okenye 7/19/64
NASA APPROVAL
MIT APPROVAL W. Kuph 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR HOUSING ASSY
(SEXTANT EYEPIECE)

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011786

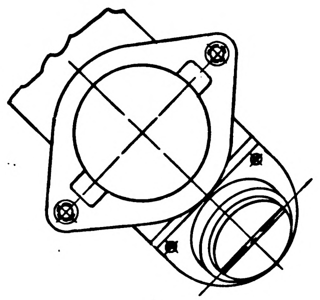
SCALE 1/1 & 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

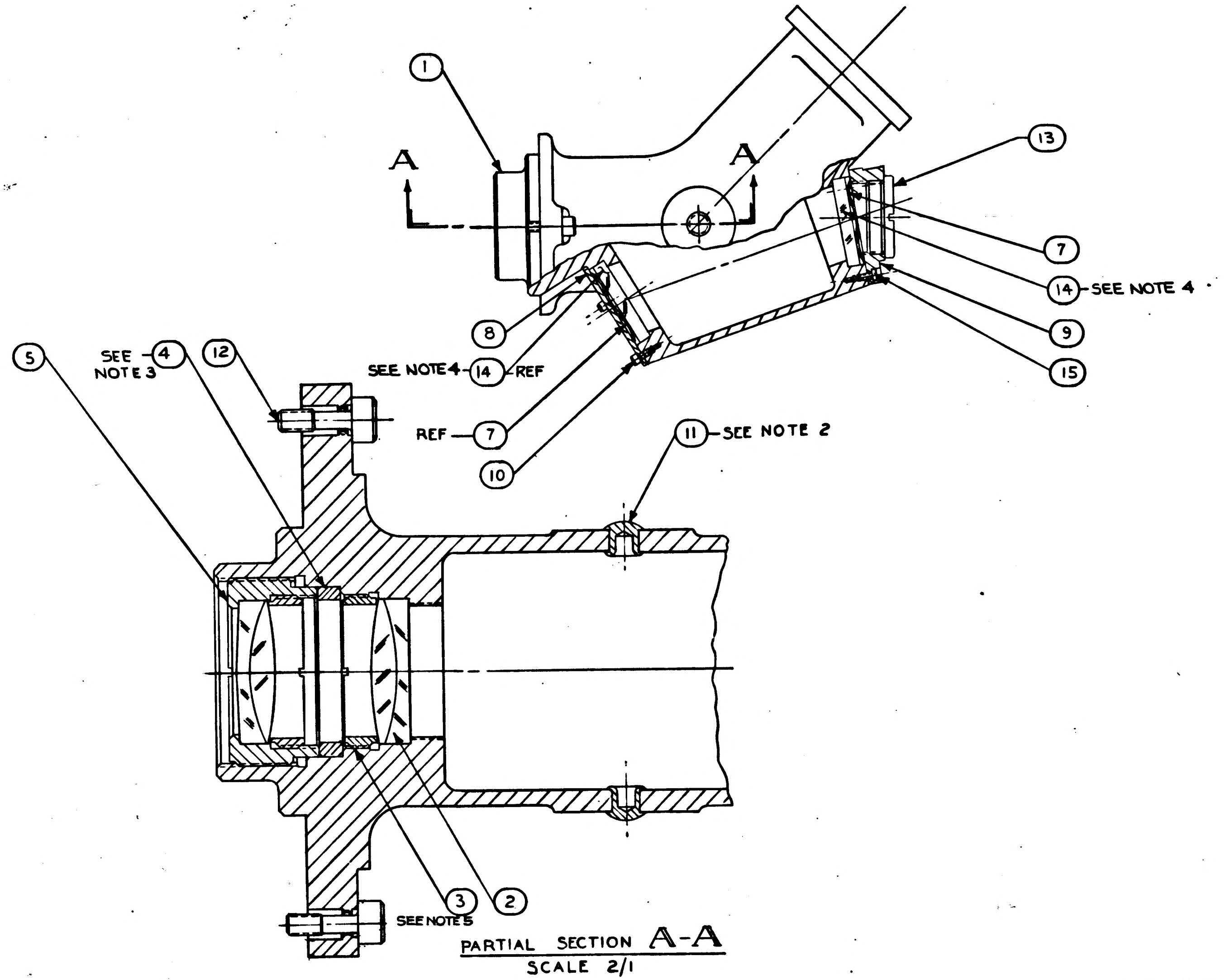
C 2011786

REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15361	1/4/65	WK
B		REVISED PER TDRR 19075	6/14/65	WK
C		REVISED PER TDRR 20026	6/15/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑪ TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. ITEM ④ TO BE GROUND TO SUIT OPTICAL ALIGNMENT REQUIREMENTS FOR THE OPTICAL UNIT AT FINAL ASSEMBLY. SEE DWG. 2011000 FOR CONDITIONS TO BE OBTAINED AT THAT ASSEMBLY.
4. ITEMS ⑭ TO BE MOUNTED WITH REFLECTIVE SURFACES FACED INWARD.
5. VIBRATION-PROOF, USING LOCKING COMPOUND, GRADE "HV", MIL-S-22473, TO 1/3 OF LAST THREAD TO ENTER MOUNTING HOLE PER ND1002211. (THIS APPLIES ONLY TO ITEM ③).
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).





PARTIAL SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
14	2		2012162	28386910520		MIRROR			
13	1		2012124	57386911070		PLUG			
12	2		2011490	48386910090		SCREW, CAPTIVE, HEX, SOCKET HEAD			
11	2		MS16535-338	——		RIVET, TUBULAR OVAL HEAD			
10	3		NAS 1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	1		2012195	52386910670		PLATE, COVER, MIRROR			
8	1		2011680	52386910680		PLATE, COVER, MIRROR			
7	2		2011685	56386910470		WASHER, WAVE			
6									
5	1		2011794	85386910840		HOLDER AND LENS, ASSY OF			
4	1		2011665	57386910970		RING, SPACER			
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011781	76386910120		LENS, ASSY OF			
1	1		2011640	52386910690		HOUSING, MIRROR (SEXTANT EYEPIECE)			

LIST OF PARTS AND MATERIALS

2011786 C

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910820

DRAWN V. AMATO DATE 4-17-64
CHECKED C. Leinz (QEC) 7/13/64
APPROVAL F. Ruschmann 7/14/64 QEC
APPROVAL E. Dhuey 7/19/64
NASA APPROVAL
MIT APPROVAL W. Koyh 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR HOUSING ASSY
(SEXTANT EYEPIECE)

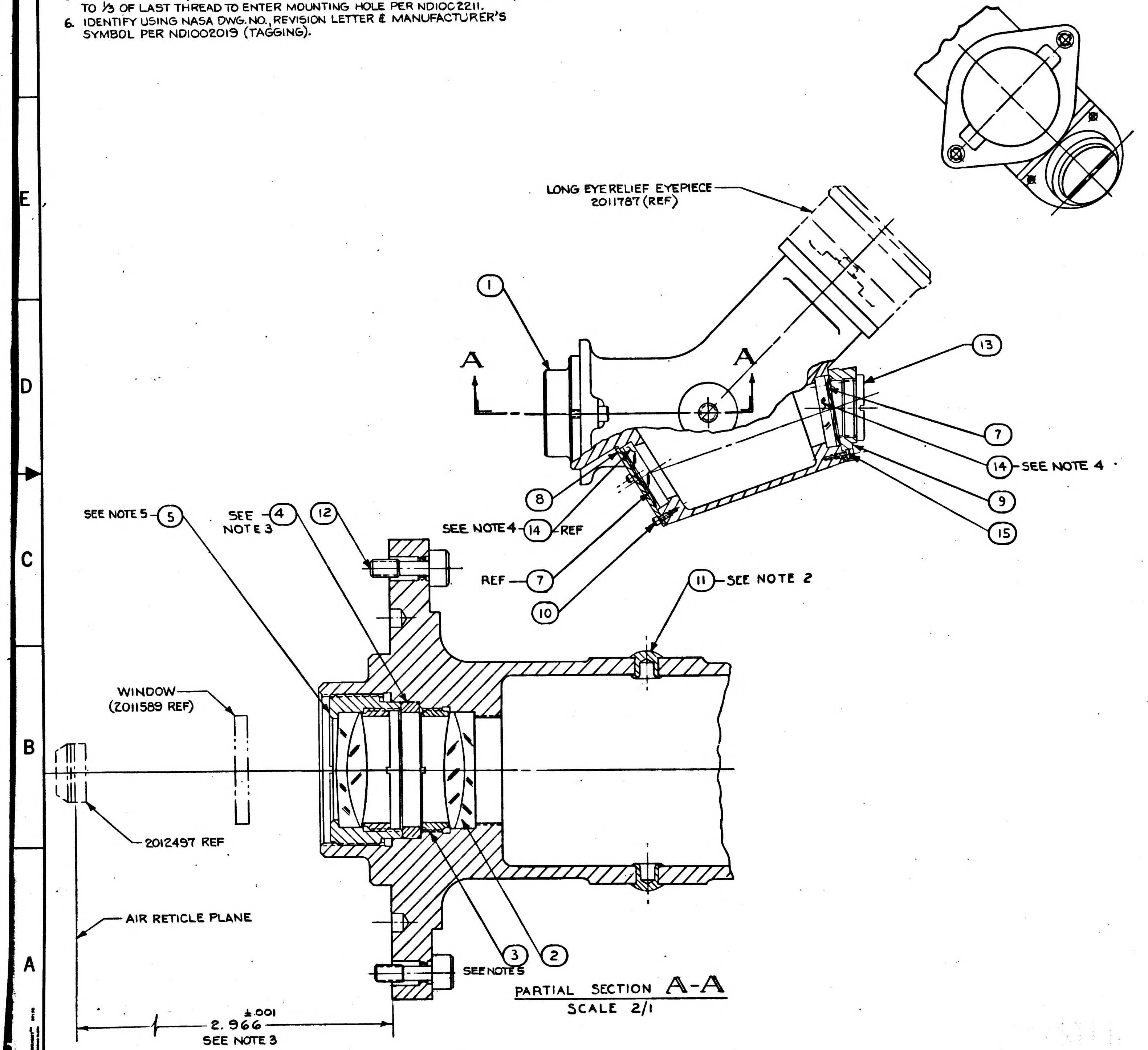
CODE IDENT NO. 80230 SIZE D NASA NUMBER 2011786
SCALE 1/1 & 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

D | 2011786

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑪ TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. WITH LONG EYERELIEF EYEPIECE IN PLACE, MACHINE ITEM ④ SO THAT AIR RETICLE SHALL FOCUS AT $-1.0^{\pm 0.15}$ DIOPTERS WHEN WINDOW AND RETICLE (OR EQUIVALENTS) ARE AS SHOWN. SAME WINDOW AND RETICLE SHALL BE USED FOR FOCUSSING ALL ASSEMBLIES TO ENSURE INTERCHANGEABILITY.
4. ITEMS ⑭ TO BE MOUNTED WITH REFLECTIVE SURFACES FACED INWARD.
5. VIBRATION-PROOF, USING LOCKING COMPOUND, GRADE "HV", MIL-S-22473, TO 1/3 OF LAST THREAD TO ENTER MOUNTING HOLE PER NDIOC2211.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER NDI002019 (TAGGING).

REVISIONS TDRR 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15361	1/4/65	WK
B		REVISED PER TDRR 19075	6/11/65	WK
C		REVISED PER TDRR 20026	6/15/65	WK
D		REVISED PER TDRR 20195	6/28/65	WK



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
14	2		2012162	28386910520		MIRROR			
13	1		2012124	57386911070		PLUG			
12	2		2011490	48386910090		SCREW, CAPTIVE, HEX, SOCKET HEAD			
11	2		MS16535-338	——		RIVET, TUBULAR OVAL HEAD			
10	3		NAS 1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	1		2012195	52386910670		PLATE, COVER, MIRROR			
8	1		2011680	52386910680		PLATE, COVER, MIRROR			
7	2		2011685	56386910470		WASHER, WAVE			
6									
5	1		2011794	85386910840		HOLDER AND LENS, ASSY OF			
4	1		2011665	57386910970		RING, SPACER			
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011781	76386910120		LENS, ASSY OF			
1	1		2011640	52386910690		HOUSING, MIRROR (SEXTANT EYEPIECE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910820
DRAWN V. AMATO DATE 4-17-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL F. Ruchmann 7/14/64 QEC
APPROVAL E. Thorup 7/19/64
NASA APPROVAL
MIT APPROVAL W 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR HOUSING ASSY
(SEXTANT EYEPIECE)

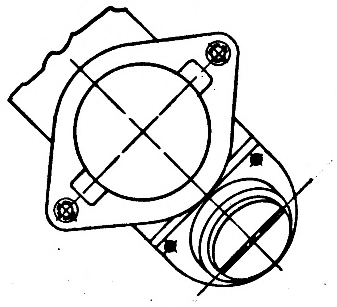
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011786
SCALE 1/1 & 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

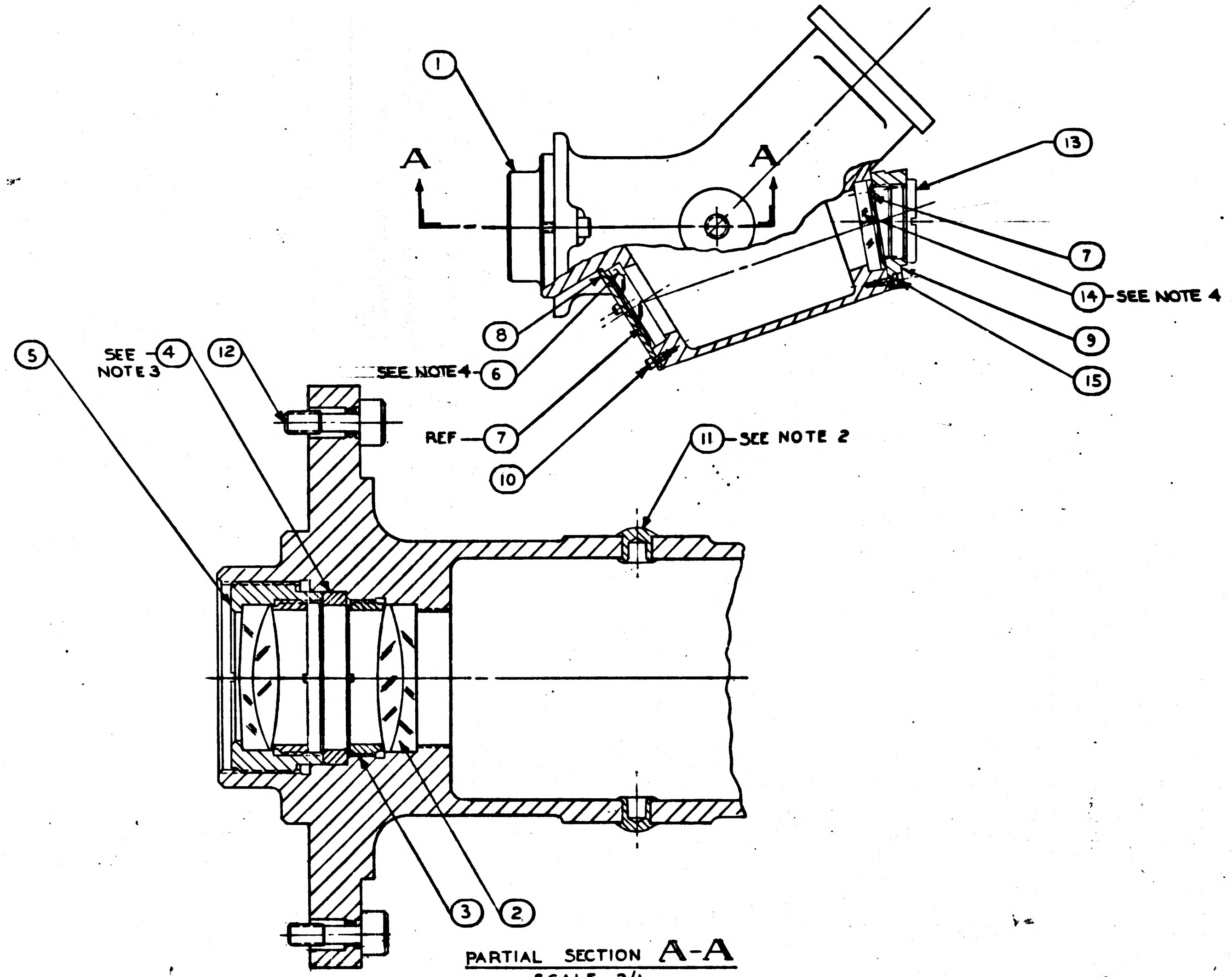
2011786

REVISIONS TD2R 11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ITEM (11) TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. ITEM (4) TO BE GROUND TO SUIT OPTICAL ALIGNMENT REQUIREMENTS FOR THE OPTICAL UNIT FINAL ASSEMBLY DWG 2011000
4. ITEMS (6) & (14) TO BE MOUNTED WITH REFLECTIVE SURFACES FACED INWARD.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)





PARTIAL SECTION A-A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
15	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF-LOCKING			
14	1		2012162	28386910520		MIRROR			
13	1		2012124	57386911070		PLUG			
12	2		2011282	48386910040		SCREW, CAPTIVE, HEX, SOCKET HEAD			
11	2		MS16535-338	——		RIVET, TUBULAR OVAL HEAD			
10	3		NAS 1352C02LL3	74455157005		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	1		2012195	52386910670		PLATE, COVER, MIRROR			
8	1		2011680	52386910680		PLATE, COVER, MIRROR			
7	2		2011685	56386910470		WASHER, WAVE			
6	1		2011863	28386910420		MIRROR			
5	1		2011794	85386910840		HOLDER AND LENS, ASSY OF			
4	1		2011665	57386910970		RING, SPACER			
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011781	76386910120		LENS, ASSY OF			
1	1		2011640	52386910690		HOUSING, MIRROR (SEXTANT EYEPIECE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910820
DRAWN V. AMATO DATE 4-17-64
CHECKED C. Leins (QEC) 7/13/64
APPROVAL F. Ruschmann 7/14/64
APPROVAL E. Ohoroyo 7/19/64
NASA APPROVAL
KIT APPROVAL 21/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR HOUSING ASSY
(SEXTANT EYEPIECE)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011786
SCALE 1/1 & 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011786

MASTER

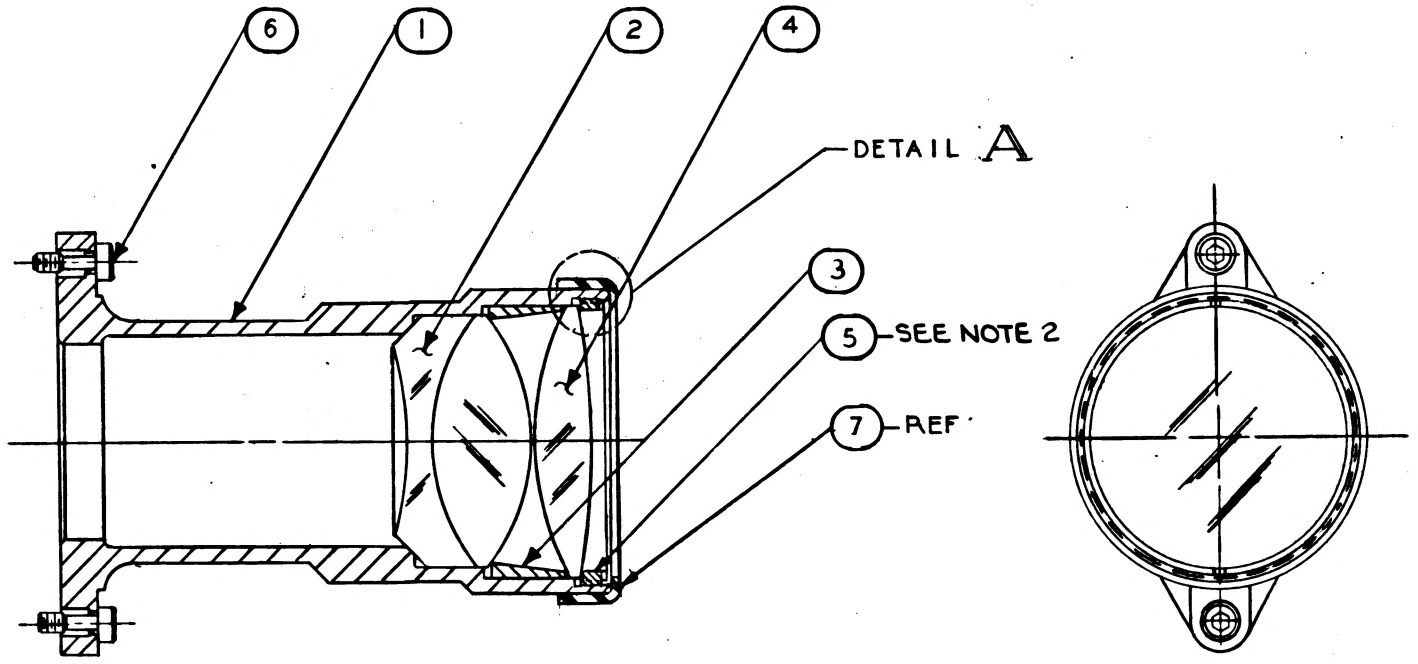
INCHES 0 1 2

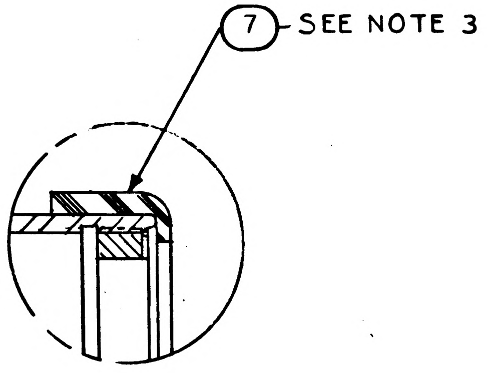
2011788 A

REVISIONS TDR11109

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 19076	6/18/65	wH

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. APPLY TO 1/3 CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473 GRADE H.V. PER ND 1002211
3. CEMENT IN PLACE IN ACCORDANCE WITH MIL-A-1154.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).





DETAIL A
SCALE 2/1

2011788 A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1		2011974	26386910050		GUARD, RUBBER			
6	2		2012490	48386910090		SCREW, CAPTIVE, HEX SOC HD			
5	1		2011916	57386910820		RING, LOCKING			
4	1		2011824	28386910350		LENS, POSITIVE			
3	1		2011917	57386910820		SPACER, LENS			
2	1		2011730	76386910100		LENS, ASSY OF			
1	1		2011915	50386910050		HOUSING, EYEPIECE, SCT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910640
DRAWN J. Schiller DATE 4-13-64
CHECKED C. LEINZ (CRS) 7/13/64
APPROVAL F. Ruschmann 7/14/64
APPROVAL E. Thorup 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 21 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

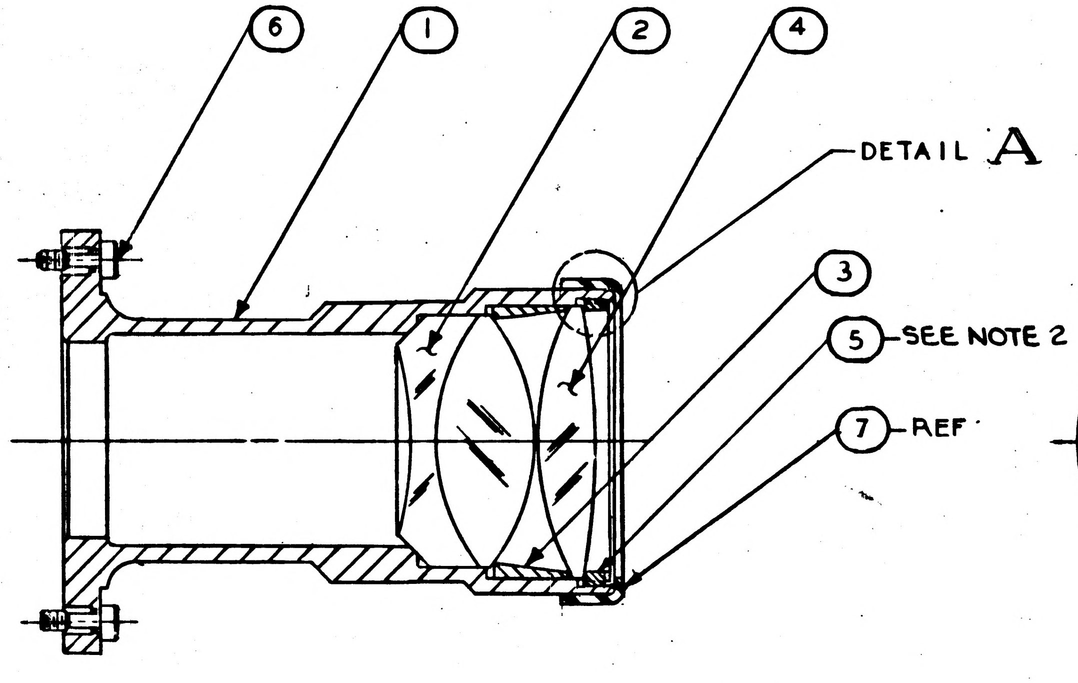
TITLE
LONG EYE RELIEF
EYEPIECE ASSEMBLY (SCT)
(1/2 x)

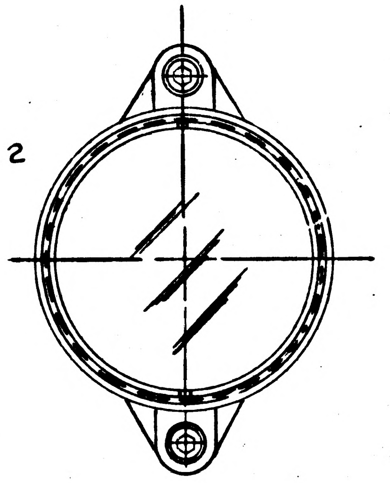
CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011788
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

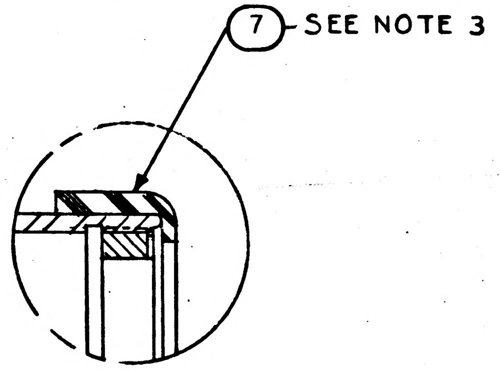
E-184

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. APPLY TO 1/3 CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473 GRADE H.V. PER ND1002211
3. CEMENT IN PLACE IN ACCORDANCE WITH MIL-A-1154.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

REVISIONS TDR11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL







DETAIL A
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1		2011974	26386910050		GUARD, RUBBER			
6	2		2011282	48386910040		SCREW, CAPTIVE, HEX SOC HD			
5	1		2011916	57386910820		RING, LOCKING			
4	1		2011824	28386910350		LENS, POSITIVE			
3	1		2011917	51386910820		SPACER, LENS			
2	1		2011730	76386910100		LENS, ASSY OF			
1	1		2011915	50386910050		HOUSING, EYEPIECE, SCT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910640

DRAWN DATE 4-13-64
CHECKED C. LEINZ (CRC) 7/13/64
APPROVAL F. Ruschmann 7/14/64
APPROVAL E. Dhorup 7/14/64
NASA APPROVAL
MIT APPROVAL 21 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LONG EYE RELIEF
EYEPIECE ASSEMBLY (SCT)
(1/2 x)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011788
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011788

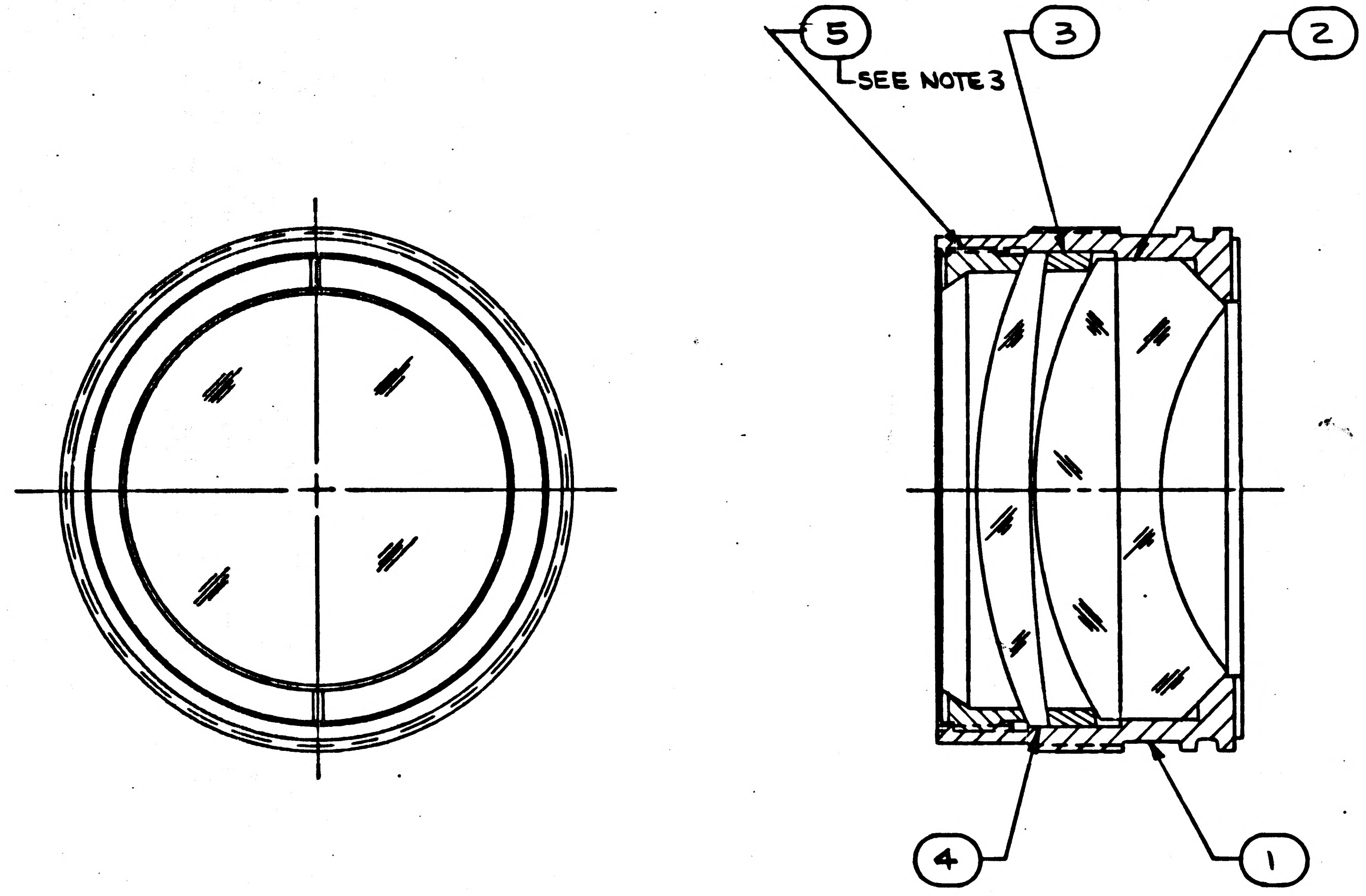
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011792

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 11109		

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLY SHALL BE TIGHT WITH NO STRAIN CONCENTRATIONS DETECTED UNDER EXAMINATION, BY POLARISCOPE.
3. APPLY TO 1/3 OF THE LAST THREAD TO ENTER THE THREADED HOLE, LOCKING COMPOUND, OF MIL-S-22473, GRADE HV, PER ND1002211
4. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURER'S SYMBOL PER ND1002015. (BAGGING).



2011792

5	1		2011677	57386910500		RING, LOCKING			
4	1		2011172	28386910230		LENS, POSITIVE (TELESCOPE RELAY)			
3	1		2011676	57386910490		SPACER, LENS			
2	1		2011175	76386910070		LENS, ASSY OF (TELESCOPE RELAY)			
1	1		2011678	57386910480		HOUSING, LENS			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011729	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910410

DRAWN R. BRUNELLE DATE 4-8-64
CHECKED C. LENZ (CRK) 7/13/64
APPROVAL [illegible] 7/14/64
APPROVAL [illegible] 7/14/64
NASA APPROVAL
MIT APPROVAL [illegible] 7/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS,
ASSEMBLY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011792
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

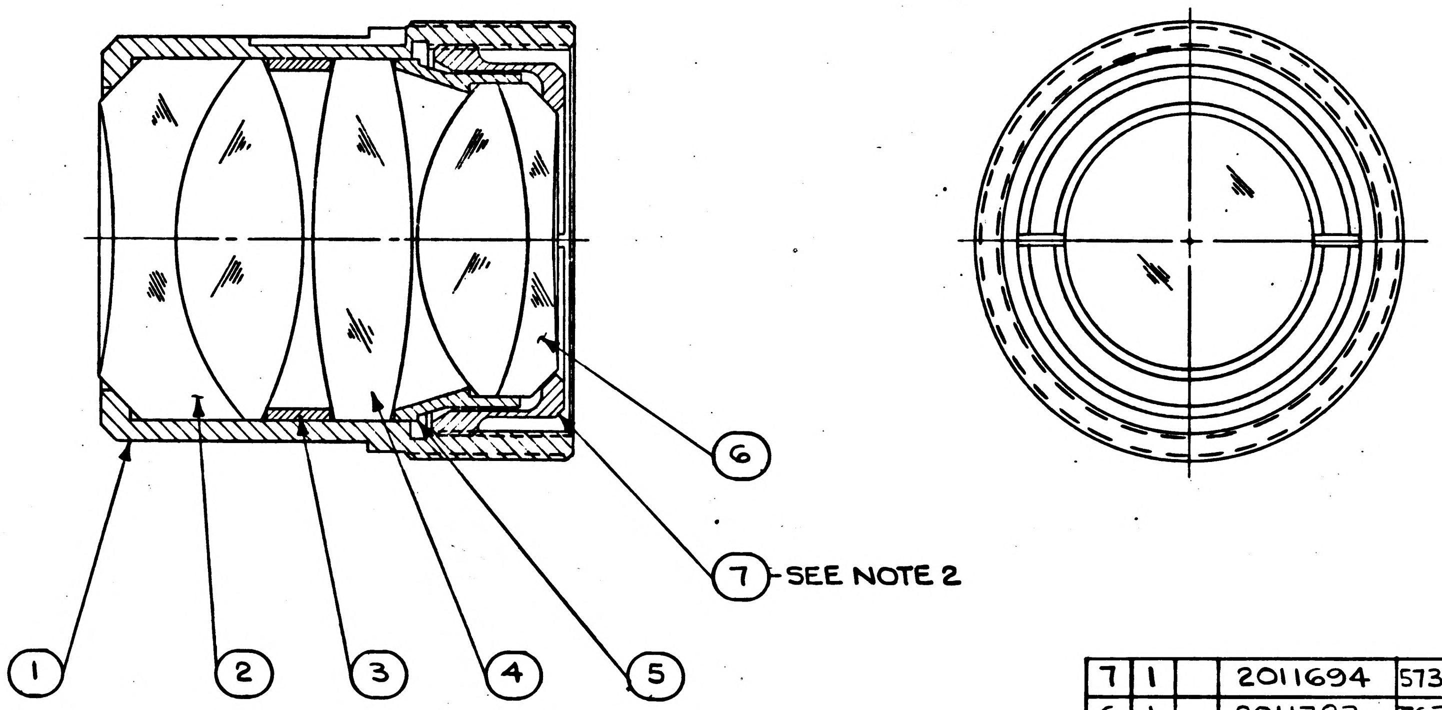
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011793 A

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20196	6/22/65	WR

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSEMBLY USING ONE (1) DROP OF LOCKING COMPOUND, GRADE "H", OF MIL-S-22473. PER ND 1002211
3. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (BAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1		2011694	57386911040		RETAINER, RING, LOCKING			
6	1		2011783	76386910150		LENS, ASSY OF			
5	1		2011642	57386911030		SPACER, LENS			
4	1		2011860	28386910470		LENS, POSITIVE			
3	1		2011641	57386911020		SPACER, LENS			
2	1		2011782	76386910140		LENS, ASSY OF			
1	1		2011876	57386911010		HOUSING, SEXTANT EYEPIECE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012610	
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910850

DRAWN J. Schiller DATE 4-16-64
CHECKED G. LEINZ (CRE) 7/13/64
APPROVAL F. Ruschmann 7/14/64 QC
APPROVAL E. Morus 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 2/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS,
ASSY OF (SXT EYEPIECE)

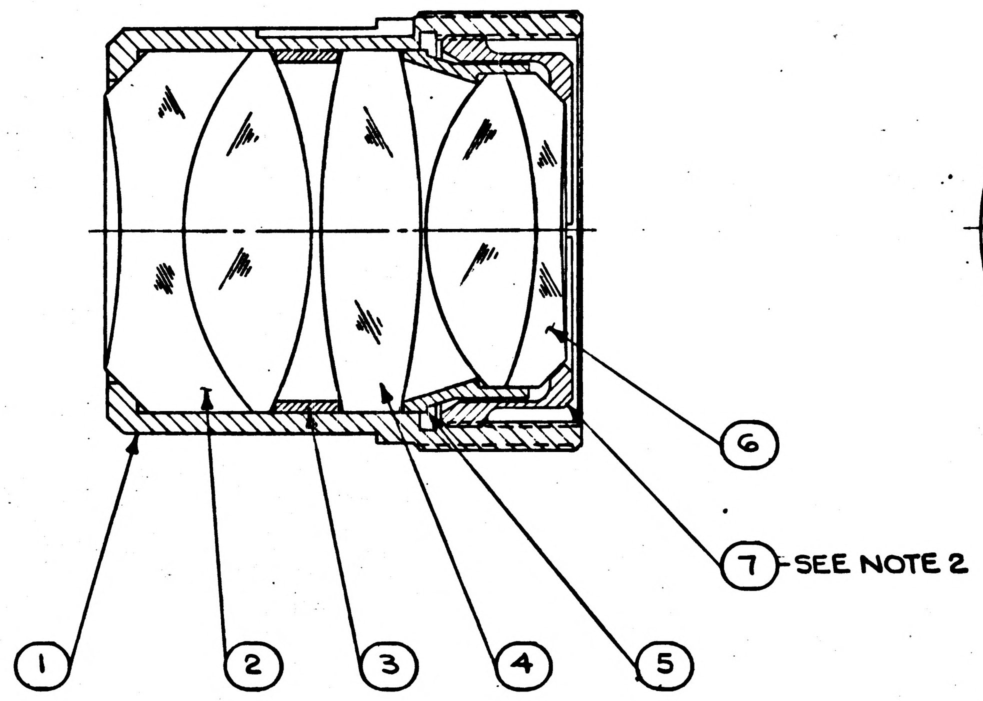
CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011793
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

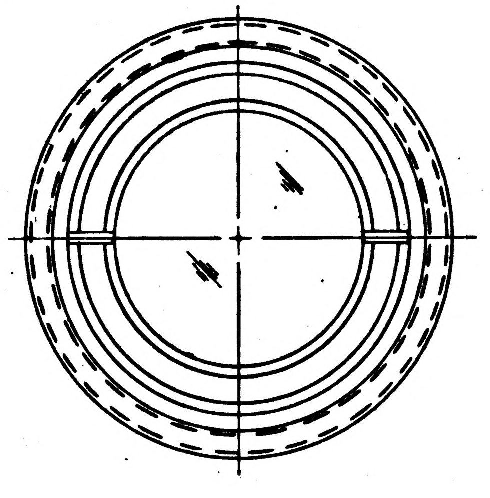
K+E
E-154

2011793

REVISIONS TDRR 11109				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSEMBLY USING ONE (1) DROP OF LOCKING COMPOUND, GRADE "H", OF MIL-S-22473. PER ND 1002211
3. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND ~~MANUFACTURERS~~ SYMBOL IN ACCORDANCE WITH ND1002019. (BAGGING)





7	1		2011694	57386911040		RETAINER, RING, LOCKING			
6	1		2011783	76386910150		LENS, ASSY OF			
5	1		2011642	57386911030		SPACER, LENS			
4	1		2011860	28386910470		LENS, POSITIVE			
3	1		2011641	57386911020		SPACER, LENS			
2	1		2011782	76386910140		LENS, ASSY OF			
1	1		2011876	57386911010		HOUSING, SEXTANT EYEPIECE			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± –	± –

DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910850
DRAWN J. Schiller DATE 4-16-64
CHECKED G. LEINZ (CRE) 7/13/64
APPROVAL Ruschmann 7/14/64
APPROVAL E. Manning 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 21/7/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS,
ASSY OF (SXT EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011793
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011793

MASTER

K-184

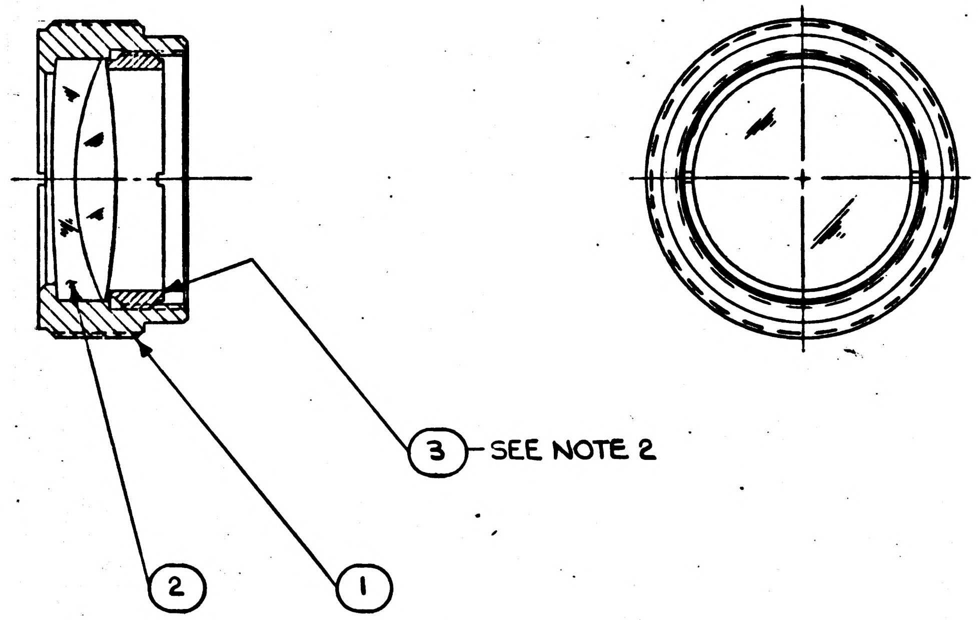
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011794

REVISIONS		TDRR 11109		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSEMBLY USING ONE (1) DROP OF LOCKING COMPOUND OF MIL-S-22473 GRADE "H" PER ND 1002211
3. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (BAGGING)



2011794

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		2011667	57386910980		RING, LOCKING			
2	1		2011780	76386910130		LENS, ASSY OF			
1	1		2011668	57386910990		HOLDER, LENS			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910840

DRAWN V. AMATO DATE 4-16-64
CHECKED C. Lenz (CRC) 7/13/64
APPROVAL F. Buschmann 7/14/64
APPROVAL E. Thorup 7/14/64
NASA APPROVAL
MIT APPROVAL W Kupfer 21/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER & LENS,
ASSY OF (SXT EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011794

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-184

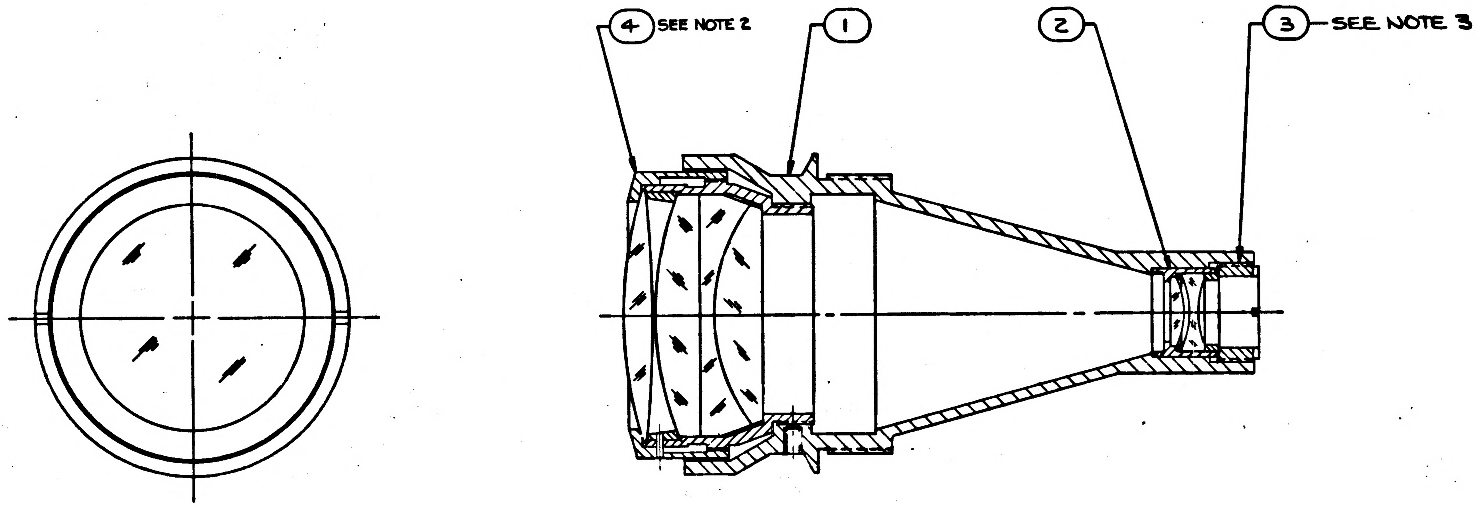
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011796 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18003	4/13/65	WK

REVISIONS 12 2/7

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SECURE ITEM 4 TO ITEM 1 USING 3 OR 4 DROPS OF SEALING COMPOUND GRADE "A" OF MIL-S-22473 PER ND1002211. ITEM 4 TO BE THREADED TO ITEM 1 WITH A TORQUE BETWEEN 25-75 INCH LBS.
3. APPLY TO LAST ½ CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473, GRADE E, PER ND1002211.
4. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (BAGGING).



MASTER

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1	*	2012492	48386910110		OBJECTIVE LENS ASSY			
3	1		2011303	57386910360		RING, LOCKING			
2	1	*	1011591	74471374001		INTERMEDIATE LENS ASSY			
1	1		2011302	57386910350		HOLDER, LENS			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011704	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910330

DRAWN DATE 4-6-64
CHECKED C. Lewis (GS) 7/13/64
APPROVAL 8/31/64
APPROVAL E. Thorp 8/31/64
NASA APPROVAL
MIT APPROVAL 1 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS HOLDER ASSY,
SEXTANT TELESCOPE

CODE IDENT NO.
SIZE D
NASA NUMBER 2011796
SCALE 2/1
WEIGHT
CALC
ACTUAL
SHEET 1 OF 1

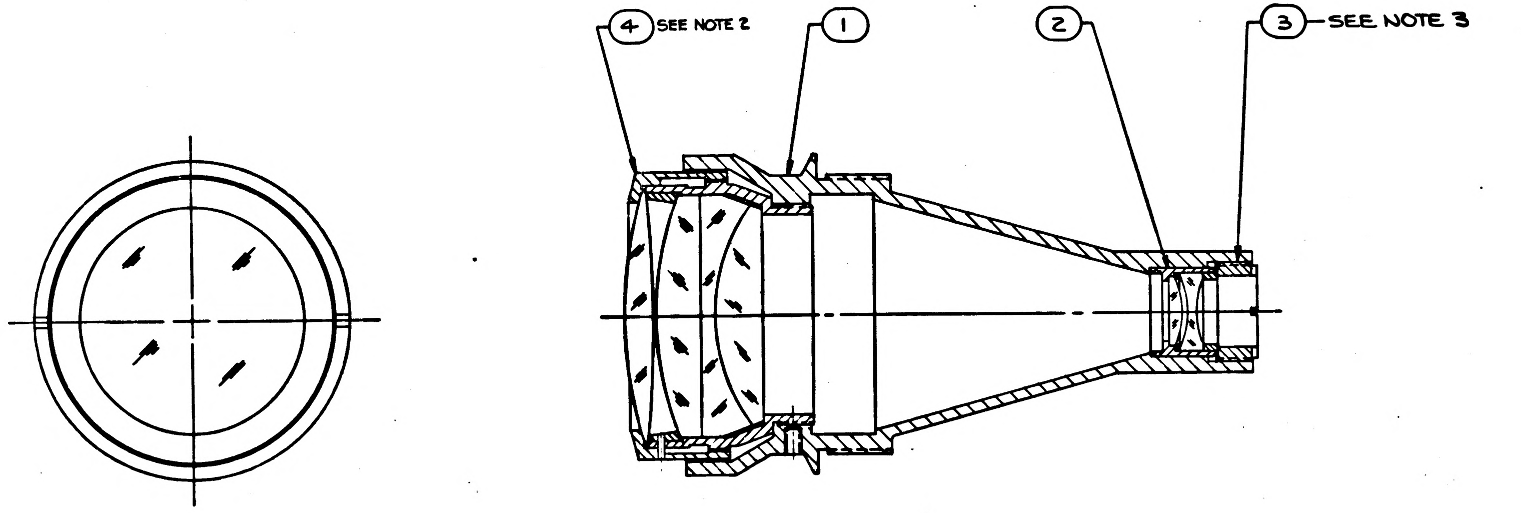
2011796 A

B 2011796

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18003	4/13/65	WK
B		REVISED PER TDRR 21531	8/24/65	WK

REVISIONS 12217

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. SECURE ITEM 4 TO ITEM 1 USING 3 OR 4 DROPS OF SEALING COMPOUND GRADE "A" OF MIL-S-22473 PER ND1002211. ITEM 4 TO BE THREADED TO ITEM 1 WITH A TORQUE BETWEEN 25-75 INCH LBS.
3. APPLY TO LAST ½ CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473, GRADE E, PER ND1002211.
4. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (BAGGING).



LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1	*	1011585-001	74471371001		OBJECTIVE LENS ASSY			
3	1		2011303	57386910360		RING, LOCKING			
2	1	*	1011591	74471374001		INTERMEDIATE LENS ASSY			
1	1		2011302	57386910350		HOLDER, LENS			

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011704	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910330

DRAWN F. Schiller DATE 4-6-64
CHECKED C. Lewis (CAS) 7/13/64
APPROVAL R. Aiwison 8/21/64
APPROVAL E. Thoup 8/31/64
NASA APPROVAL
MIT APPROVAL W Kupfer 1 Sep '64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS HOLDER ASSY,
SEXTANT TELESCOPE

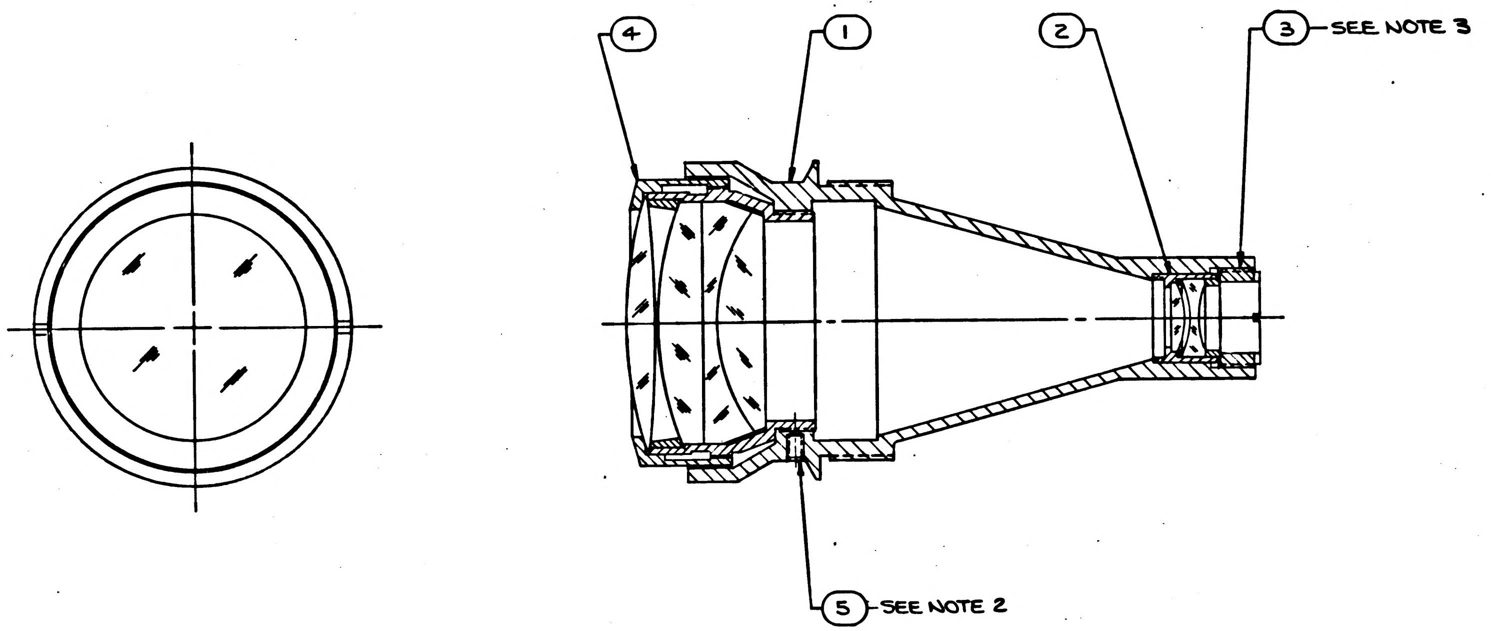
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011796
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011796 B

2011796

REVISIONS 2217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF ITEM 5 PER MIL-S-22473, GRADE E.
3. APPLY TO LAST ½ CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473, GRADE E, PER ND 1002211
4. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1	*	1011773-2	74455166003		SETSCREW, FLAT (NYLON) POINT, HEX. SOC.			
4	1	*	1011585	74471371001		OBJECTIVE LENS ASSY			
3	1		2011303	57386910360		RING, LOCKING			
2	1	*	1011591	74471374001		INTERMEDIATE LENS ASSY			
1	1		2011302	57386910350		HOLDER, LENS			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011704	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910330

DRAWN DATE 4-6-64
CHECKED C. Lewis (CAS) 7/13/64
APPROVAL 8/31/64
APPROVAL E. Thoup 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS HOLDER ASSY,
SEXTANT TELESCOPE

CODE IDENT NO.
SIZE D
NASA NUMBER 2011796
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011797 A

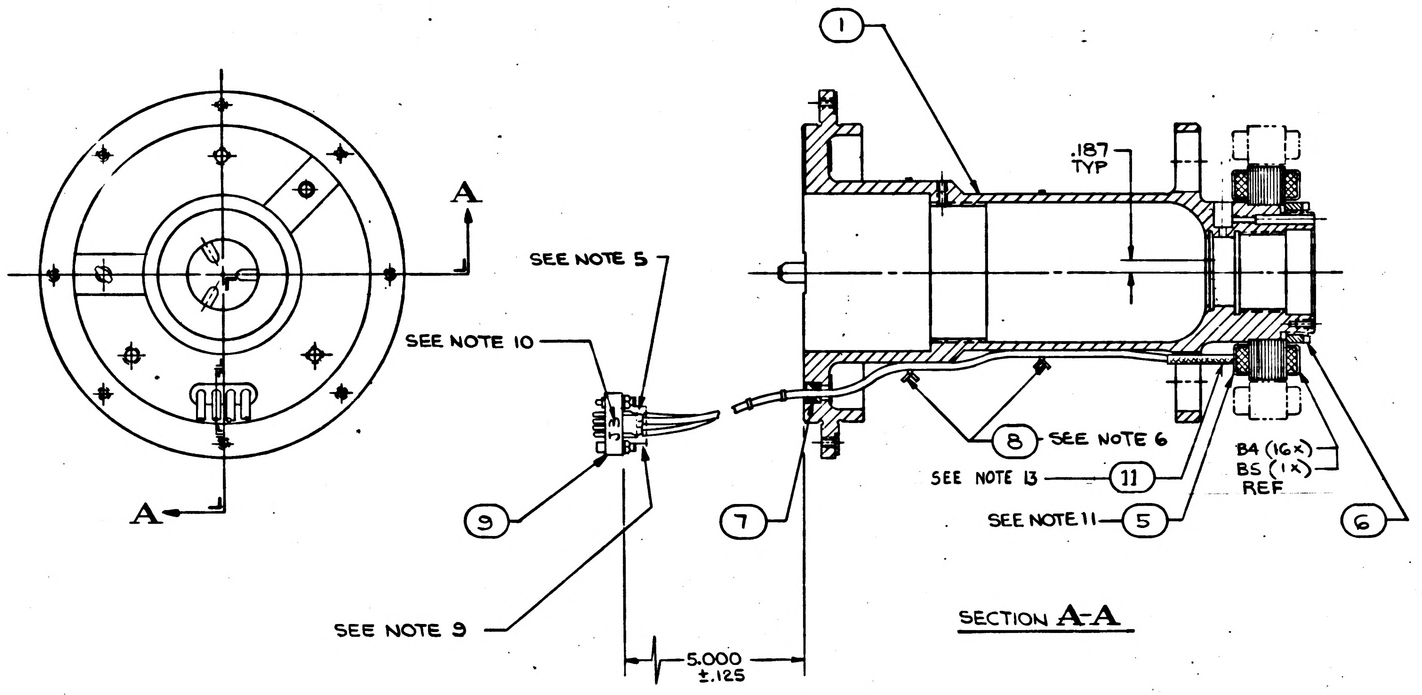
NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC NASA DWG NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 10 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 8, IN ACCORDANCE WITH ND1002032, THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 10 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002009, METHOD C.
   A- POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B- POTTING SHALL COVER WIRE INSULLATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. ITEM NO. 5 (RESOLVER) ROTOR & STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011906 FOR STATOR ASSEMBLY.
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)
13. SHRINK ITEM 11 (1010490-348) IN LOCATION SHOWN

REVISIONS TDRR 11491

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15367	1/6/65	WK

WIRING LEGEND

COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	RED-WHT (P1)		B4-B5 RED-WHT	J3-A	8
B2	BLK-WHT (P3)		B4-B5 BLK-WHT	J3-B	
B3	BLU-WHT (P4)		B4-BLU-WHT	J3-C	8
B4	YEL-WHT (P2)		B4-YEL-WHT	J3-D	



SECTION A-A

(SEE NOTE 11)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	1	*	1010490-348	—//—		INSULATION SLEEVING, HEAT SHRINKABLE			
10	4	*	1010490-060	—//—		INSULATION SLEEVING, HEAT SHRINKABLE			
9	1	*	1011741	68502017001		CONNECTOR, ELECTRICAL (J3)			
8	AR	*	1011753	60035142001		TAPE, LACING & TYING			
7	1		2011632	25386910070		INSERT, CONDUIT, RESOLVER WIRE			
6	1		2011311	57386910250		NUT, LOCKING, ROTOR			
5	1	*	1012066	—//—		RESOLVER, 16&1 SPEED TRANSMITER (ROTOR) B4 B5			
4	3								
3	3								
2	3								
1	1		2011893	85386910280		TELESCOPE TUBE ASSY, OF			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011704.	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910290
DRAWN J. Schie DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/23/64
APPROVAL E. Morup 8/6/64
NASA APPROVAL 8/10/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE ASSY

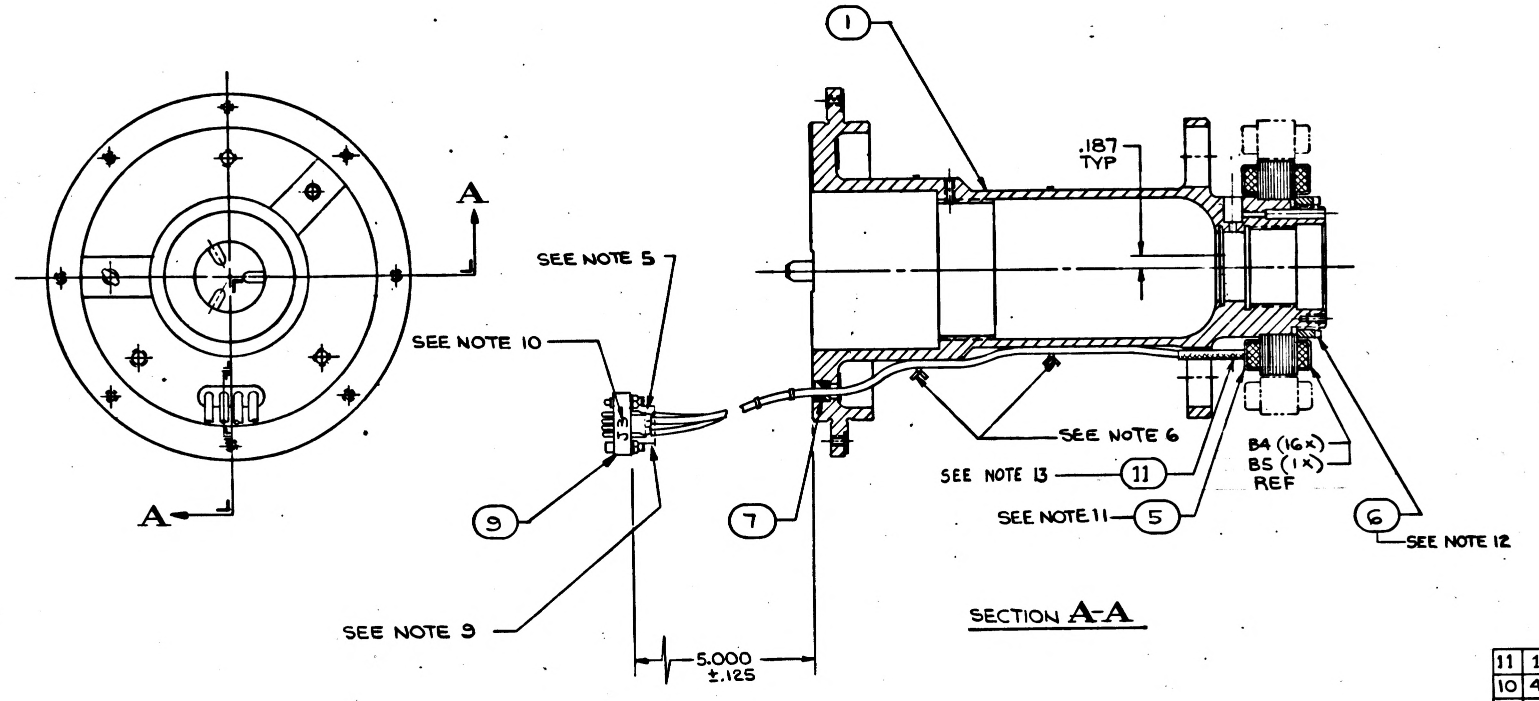
CODE IDENT NO.
SIZE D
NASA NUMBER 2011797
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B 2011797

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15367	1/6/65	WK
B		REVISED PER TDRR NO.17092	1/14/65	WK

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. SLIDE ITEM 10 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1 IN APPROXIMATE LOCATIONS SHOWN.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 10 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND 1002240, METHOD A OR B
   A- POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B- POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 5 (RESOLVER) ROTOR & STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011906 FOR STATOR ASSEMBLY.
12. APPLY SEALING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/2 OF THE LAST THREAD TO ENTER ITEM 1 PER ND1002211.
13. SHRINK ITEM 11 (1010490-348) IN LOCATION SHOWN
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)

WIRING LEGEND					
COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	RED-WHT (P1)		B4-B5 RED-WHT	J3-A	8
B2	BLK-WHT (P3)		B4-B5 BLK-WHT	J3-B	
B3	BLU-WHT (P4)		B4 - BLU-WHT	J3-C	8
B4	YEL-WHT (P2)		B4 - YEL-WHT	J3-D	



SECTION A-A

(SEE NOTE 11)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	1	*	1010490-348	—		INSULATION SLEEVING, HEAT SHRINKABLE			
10	4	*	1010490-060	—		INSULATION SLEEVING, HEAT SHRINKABLE			
9	1	*	1011741-000	68502017001		CONNECTOR, ELECTRICAL (J3)			
8									
7	1		2011632	25386910070		INSERT, CONDUIT, RESOLVER WIRE			
6	1		2011311	57386910250		NUT, LOCKING, ROTOR			
5	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITER (ROTOR) B4 B5			
4									
3									
2									
1	1		2011893	85386910280		TELESCOPE TUBE ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011704.	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910290

DRAWN DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/22/64
APPROVAL 8/6/64
NASA APPROVAL 8/12/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE ASSY

CODE IDENT NO.
SIZE D
NASA NUMBER 2011797
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011797 B

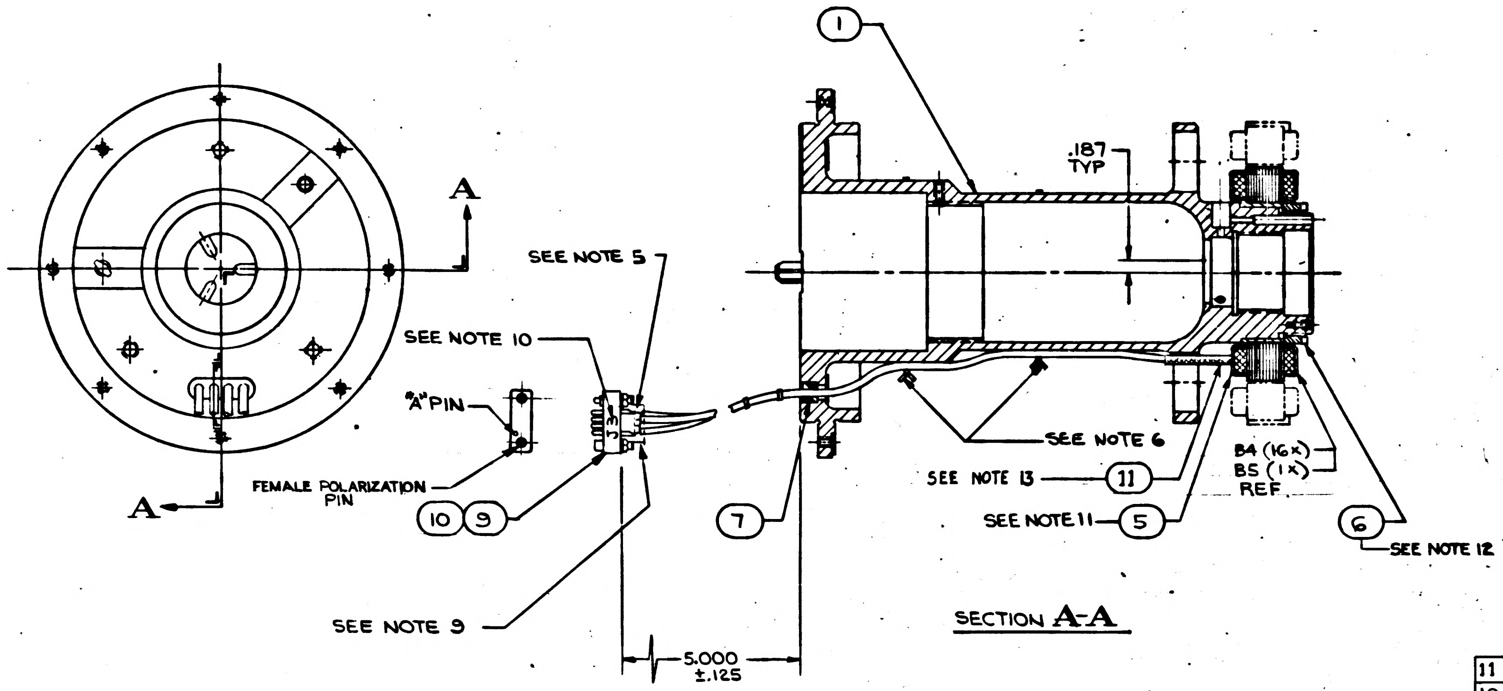
2011797 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 11491				
A		REVISED PER TDRR NO. 15367	1/6/65	WK
B		REVISED PER TDRR NO. 17092	1/26/65	WK
C		REVISED PER TDRR 24640	12/14/65	WK

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 10 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1 IN APPROXIMATE LOCATIONS SHOWN.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 10 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD A OR B
   A- POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B- POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. ITEM NO. 5 (RESOLVER) ROTOR & STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011906 FOR STATOR ASSEMBLY.
12. APPLY SEALING COMPOUND GRADE "HV" OF MIL-S-22473 TO 1/2 OF THE LAST THREAD TO ENTER ITEM 1 PER ND1002211.
13. SHRINK ITEM 11 (1010490-348) IN LOCATION SHOWN
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)

WIRING LEGEND

COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	RED-WHT (P1)		B4-B5 RED-WHT	J3-A	8
B2	BLK-WHT (P3)		B4-B5 BLK-WHT	J3-B	
B3	BLU-WHT (P4)		B4 - BLU-WHT	J3-C	8
B4	YEL-WHT (P2)		B4 - YEL-WHT	J3-D	



SECTION A-A

(SEE NOTE 11)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
11	1	*	1010490-348	—//—		INSULATION SLEEVING, HEAT SHRINKABLE			
10	4	*	1010490-060	—//—		INSULATION SLEEVING, HEAT SHRINKABLE			
9	1	*	1011741-002	68502017001		CONNECTOR, ELECTRICAL (J3)			
8									
7	1		2011632	25386910070		INSERT, CONDUIT, RESOLVER WIRE			
6	1		2011311	57386910250		NUT, LOCKING, ROTOR			
5	1	*	1012066	—//—		RESOLVER, 16:1 SPEED TRANSMITER (ROTOR) B4 B5			
4									
3									
2									
1	1		2011893	85386910280		TELESCOPE TUBE ASSY OF			

LIST OF PARTS AND MATERIALS

MASTER

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2011704.	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910290
DRAWN J. Silva DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/22/64
APPROVAL 8/6/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE ASSY

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011797
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

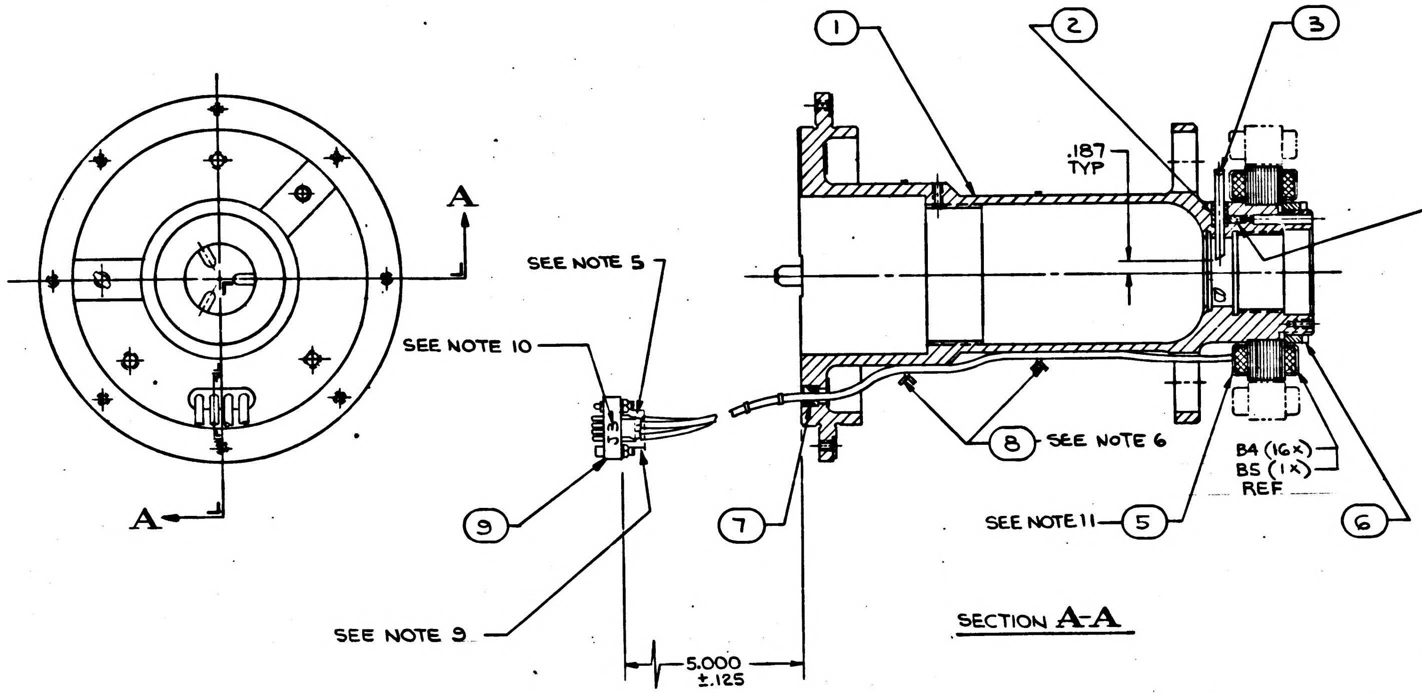
2011797

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 10 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 8, IN ACCORDANCE WITH ND1002032, THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 10 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002009, METHOD C.
   A- POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B- POTTING SHALL COVER WIRE INSULLATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. ITEM NO. 5 (RESOLVER) ROTOR & STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011906 FOR STATOR ASSEMBLY.
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

WIRING LEGEND					
COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	RED-WHT (P1)		B4-B5 RED-WHT	J3-A	8
B2	BLK-WHT (P3)		B4-B5 BLK-WHT	J3-B	
B3	BLU-WHT (P4)		B4 - BLU-WHT	J3-C	8
B4	YEL-WHT (F2)		B4 - YEL-WHT	J3-D	



(SEE NOTE 11)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	4	*	1010490-060	—		INSULATION SLEEVING, HEAT SHRINKABLE			
9	1	*	1011741	68502017001		CONNECTOR, ELECTRICAL (J3)			
8	AR	*	1011753	60035142001		TAPE, LACING & TYING			
7	1		2011632	25386910070		INSERT, CONDUIT, RESOLVER WIRE			
6	1		2011311	57386910250		NUT, LOCKING, ROTOR			
5	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITER (ROTOR) B4 B5			
4	3		2011952	48386910060		SCREW, SELF LOCKING, SET			
3	3		2011584	25386910060		ROD, ILLUMINATING			
2	3		2011633	57386910240		SLEEVE, SPLIT, ILLUMINATING ROD			
1	1		2011893	85386910280		TELESCOPE TUBE ASSY OF			

LIST OF PARTS AND MATERIALS

2011704.	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910290
DRAWN J. Selva DATE 4-2-64
CHECKED Aufering 5/14/64
APPROVAL 7/23/64
APPROVAL E. Marzo 8/6/64
NASA APPROVAL K. Michal 8/12/64
MIT APPROVAL J. Hafel 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE ASSY

CODE IDENT NO.
SIZE D
NASA NUMBER 2011797
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

* PURCHASE ITEM :- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

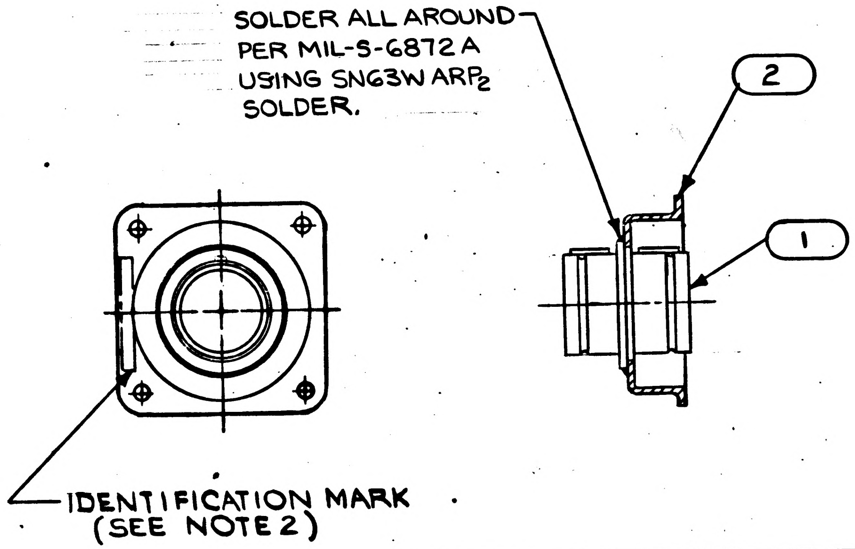
2011797

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011798

REVISIONS 12217.			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



SOLDER ALL AROUND PER MIL-S-6872A USING SN63W ARP2 SOLDER.
2
1
IDENTIFICATION MARK (SEE NOTE 2)

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011869-1	57386911250		PLATE, CONNECTOR			
1	1	*	1012152-3			CONNECTOR, ELECTRICAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011713	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910740

DRAWN F. Schilling DATE 6-18-64
CHECKED T. SULLIVAN 8-27-64
APPROVAL [illegible] 8-28-64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL [illegible]
MIT APPROVAL W [illegible] 1 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE AND CONNECTOR
ASSY OF,
(SCT)

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011798

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

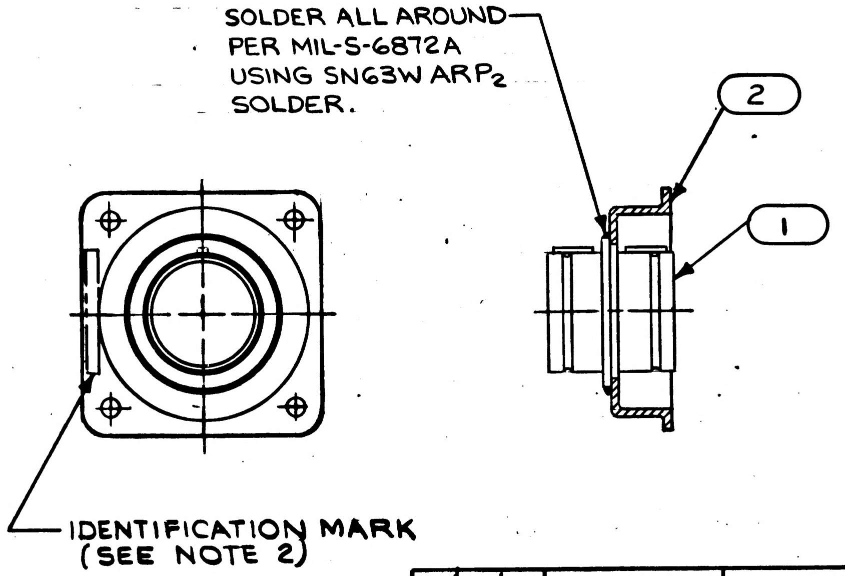
2011799

REVISIONS √2217

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2011869-2	57386911260		PLATE, CONNECTOR			
1	1	*	1012151-1			CONNECTOR, ELECTRICAL			

APPLICATION

NEXT ASSY	USED ON
2011896	2011000

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910750

DRAWN F. Schiller DATE 6-18-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL 8-27-64
APPROVAL E. Thorup 8/31/64
NASA APPROVAL
MIT APPROVAL 1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE AND CONNECTOR ASSY OF (SXT)

CODE IDENT NO.
SIZE B
NASA NUMBER 2011799
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-153

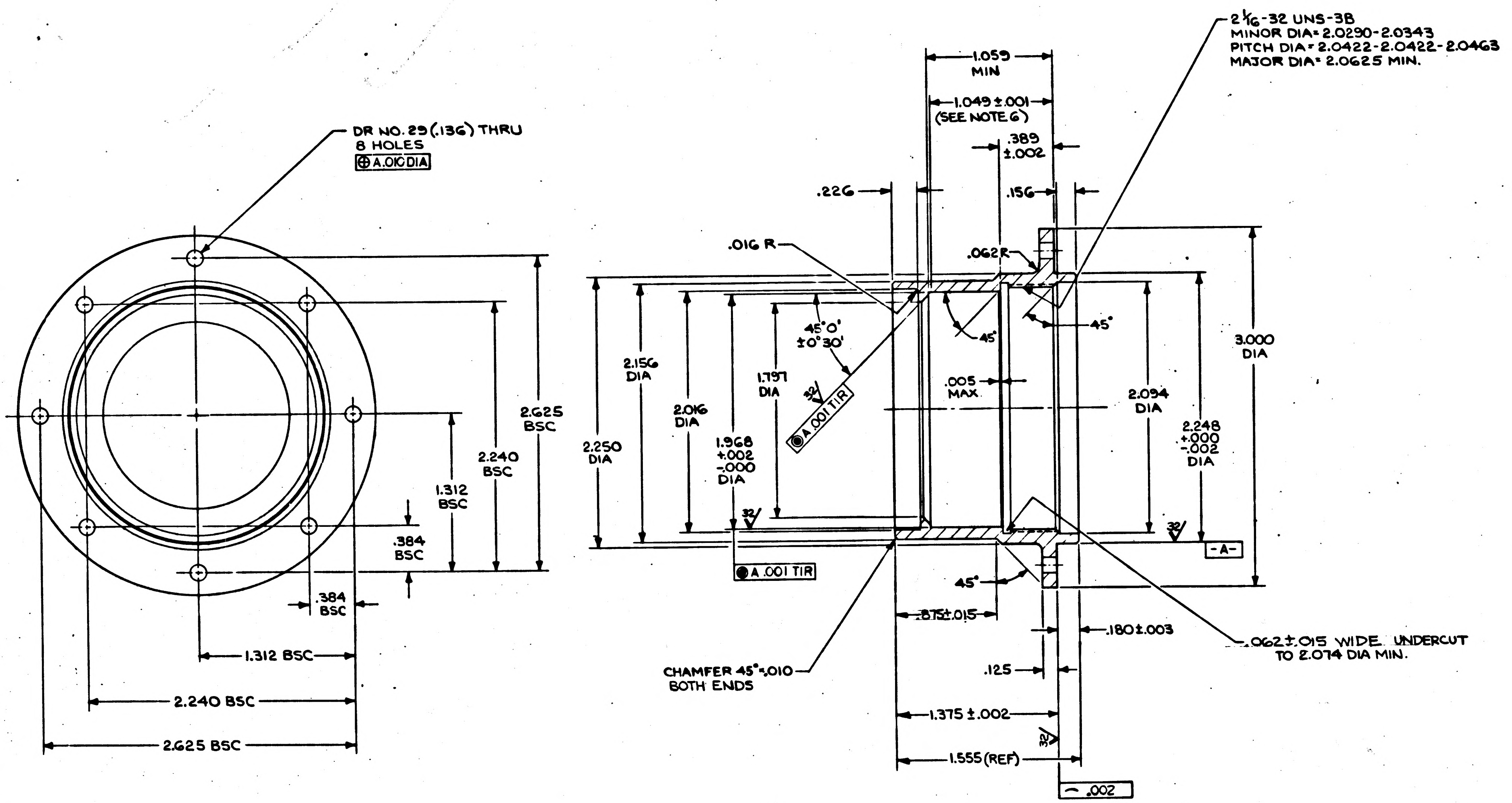
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011803

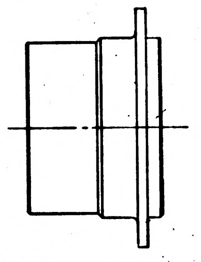
REVISIONS 7/22 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63/ FINISH ALL OVER.
   b. √ BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND1002079.
5. HEAT TREAT (STABILIZE AND STRESS RELIEVE) IN ACCORD WITH ND1002114
6. DIMENSION IS TO THEORETICAL INTERSECTION OF CONE AND CYLINDER.
7. FINISH: BLACK ANODIZE IN ACCORD WITH ND1002127.



DR NO. 29 (.136) THRU
8 HOLES
⊕ A .010 DIA
2.625 BSC
2.240 BSC
1.312 BSC
.384 BSC
.384 BSC
1.312 BSC
2.240 BSC
2.625 BSC
1.059 MIN
1.049 ±.001 (SEE NOTE 6)
.389 ±.002
.226
.156
2 1/16-32 UNS-3B
MINOR DIA = 2.0290-2.0343
PITCH DIA = 2.0422-2.0422-2.0463
MAJOR DIA = 2.0625 MIN.
.016 R
.062 R
45°0' ±0°30'
45°
45°
32/
● A .001 TIR
2.156 DIA
2.016 DIA
1.797 DIA
1.968 +.002 -.000 DIA
2.250 DIA
.005 MAX
2.094 DIA
3.000 DIA
2.248 +.000 -.002 DIA
32/
-A-
● A .001 TIR
45°
.875 ±.015
.180 ±.003
.062 ±.015 WIDE UNDERCUT TO 2.074 DIA MIN.
CHAMFER 45° × .010 BOTH ENDS
.125
1.375 ±.002
32/
1.555 (REF)
⌒ .002



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011732	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910780

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 6/1/64 JFS
APPROVAL 6/9/64
APPROVAL E. 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
TELESCOPE, LENS

CODE IDENT NO.
SIZE D
NASA NUMBER 2011803

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011803

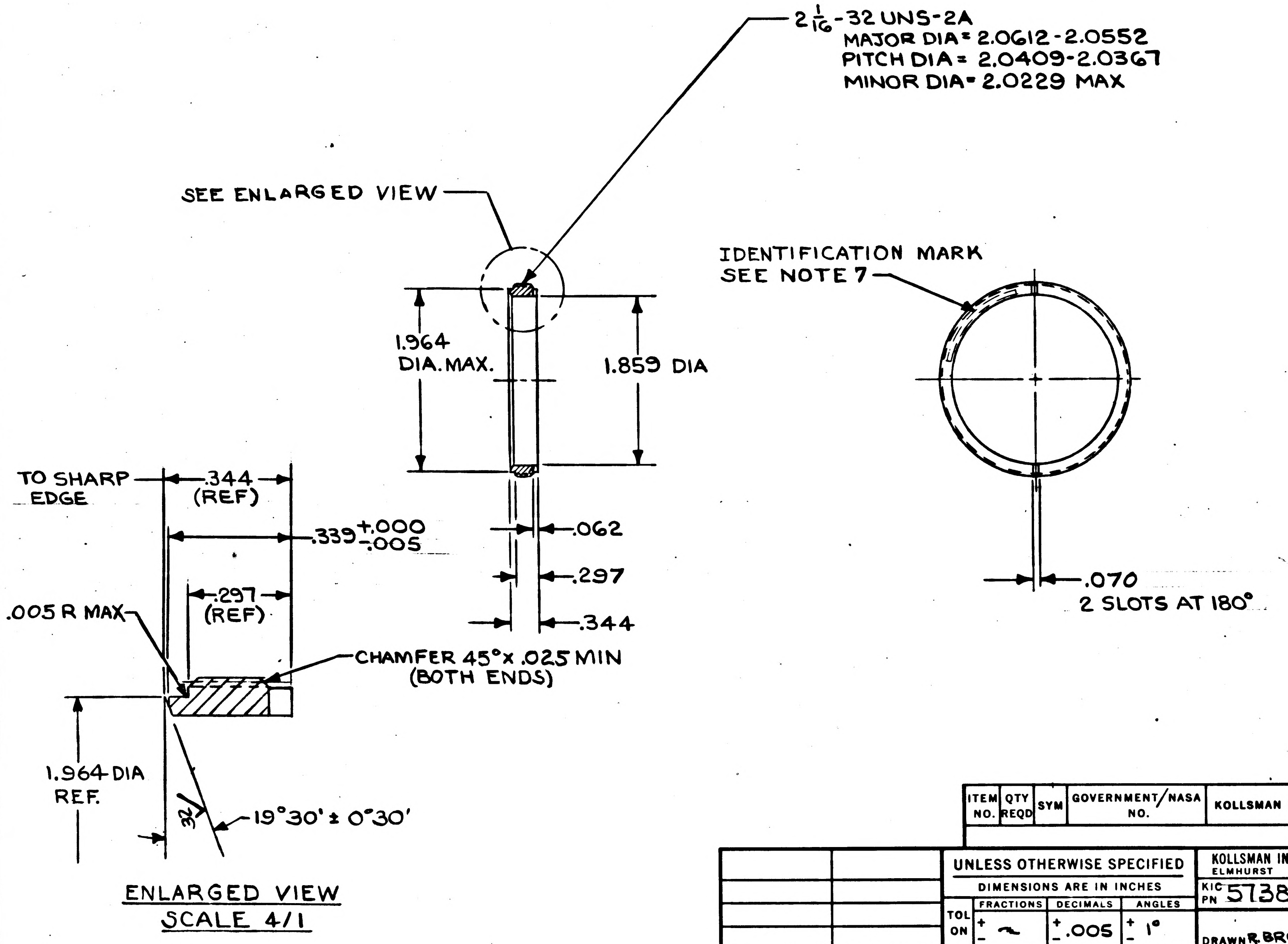
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011805

SYM	ZONE	REVISIONS TDRR 09890 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORD WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORD WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORD WITH ND1002078.
4. REMOVE BURRS IN ACCORD WITH ND 1002079.
5. ~~PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO 5.4.1 (KPS 1005 I.200)~~
6. FINISH: BLACKEN IN ACCORD WITH MIL-C-13924, CLASS 3 (KPS 1005 B.100)
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORD WITH ND 1002019


2 1/16-32 UNS-2A
MAJOR DIA = 2.0612-2.0552
PITCH DIA = 2.0409-2.0367
MINOR DIA = 2.0229 MAX
SEE ENLARGED VIEW
IDENTIFICATION MARK
SEE NOTE 7
1.964
DIA. MAX.
1.859 DIA
TO SHARP EDGE
.344
(REF)
.339 +.000 -.005
.062
.297
.344
.297
(REF)
.005 R MAX
CHAMFER 45° x .025 MIN
(BOTH ENDS)
1.964 DIA
REF.
32
19°30' ± 0°30'
.070
2 SLOTS AT 180°

ENLARGED VIEW
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011732	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910800

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 5/1/64 J.F.S.
APPROVAL 5/29/64
APPROVAL E. Meyer 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RING, LOCKING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011805
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 2011806

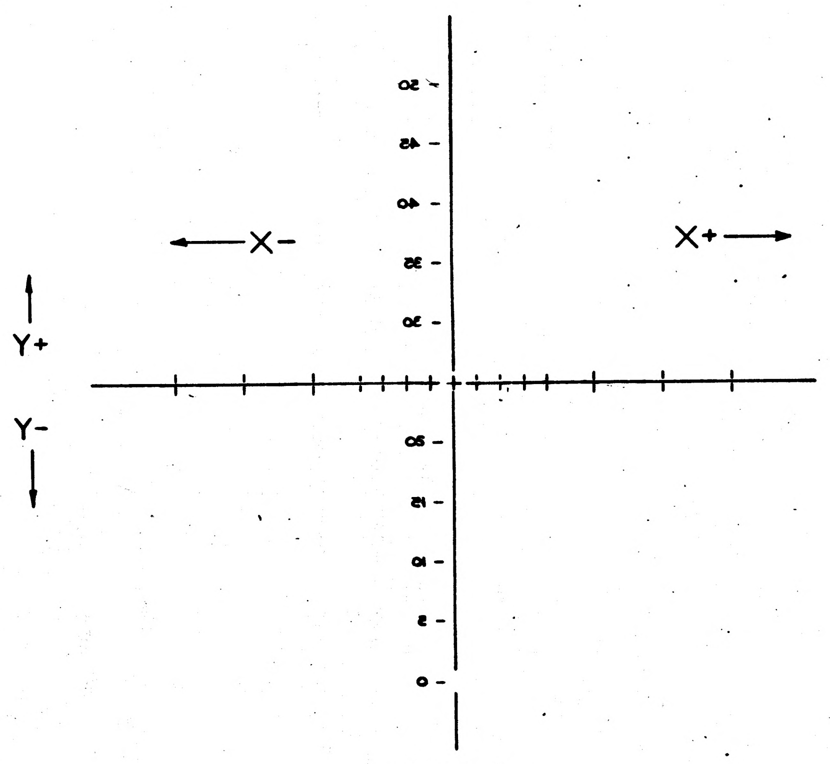
REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12665	9/1/64	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS-BSC 2 OR EQUIVALENT
FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA (REF) 10-1, OUTER ZONE 10-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA (REF) 10-1, OUTER ZONE 10-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION → A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.

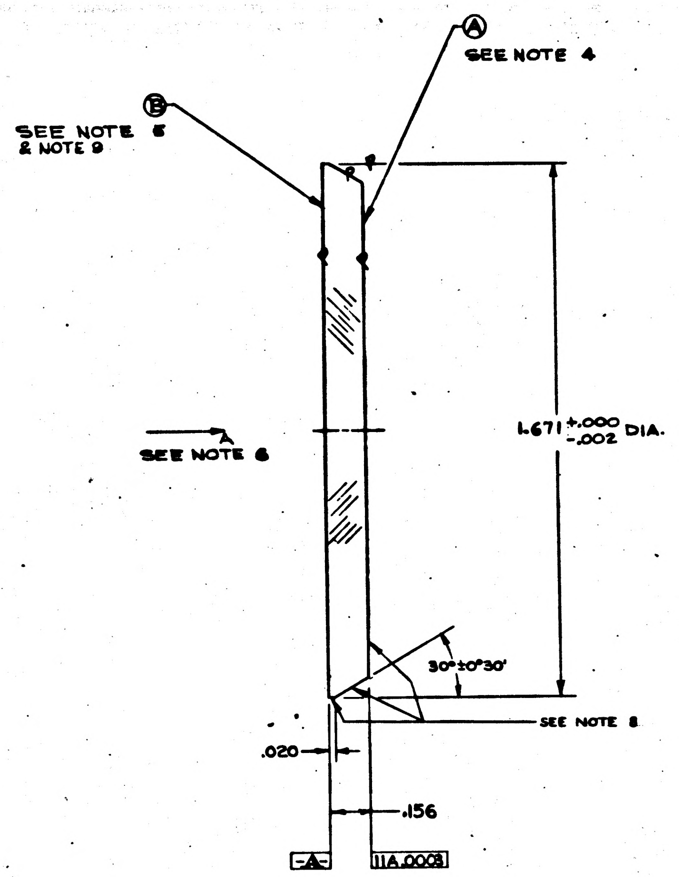
⊖	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

●		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402



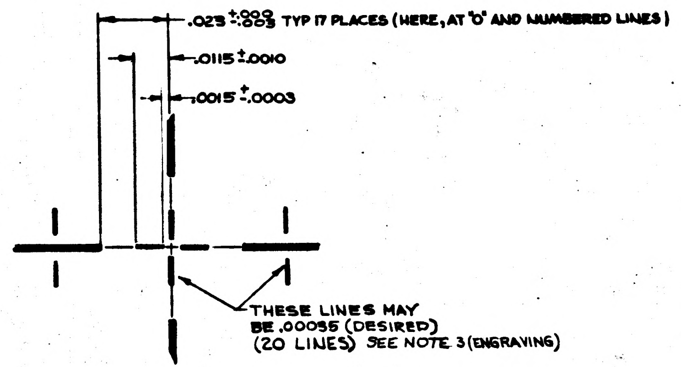
50
45
40
35
30
X-
X+
Y+
Y-
20
15
10
5
0

FIGURE A



Ⓐ SEE NOTE 4
Ⓑ SEE NOTE 5 & NOTE 9
SEE NOTE 6
1.671 +.000 -.002 DIA.
30°±0°30'
SEE NOTE 8
.020
.156
-A-
// A .0005

SCALE 5:1



.025 +.002 -.003 TYP 17 PLACES (HERE, AT "0" AND NUMBERED LINES)
.0115±.0010
.0015±.0003
THESE LINES MAY BE .00055 (DESIRED) (20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 INCLUDING WIDTH OF LINES IN CHARACTERS EXCEPT OPTION IN ENLARGED VIEW
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 +.001 -.000
6. WHITE OPAQUE FILLER IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.

ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386510200
DRAWN DATE
CHECKER
APPROVAL
APPROVAL
NASA APPROVAL
SNT APPROVAL 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
RETICLE, ELEMENT, ENGRAVED, SCT
CODE IDENT NO.
SIZE E
NASA NUMBER 2011806
SCALE
WEIGHT
SHEET OF

B 2011806

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12665	9/17/65	
B		REVISED PER TDRR 15030		

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS - BSC 2 GRADE B FINE ANNEALED
   FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2, OUTER ZONE 10-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA(REF) 10-1, OUTER ZONE 10-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION ⟶ A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.

θ	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

θ		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402

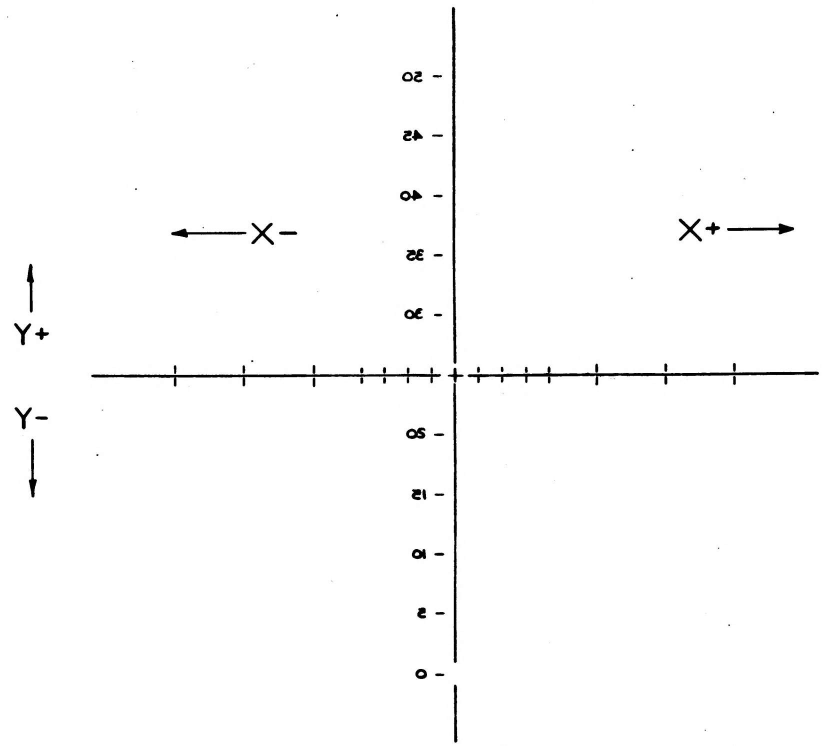
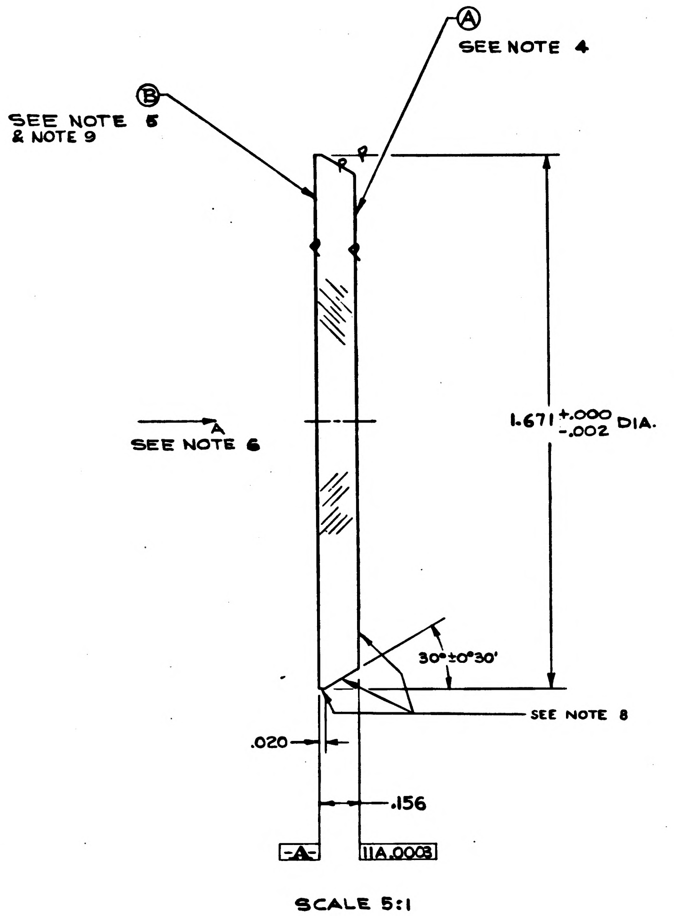
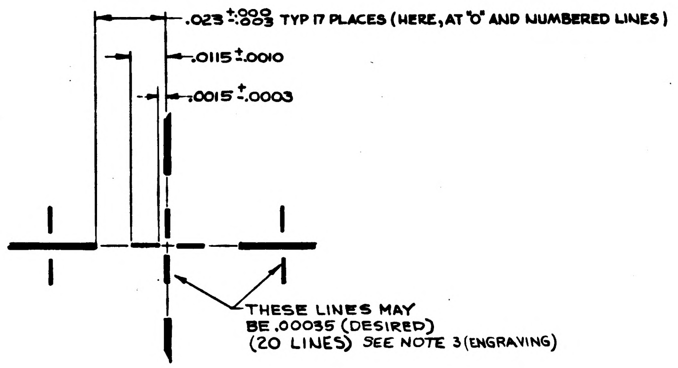

50
45
40
35
30
←X-
X+→
Y+
Y-
20
15
10
5
0

FIGURE A

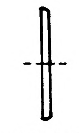

Ⓐ SEE NOTE 4
Ⓑ SEE NOTE 5 & NOTE 9
P
P
A
SEE NOTE 6
1.671 +.000 -.002 DIA.
30°±0°30'
SEE NOTE 8
.020
.156
-A-
// A .0003

SCALE 5:1


.023 +.002 -.003 TYP 17 PLACES (HERE, AT "0" AND NUMBERED LINES)
.0115±.0010
.0015±.0003
THESE LINES MAY BE .00035 (DESIRED) (20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 INCLUDING WIDTH OF LINES IN CHARACTERS EXCEPT OPTION IN ENLARGED VIEW
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 $^{+.001}_{-.000}$
6. WHITE OPAQUE FILLER (TITANIUM DIOXIDE IN ANY SUITABLE VEHICLE) IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910200
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/29/64
APPROVAL 5/29/64
APPROVAL 6-12-64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT, ENGRAVED, SCT

CODE IDENT NO.
SIZE E
NASA NUMBER 2011806
SCALE AS NOTED
WEIGHT CALC ACTUAL
SHEET OF

C	2011806

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS - BSC 2 GRADE B FINE ANNEALED
   FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2, OUTER ZONE 10-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA. 10-1, OUTER ZONE 20-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION ⟶ A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ.
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.

⊖	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

●		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402

REVISIONS TDRR 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12665	9-7-64	
B		REVISED PER TDRR 15030		
C		REVISED PER TDRR 17710	2-65	

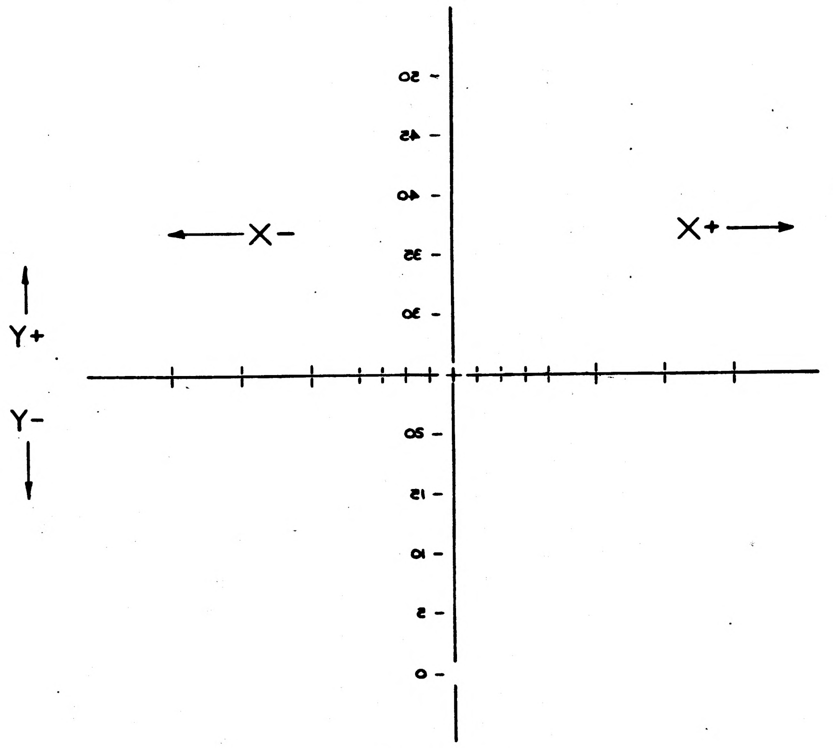
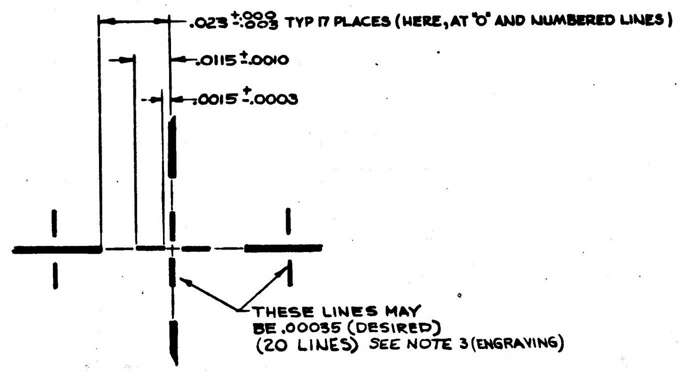
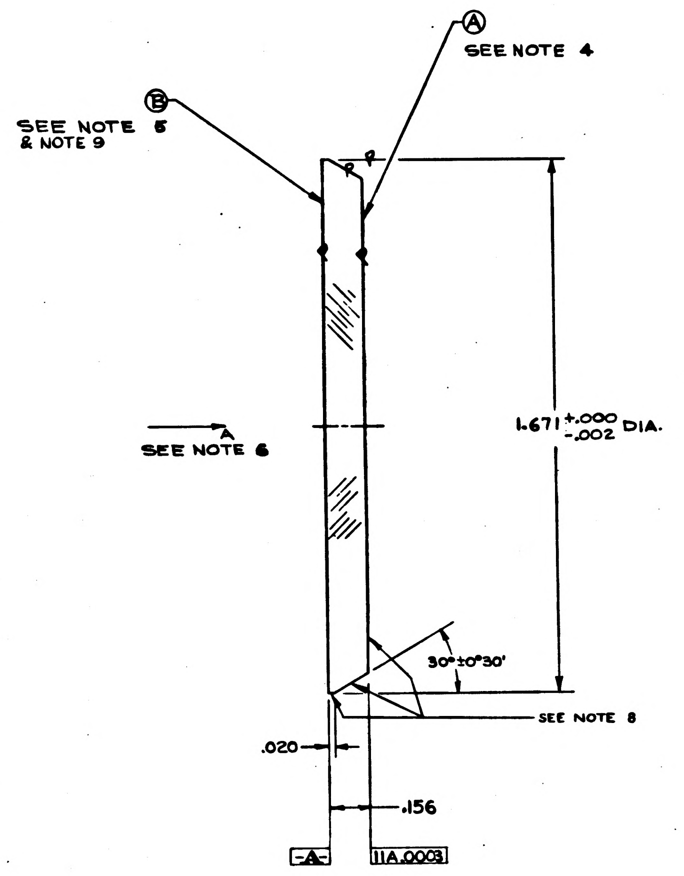

50
45
40
35
30
20
15
10
5
0
X-
X+
Y+
Y-

FIGURE A

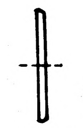

.023 +.000 -.003 TYP 17 PLACES (HERE, AT "0" AND NUMBERED LINES)
.0115 ±.0010
.0015 ±.0003
THESE LINES MAY BE .00035 (DESIRED) (20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER


Ⓐ SEE NOTE 4
Ⓑ SEE NOTE 5 & NOTE 9
P
P
A
SEE NOTE 6
1.671 +.000 -.002 DIA.
30° ±0°30'
SEE NOTE 8
.020
.156
-A-
‖ A .0003

SCALE 5:1

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 INCLUDING WIDTH OF LINES IN CHARACTERS EXCEPT OPTION IN ENLARGED VIEW
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 +.001 -.000
6. WHITE OPAQUE FILLER (TITANIUM DIOXIDE IN ANY SUITABLE VEHICLE) IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386510200
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED 5/20/64
APPROVAL 5/29/64
APPROVAL 6-12-64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT, ENGRAVED, SCT

CODE IDENT NO. | SIZE E | NASA NUMBER 2011806
SCALE AS NOTED | WEIGHT | CALC ACTUAL | SHEET | OF

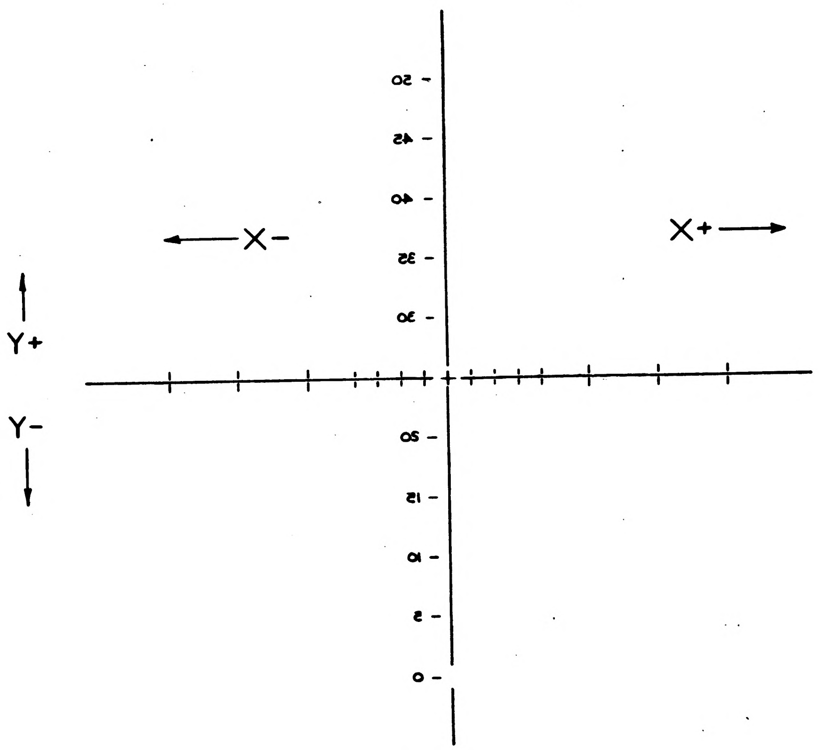
2011806 C

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12665	9/17/64	[illegible]
B		REVISED PER TDRR 15030	[illegible]	WK
C		REVISED PER TDRR 17710	1/13/65	WK
D		REVISED PER TDRR 18001	[illegible]	W.C.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS-BSC 2 GRADE B FINE ANNEALED
   FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2, OUTER ZONE 20-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA. 10-2, OUTER ZONE 20-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION ⟶ A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
11. REF. PATTERNS VIEWED UNDER 7 POWER MAGNIFICATION.

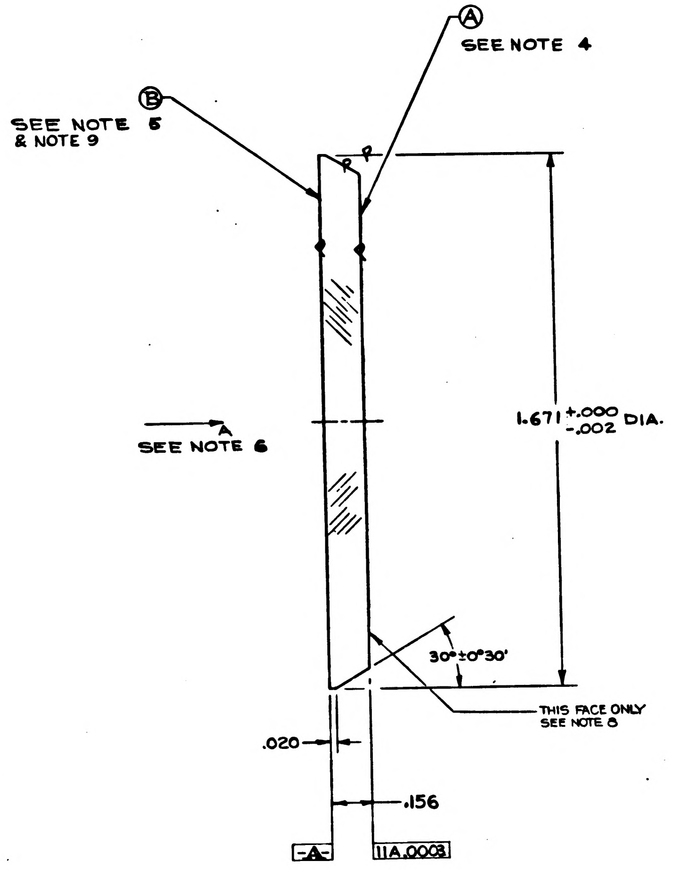
θ	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

θ		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402



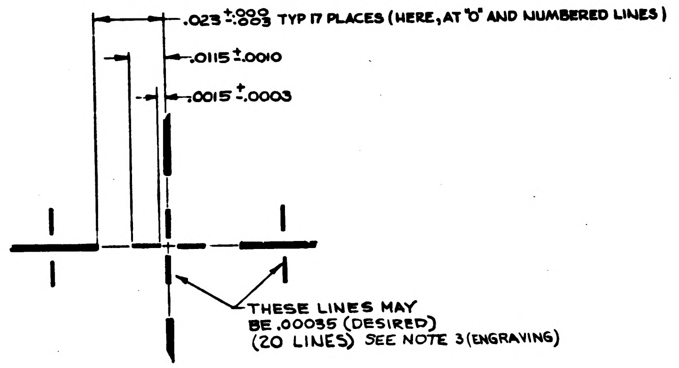
50
45
40
35
30
20
15
10
5
0
X-
X+
Y+
Y-

FIGURE A



Ⓐ SEE NOTE 4
Ⓑ SEE NOTE 5 & NOTE 9
P
P
SEE NOTE 6
A
1.671 +.000 -.002 DIA.
30°±0°30'
THIS FACE ONLY SEE NOTE 8
.020
.156
-A-
// A .0003

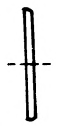
SCALE 5:1



.023 +.000 -.003 TYP 17 PLACES (HERE, AT "0" AND NUMBERED LINES)
.0115±.0010
.0015±.0003
THESE LINES MAY BE .00035 (DESIRED) (20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 EXCEPT AS FOLLOWS:
   a) OPTION IN ENLARGED VIEW.
   b) WIDTH OF CHARACTER LINES .0009±.0003.
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 +.001 -.000
6. WHITE OPAQUE FILLER (TITANIUM DIOXIDE IN ANY SUITABLE VEHICLE) IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910200
DRAWN R. BRUNELLE DATE 4-6-64
CHECKED [illegible] 5-29-64
APPROVAL [illegible] 5/29/64
APPROVAL [illegible] 6-12-64
NASA APPROVAL
MIT APPROVAL [illegible] 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT,
ENGRAVED, SCT

CODE IDENT NO.
SIZE E
NASA NUMBER 2011806
SCALE AS NOTED
WEIGHT
C/LC ACTUAL
SHEET 1 OF

E 2011806

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12665	9/17/64	
B		REVISED PER TDRR 15030	[illegible] 4	WK
C		REVISED PER TDRR 17710	11/2/65	WK
D		REVISED PER TDRR 18001	[illegible] 65	WK
E		REVISED PER TDRR 20435	7/8/65	WK

REVISIONS TDRR 10230

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS - BSC 2 PER MIL-G-174, TYPE (517-645) GRADE B FINE ANNEALED. FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA 10-2, OUTER ZONE 20-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA. 10-2, OUTER ZONE 20-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION → A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND 1002019.
11. REF. PATTERNS VIEWED UNDER 7 POWER MAGNIFICATION.

θ	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

θ		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402

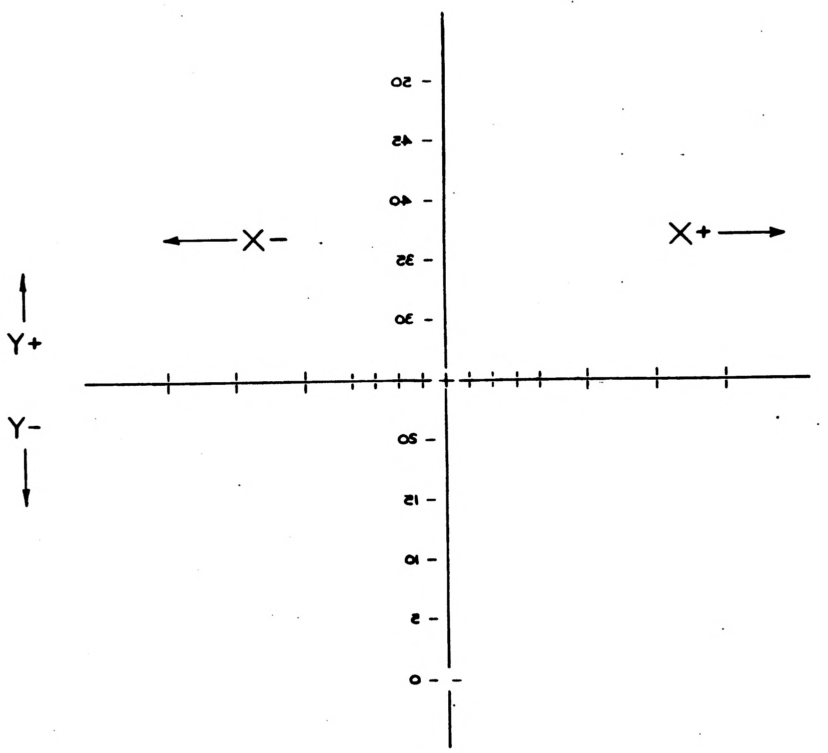
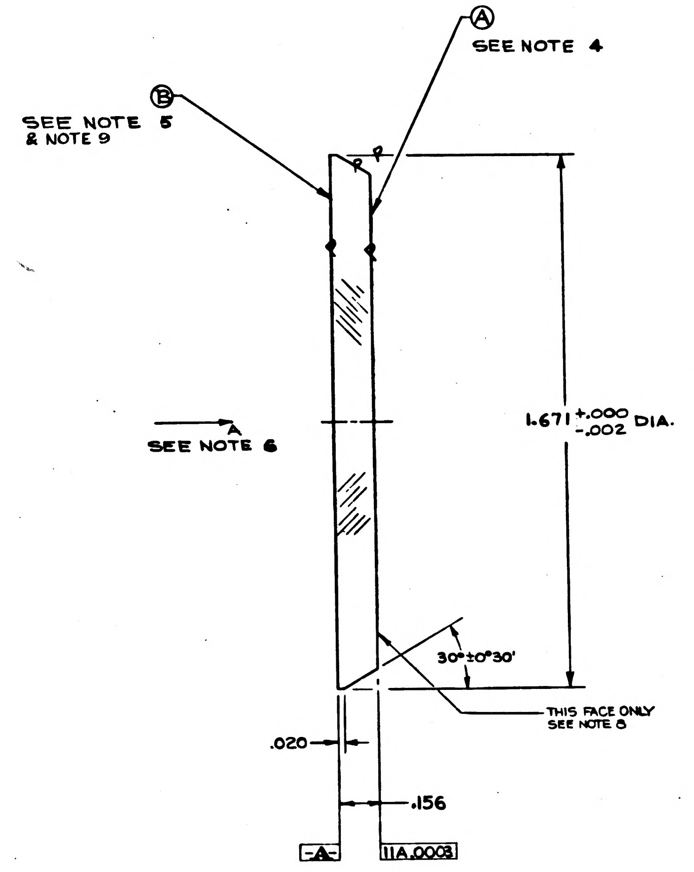
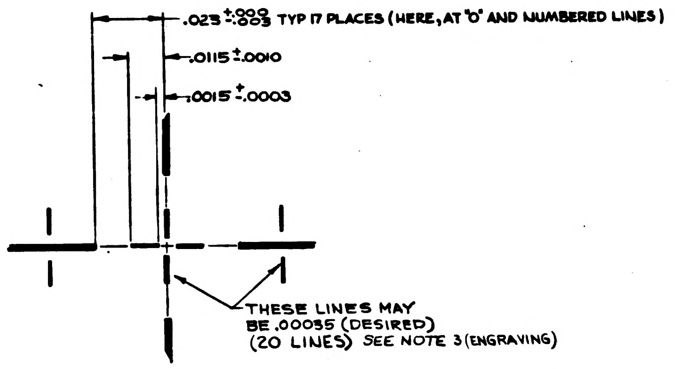

20
45
40
35
30
← X-
X+ →
Y+
Y-
50
15
10
5
0

FIGURE A

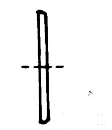

Ⓐ
SEE NOTE 4
Ⓑ
SEE NOTE 5
& NOTE 9
P
P
SEE NOTE 6
A
1.671 +.000 -.002 DIA.
30°±0°30'
THIS FACE ONLY
SEE NOTE 8
.020
.156
-A-
11A.0003

SCALE 5:1


.023 +.002 -.003 TYP 17 PLACES (HERE, AT "0" AND NUMBERED LINES)
.0115±.0010
.0015±.0003
THESE LINES MAY
BE .00035 (DESIRED)
(20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 EXCEPT AS FOLLOWS:
   a) OPTION IN ENLARGED VIEW.
   b) WIDTH OF CHARACTER LINES .0009±.0003.
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 +.001 -.000
6. WHITE OPAQUE FILLER (TITANIUM DIOXIDE IN ANY SUITABLE VEHICLE) IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.



ACTUAL SIZE

2011806 E

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910200
DRAWN R BRUNELLE DATE 4-6-64
CHECKED 5/29/64
APPROVAL 5/29/64
APPROVAL 6-12-64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT, ENGRAVED, SCT

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011806
SCALE
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011806

REVISIONS 10230

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS - BSC 2 OR EQUIVALENT
   FLATNESS - 5 λ AT 5461 Å BOTH SIDES
4. SURFACE QUALITY Ⓐ INNER ZONE = 1.1240 DIA (REF) 10-1, OUTER ZONE 10-5.
5. SURFACE QUALITY Ⓑ INNER ZONE = 1.1240 DIA (REF) 10-1, OUTER ZONE 10-5.
6. FIGURE "A" INSCRIPTION (WHEN VIEWED IN DIRECTION ⟶ A) SHOULD BE CENTRALLY LOCATED.
7. SURFACES MARKED "P" POLISHED.
8. COAT PER ND 1002224 (ALL OVER) BEFORE ENGRAVING
9. ENGRAVING ON SURFACE Ⓑ
10. IDENTIFY USING NASA DRAWING NO, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.

θ	Y±.0002
25	0.0000
20, 30	0.1144
15, 35	0.2282
10, 40	0.3409
5, 45	0.4523
0, 50	0.5620

θ		X±.0002
+2	-2	0.0458
+4	-4	0.0916
+6	-6	0.1372
+8	-8	0.1828
+12	-12	0.2734
+18	-18	0.4080
+24	-24	0.5402

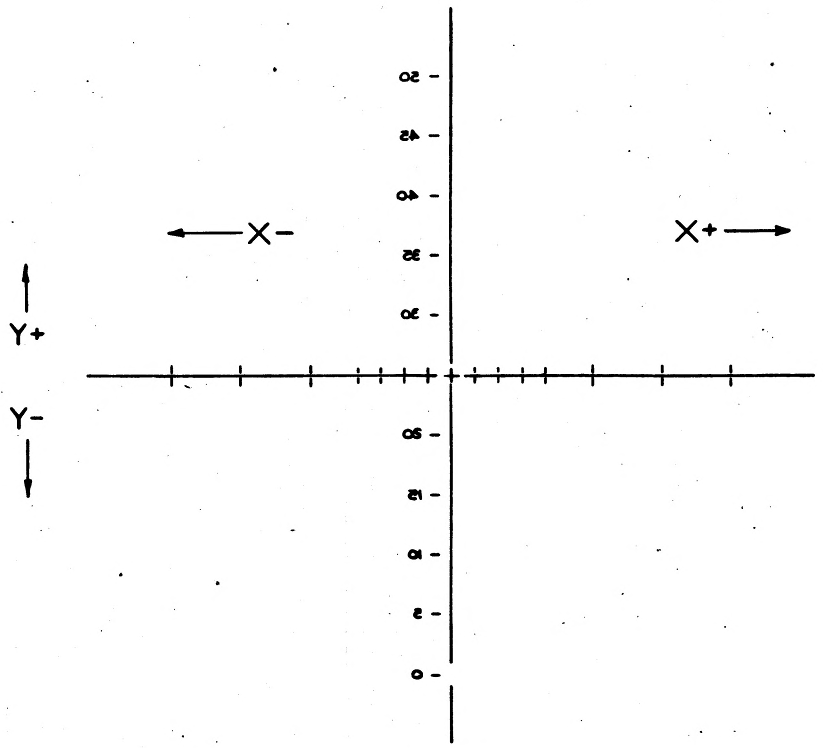
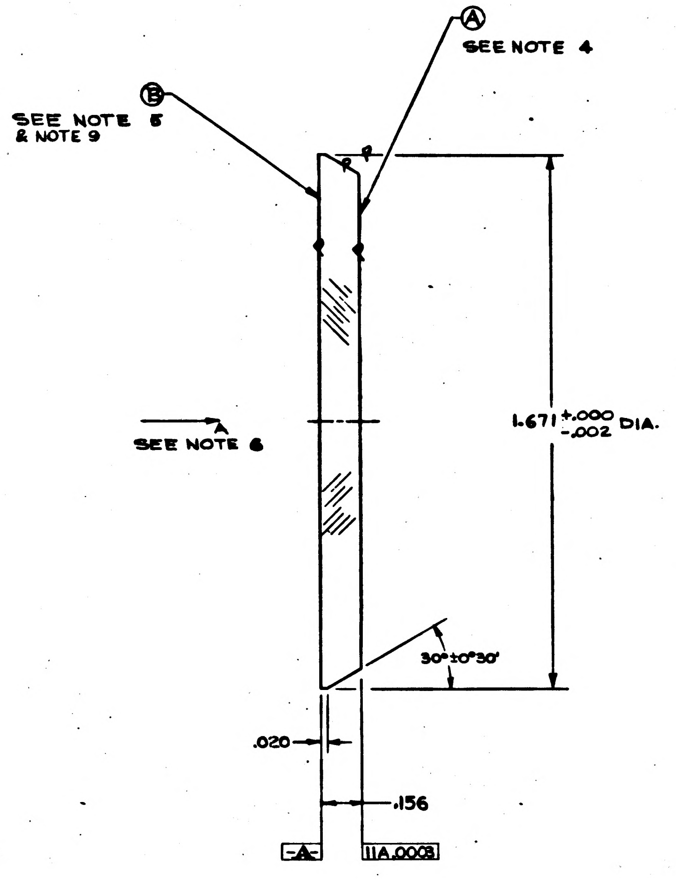
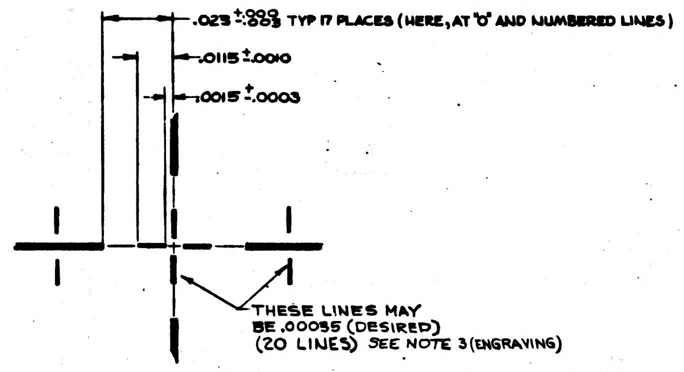

50
45
40
35
30
20
15
10
5
0
X-
X+
Y+
Y-

FIGURE A

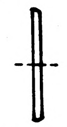

Ⓐ
SEE NOTE 4
Ⓑ
SEE NOTE 5 & NOTE 9
P
P
A
SEE NOTE 6
1.671 +.000 -.002 DIA.
30°±0°30'
.020
.156
-A-
// A .0003

SCALE 5:1


.023 +.000 -.003 TYP 17 PLACES (HERE, AT "O" AND NUMBERED LINES)
.0115 ±.0010
.0015 ±.0003
THESE LINES MAY BE .00035 (DESIRED) (20 LINES) SEE NOTE 3 (ENGRAVING)

ENLARGED VIEW OF CENTER

ENGRAVING NOTES:
1- LINE WIDTH .0007±.0001 INCLUDING WIDTH OF LINES IN CHARACTERS EXCEPT OPTION IN ENLARGED VIEW
2- LONG LINE LENGTH = .015±.002 (23 LINES)
3- SHORT LINE LENGTH = .010±.001 (20 LINES)
4- DISTANCE FROM END OF NUMBERED LINES TO CENTER OF FIGURE = .030±.002
5- DISTANCE TO BOTH SHORT & LONG LINE ON "X" AXIS = .003 +.001 -.000
6. WHITE OPAQUE FILLER IN ENGRAVING.
7. 1.375±.010 DIA TO EXTREMES OF CENTER LINES
8. DO NOT ENGRAVE "X" & "Y". THEY ARE FOR CHARTED DIMENSIONS LOCATING LINES
9. CHARACTERS TO BE .015±.002 HIGH.



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011760	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910200
DRAWN
DATE
CHECKED 5/26/66
APPROVAL 5/26/66
APPROVAL 6-12-66
NASA APPROVAL
UNIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE, ELEMENT, ENGRAVED, SCT

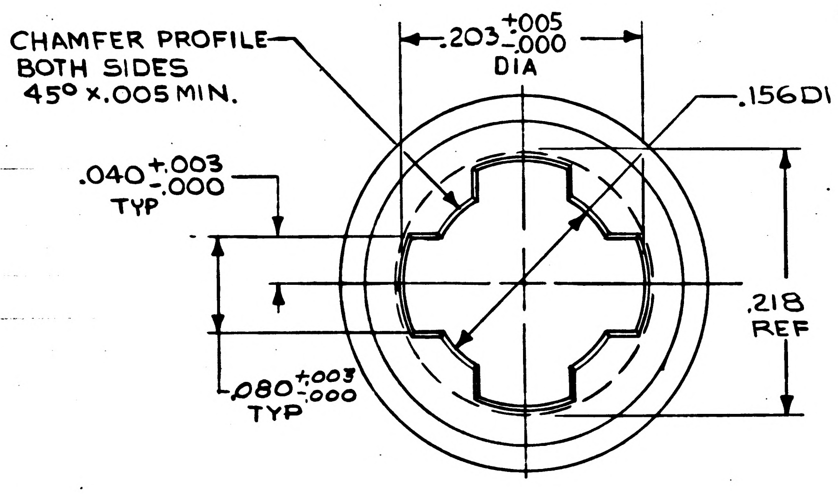
CODE IDENT NO.
SIZE E
NASA NUMBER 2011806
SCALE
WEIGHT
SHEET 1 OF 1

2011806

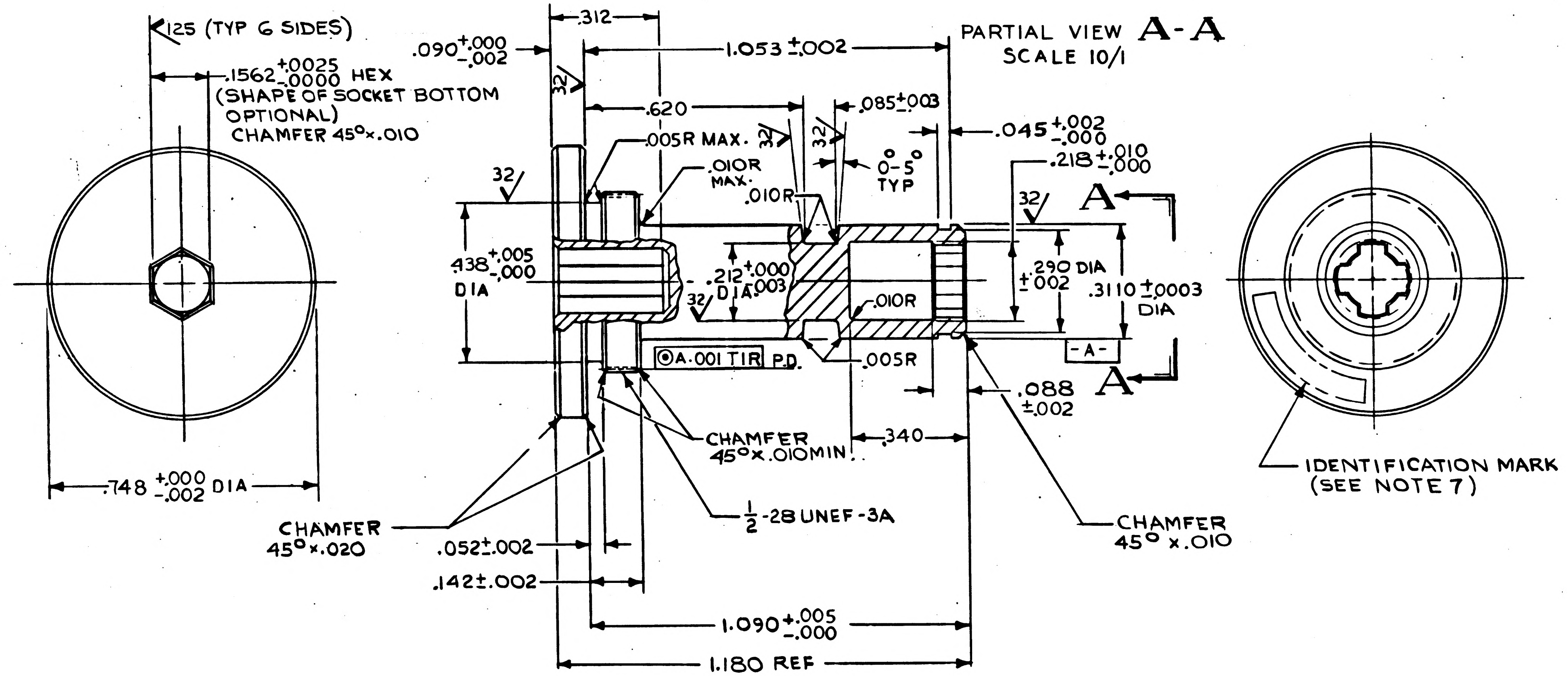
2011820 A

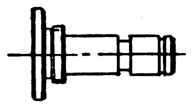
SYM	ZONE	REVISIONS TDRR 10230 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 21070	7/28/65	WK

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE AND STABILIZE) PER ND 1002114.
6. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019.


CHAMFER PROFILE BOTH SIDES 45° x .005 MIN.
.203 +.005 -.000 DIA
.156 DI
.040 +.003 -.000 TYP
.218 REF
.080 +.003 -.000 TYP

PARTIAL VIEW A-A
SCALE 10/1


.125 (TYP 6 SIDES)
.1562 +.0025 -.0000 HEX (SHAPE OF SOCKET BOTTOM OPTIONAL) CHAMFER 45° x .010
.748 +.000 -.002 DIA
.312
.090 +.000 -.002
1.053 ±.002
.620
.005R MAX.
.010R MAX.
.010R
.085 ±.003
0-5° TYP
.045 +.002 -.000
.218 +.010 -.000
32
A
.438 +.005 -.000 DIA
.212 +.000 -.003 DIA
.290 DIA ±.002
.3110 ±.0003 DIA
.010R
.005R
◎A .001 TIR P.D.
-A-
.088 ±.002
CHAMFER 45° x .010MIN.
.340
1/2-28 UNEF-3A
CHAMFER 45° x .020
.052 ±.002
.142 ±.002
1.090 +.005 -.000
1.180 REF
CHAMFER 45° x .010
IDENTIFICATION MARK (SEE NOTE 7)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910770

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/28/64 J.S.
APPROVAL 6/15/64
APPROVAL E. Mirous 6/15/64
NASA APPROVAL J. Barnard
MIT APPROVAL E. Milers 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, MANUAL ADJUSTMENT

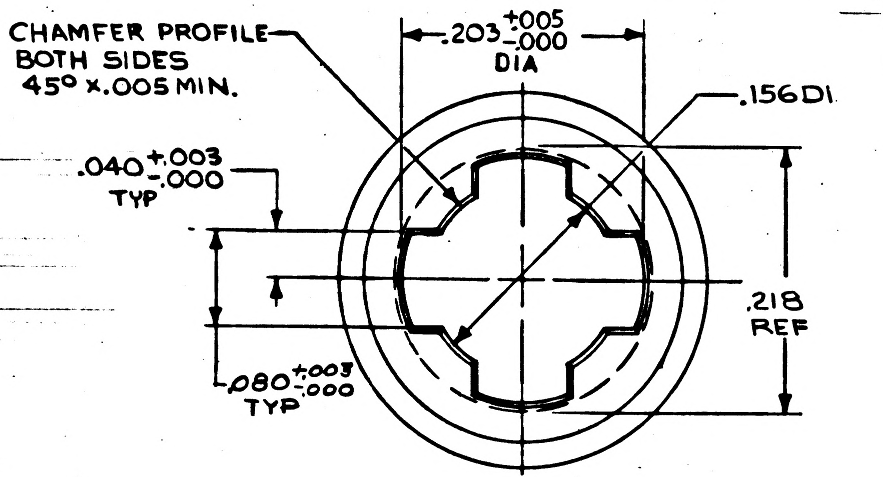
CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011820
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B 2011820

REVISIONS TDRR 10230

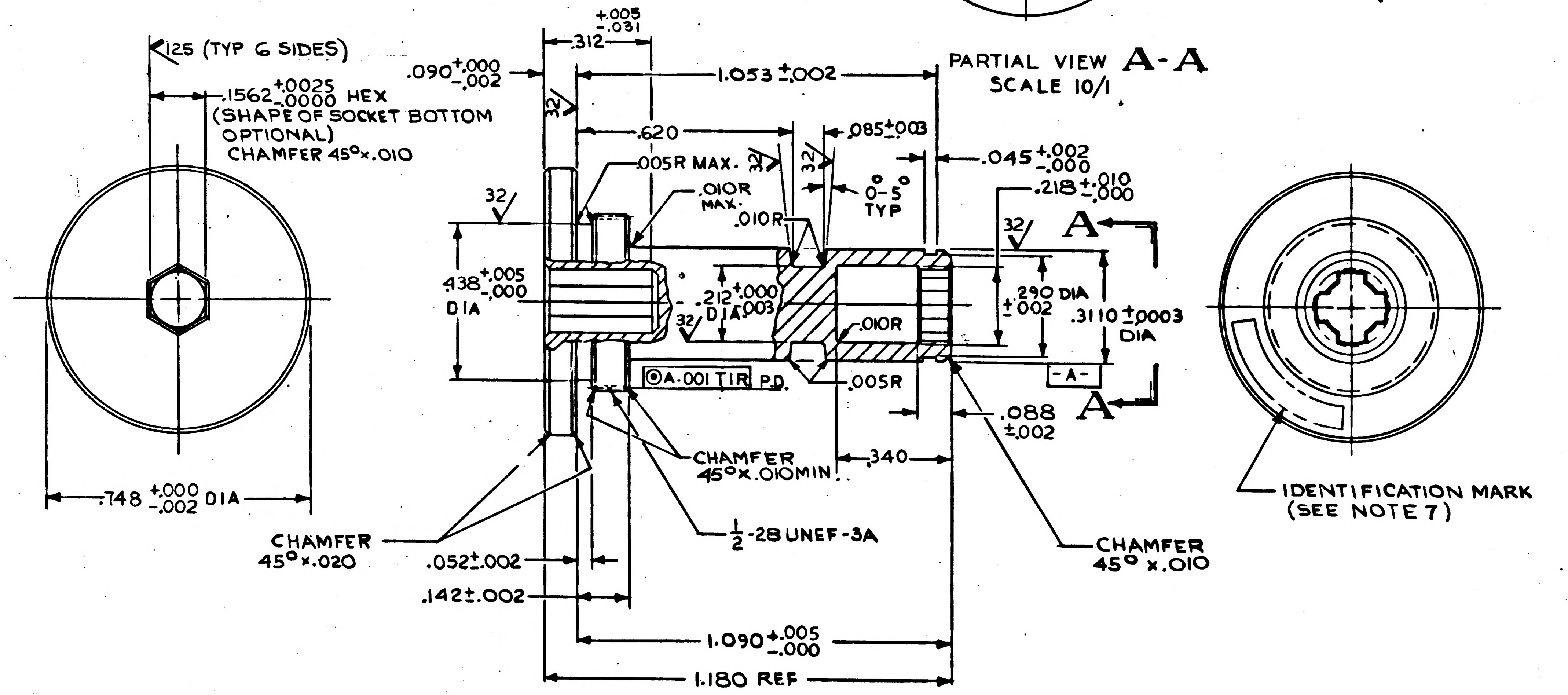
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 21070	7/28/65	WK
B		REVISED PER TDRR 23065	10/11/65	WK

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE AND STABILIZE) PER ND 1002114.
6. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019.

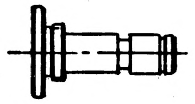


CHAMFER PROFILE BOTH SIDES 45° x .005 MIN.
.203 +.005 -.000 DIA
.156 DI
.040 +.003 -.000 TYP
.218 REF
.080 +.003 -.000 TYP

PARTIAL VIEW A-A
SCALE 10/1



.125 (TYP 6 SIDES)
.1562 +.0025 -.0000 HEX
(SHAPE OF SOCKET BOTTOM OPTIONAL)
CHAMFER 45° x .010
.748 +.000 -.002 DIA
+.005 -.031
.312
.090 +.000 -.002
1.053 ±.002
32
.620
.005R MAX.
32
32
.085±.003
.045 +.002 -.000
.010R MAX.
.010R
0°-5° TYP
.218 +.010 -.000
32
A
.438 +.005 -.000 DIA
.212 +.000 -.003 DIA
32
.010R
.290 DIA ±.002
.3110 ±.0003 DIA
-A-
A
⊚ A .001 TIR P.D.
.005R
.088 ±.002
CHAMFER 45° x .010 MIN.
.340
CHAMFER 45° x .020
½-28 UNEF-3A
CHAMFER 45° x .010
.052±.002
.142±.002
1.090 +.005 -.000
1.180 REF
IDENTIFICATION MARK (SEE NOTE 7)



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 440C

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910770

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/28/64 F.S.
APPROVAL 6/15/64
APPROVAL E. Maruy 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, MANUAL ADJUSTMENT

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011820
SCALE 4/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

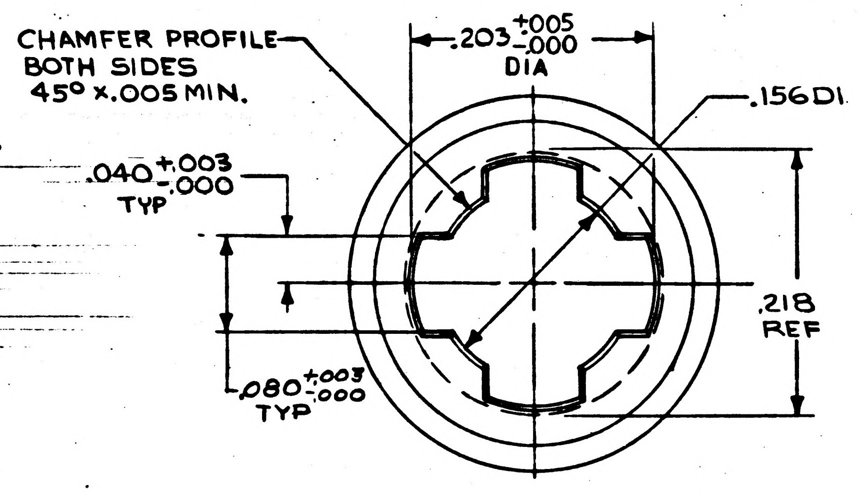
E-184

2011820

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

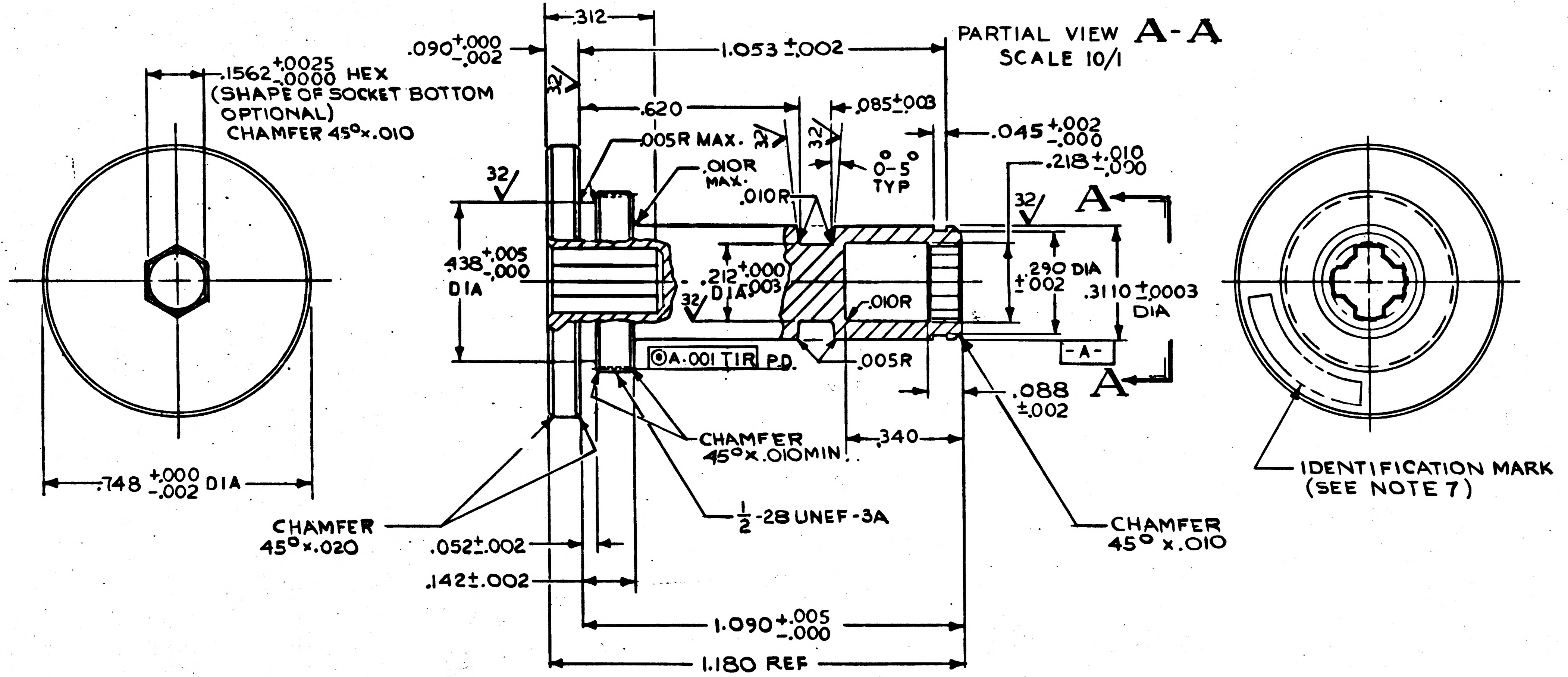
NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. 63√ FINISH ALL OVER.
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT (STRESS RELIEVE AND STABILIZE) PER ND1002114.
6. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019.

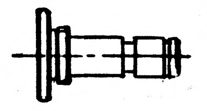


CHAMFER PROFILE BOTH SIDES 45° x.005 MIN.
.203 +.005 -.000 DIA
.156 DI
.040 +.003 -.000 TYP
.218 REF
.080 +.003 -.000 TYP

PARTIAL VIEW A-A
SCALE 10/1



.1562 +.0025 -.0000 HEX
(SHAPE OF SOCKET BOTTOM OPTIONAL)
CHAMFER 45° x.010
.748 +.000 -.002 DIA
CHAMFER 45° x.020
.312
.090 +.000 -.002
32
1.053 ±.002
.620
.085 ±.003
.005R MAX.
.010R MAX.
.010R
0-5° TYP
.045 +.002 -.000
.218 +.010 -.000
A
.438 +.005 -.000 DIA
.212 +.000 -.003 DIA
.290 DIA ±.002
.3110 ±.0003 DIA
.010R
-A-
⊙A .001 TIR P.D.
.005R
.088 ±.002
.340
CHAMFER 45° x.010 MIN.
1/2-28 UNEF-3A
CHAMFER 45° x.010
.052 ±.002
.142 ±.002
1.090 +.005 -.000
1.180 REF
IDENTIFICATION MARK (SEE NOTE 7)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED. SPEC QQ-S-763
CLASS 440C

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910770

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/2 J.S.
APPROVAL 6/15/64
APPROVAL E. Morey 6/15/64
NASA APPROVAL
MIT APPROVAL E. Milner 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHAFT, MANUAL ADJUSTMENT

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011820

SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011820

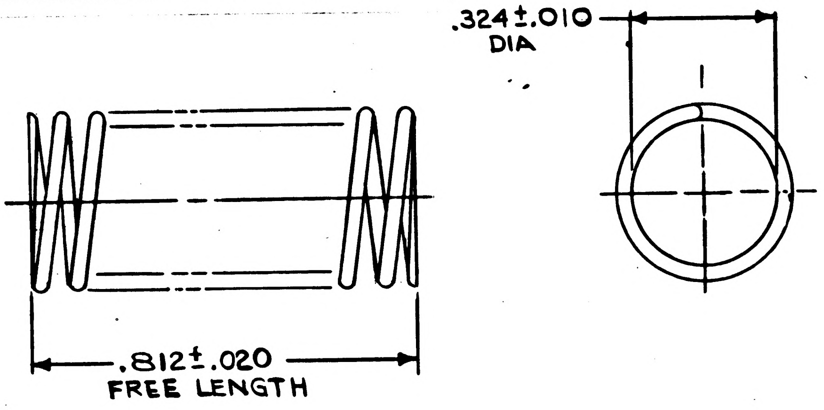
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011821 A

REVISIONS TDRR 09893			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR NO. 15033	22 Dec 64	WK.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005 I.200).
4. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (TAGGING)



SPRING DATA
1. WIRE GAGE ________ #22 (.0312 DIA)
2. TOTAL COILS ________ 8±5%
3. DIRECTION OF HELIX ___ OPTIONAL
4. CLOSED ENDS, GROUND ___ 270° ± 30°
5. SPRING RATE ___ 4.75±5% LBS/IN

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

ACTUAL SIZE

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ — −	+ — −	+ — −

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED. SPEC QQ-W-423
COMP 302 COND. B

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910380

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/28/64 JS
APPROVAL G. Ruhman 5-24-64
APPROVAL E. Maurp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL L Hafel 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPRING, HELICAL, COMPRESSION

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011821

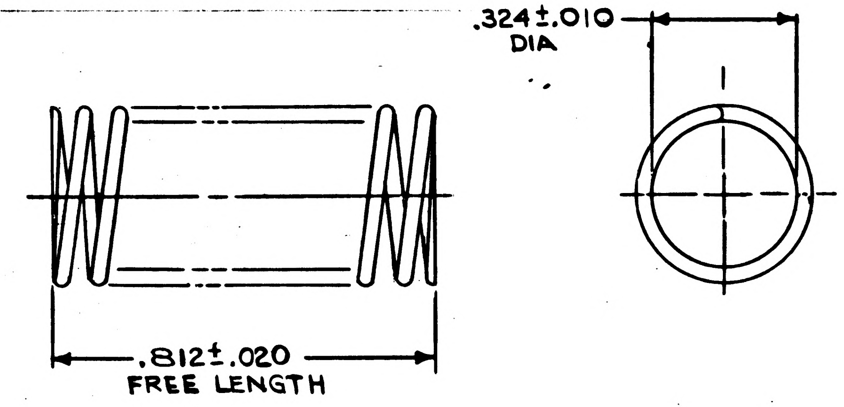
SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011821

REVISIONS Torn 09893

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200).
4. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (TAGGING)



SPRING DATA
1. WIRE DIA ———— .0317
2. TOTAL COILS ———— 8±5%
3. DIRECTION OF HELIX — OPTIONAL
4. CLOSED ENDS, GROUND — 270° ± 30°
5. SPRING RATE — 4.63 LBS/IN

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

ACTUAL SIZE

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL
FED. SPEC QQ-W-423
COMP 302 COND. B
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910380

DRAWN R. BRUNELLE DATE 4-13-64
CHECKED 4/28/64 JS
APPROVAL 5-29-64.
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPRING, HELICAL, COMPRESSION

CODE IDENT NO.
SIZE B
NASA NUMBER 2011821
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

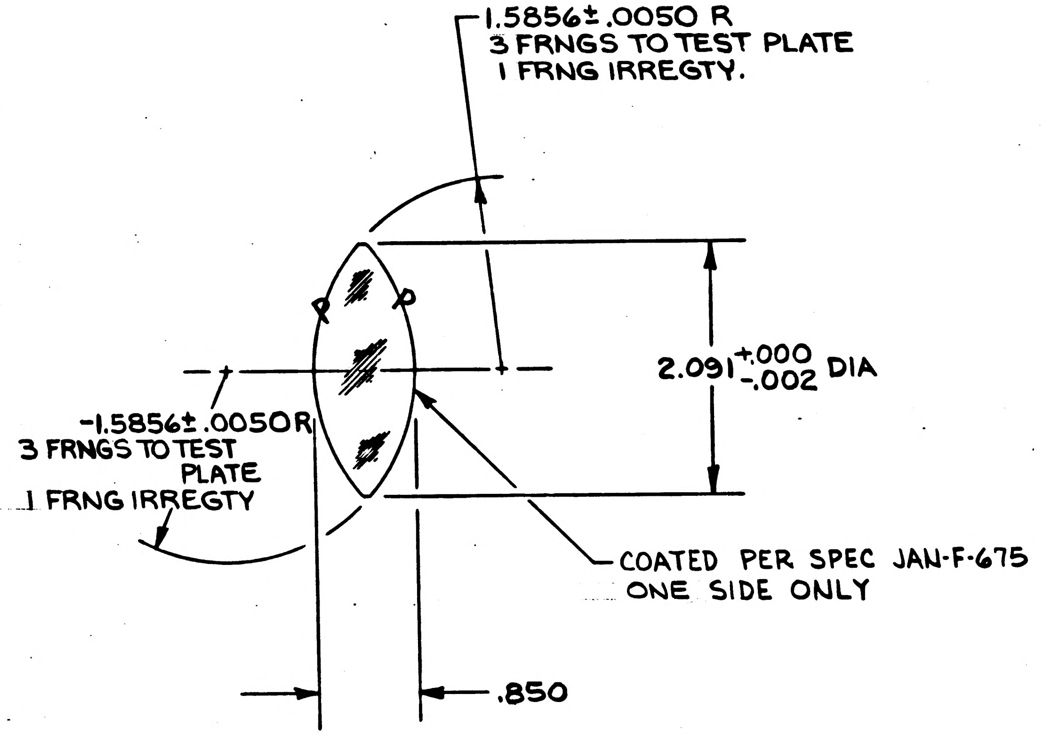
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011823

REVISIONS TDRR 09880				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B- FINE ANNEALED
   TYPE 540-597
4. CA: ENT= 1.754 EXIT= 1.906
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES MAX.
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (BAGGING)


1.5856± .0050 R
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY.
P
P
2.091 +.000 -.002 DIA
-1.5856± .0050 R
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY
COATED PER SPEC JAN-F-675
ONE SIDE ONLY
.850

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011730	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910360

DRAWN DATE 4/13/64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(TELESCOPE ½X)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011823

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011823

MASTER

E-184

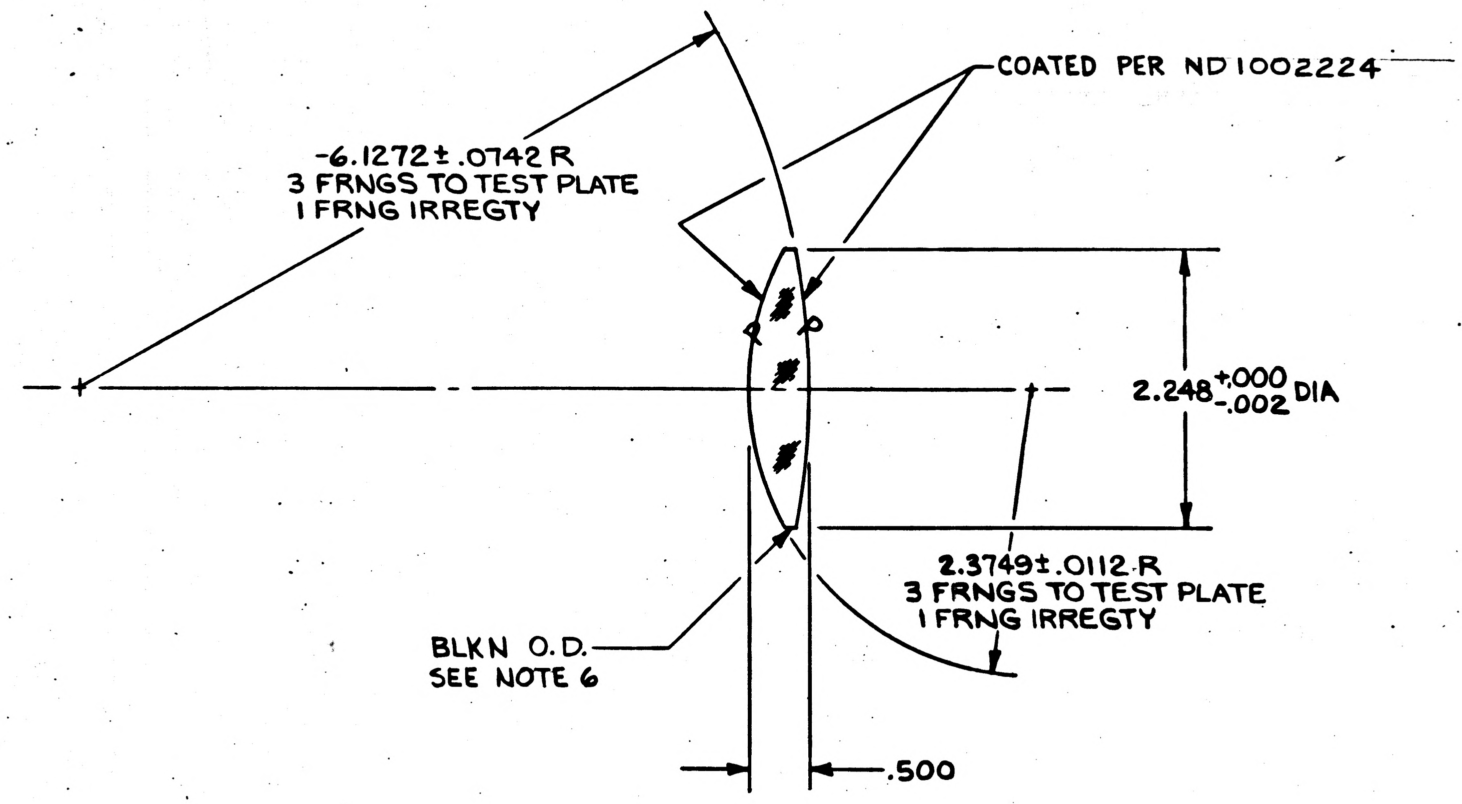
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011824

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TORR 10230

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
   GRADE B-FINE ANNEALED
   TYPE 613-586
4. CA: ENT= 1.964 EXIT= 1.906
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES MAX.
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.12
   WITH BLACK INK PER FED. SPEC. TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER &
   MANUFACTURERS SYMBOL PER ND1002019 (BAGGING).


COATED PER ND1002224
-6.1272±.0742 R
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY
P
P
2.248 +.000 -.002 DIA
2.3749±.0112 R
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY
BLKN O.D.
SEE NOTE 6
.500

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011788	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910350

DRAWN DATE 4/13/64
CHECKED 5/20/64
APPROVAL 6/13/64
APPROVAL 6/16/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(TELESCOPE ½X)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011824
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

2011824

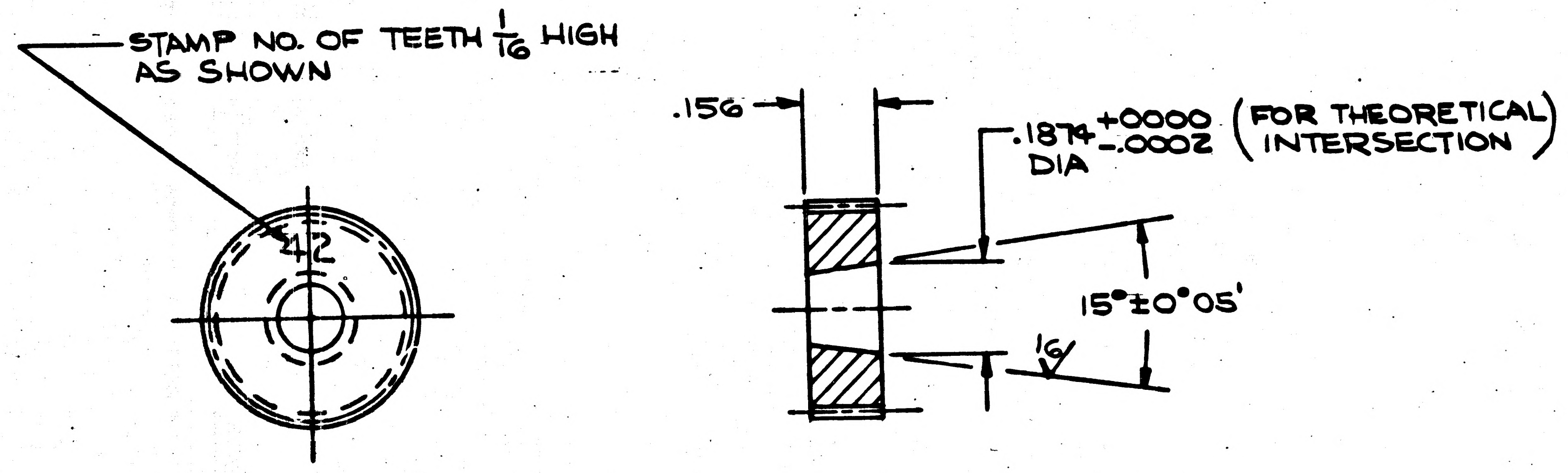
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011825

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

10049

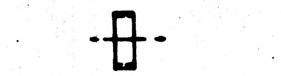
SPUR GEAR DATA	
NO. OF TEETH	42
DIAMETRAL PITCH	96
PRESSURE ANGLE	20°
PITCH DIAMETER	.43750
OUTSIDE DIAMETER	$.4583^{+.0000}_{-.0020}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\sqrt{32}$



STAMP NO. OF TEETH 1/16 HIGH AS SHOWN
42
.156
.1874 +.0000 -.0002 DIA (FOR THEORETICAL INTERSECTION)
15°±0°05'
16

6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 FINISH NO. 5.4.1 (KPS-10051.200).
~~4. REMOVE BURRS PER ND 1002079~~
3. UNLESS OTHERWISE SPECIFIED $\sqrt{63}$ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078
1. INTERPRET DRAWING PER MIL-D-70327

NOTES



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910170

DRAWN DATE 4-8-64
CHECKED J. SULLIVAN 5-29-64
APPROVAL 7/24/60
APPROVAL E. Thomp 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR (42T-96P)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011825

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-184

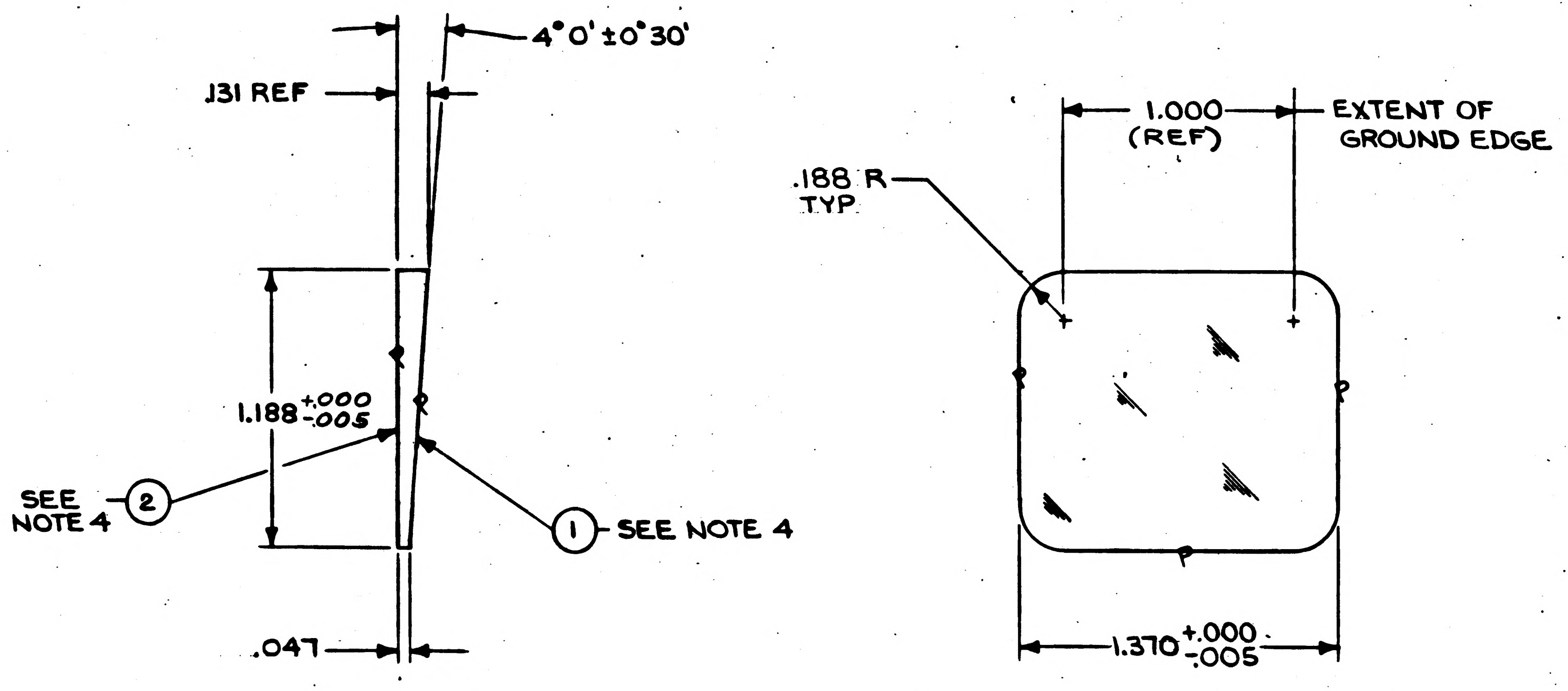
INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

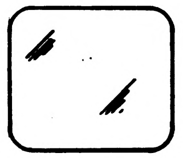
2011828

SYM	ZONE	REVISIONS 10420 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830 (Ord)
3. MATERIAL: GLASS, OPTICAL PER JAN-G-174
   TYPE 517-645 GRADE C, BUBBLE FREE
4. SURFACE QUAL OF SURFACES ① & ②, 20-5
5. SURFACES MARKED "P" POLISHED, ALL OTHERS GROUND.
6. CHAMFER 45°×.010 ALL EDGES.





ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910310

DRAWN R. BRUNELLE DATE 4-14-64
CHECKED 4/28/64 J.S.
APPROVAL 6/17/64
APPROVAL E. 6/18/64

NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WEDGE, ILLUMINATING 7

CODE IDENT NO. | SIZE C | NASA NUMBER 2011828

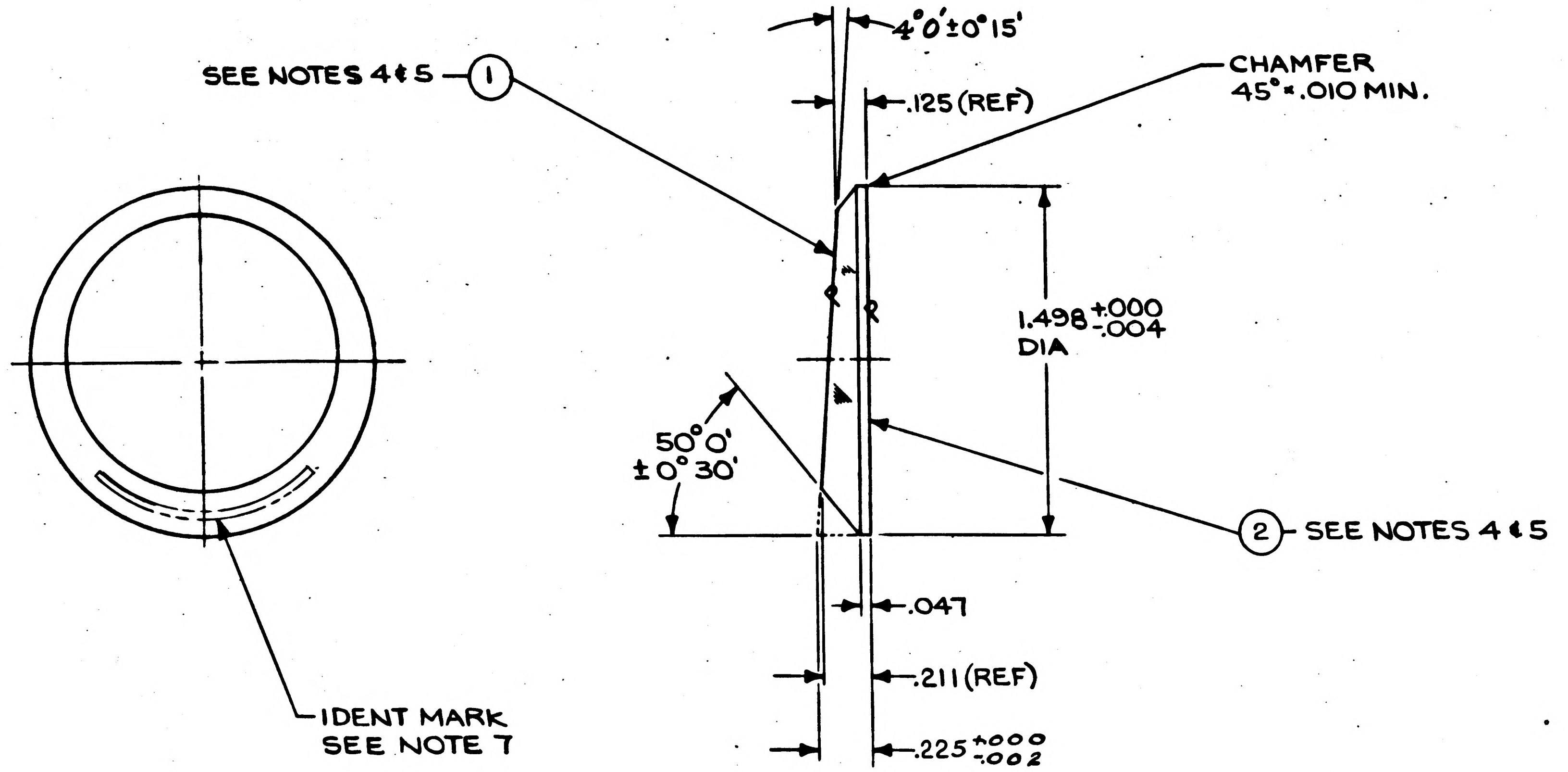
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

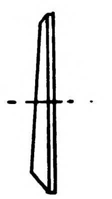
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

6281102

REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830(Ord)
3. MATERIAL: GLASS, OPTICAL PER JAN-G-174, TYPE 517-645, GRADE C
4. SURFACES ① AND ② POLISHED FLAT WITHIN ½ λ AT 5461 Å.
5. SURFACE QUALITY ON SURFACES ① & ②, 20-5.
6. SURFACES MARKED "P" POLISHED, ALL OTHERS GRD.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORD WITH ND1002019.




ACTUAL SIZE

2011829

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011784	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910300

DRAWN P. BRUNELLE DATE 4-14-64
CHECKED 4/20/64 F.S.
APPROVAL 6/18/64
APPROVAL 6/18/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WINDOW, GLASS

CODE IDENT NO.
SIZE C
NASA NUMBER 2011829
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

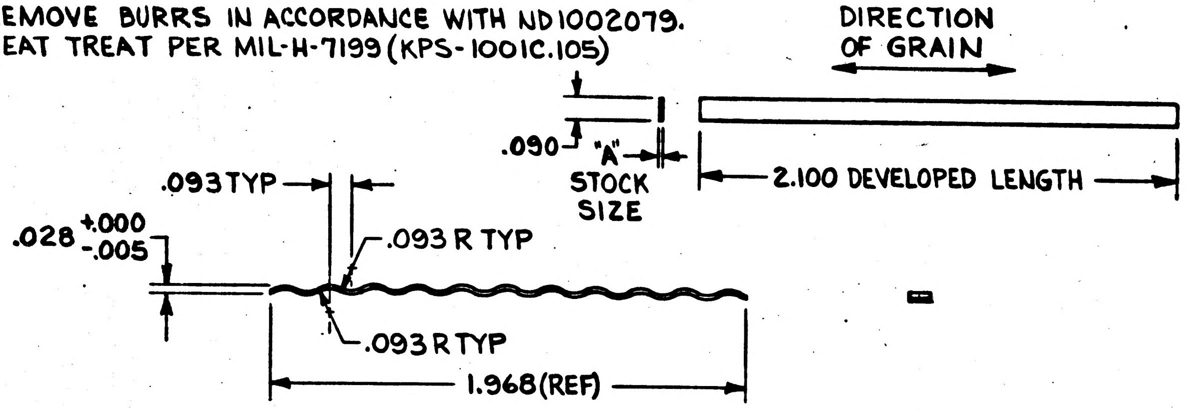
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011837

REVISIONS TDRR 10230

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. HEAT TREAT PER MIL-H-7199 (KPS-1001C.105)



MASTER

NASA NO.	KIC NO.	"A"
2011837-1	79386910701	.002
2011837-2	79386910702	.003

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

ACTUAL SIZE

NEXT ASSY	USED ON
2011724	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON — FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± ~
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM COPPER ½H. FED. SPEC-QQ-C-533
CONDITION ½H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 7938691 0701 0702

DRAWN R. BRUNELLE DATE 4-8-64
CHECKED 6/1/64
APPROVAL 6/15/64
APPROVAL E. Thomas 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPRING, PRISM SPACER

CODE IDENT NO.
SIZE B
NASA NUMBER 2011837-
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-183

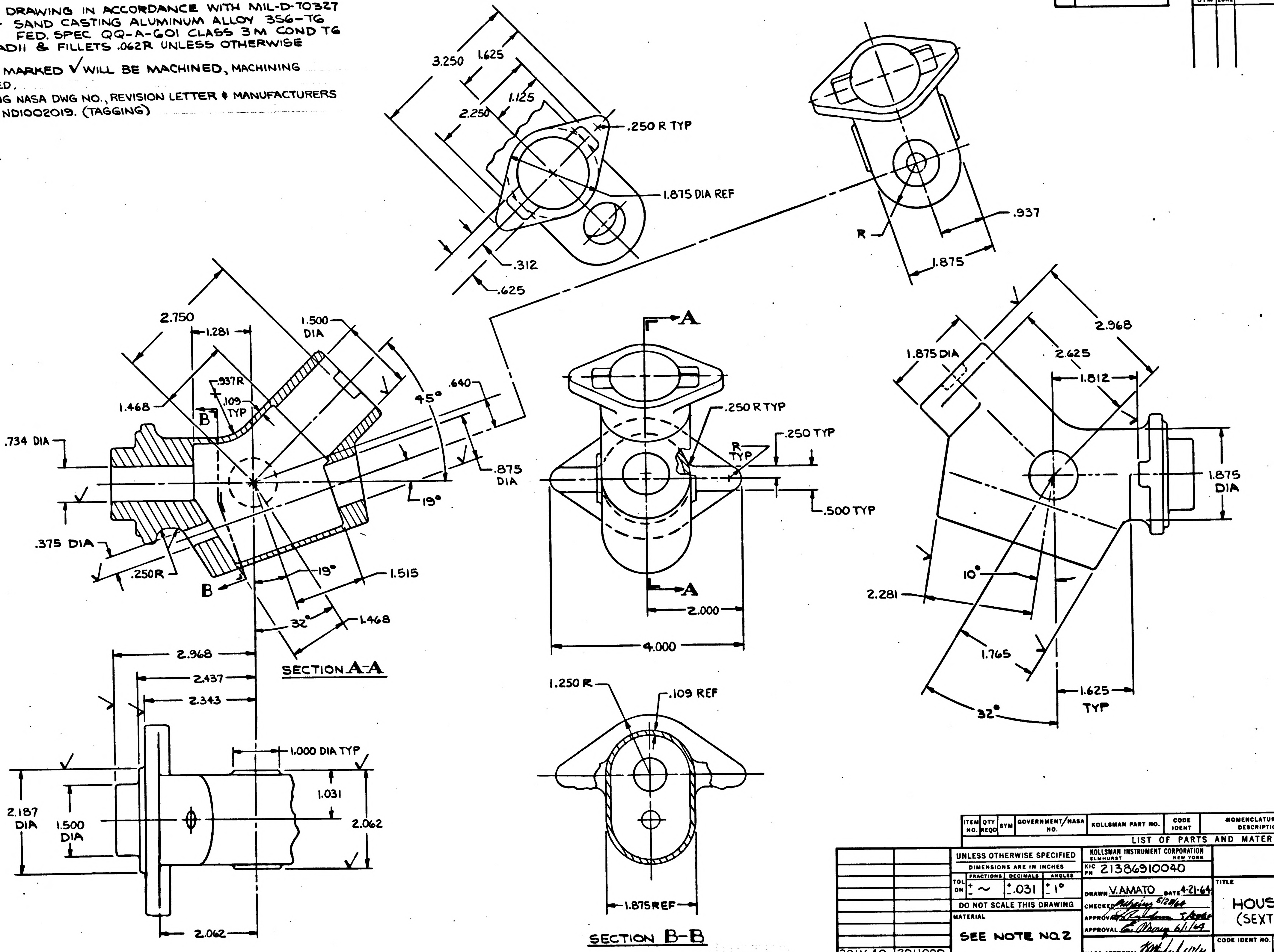
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011848

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TULR 09890

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL:- SAND CASTING ALUMINUM ALLOY 356-T6
FED. SPEC QQ-A-601 CLASS 3M COND T6
3. CORNER RADII & FILLETS .062R UNLESS OTHERWISE SPECIFIED
4. SURFACES MARKED √ WILL BE MACHINED, MACHINING STOCK ADDED.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)


3.250
1.625
1.125
2.250
.250 R TYP
1.875 DIA REF
.312
.625
R
.937
1.875
2.750
1.281
1.500 DIA
.937R
.109 TYP
1.468
B
45°
.640
.734 DIA
.875 DIA
19°
.375 DIA
.250R
B
19°
1.515
32°
1.468
SECTION A-A
A
.250 R TYP
R TYP
.250 TYP
.500 TYP
A
2.000
4.000
2.968
2.625
1.875 DIA
1.812
1.875 DIA
10°
2.281
1.765
1.625 TYP
32°
2.968
2.437
2.343
1.000 DIA TYP
1.031
2.187 DIA
1.500 DIA
2.062
2.062
1.250 R
.109 REF
1.875 REF
SECTION B-B

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

NEXT ASSY	USED ON
2011640	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.031	±1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE NO.2
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 21386910040
DRAWN V. AMATO DATE 4-21-64
CHECKED 5/29/64
APPROVAL
APPROVAL 6/1/64
NASA APPROVAL
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, MIRROR
(SEXTANT EYEPIECE)

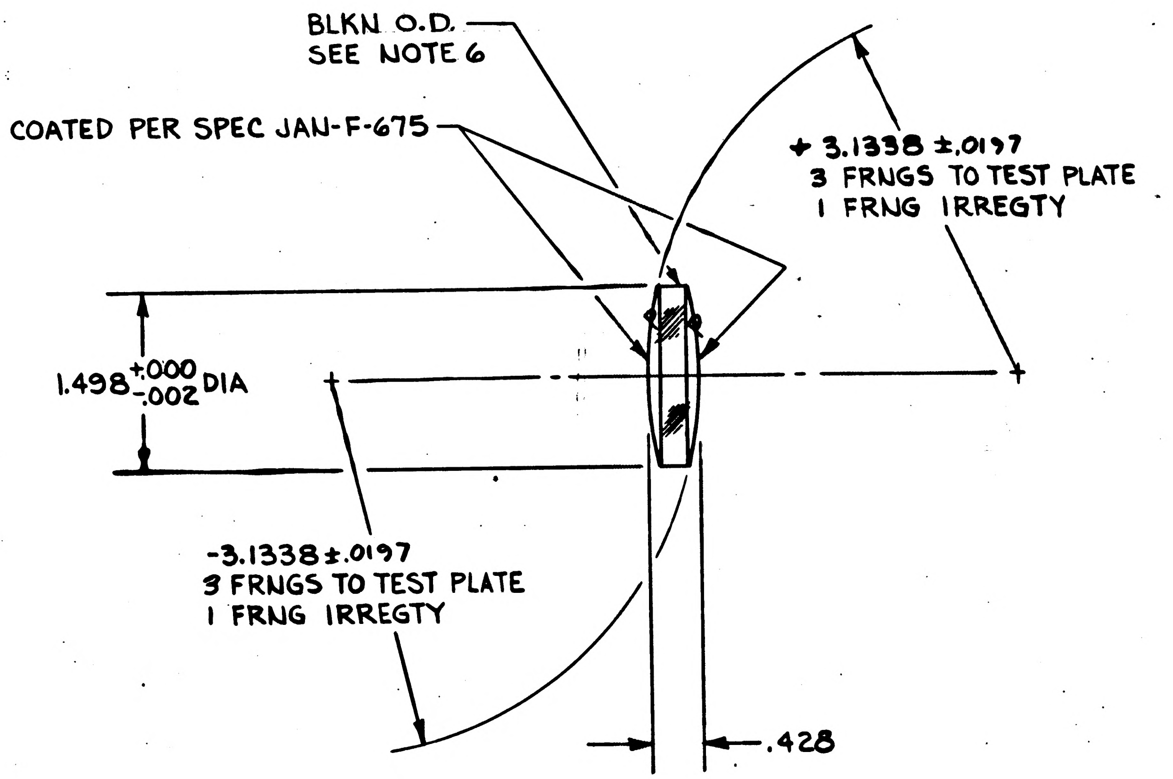
CODE IDENT NO.
SIZE D
NASA NUMBER 2011848
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011848

2011860

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER JAN-G-174
GRADE B-FINE ANNEALED
TYPE 652-585
4. CA: ENT= 1.342 EXIT= 1.332
SURF. QUAL: 60-40
CTRG ERROR 3 MINUTES MAX
5. SURFACES MARKED "P" POL ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR 3.5.12 WITH BLACK INK PER FED. SPEC TT-1-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



BLKN O.D.
SEE NOTE 6
COATED PER SPEC JAN-F-675
+3.1338 ±.0197
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY
1.498 +.000 -.002 DIA
-3.1338 ±.0197
3 FRNGS TO TEST PLATE
1 FRNG IRREGTY
.428

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011793	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910470

DRAWN J. Seiller DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL E. Thoury 6/1/64
NASA APPROVAL 6/4/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(SEXTANT EYEPIECE)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011860

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

E-184

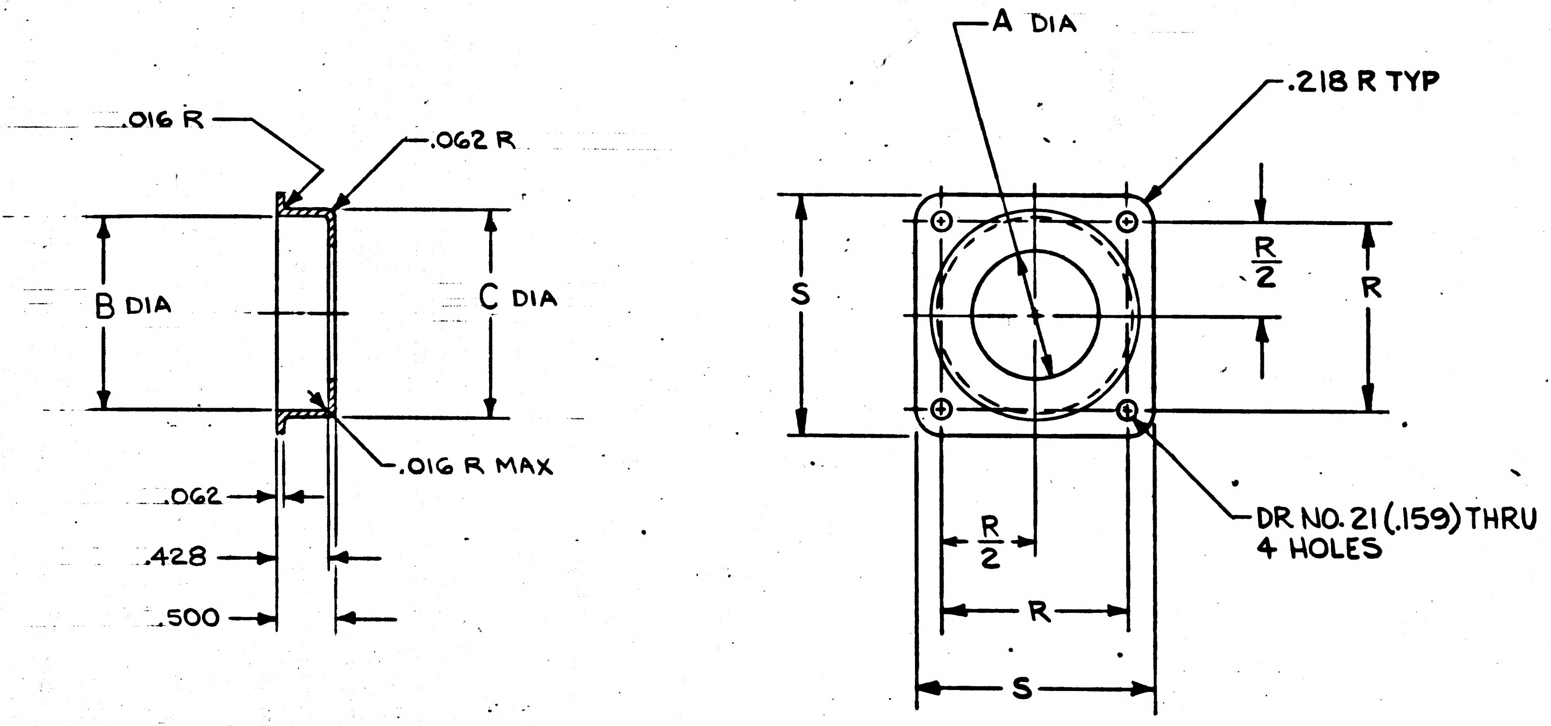
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011860

2011869

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B-6	REVISED PER TDRR NO. 12845	23/[illegible]/64	WK.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL. STD. 171 TABLE V-A FINISH 5·4·2 (KPS-1005 I.200).
6. GOLD PLATE OVER SILVER PLATE PER MIL-G-45204 TYPE 2 CLASS 3 QQ-S-365 GRADE B.



NASA NO.	KOLLSMAN NO.	A DIA	R	S±.010	B DIA	C DIA
2011869-1	57386911250	.960	1.375	1.766	1.395	1.489
2011869-2	57386911260	1.147	1.562	2.016	1.645	1.739

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011799	
2011798	2011000

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CORROSION RESISTANT STEEL, FED. SPEC. QQ-S-766 CLASS 304, COND. A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5738691 1250 THRU 1260
DRAWN F. Schiller DATE 6-18-64
CHECKED C. [illegible] 7/14/64
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. [illegible] 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL [illegible] 14 July 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2011869
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011869

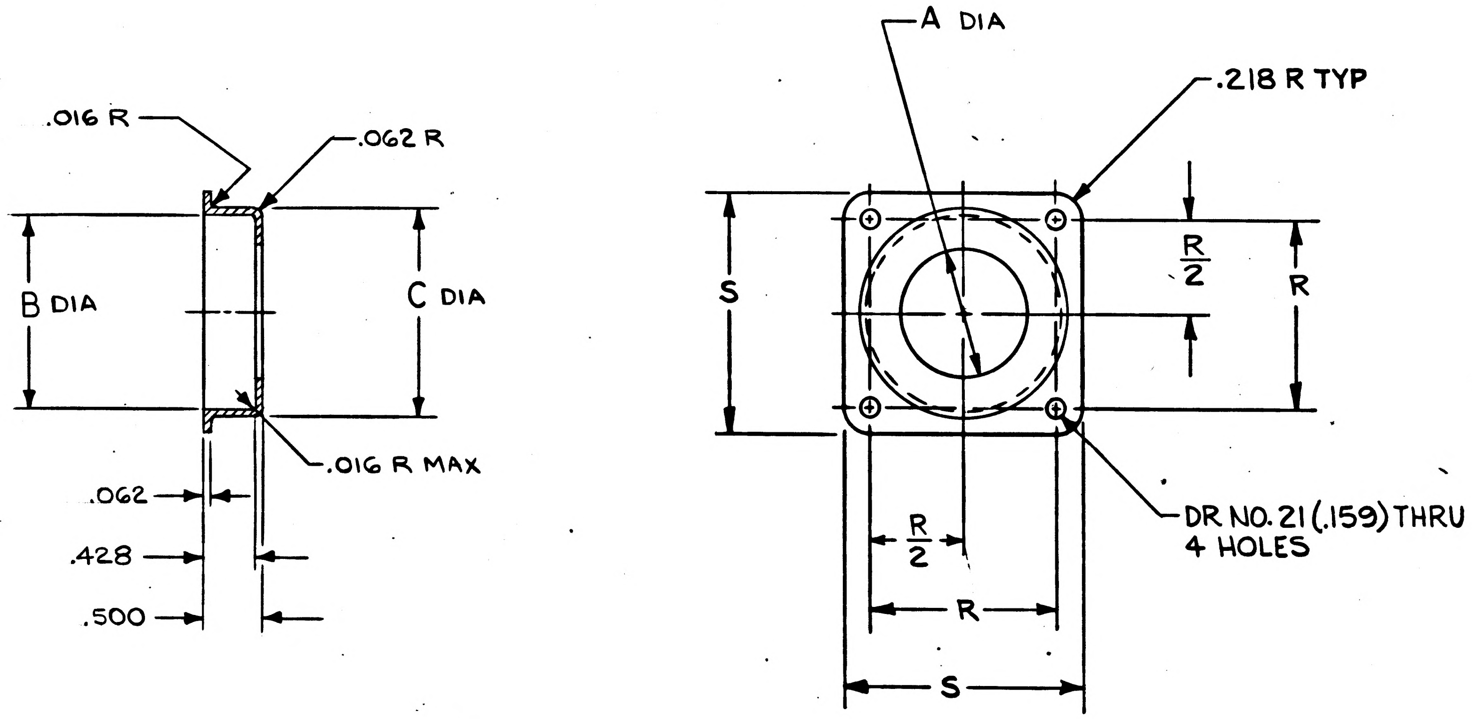
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-184

2011869 B

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\overset{63}{\surd}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL.STD.171 TABLE V-A FINISH 5·4·2 (KPS-1005 I.200).
6. GOLD PLATE OVER SILVER PLATE PER MIL-G-45204 TYPE 2 CLASS 3 QQ-S-365 GRADE B.

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B-6	REVISED PER TDRR NO. 12845	23 Sep 64	WK.
B	A-3	REVISED PER TDRR 15022	12 Jan 64	wk.



NASA NO.	KOLLSMAN NO.	A DIA	R	S±.010	B DIA	C DIA
2011869-1	57386911250	.960	1.375	1.766	1.395	1.489
2011869-2	57386911260	1.147	1.562	2.016	1.645	1.739

2011869

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011799	
2011798	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL FED. SPEC. QQ-S-766 CLASS 304 COND. A OR CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 CLASS 304 COND A.

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5738691 1250 THRU 1260

DRAWN DATE 6-18-64
CHECKED 7/10/64
APPROVAL F. Ruschmann 7/13/64
APPROVAL 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2011869-

SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

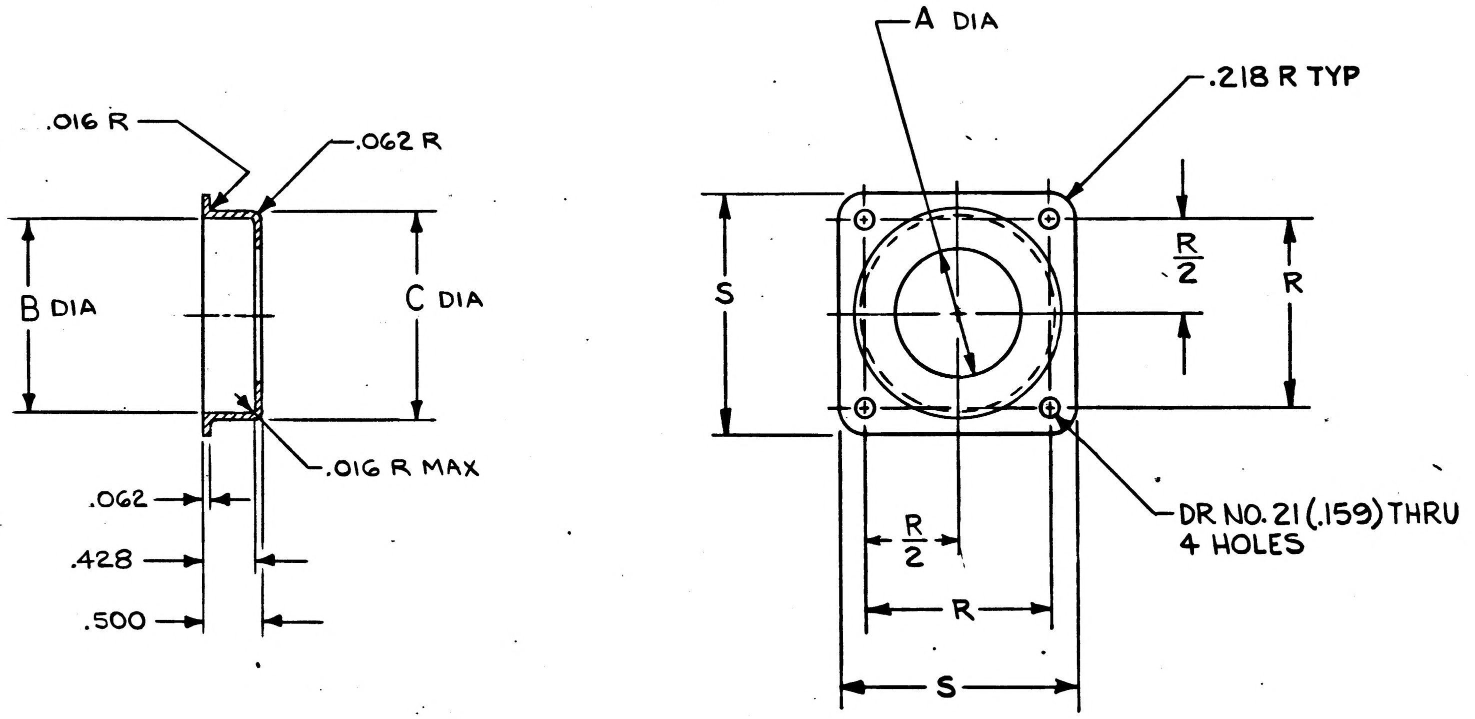
E-184

2011869 C

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63 √ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL.STD.171 TABLE V-A FINISH 5·4·2 (KPS-1005 I.200).
6. GOLD PLATE PER MIL-G-45204 TYPE II CLASS 3 OVER GOLD FLASH (TYPE I) AND NICKEL STRIKE.

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B-6	REVISED PER TDRR NO. 12845	23 Aug 64	WK
B	A-3	REVISED PER TDRR 15022	12 Dec 64	WK
C		REVISED PER TDRR 18563	4/27/65	WK



NASA NO.	KOLLSMAN NO.	A DIA	R	S±.010	B DIA	C DIA
2011869-1	57386911250	.960	1.375	1.766	1.395	1.489
2011869-2	57386911260	1.147	1.562	2.016	1.645	1.739

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011799	
2011798	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL FED. SPEC. QQ-S-766 CLASS 304 COND. A OR CORROSION RESISTANT STEEL FED. SPEC. QQ-S-763 CLASS 304 COND A.

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5738691 1250 THRU 1260

DRAWN F. Schiller DATE 6-18-64
CHECKED C. [illegible] 7/14/64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. [illegible] 7/13/64
NASA APPROVAL W. J. [illegible] 7-14-64
MIT APPROVAL [illegible] 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, CONNECTOR

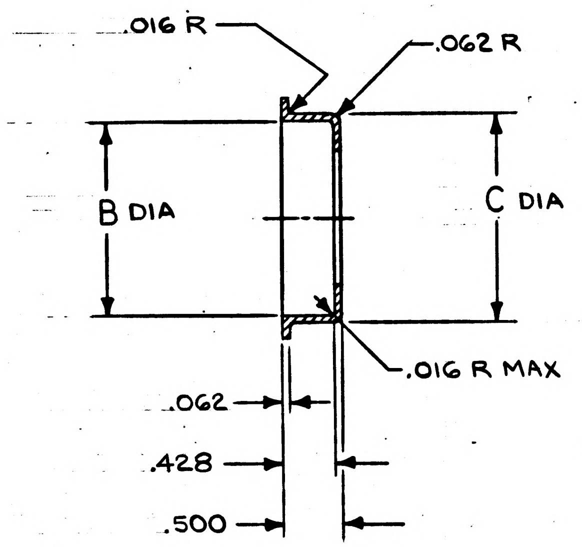
CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011869-
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

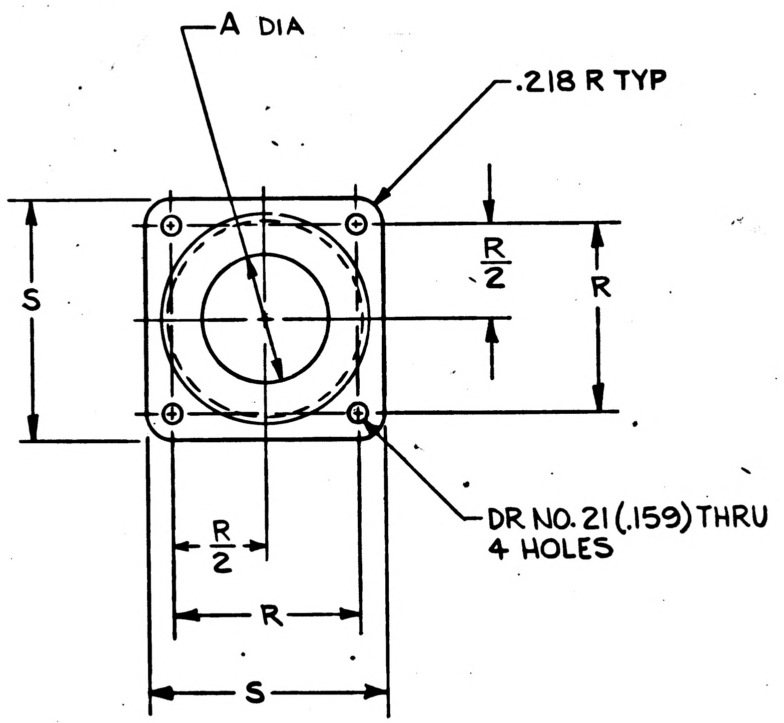
2011869 C

2011869

SYM	ZONE	REVISIONS 10952 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL.STD.171 TABLE V-A FINISH 5·4·2 (KPS-1005 I.200).
6. GOLD PLATE OVER SILVER PLATE PER MIL-G-45204 TYPE 2 CLASS 3 QQ-S-365 GRADE B.





NASA NO.	KOLLSMAN NO.	A DIA	R	S±.010	B DIA	C DIA
2011869-1	57386911250	.945	1.375	1.766	1.395	1.489
2011869-2	57386911260	1.132	1.562	2.016	1.645	1.739

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011799	
2011798	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CORROSION RESISTANT STEEL, FED. SPEC. QQ-S-766 CLASS 304, COND. A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5738691 1250 THRU 1260
DRAWN F. Schiller DATE 6-18-64
CHECKED C. Lampdorff 7/14/64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Mayo 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2011869
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-154

MASTER

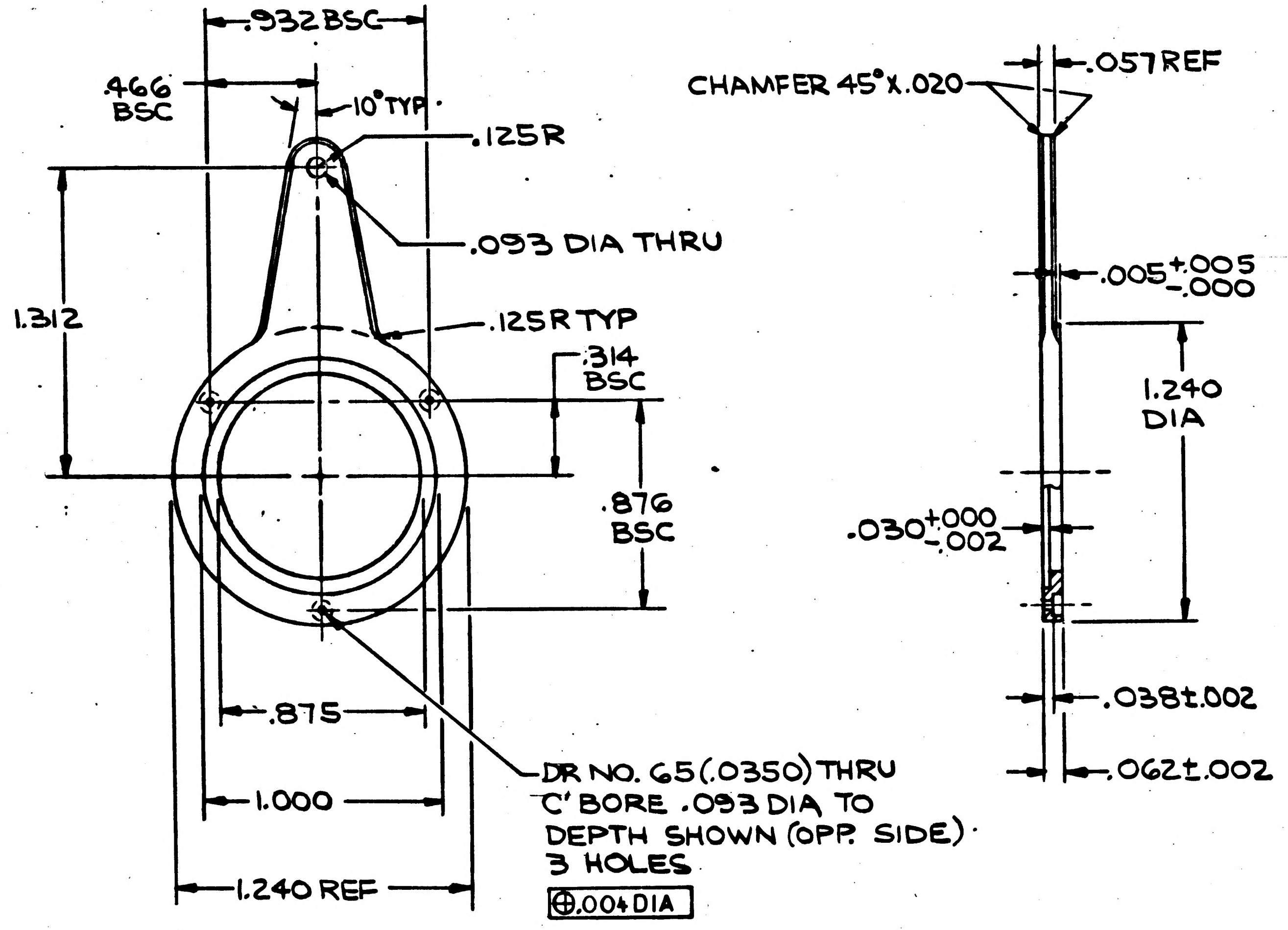
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011871

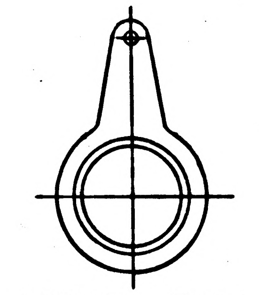
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

10420

NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) $\sqrt{}^{63}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG. NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORD WITH ND 1002019 (BAGGING OR TAGGING)



.932 BSC
.466 BSC
10° TYP
.125R
.093 DIA THRU
1.312
.125R TYP
.314 BSC
.876 BSC
.875
1.000
1.240 REF
DR NO. 65 (.0350) THRU
C' BORE .093 DIA TO
DEPTH SHOWN (OPP. SIDE)
3 HOLES
⊕ .004 DIA
CHAMFER 45° X .020
.057 REF
.005 +.005 -.000
1.240 DIA
.030 +.000 -.002
.038 ±.002
.062 ±.002



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011790	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-250/11 TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910730.

DRAWN F. LaValle DATE 4-16-64
CHECKED 5/28/64
APPROVAL F. Buchmann (EE) 6/19/64
APPROVAL 6/19/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOLDER, FILTER
(SXT EYEPIECE)

CODE IDENT NO.
SIZE C
NASA NUMBER 2011871
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

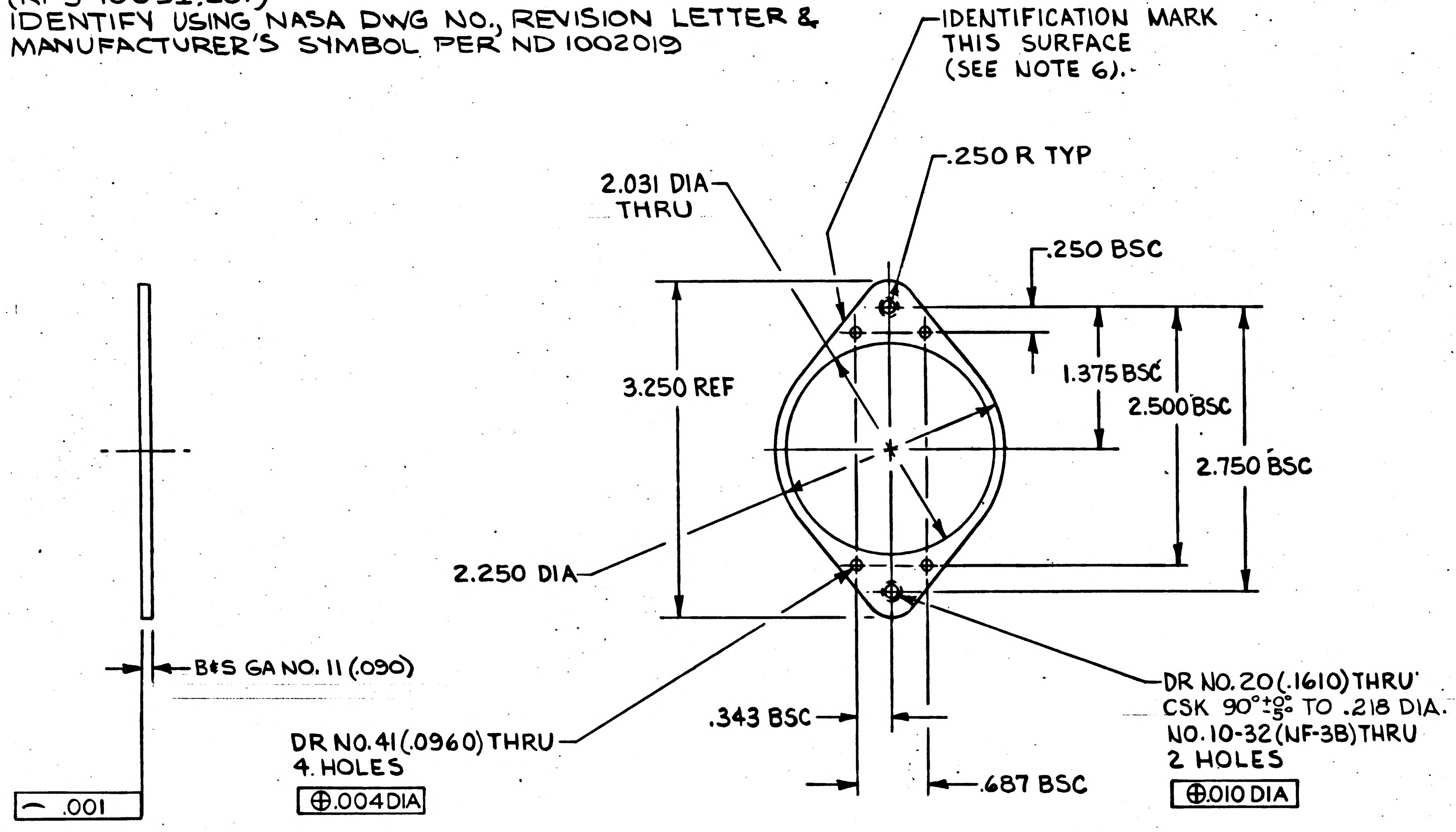
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011874 | A

REVISIONS			0048	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 3	REVISED PER TDRR NO. 13320	10/6/64	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
    a. $\sqrt{}^{63}$ FINISH ALL OVER.
    b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005I.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019


IDENTIFICATION MARK THIS SURFACE (SEE NOTE 6).
.250 R TYP
2.031 DIA THRU
.250 BSC
3.250 REF
1.375 BSC
2.500 BSC
2.750 BSC
2.250 DIA
B&S GA NO. 11 (.090)
⌒ .001
DR NO. 20 (.1610) THRU CSK 90°+0°−5° TO .218 DIA. NO. 10-32 (NF-3B) THRU 2 HOLES
⊕ .010 DIA
.343 BSC
.687 BSC
DR NO. 41 (.0960) THRU 4. HOLES
⊕ .004 DIA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
AL ALLOY
FED. SPEC: QQ-A-250/4
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910720

DRAWN F. Schiller DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL E. Thorup 6-5-64
NASA APPROVAL
MIT APPROVAL 7/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, ADJUSTMENT NUT

CODE IDENT NO. | SIZE C | NASA NUMBER 2011874
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011874 A

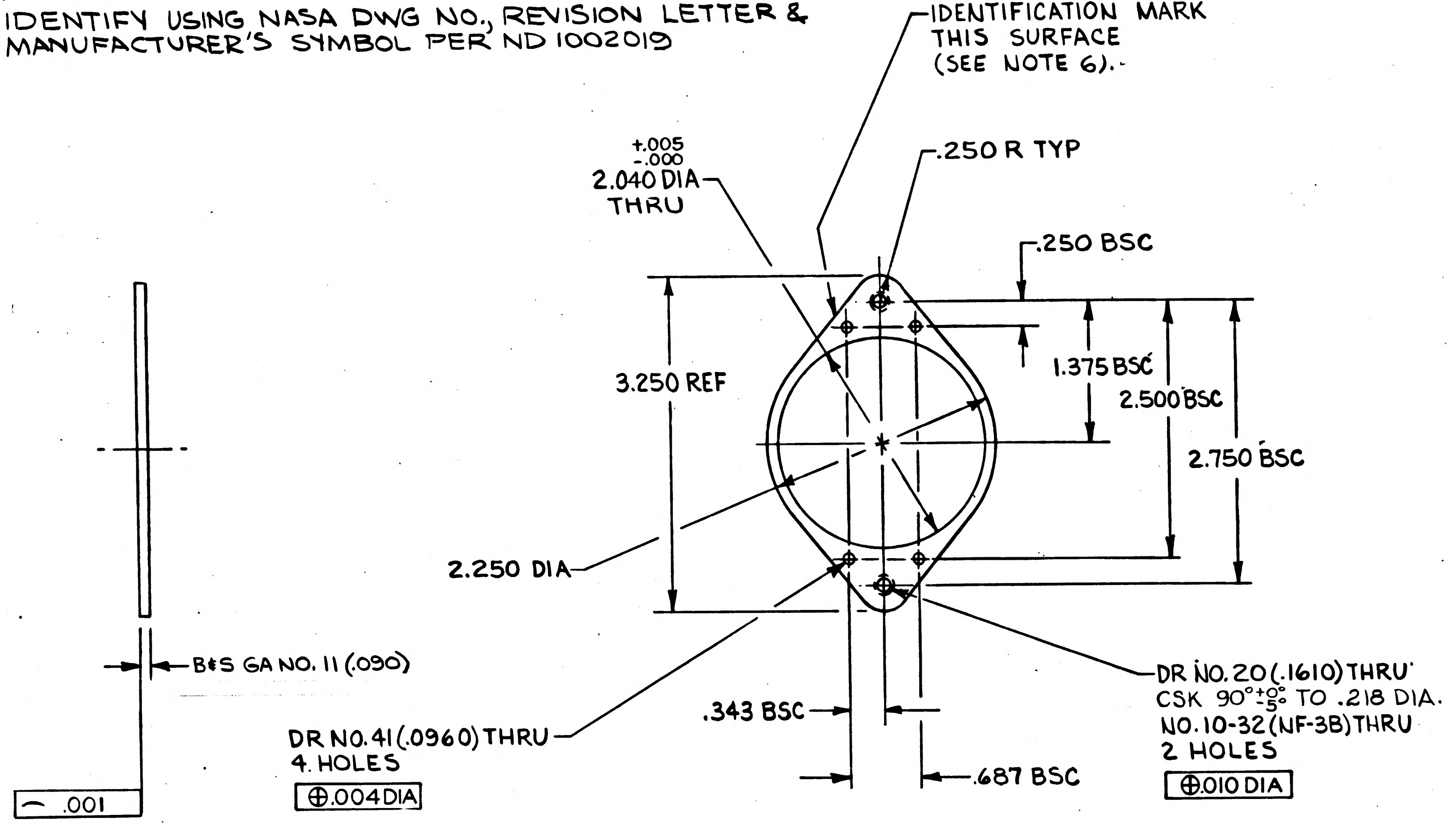
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
  a. 63√ FINISH ALL OVER.
  b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II DYED BLACK (KPS-1005A.150 TYPE II CLASS 3.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

B	2011874

REVISIONS			0048	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 3	REVISED PER TDRR NO. 13320	10/6/64	WR.
B		REVISED PER TDRR NO. 16182	2/3/65	WR.



IDENTIFICATION MARK THIS SURFACE (SEE NOTE 6).
+.005 -.000 2.040 DIA THRU
.250 R TYP
.250 BSC
1.375 BSC
2.500 BSC
2.750 BSC
3.250 REF
2.250 DIA
B&S GA NO. 11 (.090)
— .001
DR NO. 41 (.0960) THRU 4 HOLES
⊕ .004 DIA
.343 BSC
.687 BSC
DR NO. 20 (.1610) THRU CSK 90° +0° -5° TO .218 DIA. NO. 10-32 (NF-3B) THRU 2 HOLES
⊕ .010 DIA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011007
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
AL ALLOY
FED. SPEC: QQ-A-250/4
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910720

DRAWN DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL E. Thorup 6-5-64
NASA APPROVAL
MIT APPROVAL 9/1/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

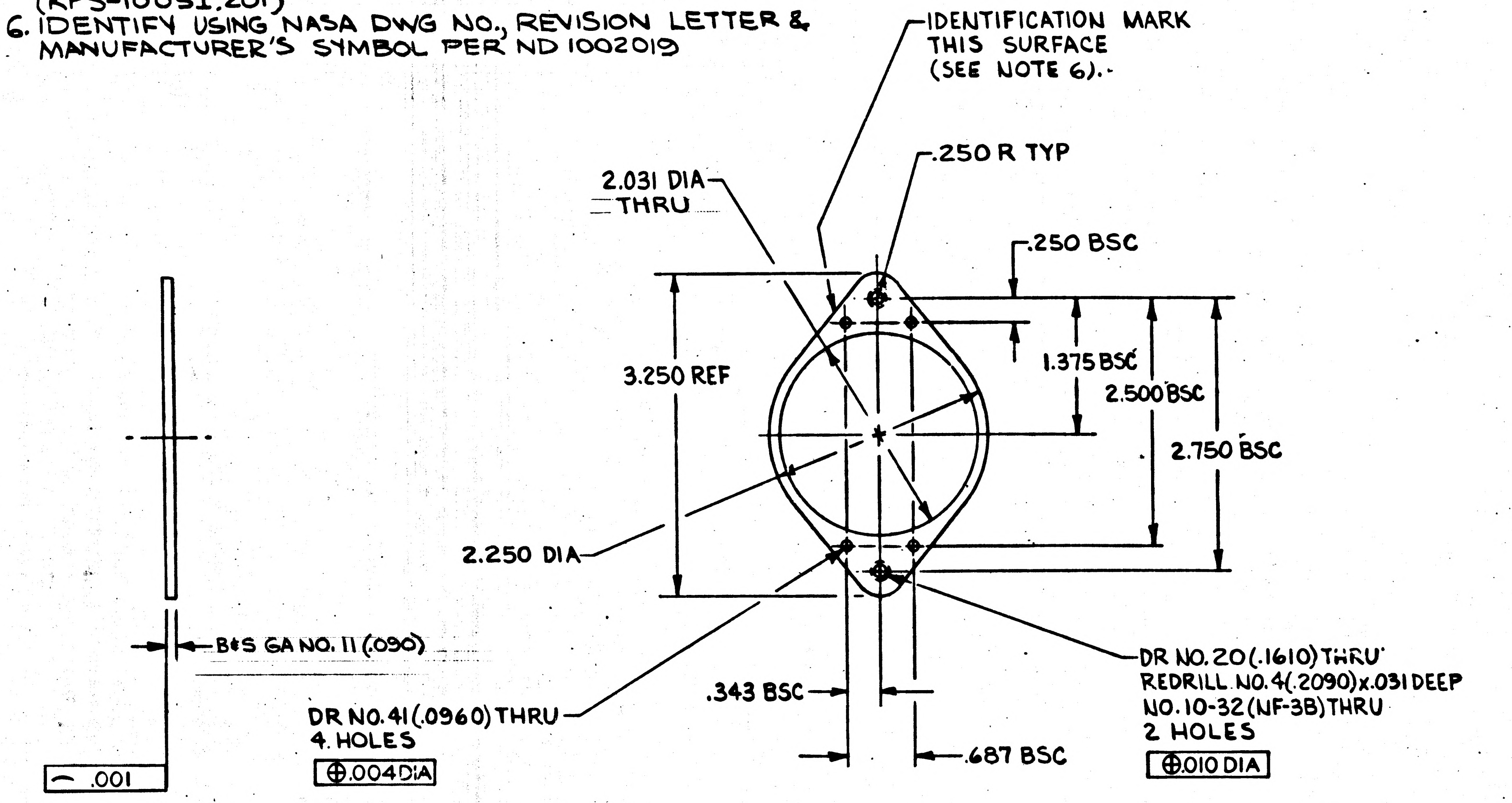
TITLE
RETAINER, ADJUSTMENT NUT

CODE IDENT NO.
SIZE C
NASA NUMBER 2011874
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011874 B

E-154

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
  a. $\overset{63}{\vee}$ FINISH ALL OVER.
  b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005I.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



IDENTIFICATION MARK THIS SURFACE (SEE NOTE 6).
.250 R TYP
2.031 DIA THRU
.250 BSC
3.250 REF
1.375 BSC
2.500 BSC
2.750 BSC
2.250 DIA
B&S GA NO. 11 (.090)
.001
DR NO. 20 (.1610) THRU REDRILL NO. 4 (.2090) x .031 DEEP NO. 10-32 (NF-3B) THRU 2 HOLES
⊕ .010 DIA
.343 BSC
.687 BSC
DR NO. 41 (.0960) THRU 4 HOLES
⊕ .004 DIA

2011874	REVISIONS 10048			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
AL ALLOY
FED. SPEC: QQ-A-250/4
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910720

DRAWN F. S. Gillen DATE 4-16-64
CHECKED [illegible] 5/27/64
APPROVAL [illegible] 5/27/64
APPROVAL E. Thomas 6-5-64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 9/?/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, ADJUSTMENT NUT

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011874
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

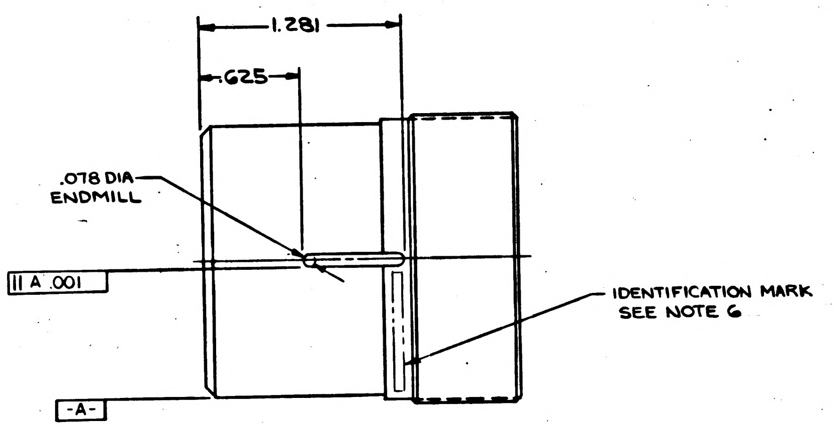
2011874

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

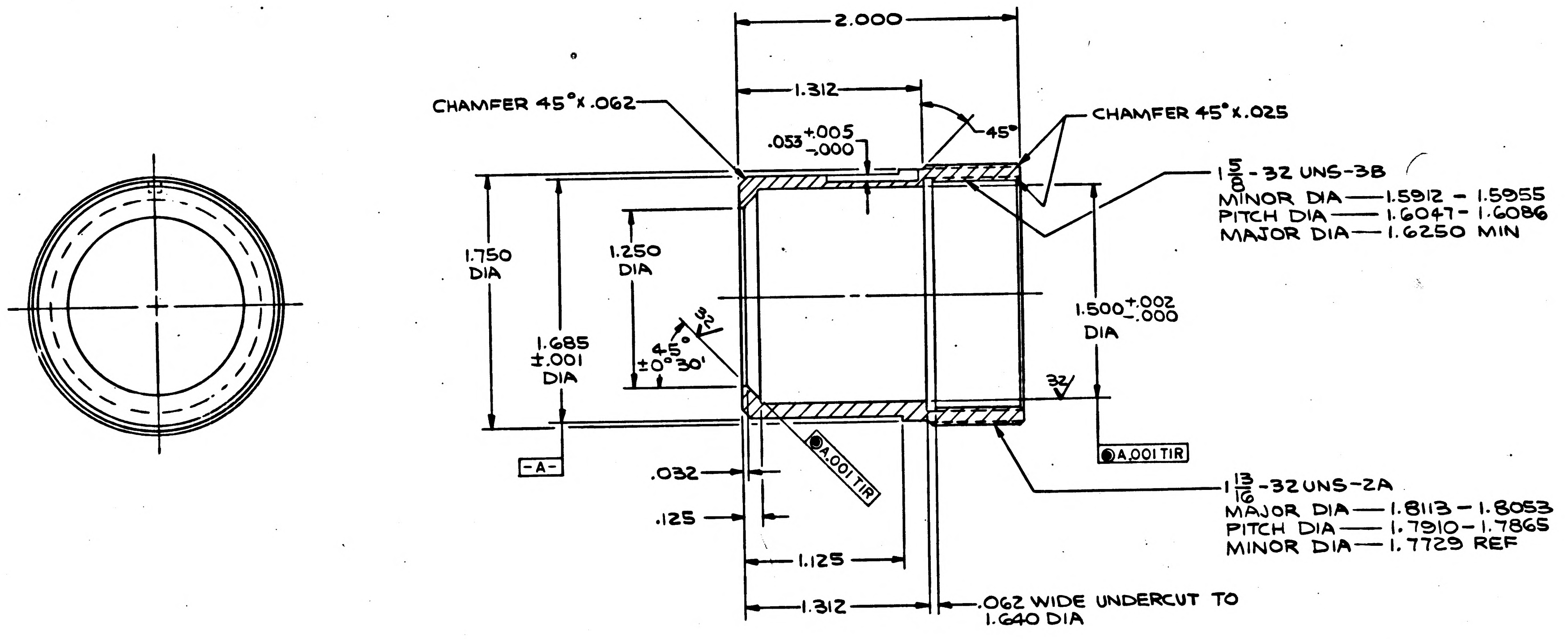
2011876 | A

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TORR# 16675	2/24/65	WK.

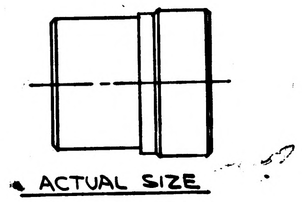
NOTES:-
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079,
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625 TYPE II
   DYED BLACK (KPS-1005 A. 150 TYPE II CLASS 3)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, MANUFACTURERS SYMBOL PER ND 1002019.



1.281
.625
.078 DIA ENDMILL
// A .001
-A-
IDENTIFICATION MARK SEE NOTE 6



2.000
1.312
CHAMFER 45° X .062
.053 +.005 -.000
45°
CHAMFER 45° X .025
1 5/8-32 UNS-3B
MINOR DIA — 1.5912 - 1.5955
PITCH DIA — 1.6047 - 1.6086
MAJOR DIA — 1.6250 MIN
1.750 DIA
1.250 DIA
1.685 ±.001 DIA
32
45° ±0°30'
1.500 +.002 -.000 DIA
32
A .001 TIR
A .001 TIR
-A-
.032
.125
1.125
1.312
1 13/16-32 UNS-2A
MAJOR DIA — 1.8113 - 1.8053
PITCH DIA — 1.7910 - 1.7865
MINOR DIA — 1.7729 REF
.062 WIDE UNDERCUT TO 1.640 DIA



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

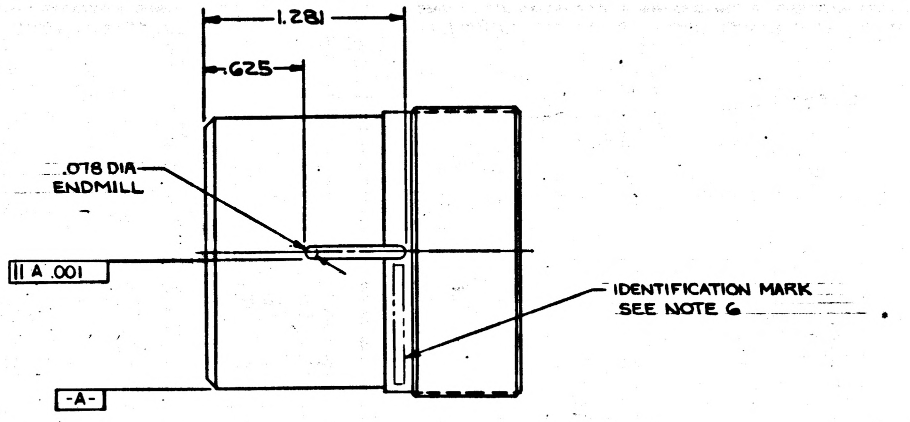
LIST OF PARTS AND MATERIALS

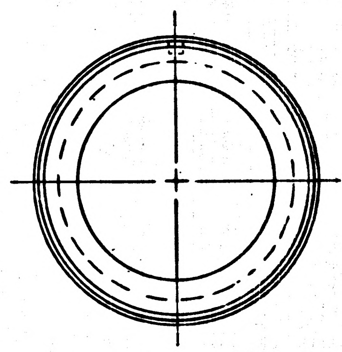
2011793	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1° DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 57386911010	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-225/6 TEMPER T4	DRAWN J. Schiller DATE 4-16-64 CHECKED 5/20/64 APPROVAL 5/29/64 APPROVAL 6-5-64	TITLE HOUSING, SEXTANT EYEPIECE
APPLICATION		CONTRACT	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. — SIZE D — NASA NUMBER 2011876 SCALE 2/1 — WEIGHT CALC ACTUAL — SHEET 1 OF 1

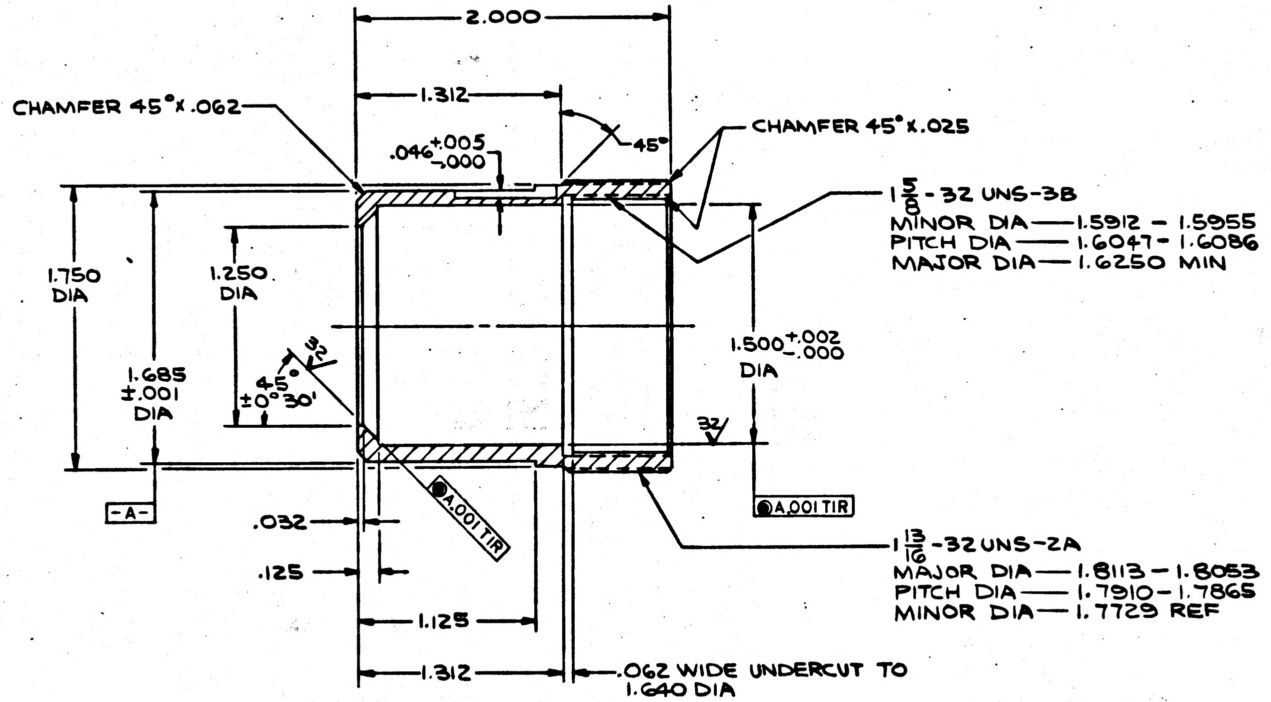
2011876	REVISIONS 10049				
	SYM	ZONE	DESCRIPTION	DATE	APPROVAL

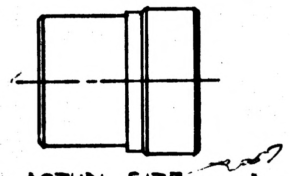
NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   - a) $\sqrt{}^{63}$ FINISH ALL OVER
   - b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.


1.281
.625
.078 DIA ENDMILL
∥ A .001
-A-
IDENTIFICATION MARK SEE NOTE 6




2.000
1.312
CHAMFER 45° X .062
.046 +.005 -.000
45°
CHAMFER 45° X .025
1 5/8 -32 UNS-3B
MINOR DIA—1.5912 - 1.5955
PITCH DIA—1.6047 - 1.6086
MAJOR DIA—1.6250 MIN
1.750 DIA
1.250 DIA
1.685 ±.001 DIA
45° ±0°30'
32
1.500 +.002 -.000 DIA
32
-A-
◉ A .001 TIR
◉ A .001 TIR
.032
.125
1 13/16 -32 UNS-2A
MAJOR DIA—1.8113 - 1.8053
PITCH DIA—1.7910 - 1.7865
MINOR DIA—1.7729 REF
1.125
1.312
.062 WIDE UNDERCUT TO 1.640 DIA



ACTUAL SIZE

MASTER

2011876

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011793	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM
ALLOY
FED SPEC QQ-A-268
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911010

DRAWN DATE 4-16-64
CHECKED
APPROVAL 3/23/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
SEXTANT EYEPIECE

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011876

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

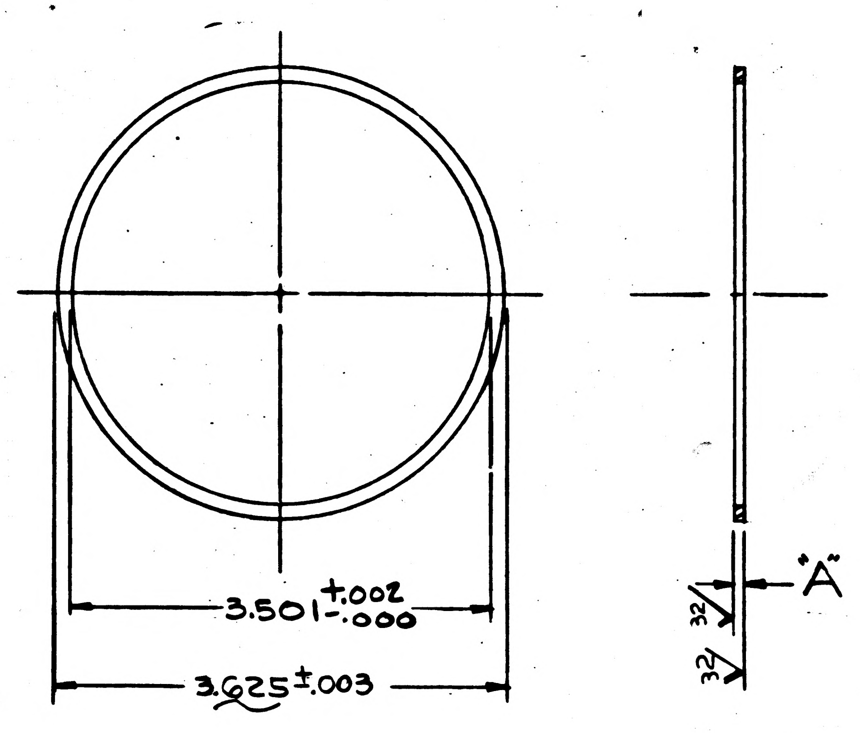
INCHES 0 1 2

2011877 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 13456	10/14/64	[illegible]

REVISIONS 100 48

NOTES:-
1. INTERPRET DRAWING PER MIL-D-70327
2. GENERNAL MACHINING STANDARDS PER ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   63√ FINISH ALL OVER
4. REMOVE BURRS PER ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



NASA DRAWING NUMBER	KOLLSMAN DRAWING NUMBER	DIM A TOL. ±.0005
2011877-1	79 38691 0401	.0380
2011877-2	79 38691 0402	.0400
2011877-3	79 38691 0403	.0420
2011877-4	79 38691 0404	.0440
2011877-5	79 38691 0405	.0460
2011877-6	79 38691 0406	.0480
2011877-7	79 386910407	.0500
2011877-8	79 386910408	.0520
2011877-9	79 386910409	.0300
2011877-10	79 386910410	.0320
2011377-11	79 386910411	.0340
2011877-12	79 386910412	.0360

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .005 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL: CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 440C COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 7938691 0401 THRU 0412
DRAWN J. Dillon DATE 4-8-64
CHECKED I SULLIVAN 5-29-64
APPROVAL G. Rushman 5/29/64
APPROVAL E. Narvey 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER

CODE IDENT NO.
SIZE C
NASA NUMBER 2011877
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

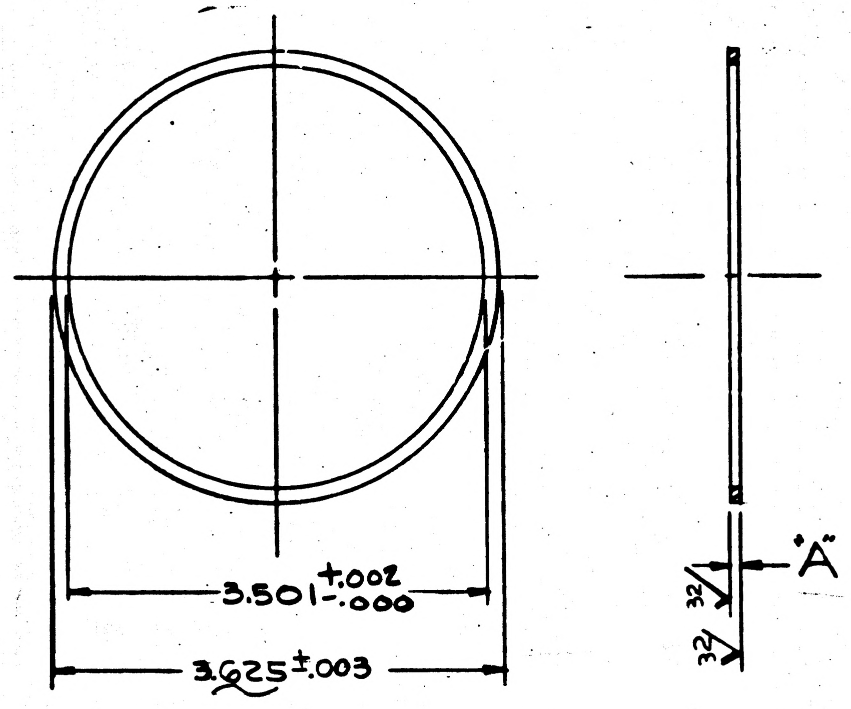
2011877 A

2011877

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
		100 49		

NOTES:-
1. INTERPRET DRAWING PER MIL-D-70327
2. GENERNAL MACHINING STANDARDS PER ND 1002078
3. UNLESS OTHERWISE SPECIFIED
63✓ FINISH ALL OVER

4. REMOVE BURRS PER ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1
(KPS-10051200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



NASA DRAWING NUMBER	KOLLSMAN DRAWING NUMBER	DIM A TOL. ±.0005
2011877-1	79 38691 0401	.0380
2011877-2	79 38691 0402	.0400
2011877-3	79 38691 0403	.0420
2011877-4	79 38691 0404	.0440
2011877-5	79 38691 0405	.0460
2011877-6	79 38691 0406	.0480

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL
FED SPEC QQ-S-763
CLASS 440C COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 7938691 0401 THRU 0406

DRAWN DATE 4-8-64
CHECKED I SULLIVAN 5-29-64
APPROVAL 7/24/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER

CODE IDENT NO.
SIZE C
NASA NUMBER 2011877
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-194

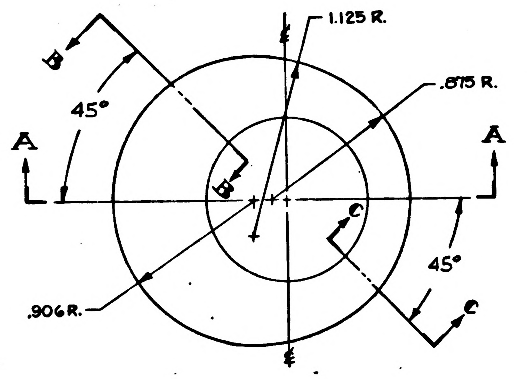
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011877

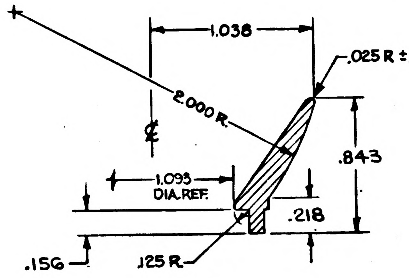
2011879 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 10048		
A		REVISED PER TDRR 20436	7/8/65	WK.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: NON-TOXIC SYNTHETIC RUBBER PER MIL-E-18648 - COLOR BLACK.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

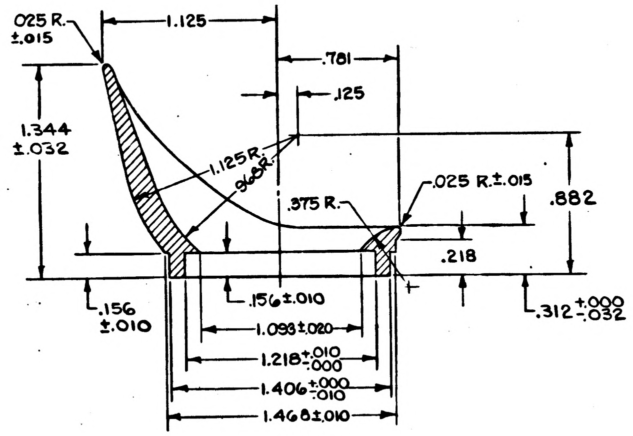


1.125 R.
.875 R.
.906 R.
45°
45°
A
A
B
B
C
C



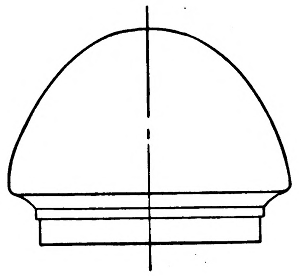
1.038
.025 R ±.015
2.000 R.
.843
1.093 DIA.REF.
.218
.156
.125 R.

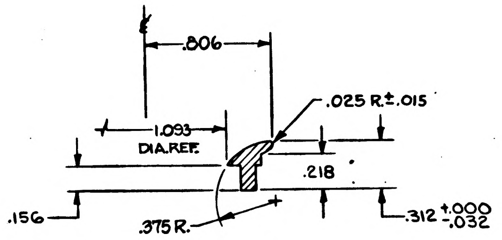
SECTION B-B



.025 R. ±.015
1.125
.781
.125
1.344 ±.032
1.125 R.
.968 R.
.375 R.
.025 R.±.015
.882
.218
.156 ±.010
.156±.010
1.093±.020
1.218 +.010 -.000
1.406 +.000 -.010
1.468±.010
.312 +.000 -.032

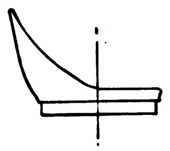
SECTION A-A





.806
1.093 DIA.REF.
.025 R.±.015
.218
.156
.375 R.
.312 +.000 -.032

SECTION C-C



ACTUAL SIZE

2011879 A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6011816	6011000
2011965	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.020	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 26386910010

DRAWN DATE 4-10-64
CHECKED 5/20/64
APPROVAL
APPROVAL E. Thorup 6-5-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
EYEGUARD

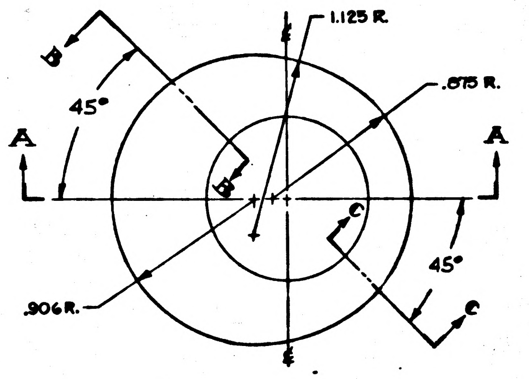
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011879
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

MASTER

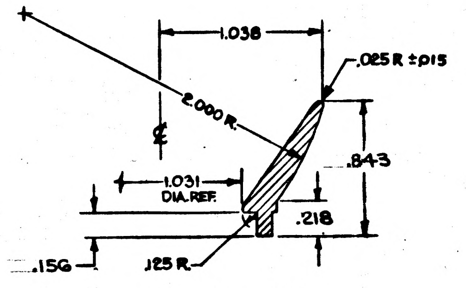
2011879	REVISIONS 1004			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: NON-TOXIC SYNTHETIC RUBBER PER MIL-E-18648 - COLOR BLACK.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

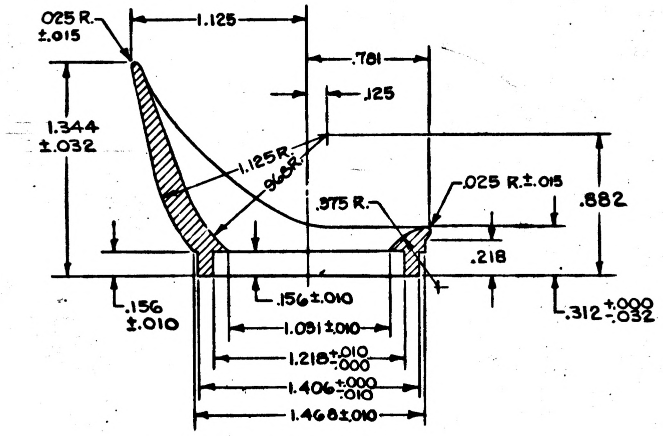


1.125 R.
.875 R.
.906 R.
A
A
B
B
C
C
45°
45°



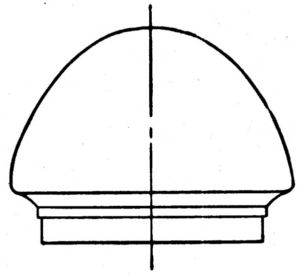
1.038
.025 R ±.015
2.000 R.
.843
1.031 DIA.REF.
.218
.156
.125 R.

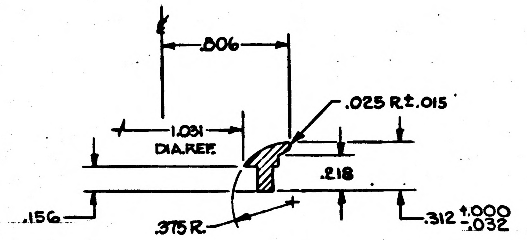
SECTION B-B



.025 R. ±.015
1.125
.781
.125
1.344 ±.032
1.125 R.
.968 R.
.375 R.
.025 R.±.015
.882
.218
.156 ±.010
.156±.010
.312 +.000 -.032
1.031±.010
1.218 +.010 -.000
1.406 +.000 -.010
1.468±.010

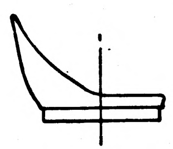
SECTION A-A





.806
.025 R.±.015
1.031 DIA.REF.
.218
.156
.375 R.
.312 +.000 -.032

SECTION C-C



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

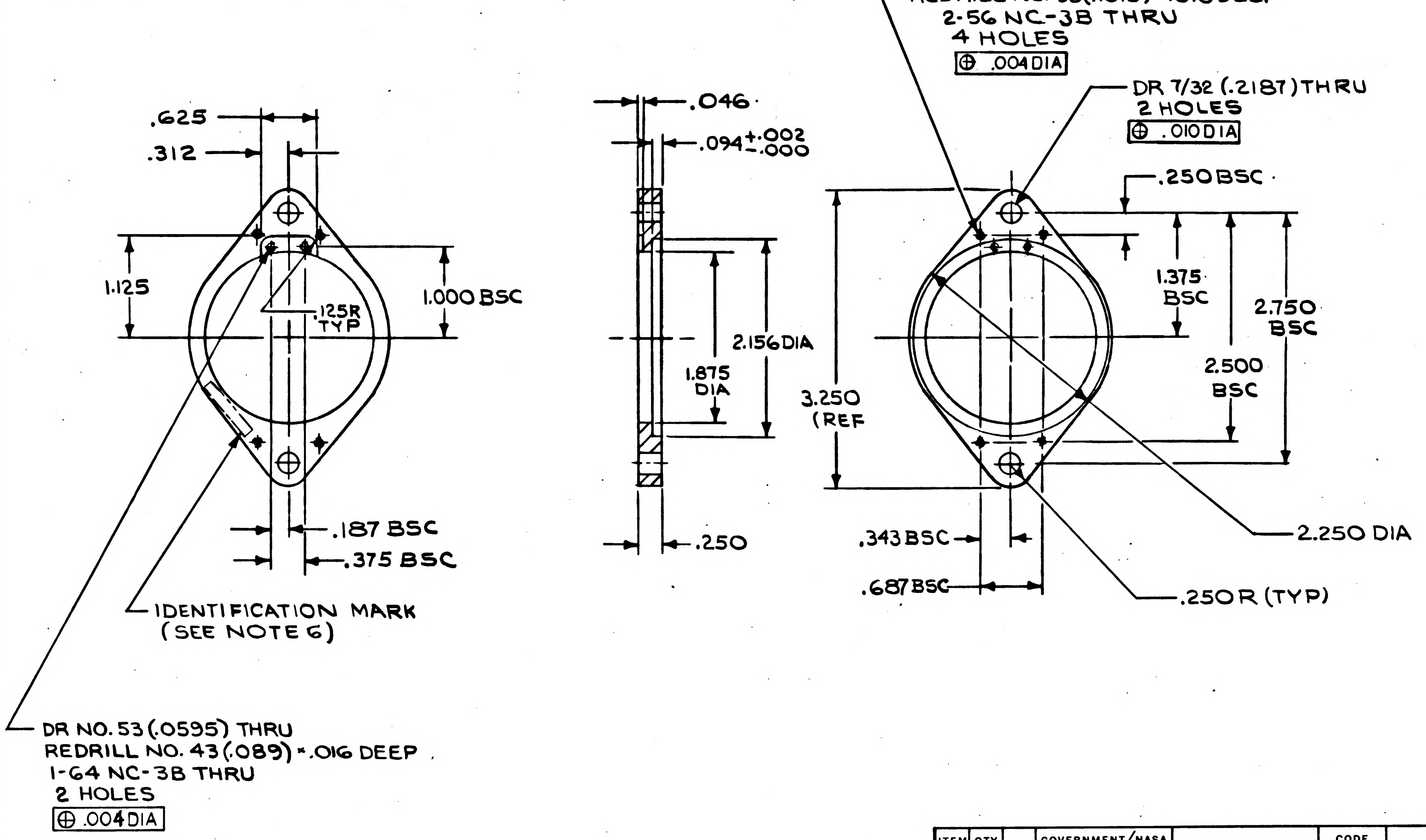
LIST OF PARTS AND MATERIALS

2011965	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
NEXT ASSY	USED ON	TOL ON: FRACTIONS ± ; DECIMALS ±.020 ; ANGLES ± 2°	KIC PN 26386910010	TITLE EYEGUARD	
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN DATE 4-10-64 CHECKED 5/28/64 APPROVAL APPROVAL 6-5-64	CODE IDENT NO.	SIZE D
		MATERIAL SEE NOTE 2	NASA APPROVAL	NASA NUMBER 2011879	
		CONTRACT	MIT APPROVAL	SCALE 2/1	WEIGHT CALC ACTUAL — SHEET 1 OF 1

2011880 A

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR# 15425	1/7/65	WR.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARD IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALLOVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625 TYPE II DYED BLACK (KPS-1005A.150 TYPE II CLASS 3)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


DR NO. 50 (.070) THRU
REDRILL NO. 38 (.1015) × .018 DEEP
2-56 NC-3B THRU
4 HOLES
⊕ .004 DIA
DR 7/32 (.2187) THRU
2 HOLES
⊕ .010 DIA
.250 BSC
1.375 BSC
2.750 BSC
2.500 BSC
3.250 (REF
.343 BSC
.687 BSC
2.250 DIA
.250 R (TYP)
.046
.094 +.002 −.000
2.156 DIA
1.875 DIA
.250
.625
.312
1.125
.125R TYP
1.000 BSC
.187 BSC
.375 BSC
IDENTIFICATION MARK
(SEE NOTE 6)
DR NO. 53 (.0595) THRU
REDRILL NO. 43 (.089) × .016 DEEP
1-64 NC-3B THRU
2 HOLES
⊕ .004 DIA

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED. SPEC QQ-A-225/8
TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910700

DRAWN F. Schiller DATE 4-16-64
CHECKED 5/28/64
APPROVAL 6/10/64
APPROVAL E. Thorup 6/15/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, MOUNTING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011880
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

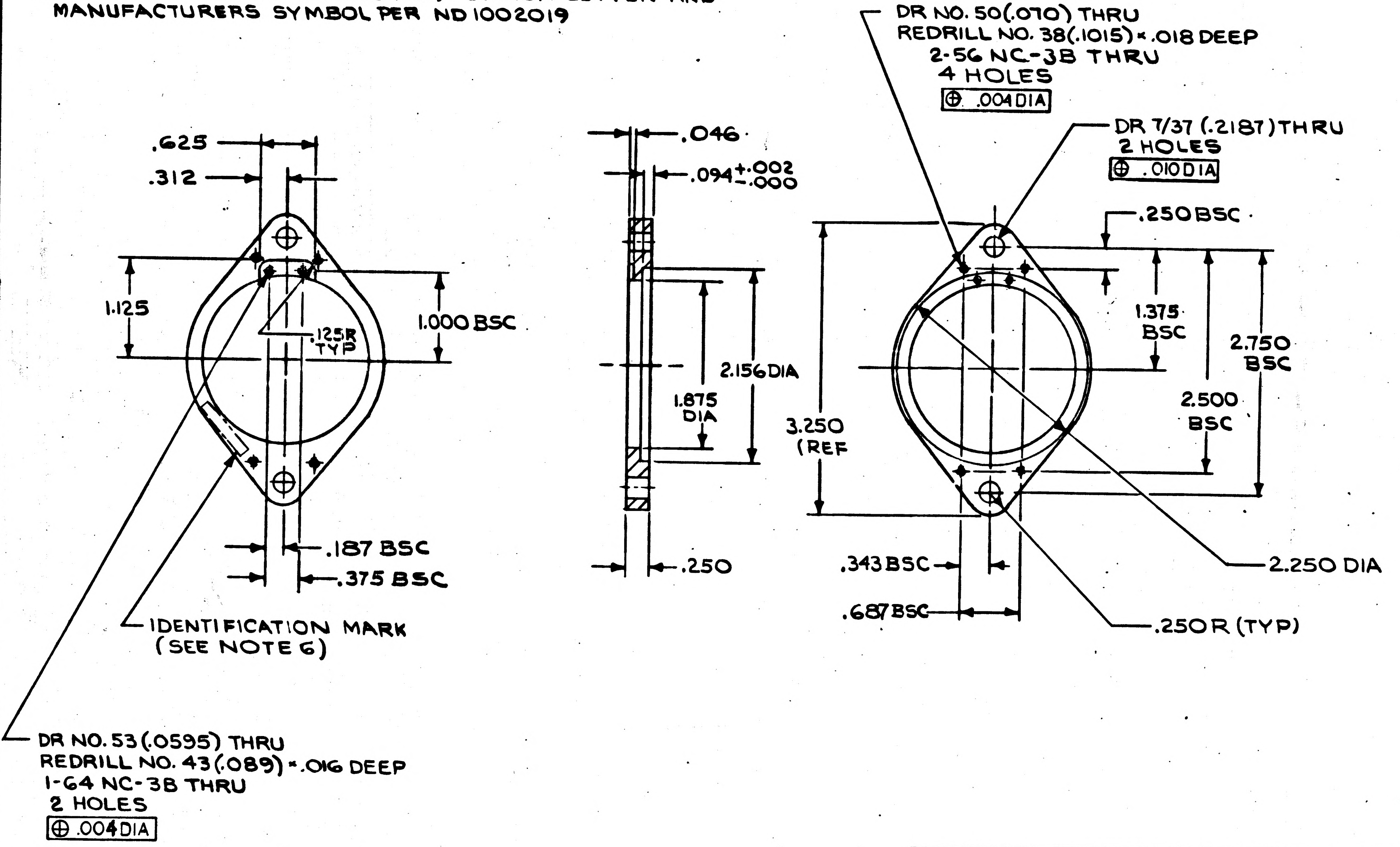
	0881102

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARD IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALLOVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201)

6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


.625
.312
1.125
.125R TYP
1.000 BSC
.187 BSC
.375 BSC
IDENTIFICATION MARK (SEE NOTE 6)
DR NO. 53 (.0595) THRU
REDRILL NO. 43 (.089) × .016 DEEP
1-64 NC-3B THRU
2 HOLES
⊕ .004 DIA
.046
.094 +.002 −.000
2.156 DIA
1.875 DIA
.250
DR NO. 50 (.070) THRU
REDRILL NO. 38 (.1015) × .018 DEEP
2-56 NC-3B THRU
4 HOLES
⊕ .004 DIA
DR 7/37 (.2187) THRU
2 HOLES
⊕ .010 DIA
.250 BSC
1.375 BSC
2.750 BSC
2.500 BSC
3.250 (REF
.343 BSC
.687 BSC
2.250 DIA
.250 R (TYP)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-355 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910700

DRAWN J. Schiller DATE 4-16-64
CHECKED 5/28/64
APPROVAL 6/1/64
APPROVAL E. [illegible] 6/5/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, MOUNTING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011880
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

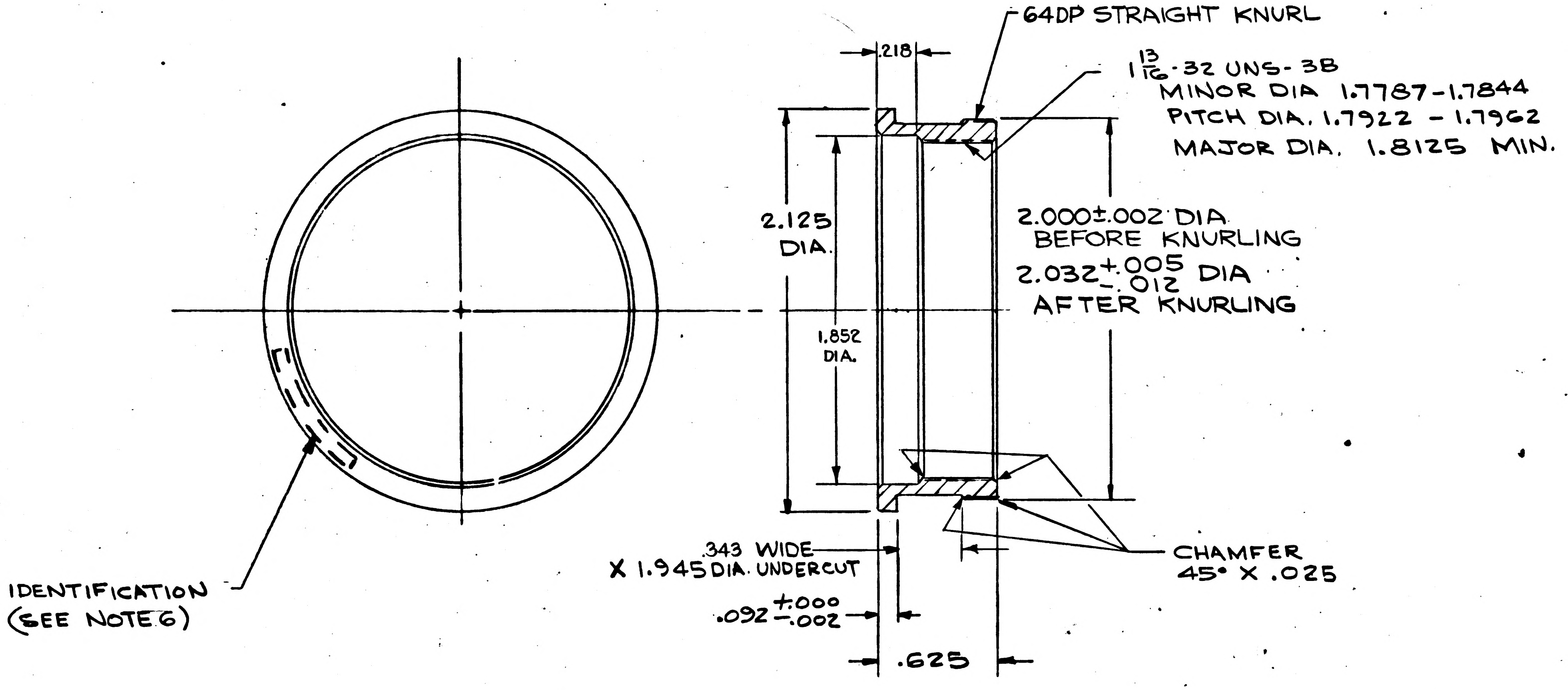
2011880

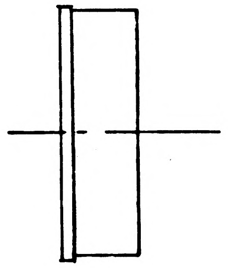
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011881 A

REVISIONS 100.48				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15593	1/19/65	WR.

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327.
2. GENERAL MACHINING STANDARDS PER ND 1002078.
3. UNLESS OTHERWISE SPECIFIED.
   - a 63✓ FINISH ALL OVER
   - b BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.2 (KPS 1005 I.200)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.


64DP STRAIGHT KNURL
.218
1 13/16-32 UNS-3B
MINOR DIA 1.7787-1.7844
PITCH DIA. 1.7922 - 1.7962
MAJOR DIA. 1.8125 MIN.
2.125 DIA.
1.852 DIA.
2.000±.002 DIA BEFORE KNURLING
2.032 +.005 -.012 DIA AFTER KNURLING
.343 WIDE X 1.945 DIA. UNDERCUT
CHAMFER 45° X .025
.092 +.000 -.002
.625
IDENTIFICATION (SEE NOTE 6)


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL - FED.SPEC.QQ-S-763, CLASS 303 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911000

DRAWN J. Schiller DATE 4-16-64
CHECKED [illegible] 5/27/64
APPROVAL [illegible] 5/27/64
APPROVAL E. [illegible] 6-5-64
NASA APPROVAL
MIT APPROVAL [illegible] 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, ADJUSTING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011881
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

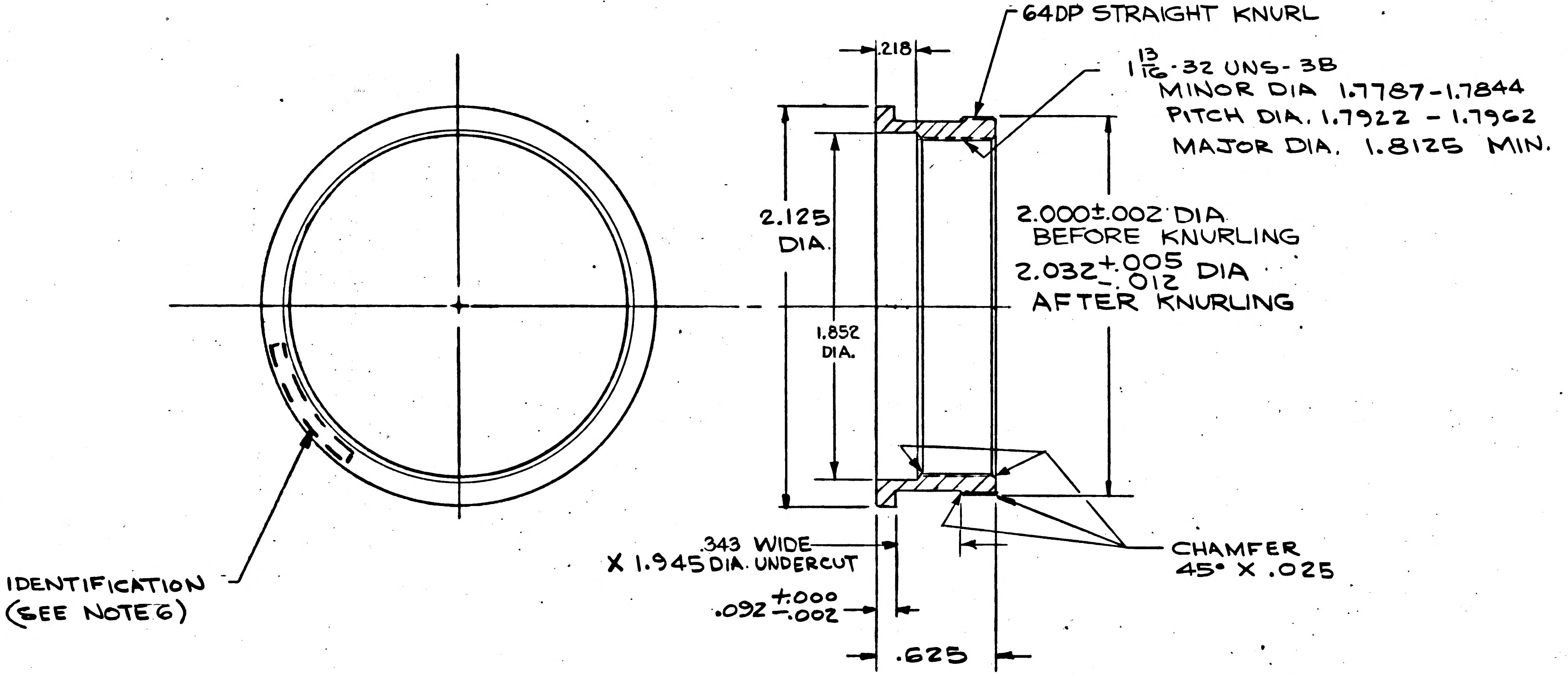
E-154

C	2011881

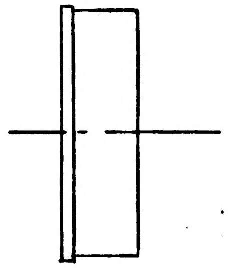
REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15593	1/19/65	WK.
B		REVISED PER TDRR 17274	6/22/65	WK
C		REVISED PER TDRR 20196	6/22/65	WK.

NOTES:

1. INTERPRET DRAWING PER MIL-D-70327.
2. GENERAL MACHINING STANDARDS PER ND 1002078.
3. UNLESS OTHERWISE SPECIFIED.
   - a 63✓ FINISH ALL OVER
   - b BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.2 (KPS 1005 I.200)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.



64DP STRAIGHT KNURL
.218
$1\frac{13}{16}$-32 UNS-3B
MINOR DIA 1.7787-1.7844
PITCH DIA. 1.7922 - 1.7962
MAJOR DIA. 1.8125 MIN.
2.125 DIA.
1.852 DIA.
2.000±.002 DIA BEFORE KNURLING
2.032 $^{+.005}_{-.012}$ DIA AFTER KNURLING
.343 WIDE X 1.945 DIA. UNDERCUT
CHAMFER 45° X .025
.092 $^{+.000}_{-.002}$
.625
IDENTIFICATION (SEE NOTE 6)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012610	
2011932	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL - FED.SPEC.QQ-S-763, CLASS 303 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911000

DRAWN F. Schiller DATE 4-16-64
CHECKED 5/22/64
APPROVAL 5/22/64
APPROVAL E. Ohrnup 6-5-64
NASA APPROVAL
MIT APPROVAL 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, ADJUSTING

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2011881
SCALE 2/1	WEIGHT	CALC ACTUAL	SHEET 1 OF 1

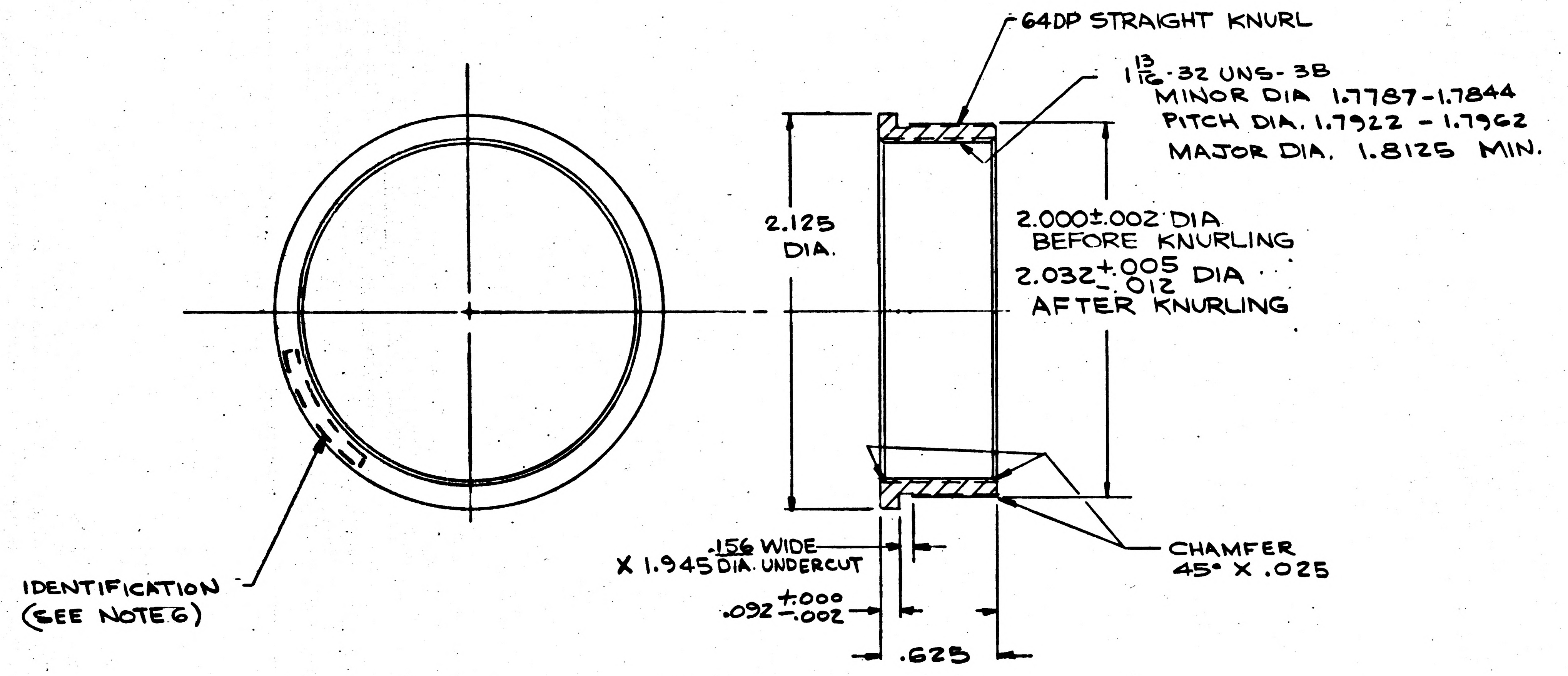
2011881C

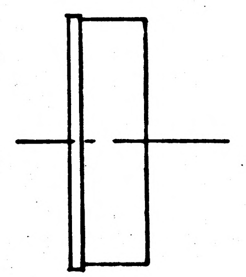
2011881

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

10048

NOTES:
1. INTERPRET DRAWING PER MIL-D-70327.
2. GENERAL MACHINING STANDARDS PER ND 1002078.
3. UNLESS OTHERWISE SPECIFIED.
   a. $\sqrt{}^{63}$ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005I.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019.


64DP STRAIGHT KNURL
$1\frac{13}{16}$-32 UNS-3B
MINOR DIA 1.7787-1.7844
PITCH DIA. 1.7922 - 1.7962
MAJOR DIA. 1.8125 MIN.
2.125 DIA.
2.000±.002 DIA BEFORE KNURLING
$2.032^{+.005}_{-.012}$ DIA AFTER KNURLING
.156 WIDE X 1.945 DIA. UNDERCUT
CHAMFER 45° X .025
IDENTIFICATION (SEE NOTE 6)
$.092^{+.000}_{-.002}$
.625


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±~	±.005	±1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED.SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911000

DRAWN J. Schiller DATE 4-16-64
CHECKED 5/27/64
APPROVAL 5/27/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL '64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, ADJUSTING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011881

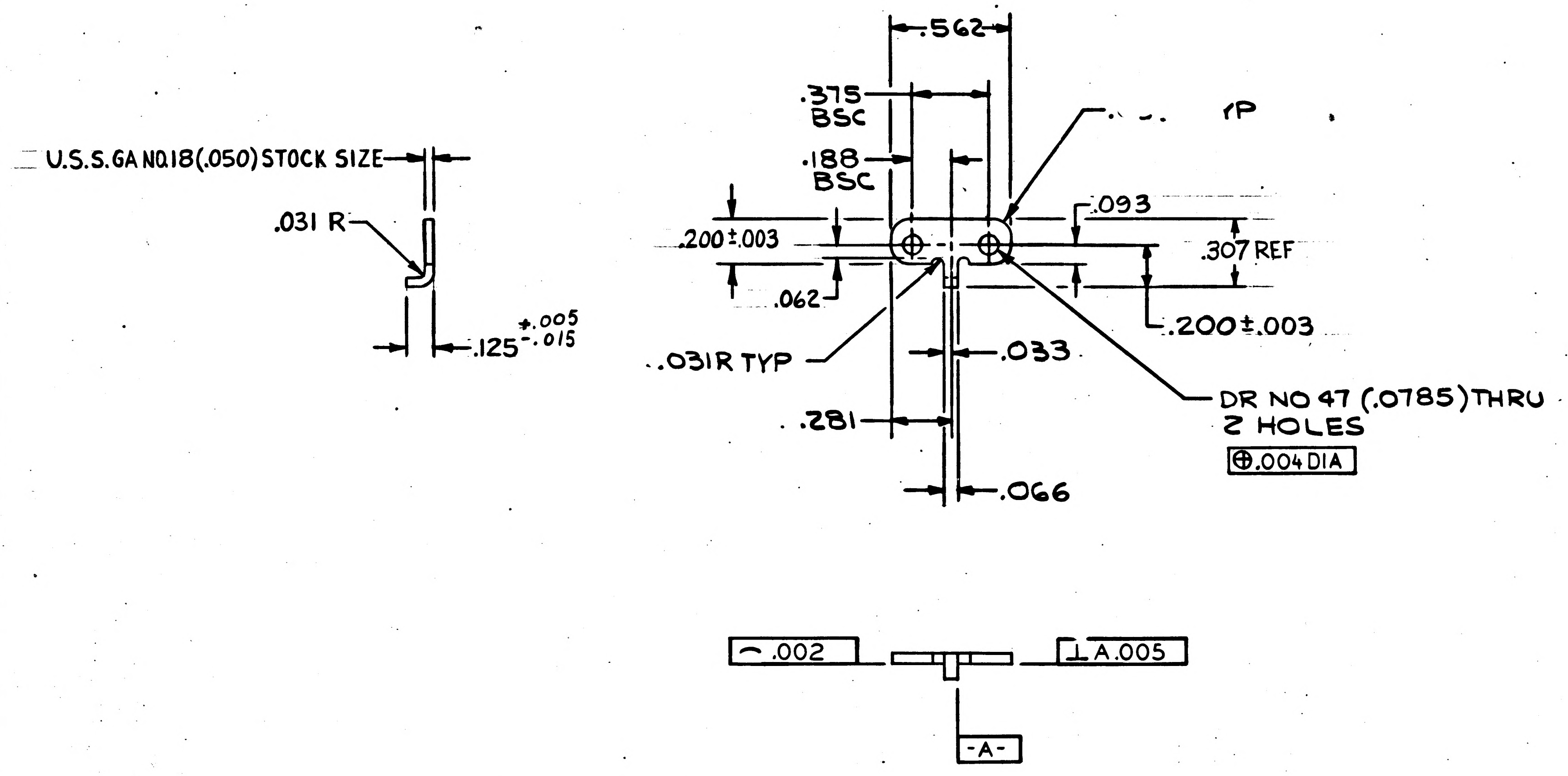
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A	2011882

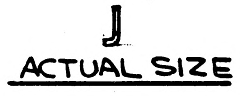
REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16676	2/24/65	WK

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   a) $\overset{63}{\sqrt{}}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200).
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING).



U.S.S. GA NO.18 (.050) STOCK SIZE
.031 R
.125 +.005 -.015
.562
.375 BSC
.188 BSC
... TYP
.093
.200±.003
.307 REF
.062
.200±.003
.031R TYP
.033
.281
.066
DR NO 47 (.0785) THRU 2 HOLES
⊕.004 DIA
⌒.002
⊥A.005
-A-

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± –

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-766 CLASS 302, CONDA FINISH 2B

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910710

DRAWN F. Schiller DATE 4-16-64
CHECKED 5/20/64
APPROVAL 5/22/64
APPROVAL 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
KEY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011882

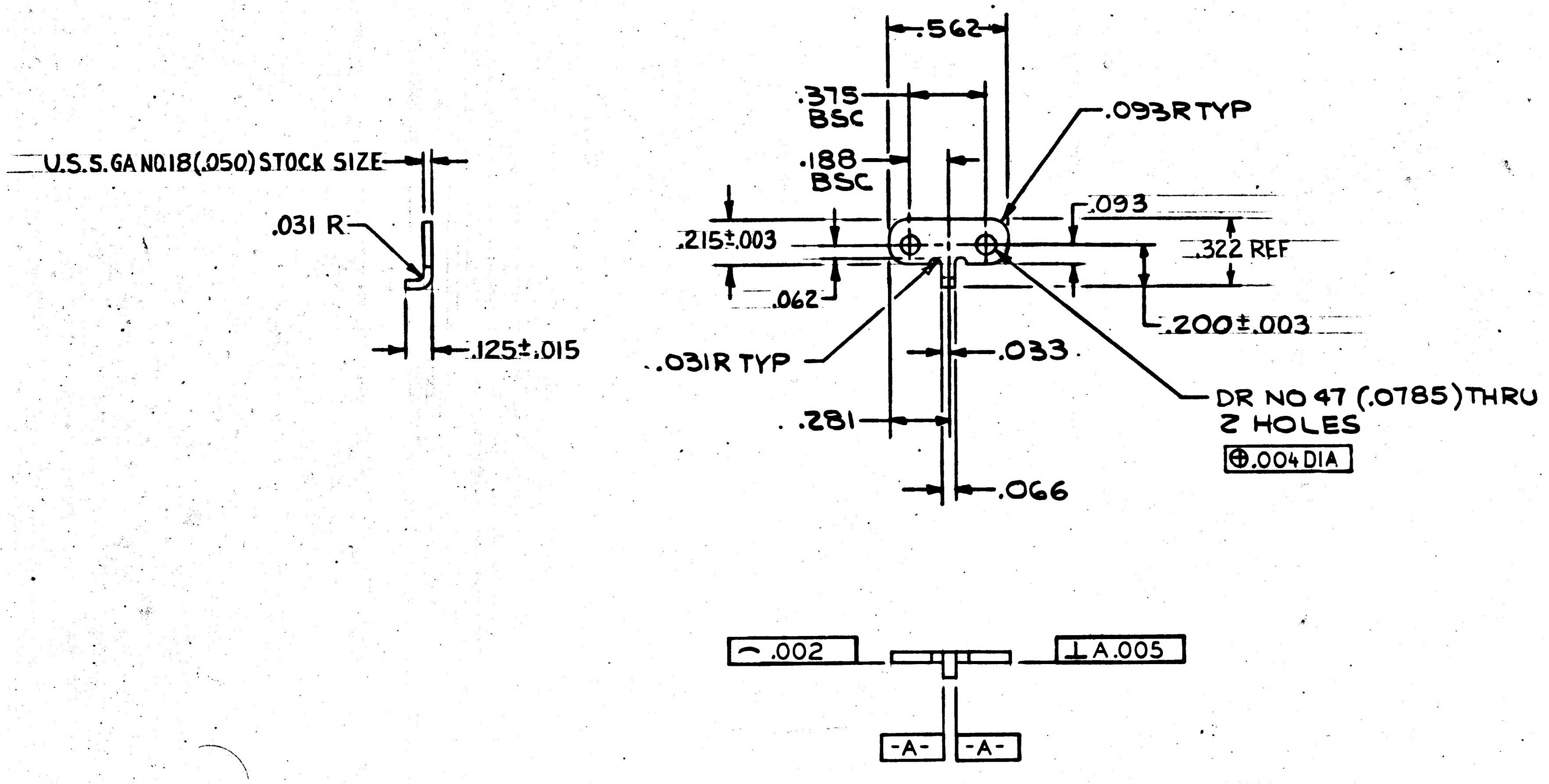
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011882 A

	2011882	C

REVISIONS 10048				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:-
   63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 PER TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200).
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING).



U.S.S. GA NO.18 (.050) STOCK SIZE
.031 R
.125±.015
.562
.375 BSC
.188 BSC
.093R TYP
.093
.215±.003
.322 REF
.062
.200±.003
.031R TYP
.033
DR NO 47 (.0785) THRU 2 HOLES
⊕ .004 DIA
.281
.066
⌒ .002
⊥ A .005
-A-
-A-

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011932	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± –

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED.SPEC QQ-S-766 CLASS 302, CONDA FINISH 2B

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910710

DRAWN F. Schiller DATE 4-16-64
CHECKED 5/20/64
APPROVAL 5/28/64
APPROVAL E. 6-5-64
NASA APPROVAL
MIT APPROVAL 9 Jun 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE KEY

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011882

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

1 ACTUAL SIZE

2011882

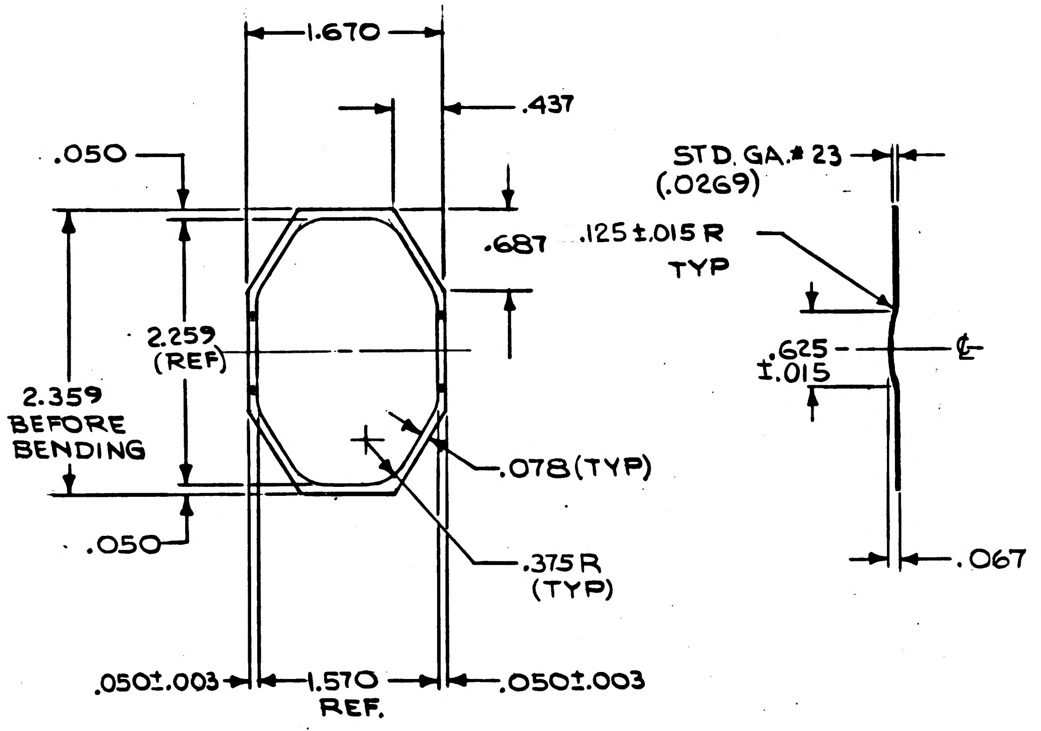
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011883 A

REVISIONS TDRR 09890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18577	4/27/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. 125√ FINISH ON ALL MACHINED SURFACES.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT PER MIL-H-7199 (KPS-1001C.105)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING).



SPRING DATA (REF)
DEFLECTION OF SPRING TO BE .011.
LOAD AT .011 INCH DEFLECTION = 6 LBS ± 10%

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011734	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM COPPER
FED SPEC QQ-C-533
CONDITION 1/2 HARD
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910360
DRAWN J. Schiller DATE 4-9-64
CHECKED 5/28/64
APPROVAL 5/28/64
APPROVAL E. Dhang 6/2/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

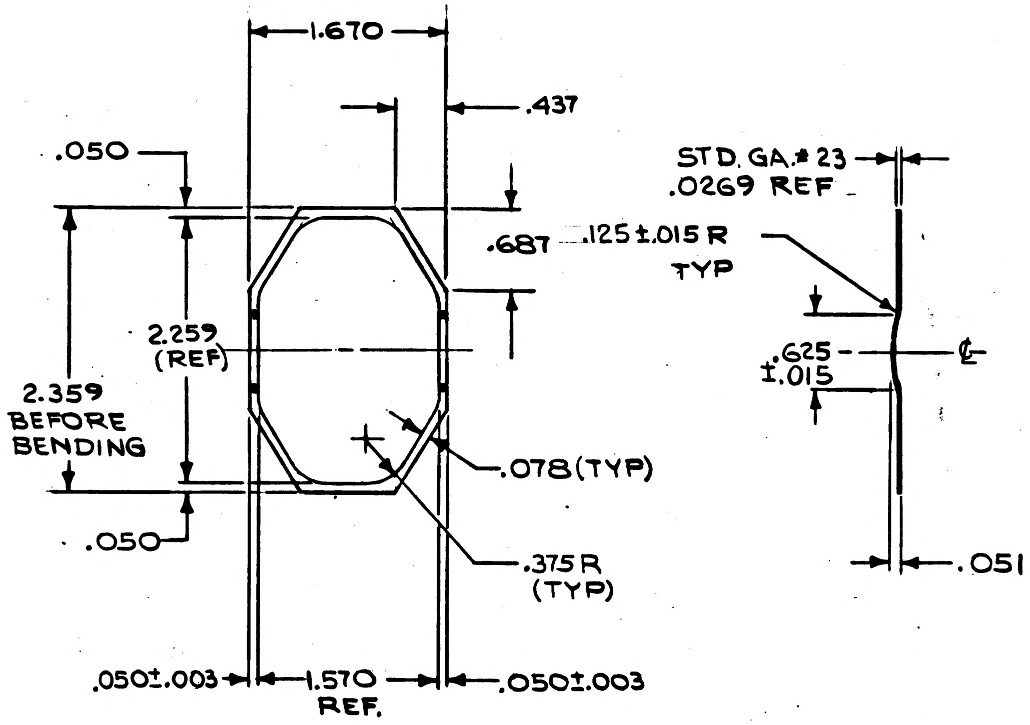
TITLE
SPRING, ELLIPTICAL
SCT PRISM

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011883
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011883

REVISIONS TDCR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. $\overset{125}{\checkmark}$ FINISH ON ALL MACHINED SURFACES.
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. HEAT TREAT PER MIL-H-7199 (KPS-1001C.105)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING).



SPRING DATA
DEFLECTION OF SPRING TO BE .011.
LOAD AT .011 INCH DEFLECTION = 6 LBS ± 10%

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011734	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL BERYLLIUM COPPER
FED SPEC QQ-C-533
CONDITION 1/2 HARD
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910360
DRAWN J. Schiller DATE 4-9-64
CHECKED 5/20/64
APPROVAL 5/26/64
APPROVAL E. Zhang 6/2/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPRING, ELLIPTICAL
SCT PRISM

CODE IDENT NO.
SIZE C
NASA NUMBER 2011883
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011883

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

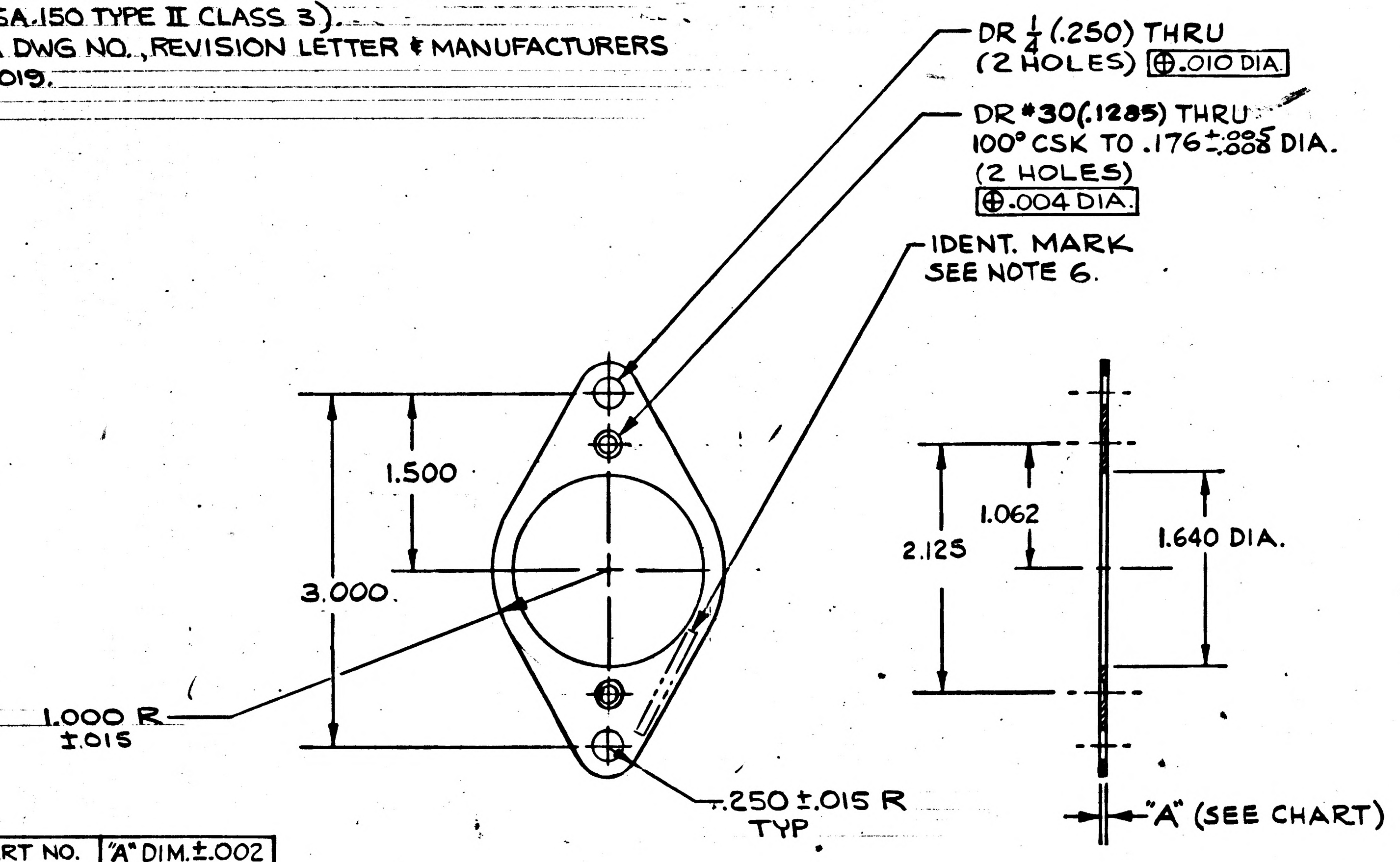
K-E
E-154

2011887

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $^{63}\surd$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
5. FINISH: ANODIZE (SULPHURIC) PER MIL-A-8625 TYPE II DYED BLACK (KPS-1005A.150 TYPE II CLASS 3).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.


DR 1/4 (.250) THRU
(2 HOLES) ⊕.010 DIA.
DR #30(.1285) THRU
100° CSK TO .176 +.005 -.000 DIA.
(2 HOLES)
⊕.004 DIA.
IDENT. MARK
SEE NOTE 6.
1.500
3.000
1.000 R ±.015
.250 ±.015 R TYP
2.125
1.062
1.640 DIA.
"A" (SEE CHART)

PART NO.	K.I.C. PART NO.	"A" DIM. ±.002
2011887-1	56386910400	.030
2011887-2	56386910401	.040
2011887-3	56386910402	.050
2011887-4	56386910403	.060
2011887-5	56386910404	.070
2011887-6	56386910405	.080
2011887-7	56386910406	.090

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED. SPEC. QQ-A-250/11
TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 5638691 0400 THRU 0406

DRAWN J. Schiller DATE 4-15-64
CHECKED 6/1/64
APPROVAL 6/5/64
APPROVAL E. Throup 6/12/64
NASA APPROVAL
MIT APPROVAL 6/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SHIM, SPACER
(SCT TURRET)

CODE IDENT NO. SIZE C NASA NUMBER 2011887

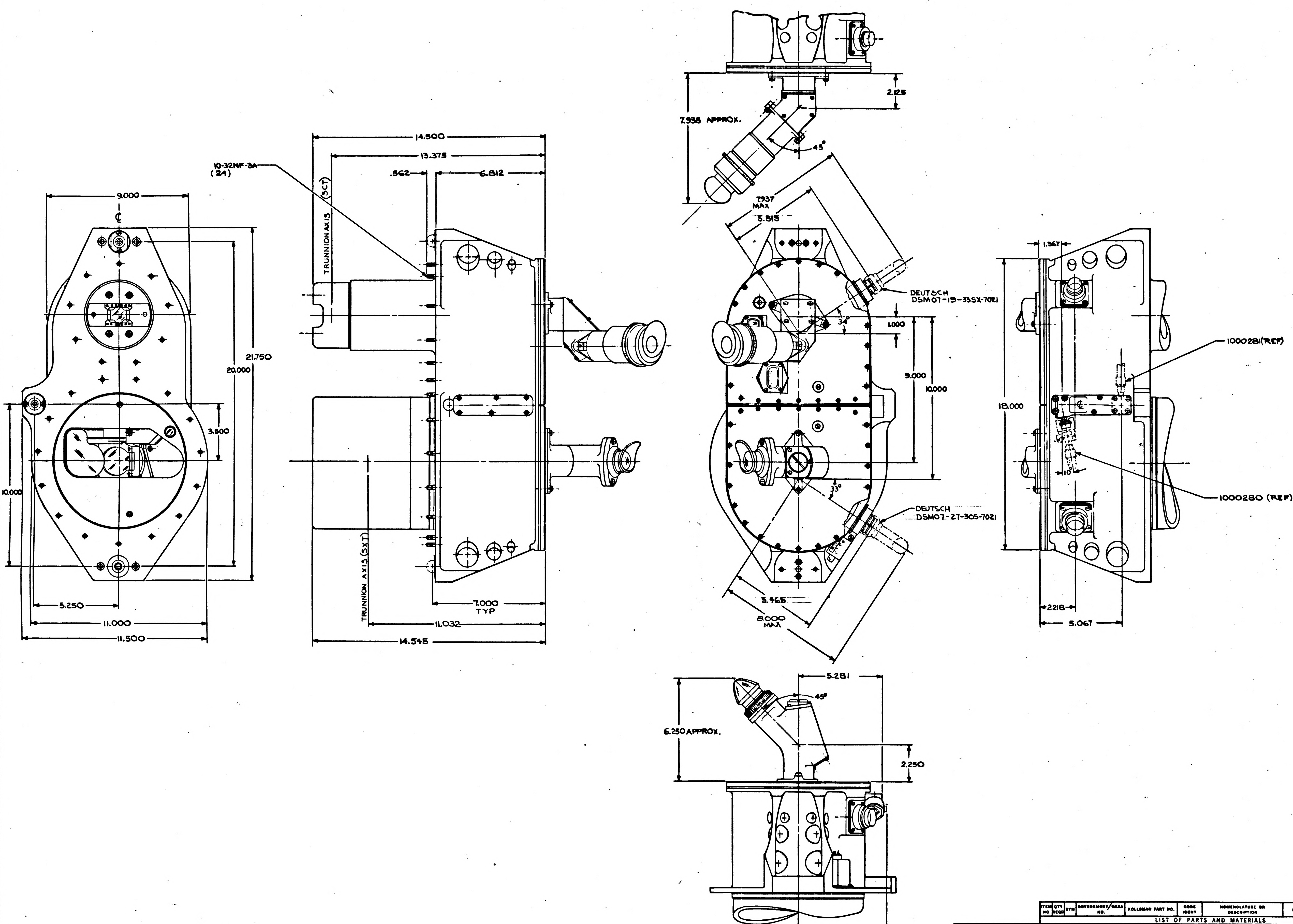
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTE
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


9.000
℄
21.750
20.000
3.500
10.000
5.250
11.000
11.500
10-32NF-3A (24)
14.500
13.375
.562
6.812
TRUNNION AXIS (SCT)
TRUNNION AXIS (SXT)
7.000 TYP
11.032
14.545
7.938 APPROX.
2.125
45°
7.937 MAX
5.515
DEUTSCH DSM07-19-35SX-7021
34°
1.000
9.000
10.000
33°
DEUTSCH DSM07-27-305-7021
5.465
8.000 MAX
1.367
18.000
1000281(REF)
1000280 (REF)
2.218
5.067
5.281
6.250 APPROX.
2.250
5.500

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .020	± 2°

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN B38690 00 001
DRAWN R. BRUNELLE DATE 7-22-64
CHECKED C. Fangstoff 8-4-64
APPROVAL E. Kaufman 8/27/64
APPROVAL E. Maug 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
(OUTLINE DWG)

CODE IDENT NO.
SIZE E
NASA NUMBER 2011888
SCALE 1/2
WEIGHT CALC ACTUAL
SHEET OF

2011888

MASTER

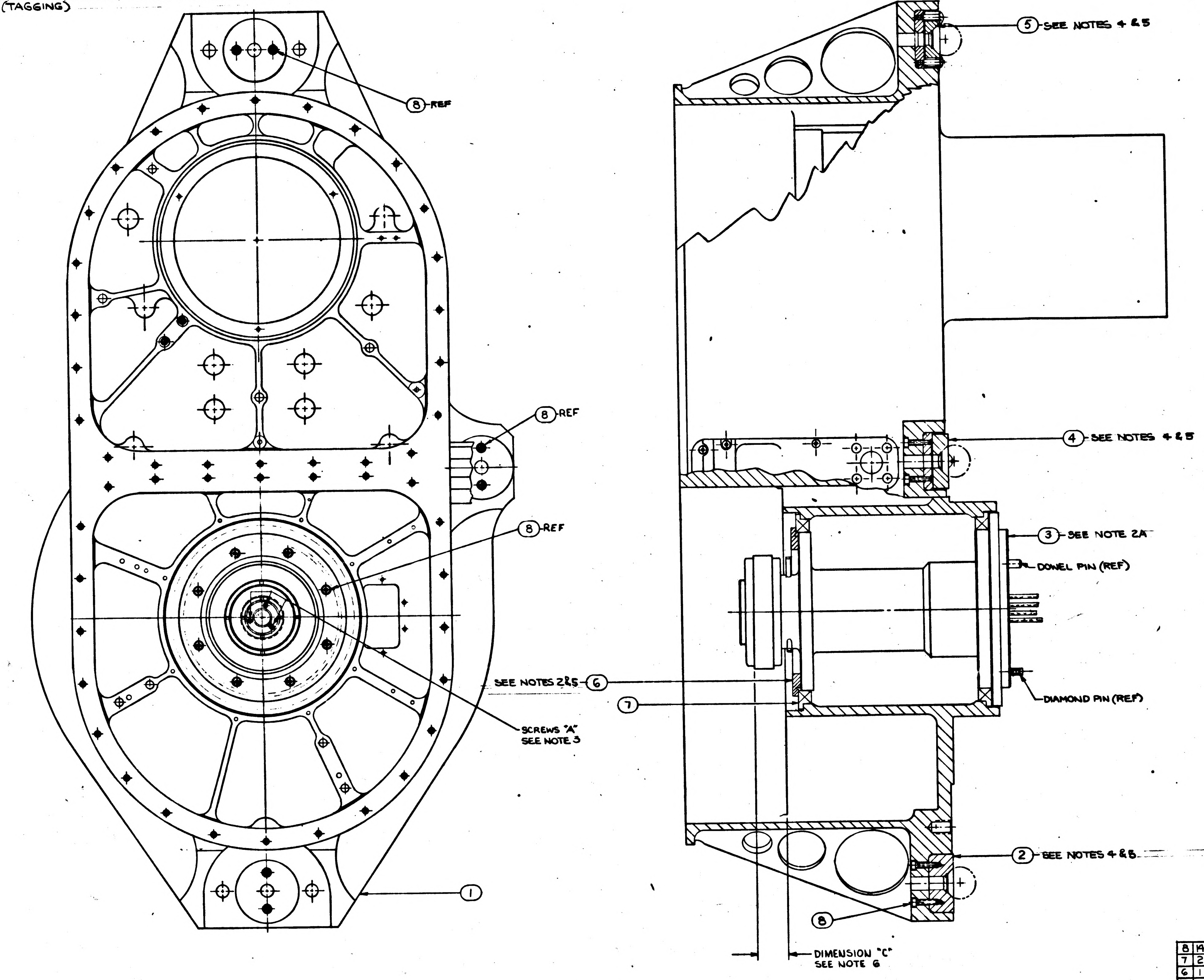
2011889 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO.- 13149	9-28-64	WK

REVISIONS 12217.

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A BEARING PRELOAD OF 150 ± 15 LBS.
3. THE SXT RETICLE (PART OF ITEM 3) SHALL BE CONCENTRIC TO THE AXIS OF ITS ROTATION WITHIN 5 ARC SECONDS. THIS ALIGNMENT SHALL BE ACCOMPLISHED BY ADJUSTMENT TO SCREWS "A"
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING)



* PURCHASE ITEM- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	14		1352C04LL8	74485157015		SCREW, CAP, SOC. HD, SELF LOCKING			
7	2		1012506-2			BEARING, BALL, ANNULAR			
6	1		2011316	57386910940		RETAINER, SHAFT			
5	1		2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
4	1		2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
3	1		2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
2	1		2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
1	1		2011631	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680

DRAWN V. AMATO DATE 4-14-64
CHECKED 7-31-64
APPROVAL 8/1/64
APPROVAL 8/20/64
NASA APPROVAL
UNIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

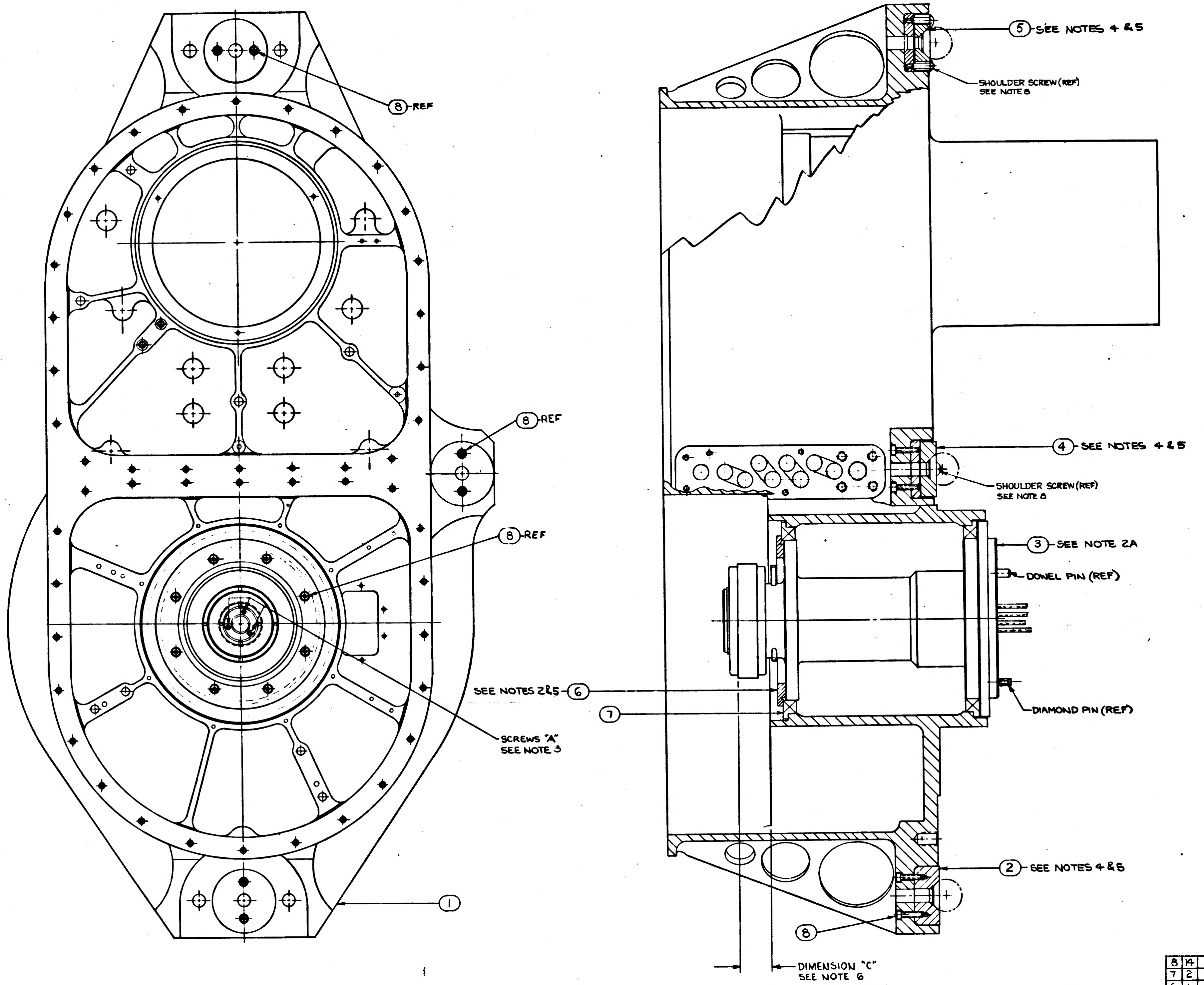
CODE IDENT NO.
SIZE E
NASA NUMBER 2011889
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF

2011889 A

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3. THE SXT RETICLE (PART OF ITEM 3) SHALL BE CONCENTRIC TO THE AXIS OF ITS ROTATION WITHIN 5 ARC SECONDS. THIS ALIGNMENT SHALL BE ACCOMPLISHED BY ADJUSTMENT TO SCREWS "A".
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906.
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND1002211.

B	2011889

REVISIONS				2217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO. 13149	9-28-64	WK
B		REVISED PER TDRR NO. 15867		WK.



* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	14		1352C04LL8	74455157015		SCREW, CAP, SOC. HD, SELF LOCKING			
7	2		1012506-2			BEARING, BALL, ANNULAR			
6	1		2011316	57386910940		RETAINER, SHAFT			
5	1		2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
4	1		2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
3	1		2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
2	1		2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
1	1		2011631	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V. AMATO DATE 4-14-64
CHECKED C. Longstaff 7-31-64
APPROVAL
APPROVAL E. Mhiry 8/28/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO. | SIZE E | NASA NUMBER 2011889
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

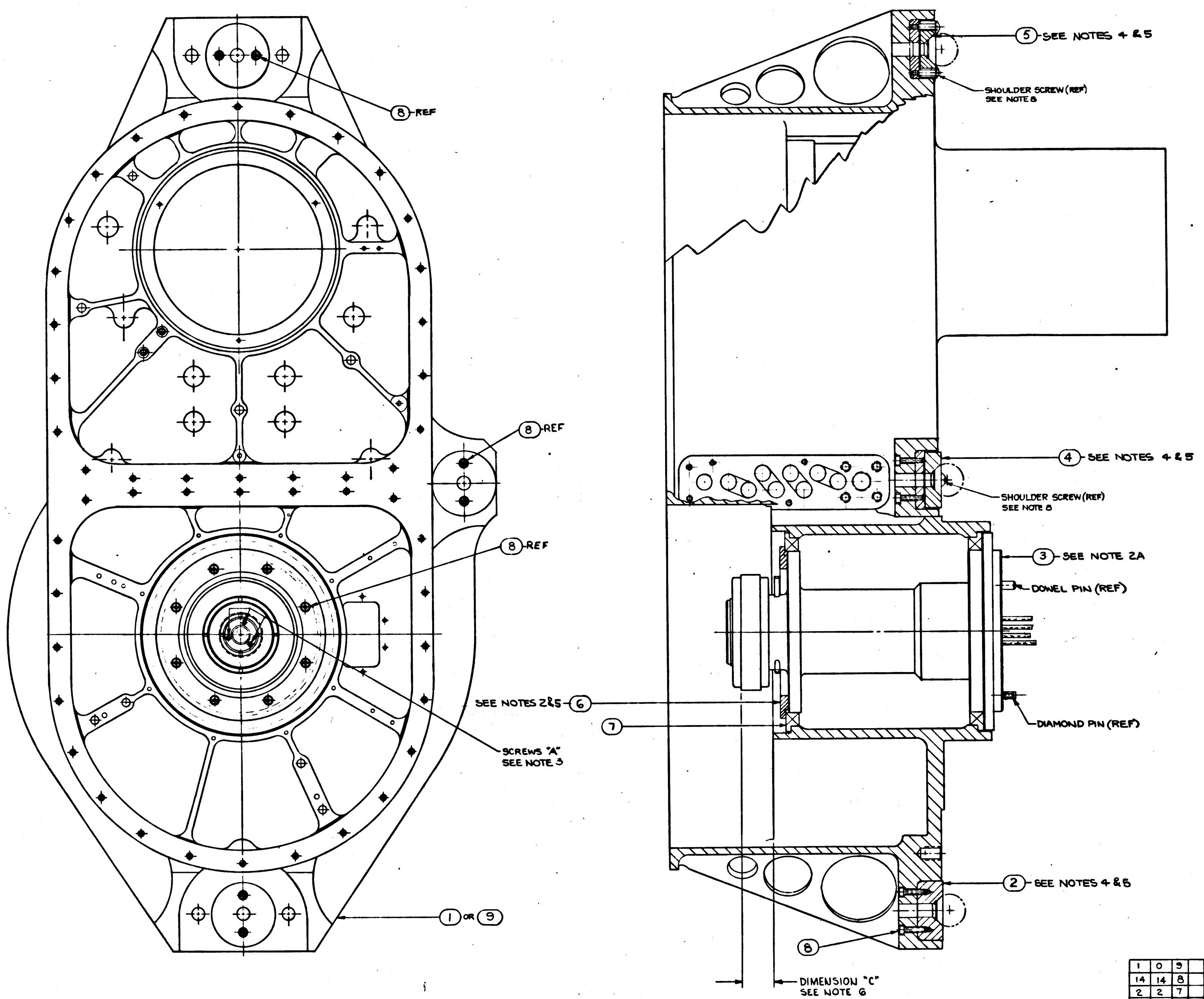
2011889	C

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.

3. THE SXT RETICLE (PART OF ITEM 3) SHALL BE CONCENTRIC TO THE AXIS OF ITS ROTATION WITHIN 3 ARC SECONDS. THIS ALIGNMENT SHALL BE ACCOMPLISHED BY ADJUSTMENT TO SCREWS "A".
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND1002211.

REVISIONS				12217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO. 13149	9-28-64	WK
B		REVISED PER TDRR NO. 15867	1/27/65	WK
C		REVISED PER TDRR NO. 19853	6/5/65	WK



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	9			2011631-011			OPTICAL BASE, ASSY OF			
14	14	8			1352C04LL8	74455157015		SCREW, CAP, SOC. HD. SELF LOCKING			
2	2	7			1012506-2			BEARING, BALL, ANNULAR			
1	1	6			2011316	57386910940		RETAINER, SHAFT			
1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680

DRAWN V. AMATO DATE 4-14-64
CHECKED C. Langstaff 7-31-64
APPROVAL 8/1/64
APPROVAL E. Murray 8/28/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 10/20/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011889

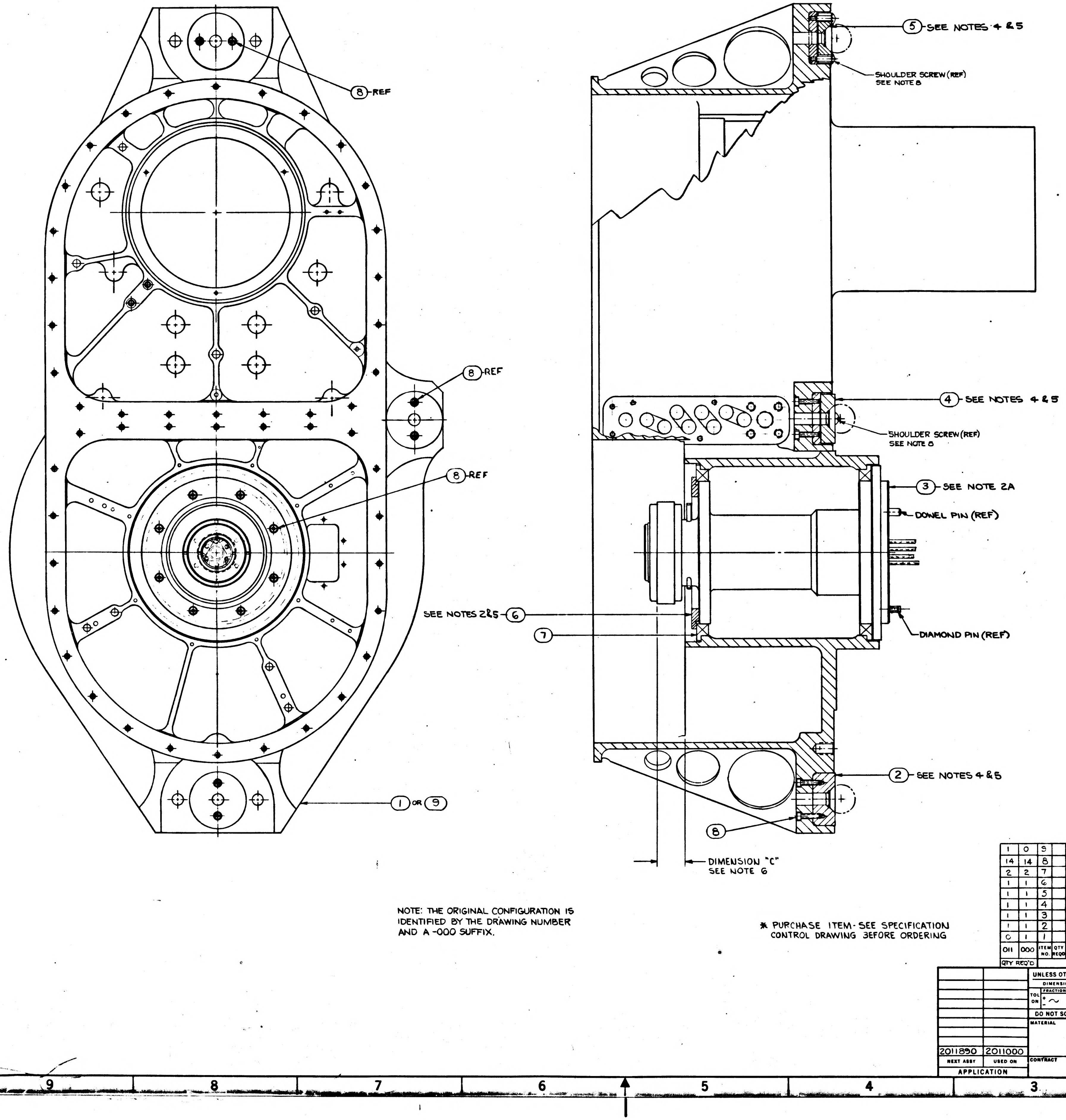
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011889 C

D 2011889

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3
4 THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6 RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906.
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND100211.

REVISIONS			2=17	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO.- 13149	9-28-64	wK
B		REVISED PER TDRR NO. 15867	1-27-65	wK
C		REVISED PER TDRR NO. 19853	6-5-65	wK
D		REVISED PER TDRR NO 21300	8-2-5	PK. wK



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

✱ PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	9			2011631-011			OPTICAL BASE, ASSY OF			
14	14	8			1352C04LL8	74455157015		SCREW, CAP, SOC. HD. SELF LOCKING			
2	2	7			1012506-2			BEARING, BALL, ANNULAR			
1	1	6			2011316	57386910940		RETAINER, SHAFT			
1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V. AMATO DATE 4-14-64
CHECKED C. Langstaff 7-31-64
APPROVAL
APPROVAL E. Phiney 7/28/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 1 Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO. 80280
SIZE E
NASA NUMBER 2011889
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

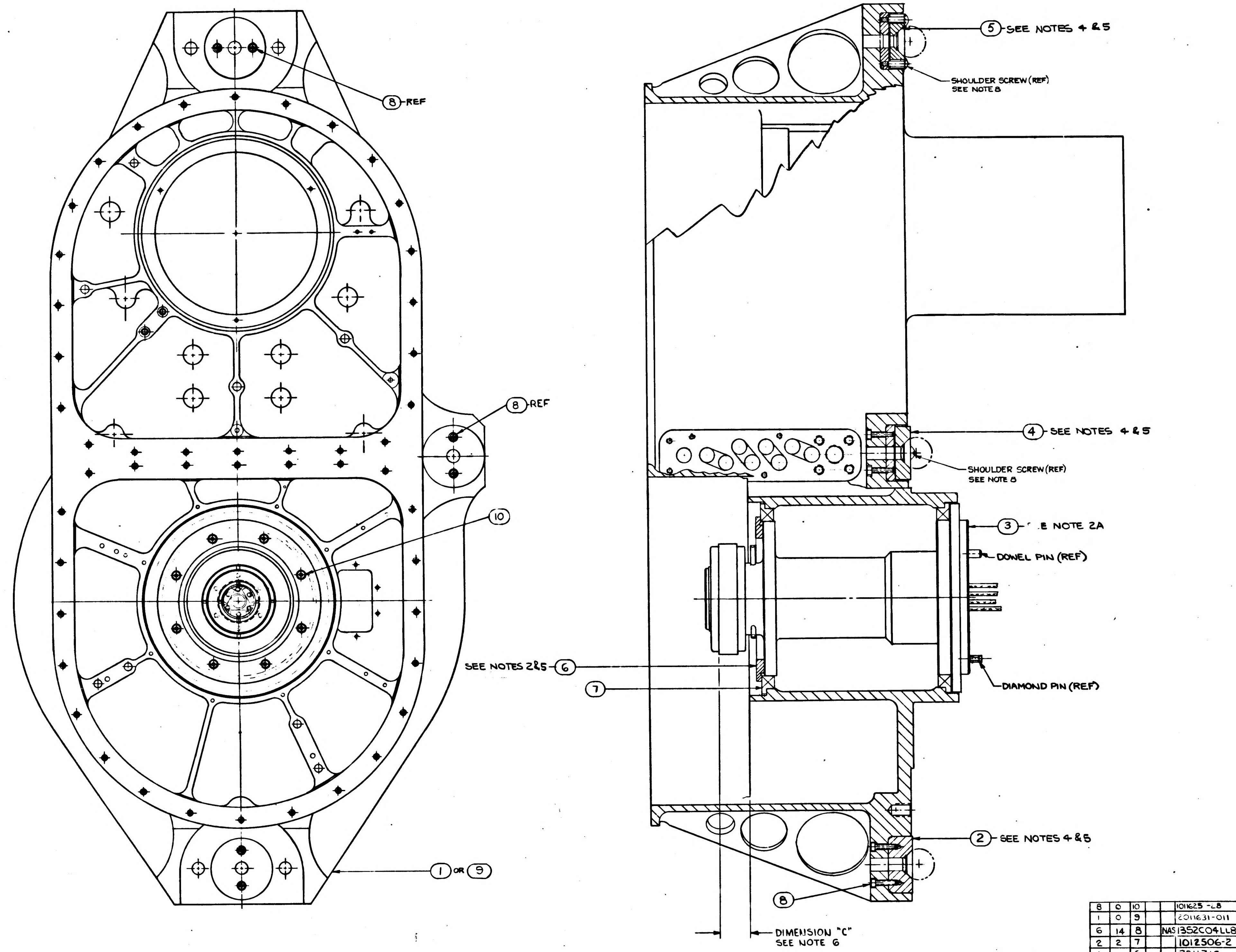
2011889 D

2011889 E

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO.- 13149	9-28-64	
B		REVISED PER TDRR NO. 15867	[illegible]	
C		REVISED PER TDRR NO. 19853	[illegible]	
D		REVISED PER TDRR NO 21300	8-2-5	
E		REVISED PER TDRR NO 21370	[illegible]	

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906.
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND1002[illegible].



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM- SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	0	10			1011625-28	74455151028		SCREW CAP SOC HD SELF LOCKING			
1	0	9			2011631-011			OPTICAL BASE ASSY OF			
6	14	8		NAS	1352C04LL8	74455157015		SCREW, CAP, SOC. HD, SELF LOCKING			
2	2	7			1012506-2			BEARING, BALL, ANNULAR			
1	1	6			2011316	57386910940		RETAINER, SHAFT			
1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			
QTY REQ'D		LIST OF PARTS AND MATERIALS									

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V AMATO DATE 4-14-64
CHECKED 7-31-64
APPROVAL
APPROVAL 8/20/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

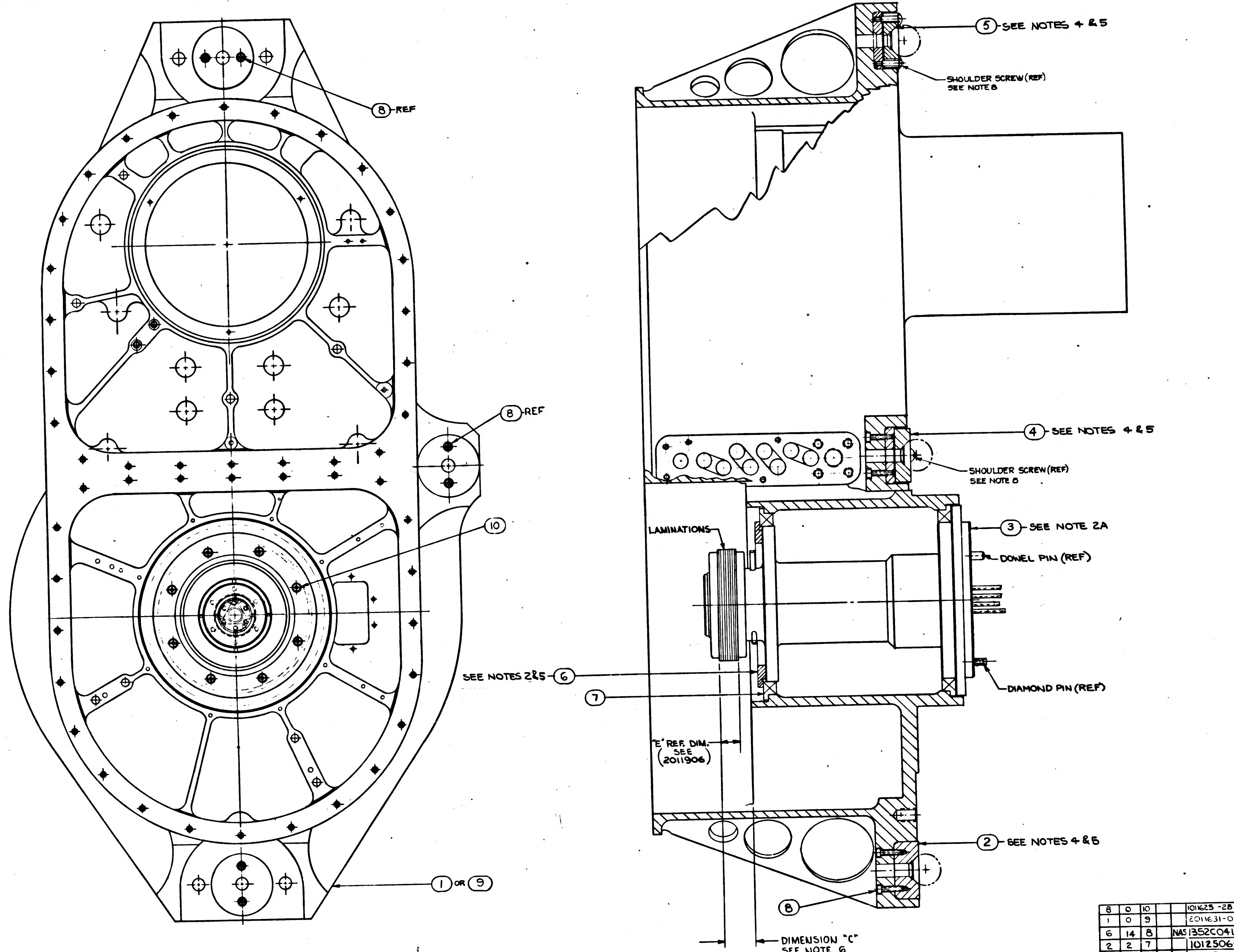
TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011889
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011889 F

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906.
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND100[illegible].

REVISIONS 2217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO. 13148	9-28-64	WK
B		REVISED PER TDRR NO. 15867	1/27/65	WK
C		REVISED PER TDRR NO. 19853	6/5/65	WK
D		REVISED PER TDRR NO 21300	8-2-5	PK WK
E		REVISED PER TDRR NO 21370	[illegible]	WK
F		REVISED PER TDRR 21659	[illegible]	WK



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

QTY REQ'D 011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	0	10			1011625-28	74455151028		SCREW CAP SOC HD SELF LOCKING			
1	0	9			2011631-011			OPTICAL BASE ASSY OF			
6	14	8			NAS1352C04LL8	74455157015		SCREW, CAP, SOC. HD. SELF LOCKING			
2	2	7			1012506-2			BEARING, BALL, ANNULAR			
1	1	6			2011316	57386910940		RETAINER, SHAFT			
1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V. AMATO DATE 4-14-64
CHECKED C. Langstaff 7-31-64
APPROVAL [illegible] 8/1/64
APPROVAL E. Whinny 8/28/64
NASA APPROVAL
MIT APPROVAL [illegible] 1964

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

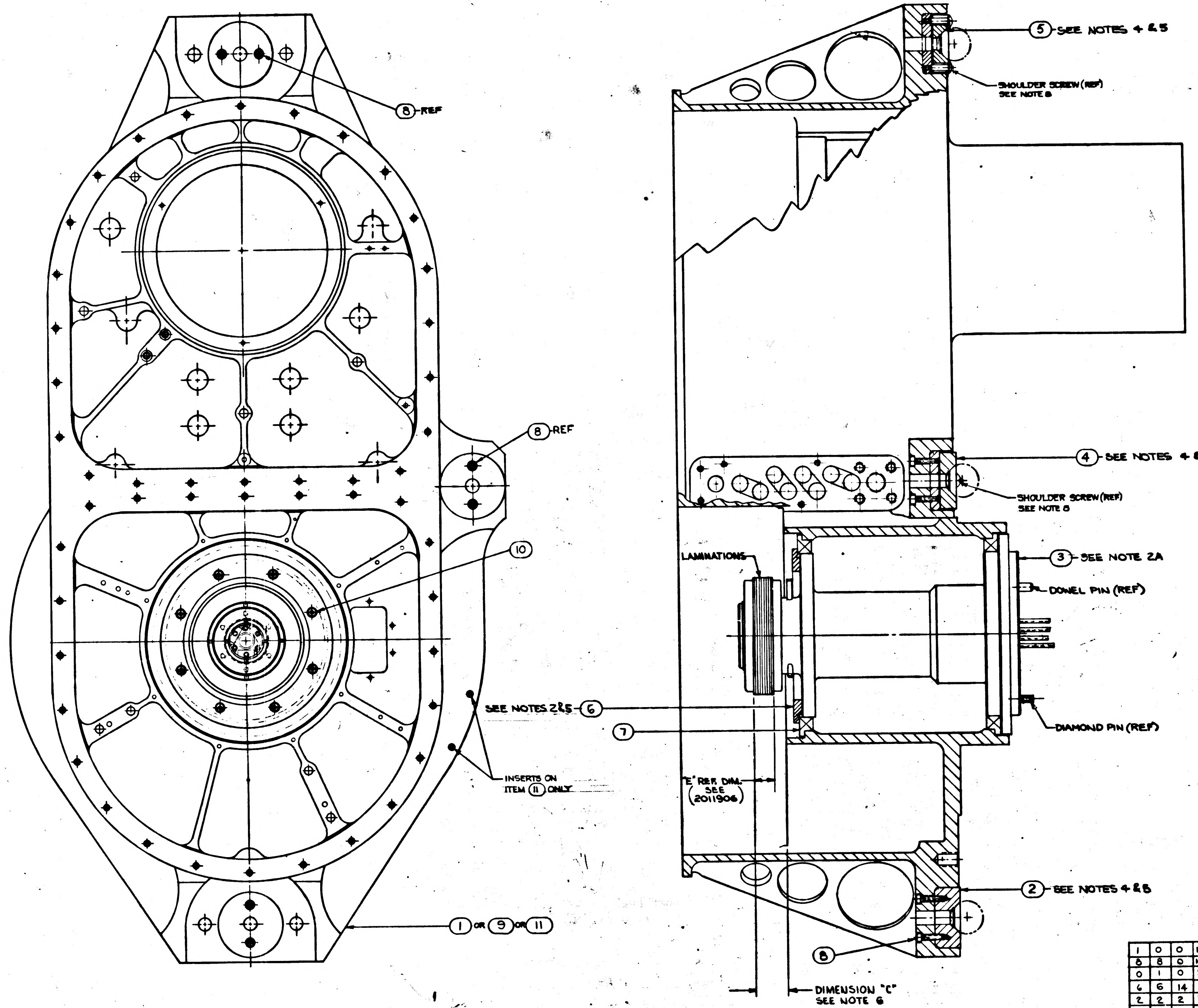
TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011889
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011889 G

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO.- 13149	9-28-64	wk
B		REVISED PER TDRR NO. 15867	1/27/65	wk
C		REVISED PER TDRR NO. 19853	6/8/65	wk
D		REVISED PER TDRR NO 21300	8-2-5	PK. WK
E		REVISED PER TDRR NO 21570	8/10/65	wk
F		REVISED PER TDRR 21659	[illegible]	wk
G		REVISED PER TDRR 23068	[illegible] 65	wk

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3.
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND1002211



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	11			2012663	85386911640		OPTICAL BASE ASSY OF			
8	8	0	10			101625-28	74455151028		SCREW CAP SOC HD SELF LOCKING			
0	1	0	9			2011631-011			OPTICAL BASE ASSY OF			
6	6	14	8		NAS	1352C04LL8	74455157015		SCREW, CAP, SOC. HD, SELF LOCKING			
2	2	2	7			1012506-2			BEARING, BALL, ANNULAR			
1	1	1	6			2011316	57386310940		RETAINER, SHAFT			
1	1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			

QTY REQ'D — LIST OF PARTS AND MATERIALS

2011890	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~ DO NOT SCALE THIS DRAWING MATERIAL CONTRACT	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 85386910680 DRAWN V. AMATO DATE 4-14-64 CHECKED 7-31-64 APPROVAL APPROVAL 8/20/64 NASA APPROVAL KIT APPROVAL
NEXT ASSY	USED ON		
APPLICATION			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO. | SIZE E | NASA NUMBER 2011889

SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

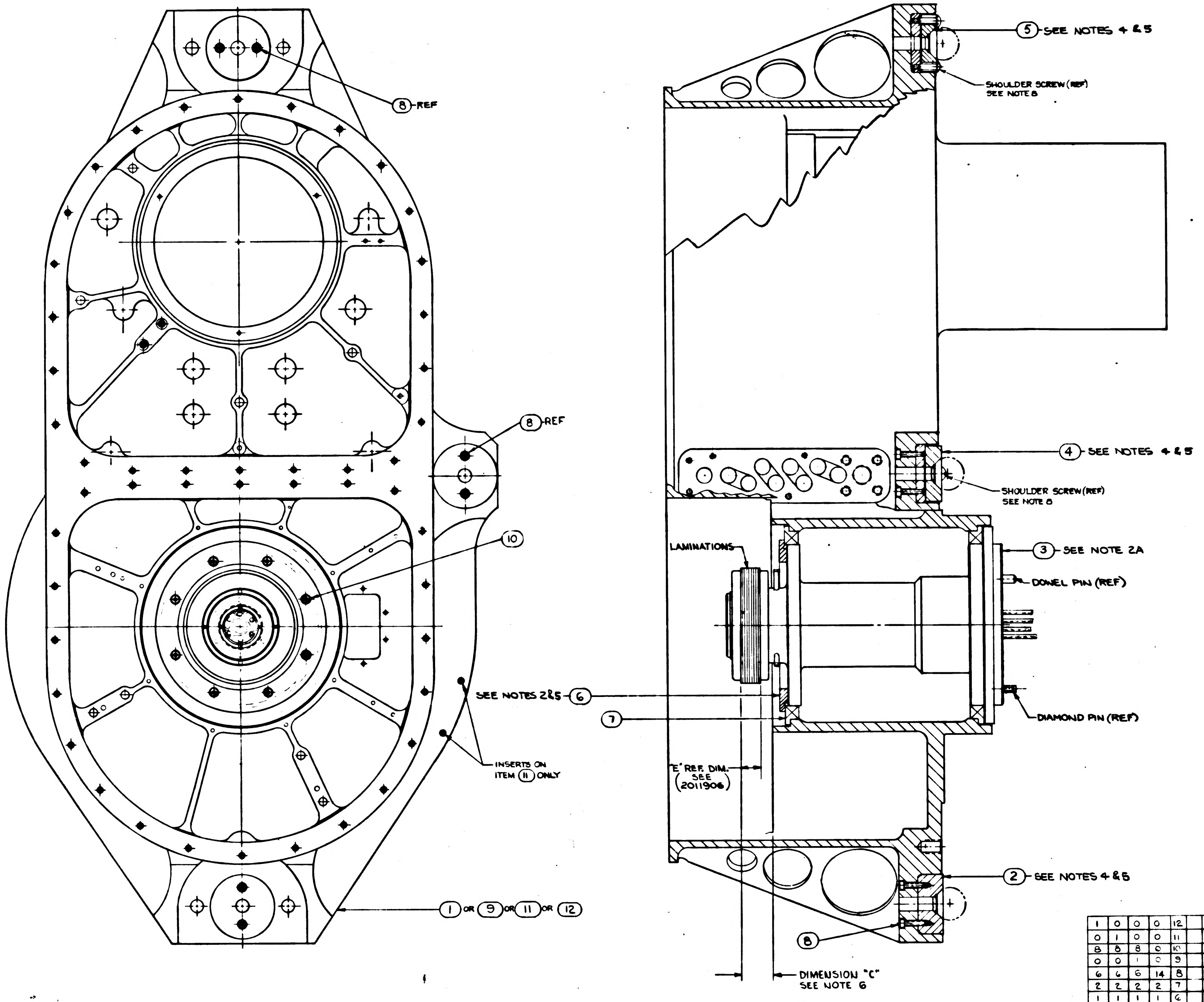
MASTER

H 2011889

NOTES:

1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A NOMINAL BEARING PRELOAD OF 150 ± 15 LBS.
3.
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS. MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT.
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY.
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906
7. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).
8. AFTER COMPLETION OF ANY MACHINING PER NOTE 4, VIBRATION PROOF BALL MOUNT (ITEMS 4 & 5) SHOULDER SCREWS, BY APPLYING LOCKING COMPOUND, GRADE "CV" OF MIL-S-22473 TO FEMALE THREAD PER ND1002[illegible]1.

REVISIONS 2-17				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDDR NO. 13149	9-28-64	WK
B		REVISED PER TDRR NO 15867	1/27/65	WK
C		REVISED PER TDRR NO 19853	6/7/65	WK
D		REVISED PER TDRR NO 21300	8-2-65	PK WK
E		REVISED PER TDRR NO 21370	[illegible]	WK
F		REVISED PER TDRR 21659	[illegible]	WK
G		REVISED PER TDRR 23068	[illegible]	WK
H		REVISED PER TDRR 29150	[illegible]	[illegible]



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	0	12			2012663-011			OPTICAL BASE, ASSY OF			
0	1	0	0	11			2012663-00[illegible]	85386911640		OPTICAL BASE, ASSY OF			
8	8	8	0	10		*	101625-28	74435151028		SCREW CAP SOC HD SELF LOCKING			
0	0	1	0	9			2011631-011			OPTICAL BASE ASSY OF			
6	6	6	14	8			NAS1352C04LL8	74455157015		SCREW CAP SOC. HD SELF LOCKING			
2	2	2	2	7		*	1012506-2			BEARING BALL, ANNULAR			
1	1	1	1	6			2011316	57386910540		RETAINER SHAFT			
1	1	1	1	5			2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
1	1	1	1	4			2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
1	1	1	1	3			2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
1	1	1	1	2			2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
0	0	0	1	1			2011631-000	85386910350		OPTICAL BASE, ASSY OF			

QTY REQ'D — LIST OF PARTS AND MATERIALS

* PURCHASE ITEM SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

NEXT ASSY	USED ON
2012736	
2012730	
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V. AMATO DATE 4-14-64
CHECKED C. Langstaff 7-31-64
APPROVAL [illegible]
APPROVAL E. [illegible] 7/28/64
NASA APPROVAL
MIT APPROVAL W. Kaplan [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

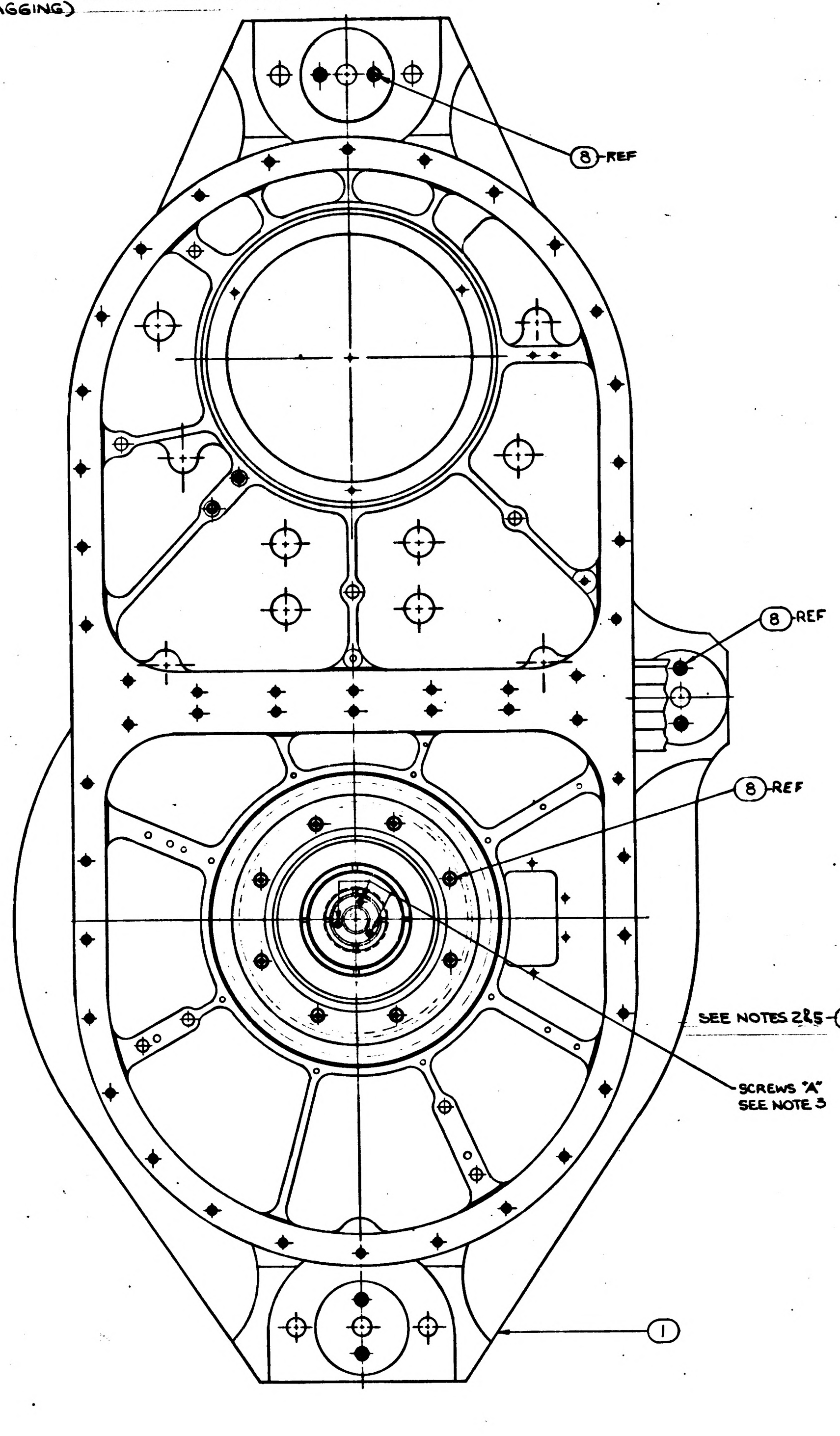
CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011889
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

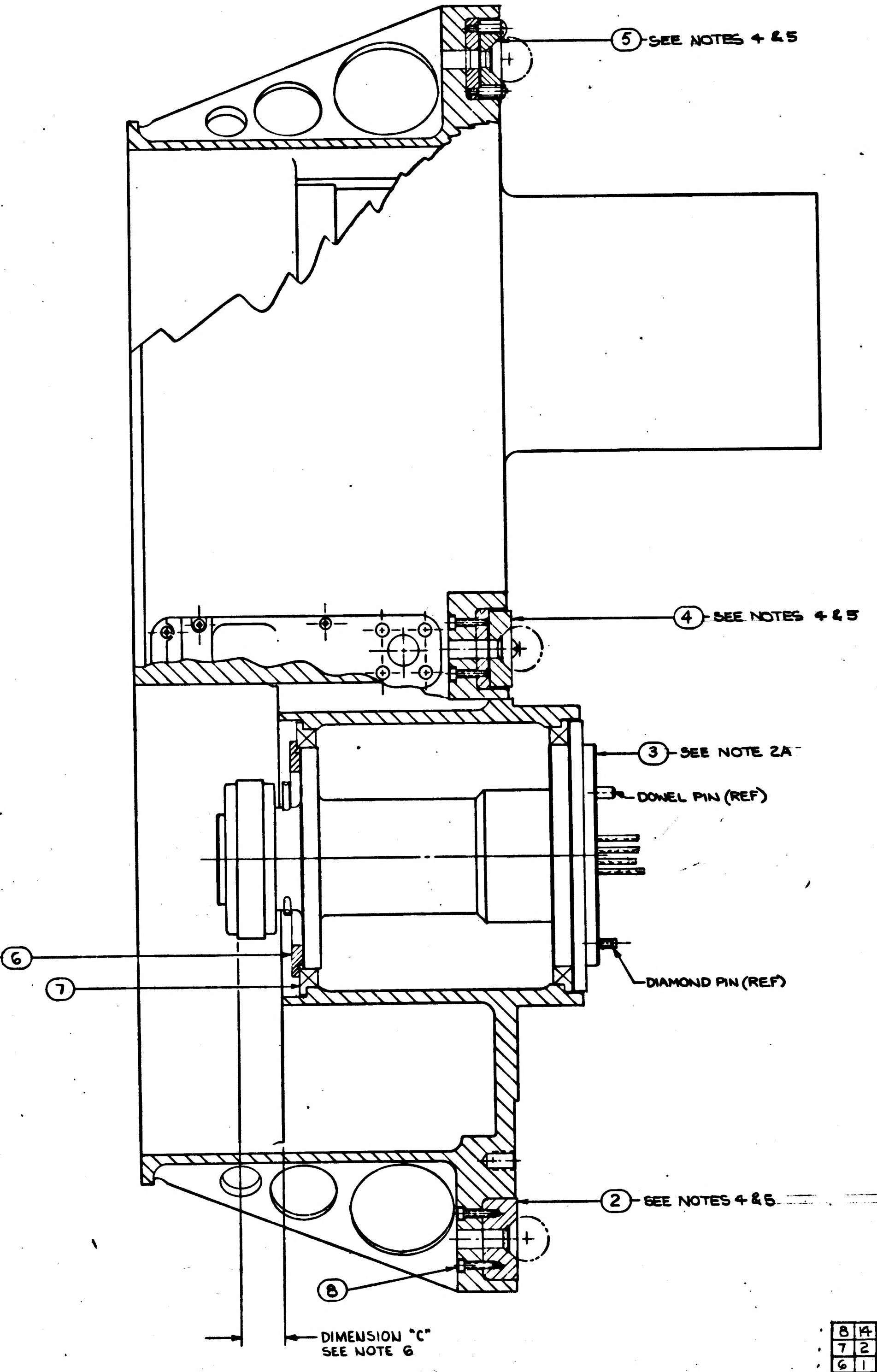
2011889

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2011889

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. ITEM 6 SHALL BE ADJUSTED BY MACHINING TO PROVIDE A BEARING PRELOAD OF 150 ± 15 LBS.
3. THE SXT RETICLE (PART OF ITEM 3) SHALL BE CONCENTRIC TO THE AXIS OF ITS ROTATION WITHIN 5 ARC SECONDS. THIS ALIGNMENT SHALL BE ACCOMPLISHED BY ADJUSTMENT TO SCREWS "A"
4. THE ROTATIONAL AXIS OF ITEM 3 SHALL BE PERPENDICULAR TO THE PLANE DEFINED BY THE BALL SEATS OF ITEMS 2, 4 & 5 WITHIN 10 ARC SECONDS MACHINING OF THE BOTTOM SURFACES OF ITEMS 2, 4 & 5 INDIVIDUALLY OR IN COMBINATION MAY BE REQUIRED TO ACCOMPLISH THIS ALIGNMENT
5. ALL STAINLESS STEEL PARTS MACHINED AT ASSEMBLY SHALL BE PASSIVATED PRIOR TO FINAL ASSEMBLY
6. RECORD THIS DIMENSION AS DATA FOR COMPLETION OF ASSEMBLY NO. 2011906
7. IDENTIFY USING NASA DWG NO. REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019 (TAGGING)





* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
8	14		1352C04LL8	14455157015		SCREW, CAP, SOC. HD, SELF LOCKING			
7	2		10:1607-2	30205772400		BEARING, BALL, ANNULAR			
6	1		2011316	57386910940		RETAINER, SHAFT			
5	1		2011739	85386910670		INSERT, BALL MOUNT, LINE, ASSY OF			
4	1		2011738	85386910660		INSERT, BALL MOUNT, PLANE, ASSY OF			
3	1		2011704	85386910320		SHAFT AXIS ASSY, SEXTANT			
2	1		2011566	57386910840		INSERT, BALL MOUNT, STATIONARY			
1	1		2011631	85386910350		OPTICAL BASE, ASSY OF			

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910680
DRAWN V. AMATO DATE 4-14-64
CHECKED C. Longstaff 7-31-64
APPROVAL E. [illegible] 8/1/64
APPROVAL E. Wrang 8/28/64
NASA APPROVAL
MIT APPROVAL W Kupfer [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT
SUB ASSY STAGE I

CODE IDENT NO.
SIZE E
NASA NUMBER 2011889
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

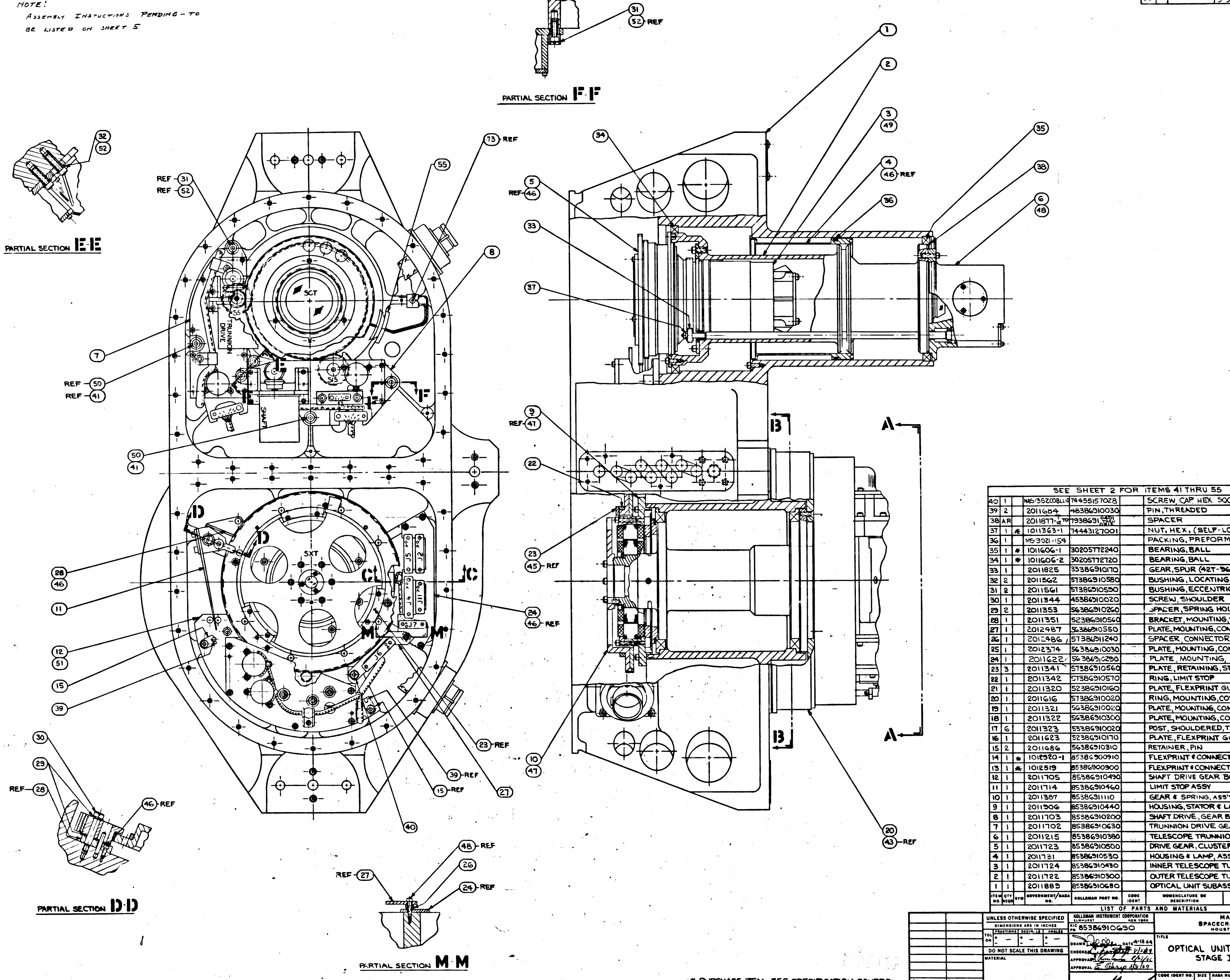
2011889

MASTER

A	2011890

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	

NOTE:
ASSEMBLY INSTUCTIONS PENDING - TO
BE LISTED ON SHEET 5



SEE SHEET 2 FOR ITEMS 41 THRU 55									
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
40	1		NAS1352C08LL10	74455157028		SCREW, CAP, HEX. SOC HD. SELF LOCKING			
39	2		2011684	48386910030		PIN, THREADED			
38	AR		2011877-1 TO -12	7938691 0401 THRU 0412		SPACER			
37	1	*	1011363-1	74443127001		NUT, HEX, (SELF-LOCKING)			
36	1		MS9021-154			PACKING, PREFORMED			
35	1	*	1011606-1	30205772240		BEARING, BALL			
34	1	*	1011606-2	30205772720		BEARING, BALL			
33	1		2011825	33386910170		GEAR, SPUR (42T-96P)			
32	2		2011562	57386910580		BUSHING, LOCATING			
31	2		2011561	57386910590		BUSHING, ECCENTRIC			
30	1		2011344	45386910020		SCREW, SHOULDER			
29	2		2011353	56386910260		SPACER, SPRING HOLDER			
28	1		2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
27	1		2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
26	1		2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
25	1		2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
24	1		2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
23	3		2011341	57386910560		PLATE, RETAINING, STOP RING			
22	1		2011342	57386910570		RING, LIMIT STOP			
21	1		2011320	52386910160		PLATE, FLEXPRINT GUIDE			
20	1		2011616	57386910020		RING, MOUNTING, COVER			
19	1		2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
18	1		2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
17	6		2011323	53386910020		POST, SHOULDERED, THREADED			
16	1		2011623	52386910170		PLATE, FLEXPRINT GUIDE			
15	2		2011686	56386910310		RETAINER, PIN			
14	1	*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
13	1	*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
12	1		2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT., ASSY OF			
11	1		2011714	85386910460		LIMIT STOP ASSY			
10	1		2011387	85386911110		GEAR & SPRING, ASS'Y OF			
9	1		2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
8	1		2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
7	1		2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
6	1		2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
5	1		2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
4	1		2011731	85386910530		HOUSING & LAMP, ASSY OF			
3	1		2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
2	1		2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
1	1		2011889	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13-64
CHECKED 8/12/69
APPROVAL 8/27/69
APPROVAL E. Wang 8/31/69
NASA APPROVAL
MIT APPROVAL

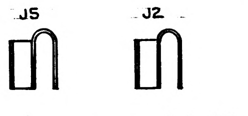
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

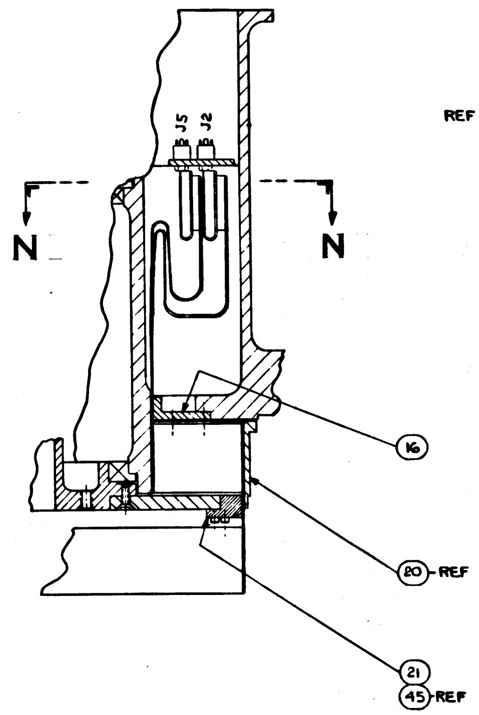
CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 4

2011890 A

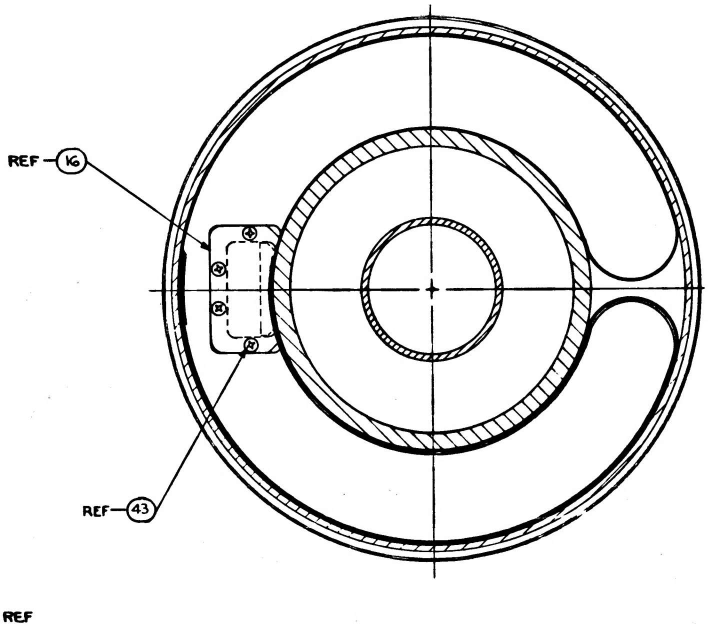
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK



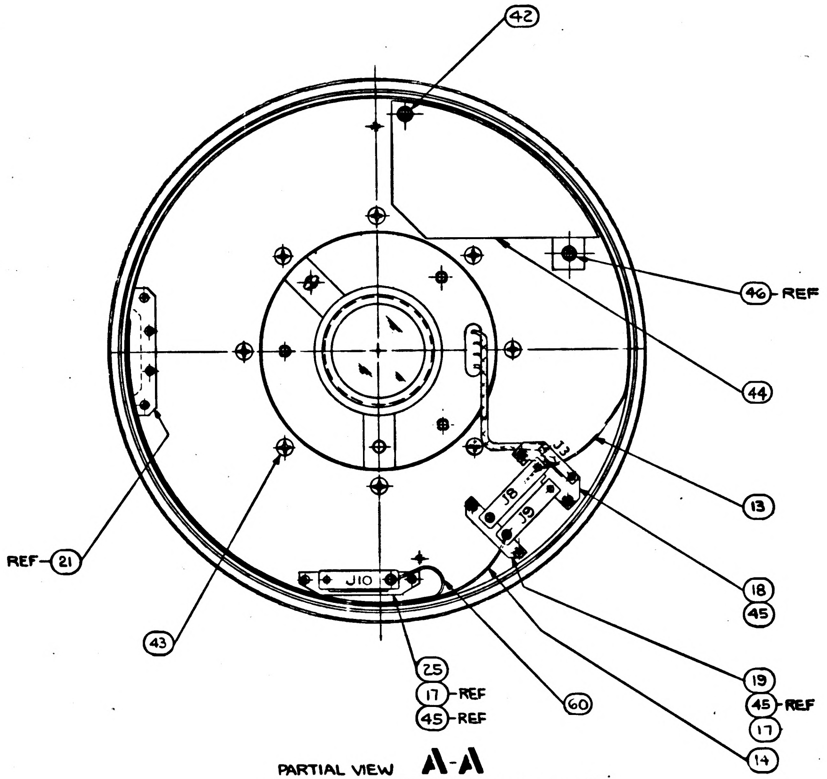
PARTIAL SECTION **N-N**
SCALE: NONE



PARTIAL SECTION **C-C**



PARTIAL SECTION **B-B**



PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 86

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
55	1		2012164	26386910060		GROMMET			
54									
53									
52	4	NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD, SELF LOCKING			
51	3	NAS	1352C08LL8	74455157027					
50	2	NAS	1352C08LL6	74455157026					
49	4	NAS	1352C06LL4	74455157018					
48	8	NAS	1352C04LL8	74455157015					
47	14	NAS	1352C04LL6	74455157014					
46	15	NAS	1352C04LL4	74455157013					
45	16	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
44	1		2007008			POWER SUPPLY (TRACKER & PHOTOMETER)			
43	12	NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
42	1		1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
41	2	AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
						SEE SHEET 1 FOR ITEMS 1 THRU 40			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. Moreno 8/31/64
NASA APPROVAL
MIT APPROVAL

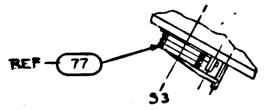
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 4

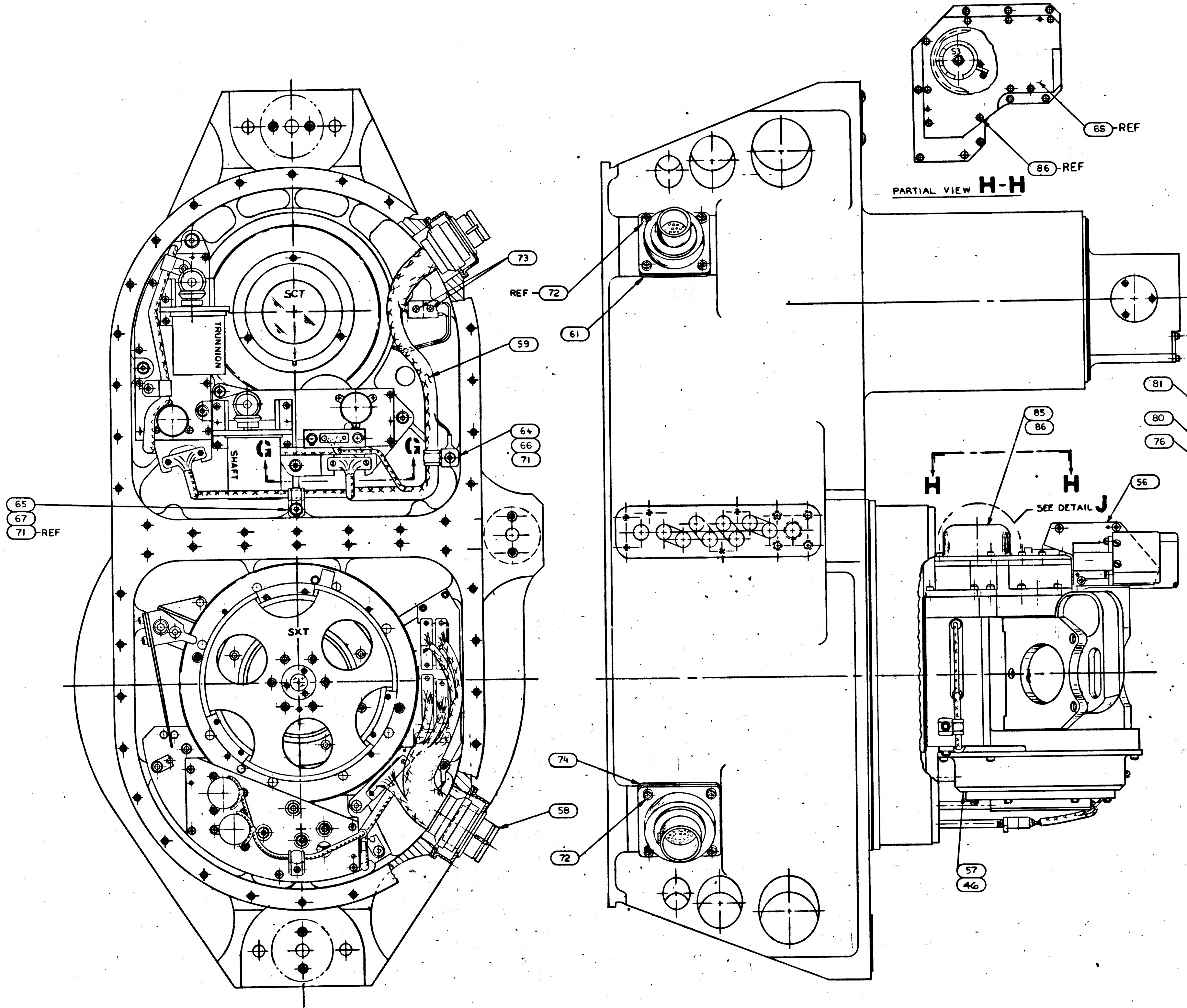
2011890 A

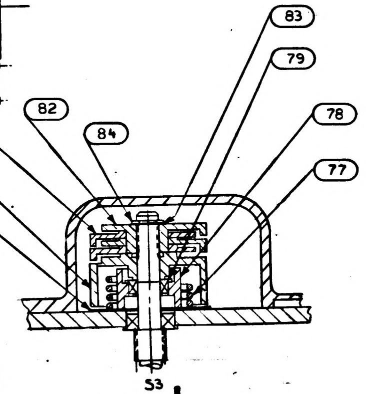
REVISIONS				2 21
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRB NO. 5330	1/4/65	WR



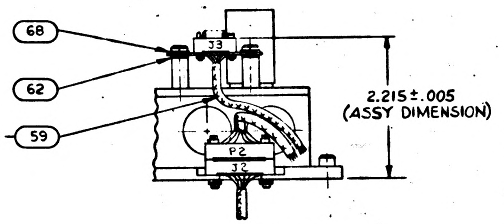
PARTIAL VIEW

PARTIAL VIEW **H-H**





DETAIL **J**
SCALE 2/1



PARTIAL SECTION **G-G**

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
87	2		NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
86	9		1011625-20	74455151020		SCREW, CAP, SOC. HD SELF LOCKING			
85	1		2011595	52386910220		COVER, GEARBOX			
84	1		MS16624-1015	74453018002		RING, RETAINING			
83	AR		2012351 -	7938691 0101 0102		WASHER, FLAT			
82	1		2011578	57386910130		DOG, LIMIT STOP, OUTER			
81	3		2011579	57386910120		DOG, LIMIT STOP			
80	1		2011580	57386910140		DOG, LIMIT STOP, INNER			
79	*		1011608-5			BEARING, BALL, ANNULAR			
78	1		2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
77	1		2011577	56386910060		SPRING, TORSION			
76	1		2012350	25386910010		WASHER			
75									
74	1	*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
73	2		MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
72	8		NAS1352C06LL5	74455157018		SCREW, CAP, SOC. HEAD, SELF LOCKING			
71	2		NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
70	2		NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
69									
68	2		MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
67	1		MS15795-305	—		WASHER, FLAT			
66	1	*	1011918-2	—		WASHER, CABLE CLAMP			
65	1	*	1000220-6	—		CLAMP, CABLE			
64	1	*	1000220-8	—		CLAMP, CABLE			
63									
62	AR		2011885	45386910040		SHIM			
61	1	*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
60	1		1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
59	1		2011713	80386910040		SCT BASE HARNESS ASSY			
58	1		2011896	80386910050		SXT BASE HARNESS ASSY			
57	1		2011909	85386910730		RESOLVER AND CONNECTOR ASSY OF			
56	1		2011701	85386910150	—	SXT INDEX HD ASSY			
						SEE SHEET 2 FOR ITEM 41 THRU 55			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R BRUNELLE DATE 2-7-69
CHECKED C. Longstaff 2-7-69
APPROVAL
APPROVAL E. Morny 8/31/69
NASA APPROVAL
MIT APPROVAL

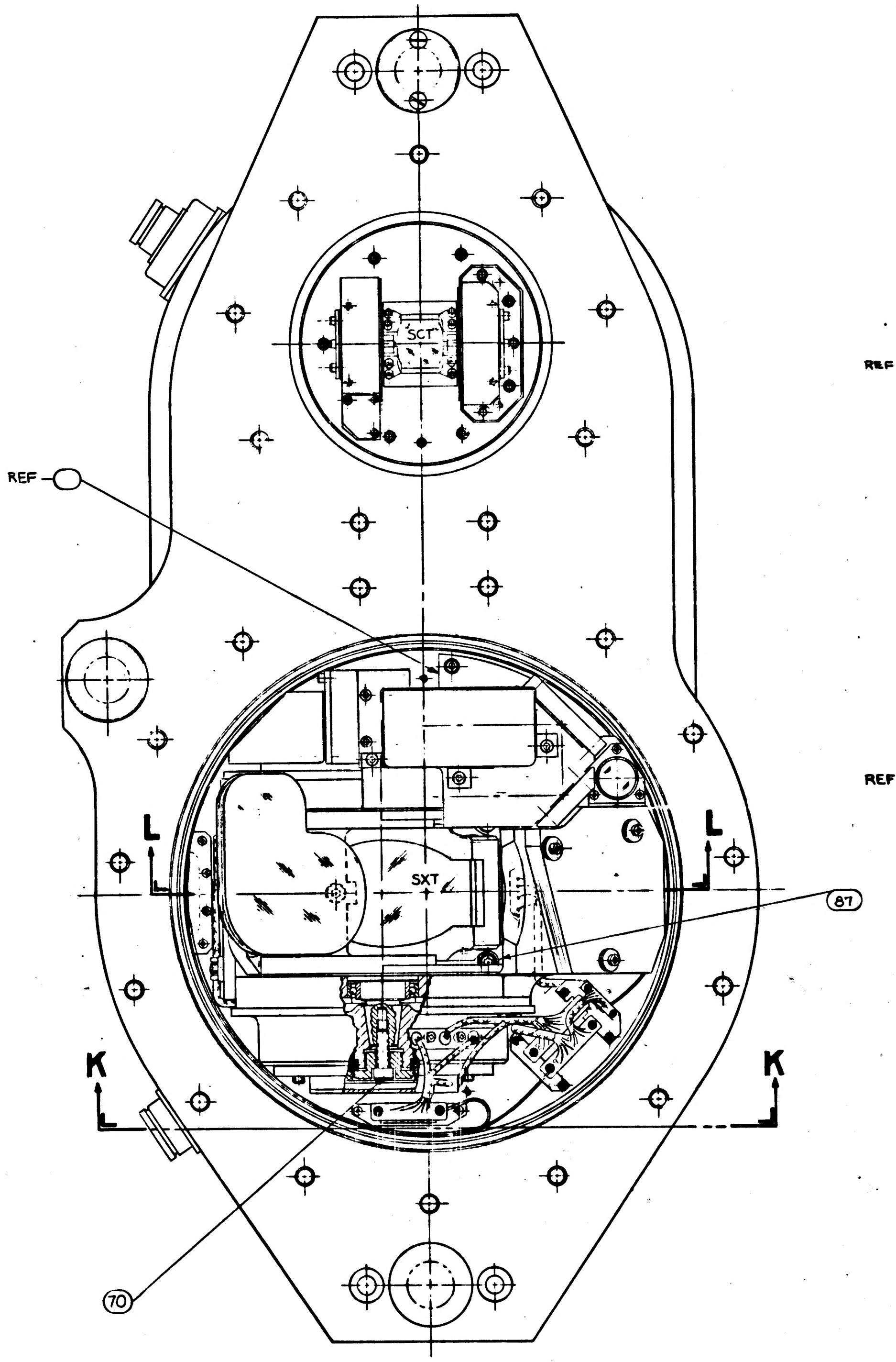
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

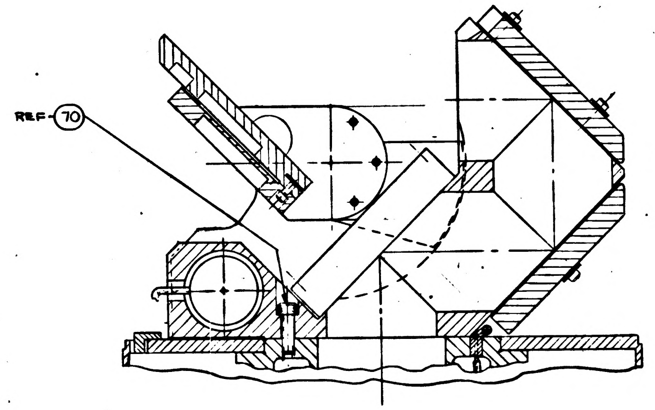
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 4

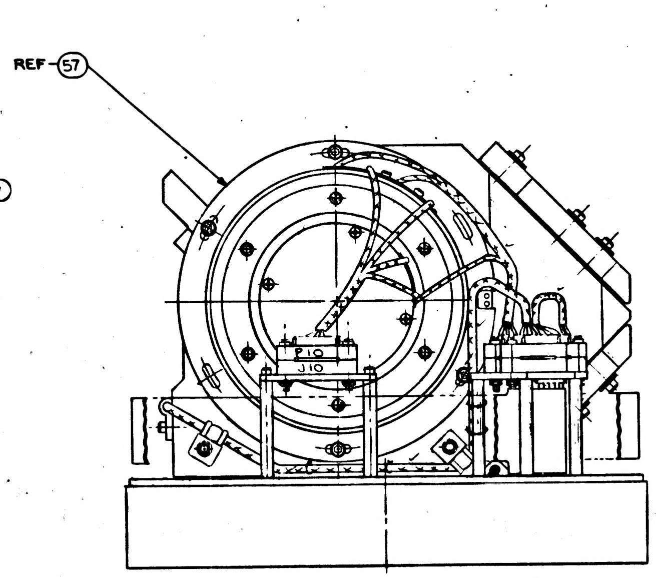
2011890 A

REVISIONS				12217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5350	6/65	wk





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	
2011000	2011000	APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. Benedetti 8/27/64
APPROVAL 8/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL 7/9/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.	SIZE	NASA NUMBER
	E	2011890

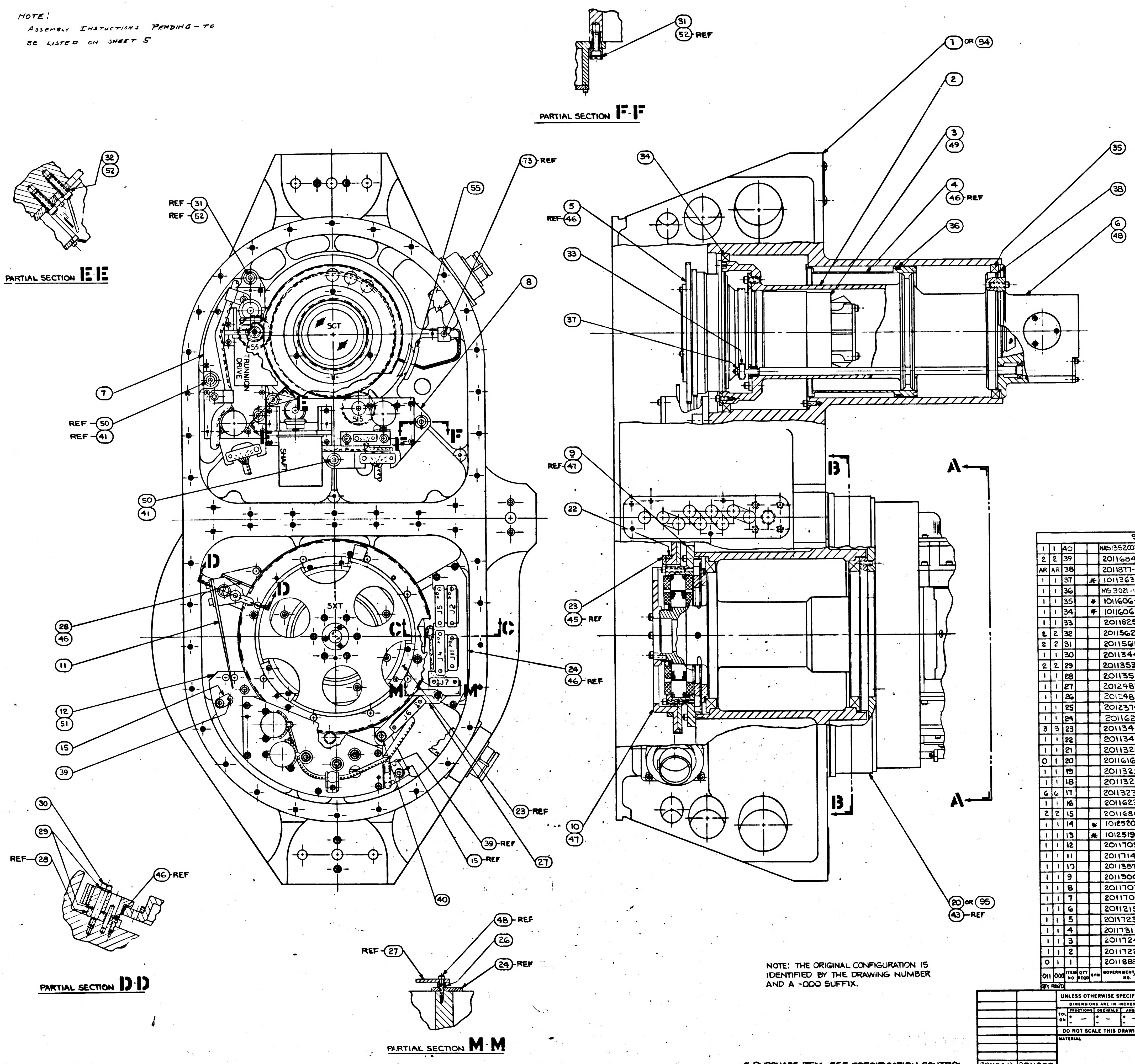
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 4 OF 4

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO BE LISTED ON SHEET 5

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	
B		REVISED PER TDRR NO. 19852	9/8/65	

REVISIONS 12217

2011890 B


PARTIAL SECTION F-F
31
52 REF
PARTIAL SECTION E-E
32
52
REF 31
REF 52
73 REF
55
8
SCT
TRUNNION DRIVE
S5
SHAFT
7
REF 50
REF 41
50
41
F
D
SXT
C
M
J5
J2
J4
J11
J7
J6
28
46
11
12
51
15
39
24
46 REF
23 REF
39 REF
15 REF
27
40
PARTIAL SECTION D-D
30
29
REF 28
46 REF
PARTIAL SECTION M-M
48 REF
26
REF 27
24 REF
1 OR 94
2
3
49
4
46 REF
35
38
6
48
34
5
REF 46
36
33
37
9
REF 47
22
23
45 REF
10
47
B
A
20 OR 95
43 REF

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

SEE SHEET 2 FOR ITEMS 41 THRU 55

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS1352C08LL10	74455157028		SCREW, CAP, HEX. SOC. HD. SELF LOCKING			
2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO 12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1011363-1	74443127001		NUT, HEX, (SELF-LOCKING)			
1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2011623	52386910170		PLATE, FLEXPRINT GUIDE			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2011387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS + - — DECIMALS + - — ANGLES + - —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13-64
CHECKED 8/12/69
APPROVAL 8/27/69
APPROVAL E. Throup 8/31/69
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

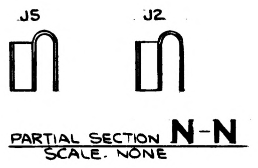
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 4

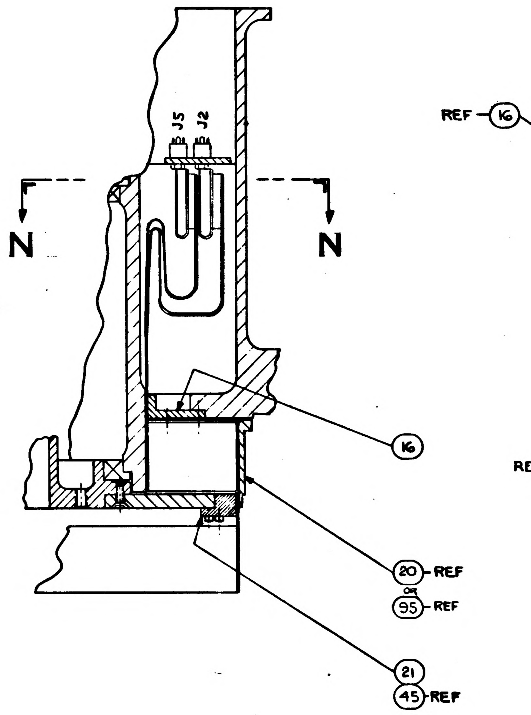
2011890 B

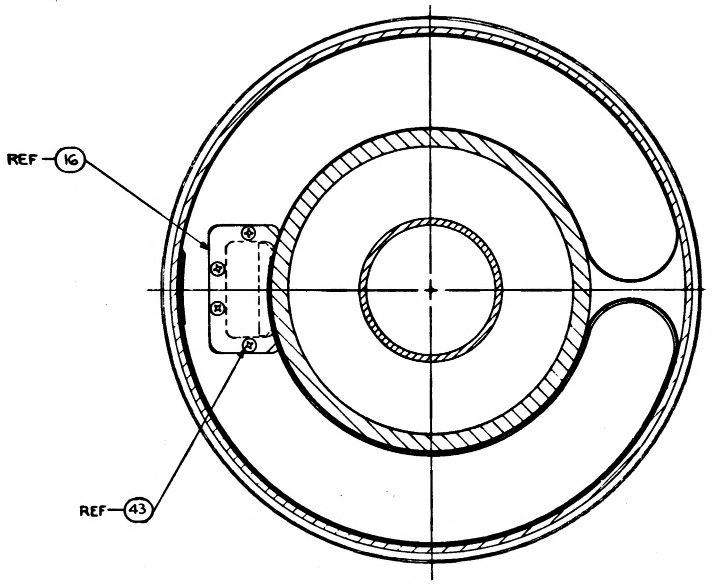
B	0681102

REVISIONS				12217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK
B		REVISED PER TDRR NO. 19852	4/5/65	WK

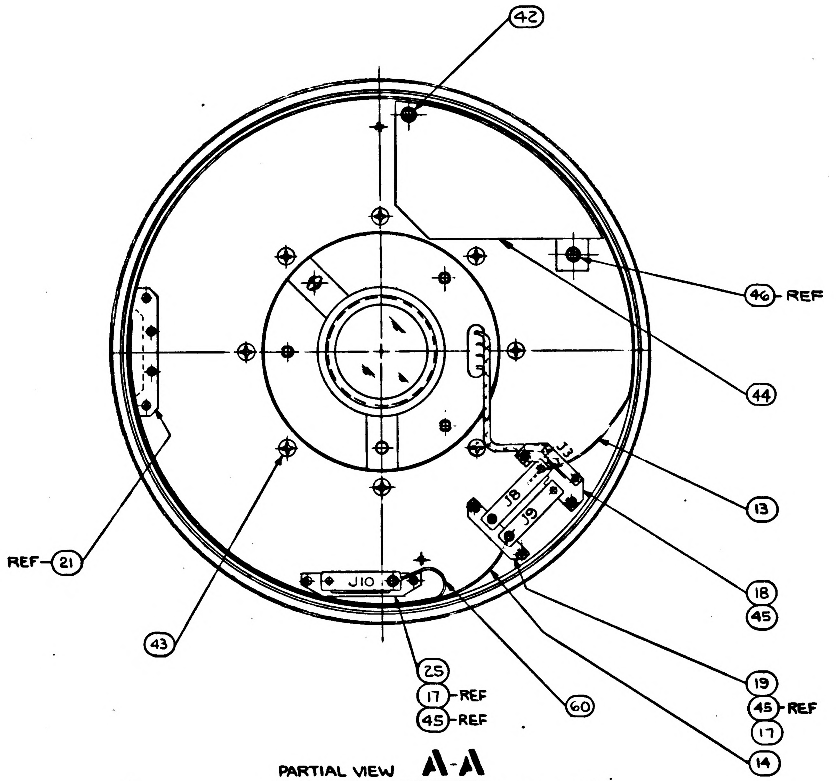


PARTIAL SECTION **N-N**
SCALE: NONE





PARTIAL SECTION **B-B**



PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)

PARTIAL SECTION **C-C**

SEE SHEET 3 FOR ITEMS 56 THRU 87											
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
4	4	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD, SELF LOCKING			
3	3	51		NAS	1352C08LL8	74455157027					
2	2	50		NAS	1352C08LL6	74455157026					
4	4	49		NAS	1352C06LL4	74455157018					
8	8	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
15	15	46		NAS	1352C04LL4	74455157013					
16	16	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
1	1	44			2007008			POWER SUPPLY (TRACKER & PHOTOMETER)			
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC. HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			
011	000	ITEM NO	QTY REQ'D	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
QTY REQ'D		LIST OF PARTS AND MATERIALS									

2011890 B

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13-64
CHECKED C. [illegible] 8-12-64
APPROVAL [illegible] 8/3/64
APPROVAL E. Mowry 8/31/64
NASA APPROVAL
MIT APPROVAL [illegible] 10/64

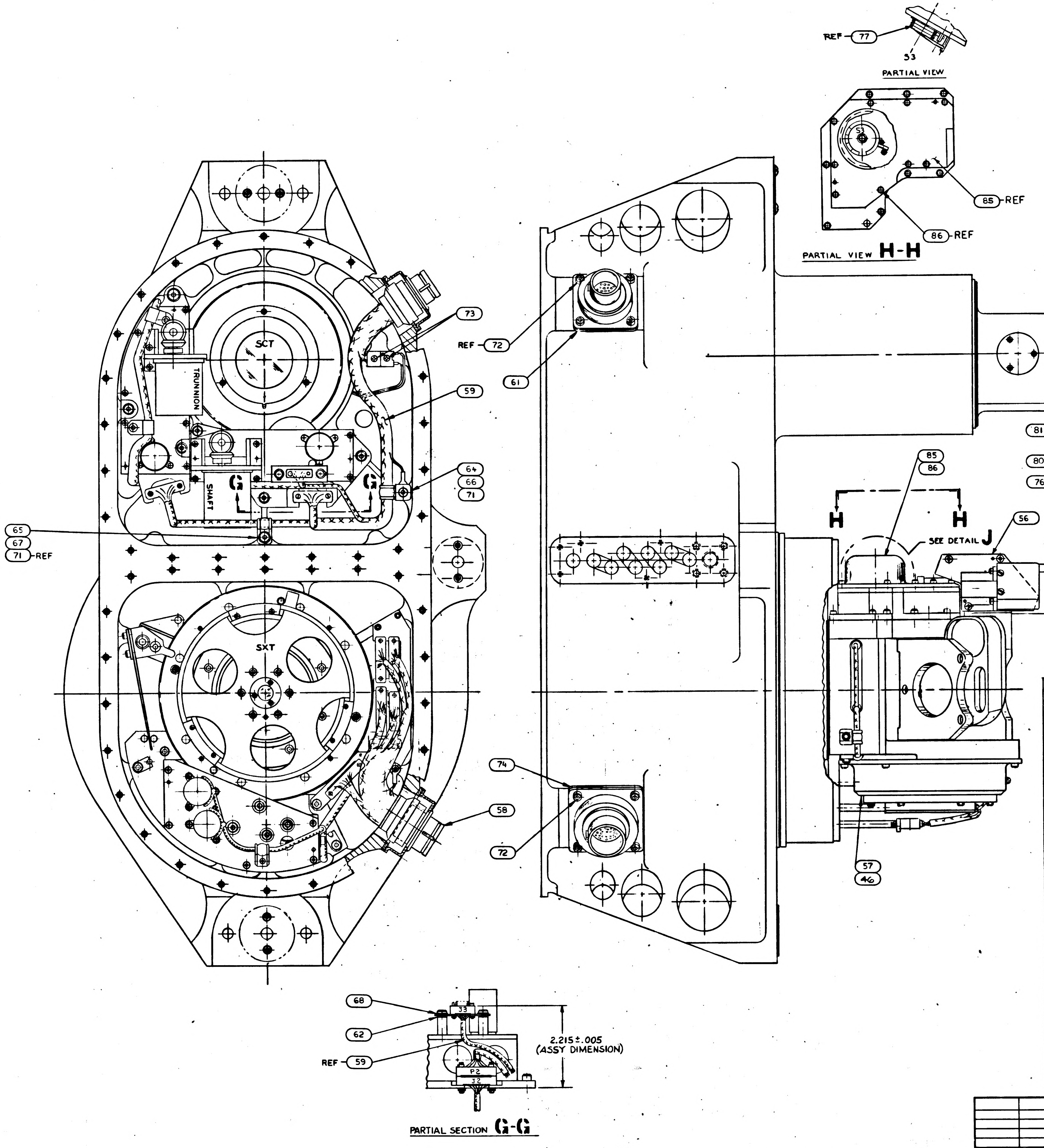
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

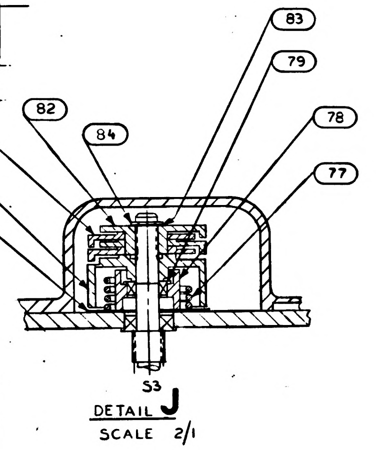
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2011890
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 2 OF 4

B 2011890

SYM	ZONE	REVISIONS 2217 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRB NO. 5330	1/6/65	WR
B		REVISED PER TDRR NO.19852	9/65	WK





011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
								SEE SHEET 4 FOR ITEMS 88 AND UP			
2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
9	9	86			1011625-20	74455151020		SCREW, CAP, SOC HD SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1015	74453018002		RING, RETAINING			
AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING. BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			NAS1352C06LL5	74455157018		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
		69									
2	2	68			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6&5	—		CLAMP, CABLE			
1	1	64		*	1000220-8&6	—		CLAMP, CABLE			
		63									
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57			2011909	85386910730		RESOLVER AND CONNECTOR ASSY OF			
1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			
QTY REQD								LIST OF PARTS AND MATERIALS			

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R. BRUNFUS DATE 8-7-64
CHECKED C. Langstaff 8-7-64
APPROVAL [illegible] 8/7/64
APPROVAL E. Thorup 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

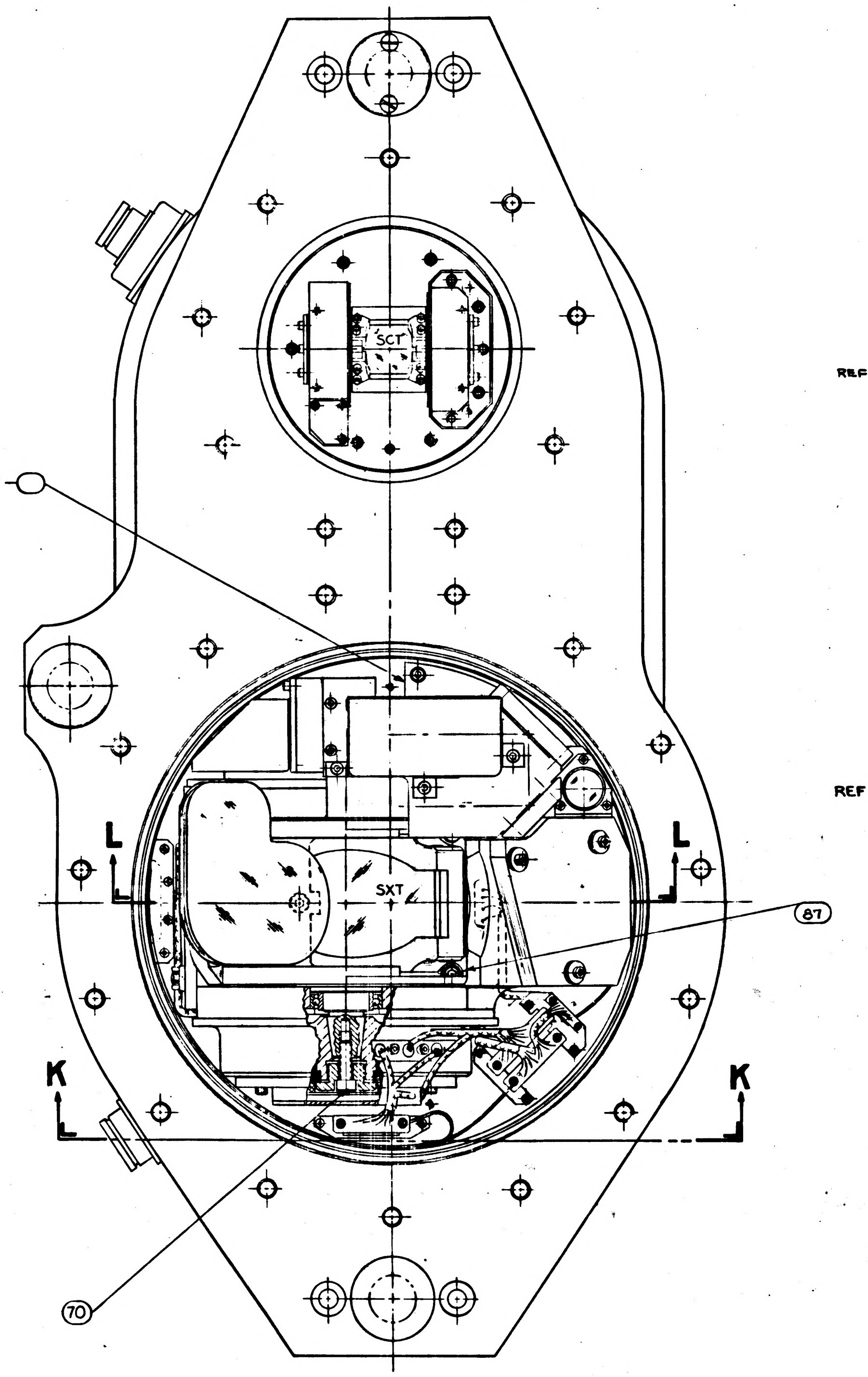
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

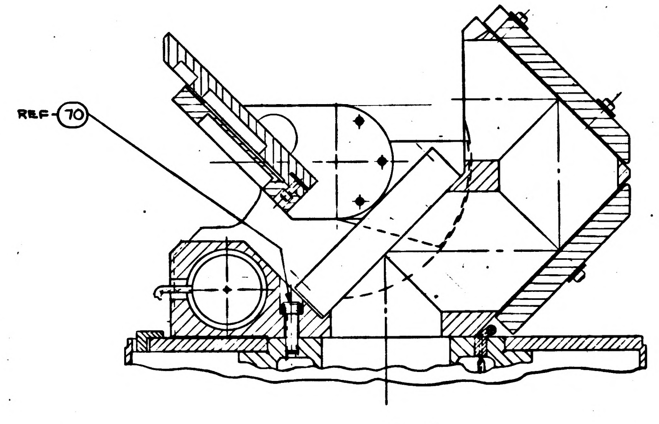
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 3 OF 4

2011890 B

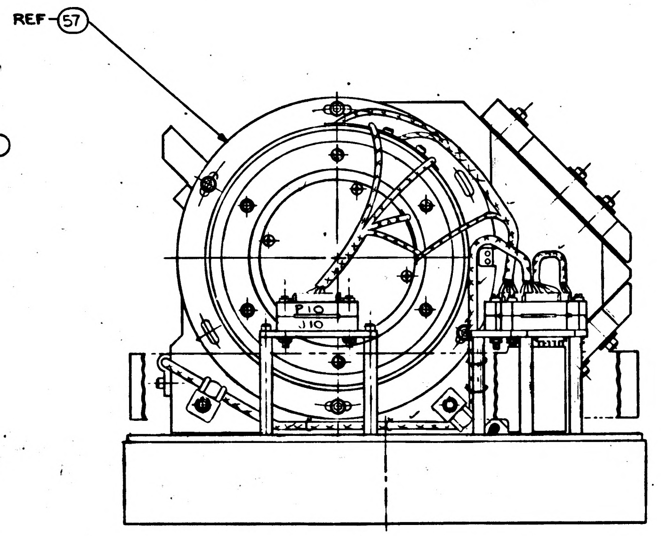
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5350	1/6/65	WK
B		REVISED PER TDRR 19852		WK

REVISIONS 12217





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
		93									
		92									
		91									
		90									
		89									
		88									

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. [illegible] DATE 8-7-64
CHECKED C. [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL E. Morris 8/31/64
NASA APPROVAL
MIT APPROVAL W. [illegible] 1964

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

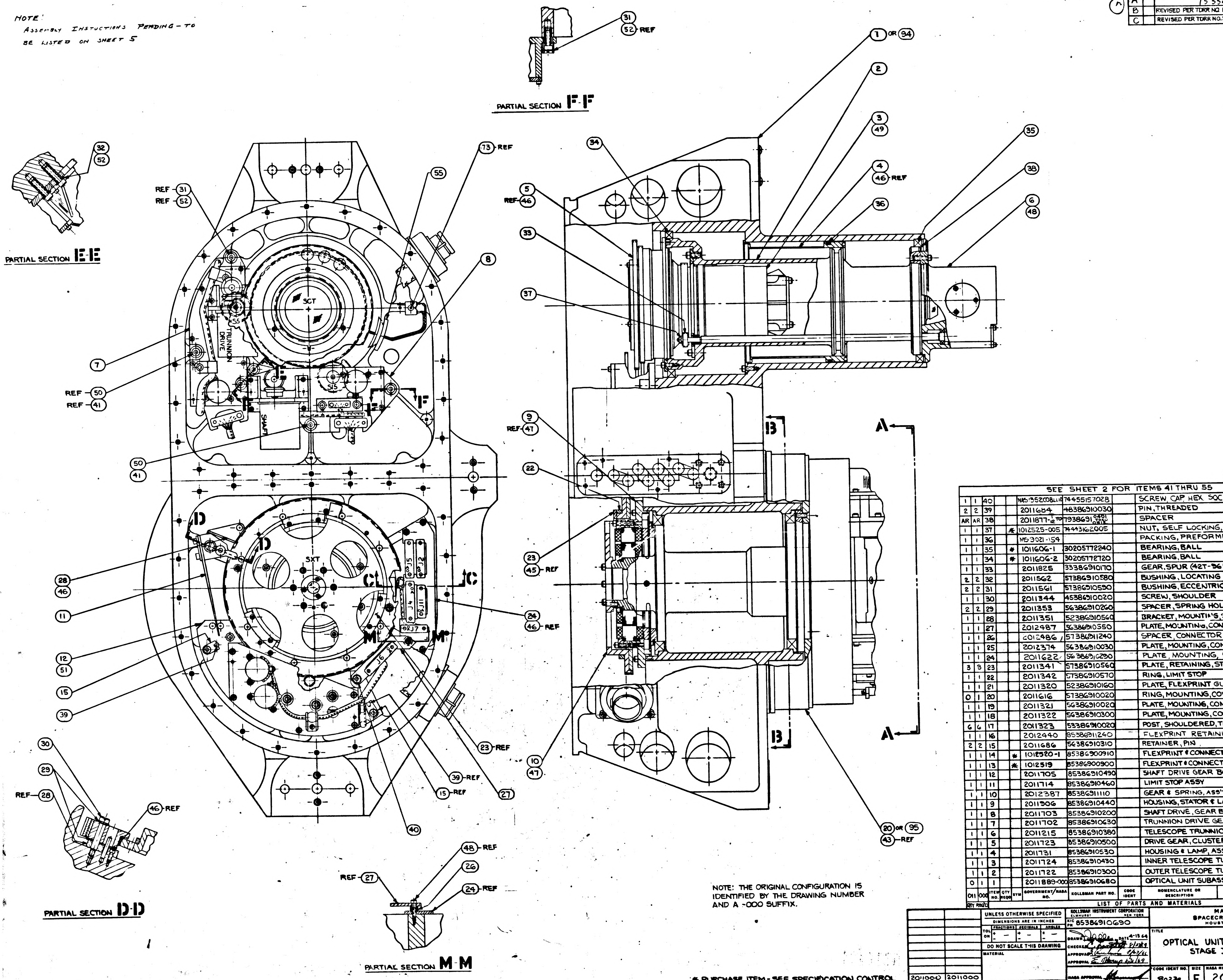
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 4

2011890 B

2011890 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15352	4/6/65	
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO BE LISTED ON SHEET 5



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

SEE SHEET 2 FOR ITEMS 41 THRU 55

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS1352C08LL10	74455157028		SCREW, CAP, HEX. SOC HD. SELF LOCKING			
2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO -12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT., ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011306	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13-64
CHECKED 8/1/69
APPROVAL 8/27/66
APPROVAL E. [illegible] 8/2/69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY STAGE II

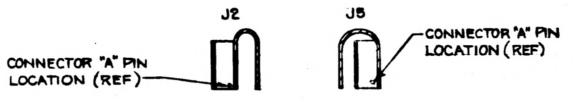
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 4

2011890 C

2011890 C

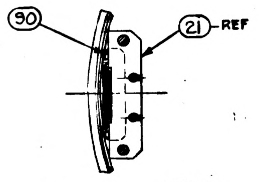
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK
B		REVISED PER TDRR NO. 19852	1965	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK

REVISIONS 12217

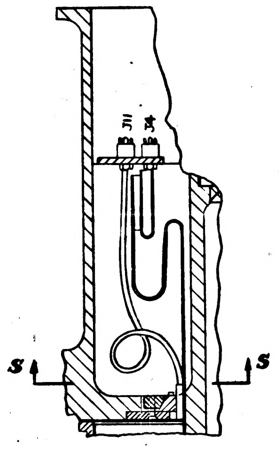


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

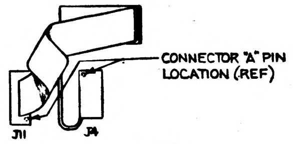
PARTIAL SECTION N-N
SCALE: NONE



PARTIAL SECTION P-P

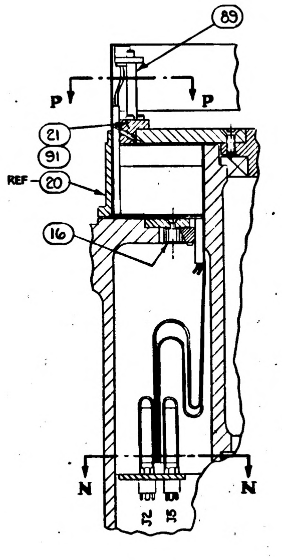


PARTIAL SECTION R-R



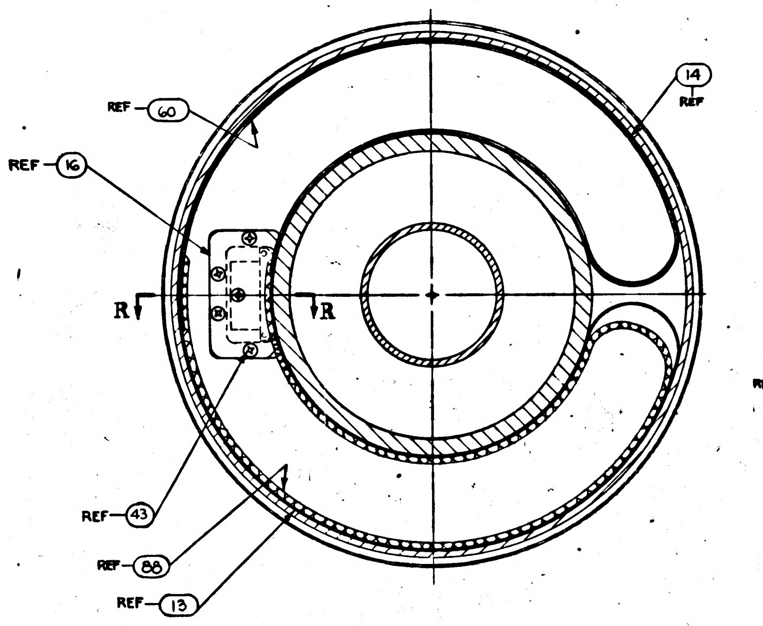
CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION S-S



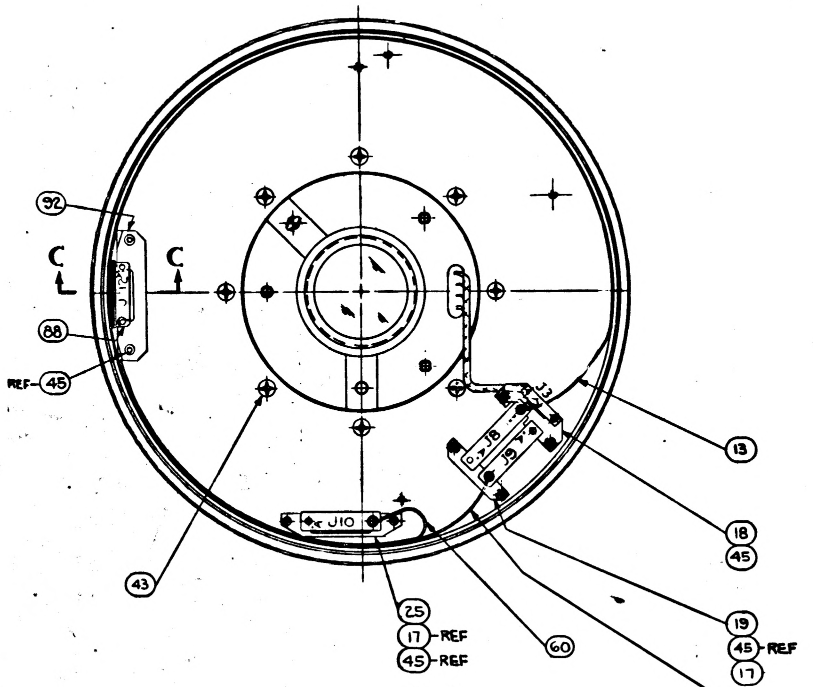
89
P
P
21
91
REF-20
16
N
N
J2
J5

PARTIAL SECTION C-C



REF-60
REF-16
14 REF
R
R
REF-43
REF-88
REF-13

PARTIAL SECTION B-B



92
C
C
J12
88
REF-45
J3
J8
J9
J10
13
18
45
19
45-REF
17
14
60
25
17-REF
45-REF
43

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
4	4	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
3	3	51		NAS	1352C08LL8	74455157027					
2	2	50		NAS	1352C08LL6	74455157026					
4	4	49		NAS	1352C06LL4	74455157018					
8	8	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
15	15	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			

QTY REQ'D
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED C. [illegible]
APPROVAL [illegible]
APPROVAL E. [illegible] 3/31/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

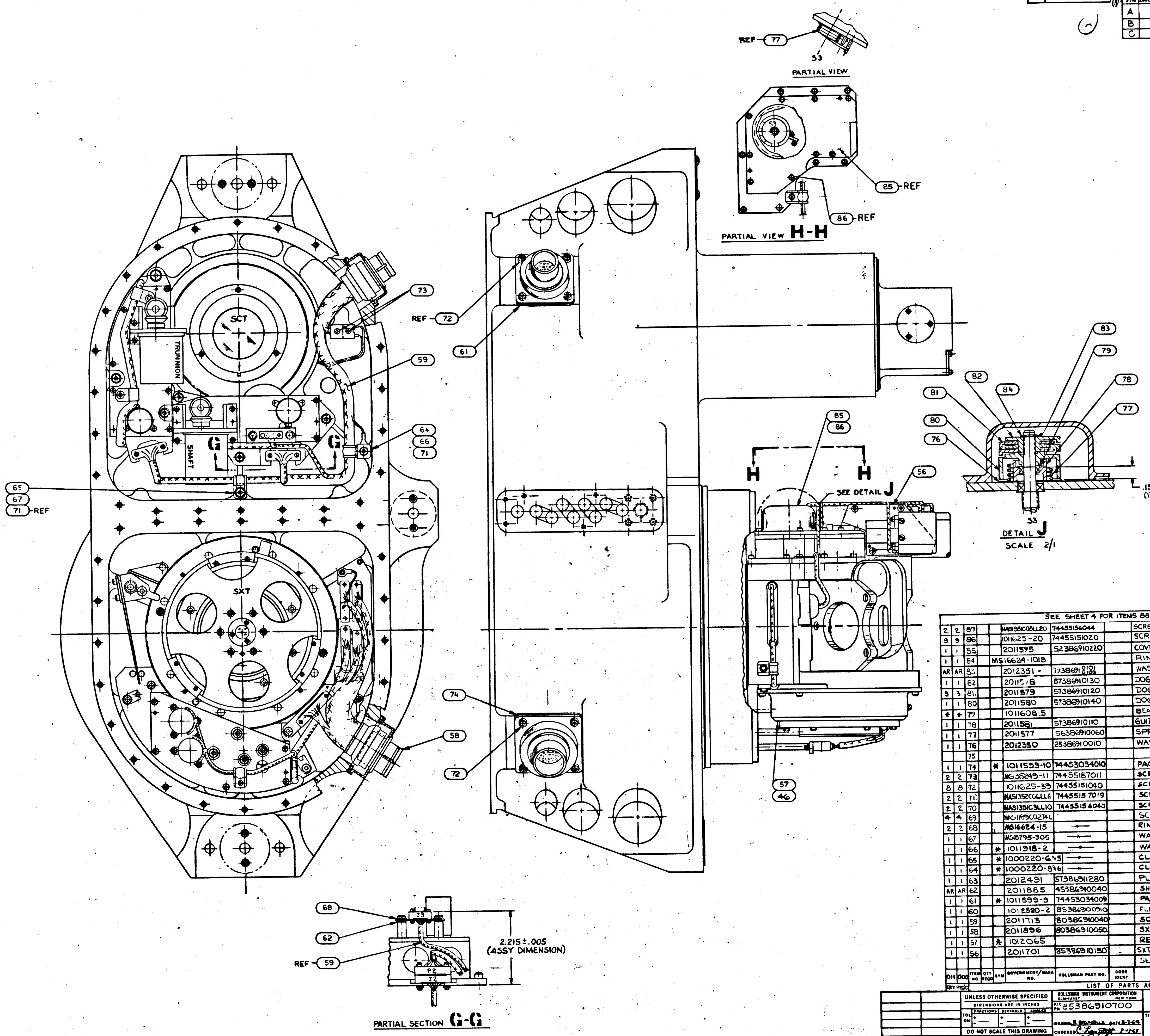
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 4

2011890 C

2011890 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5390	1/4/65	WR
B		REVISED PER TDRR NO. 19852	9/5/65	WR
C		REVISED PER TDRR NO. 20177	11/4/65	WR

REVISIONS 12217



QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
								SEE SHEET 4 FOR ITEMS 88 AND UP			
2	2	87			NAS1351C05LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
9	9	86			1011625-20	74455151020		SCREW, CAP, SOC. HD SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351 -	7738691 0101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	68			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6&5	—		CLAMP, CABLE			
1	1	64		*	1000220-8&6	—		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. Lanstaff 8-17-64
APPROVAL
APPROVAL E. Morey 8/21/64
NASA APPROVAL
MIT APPROVAL

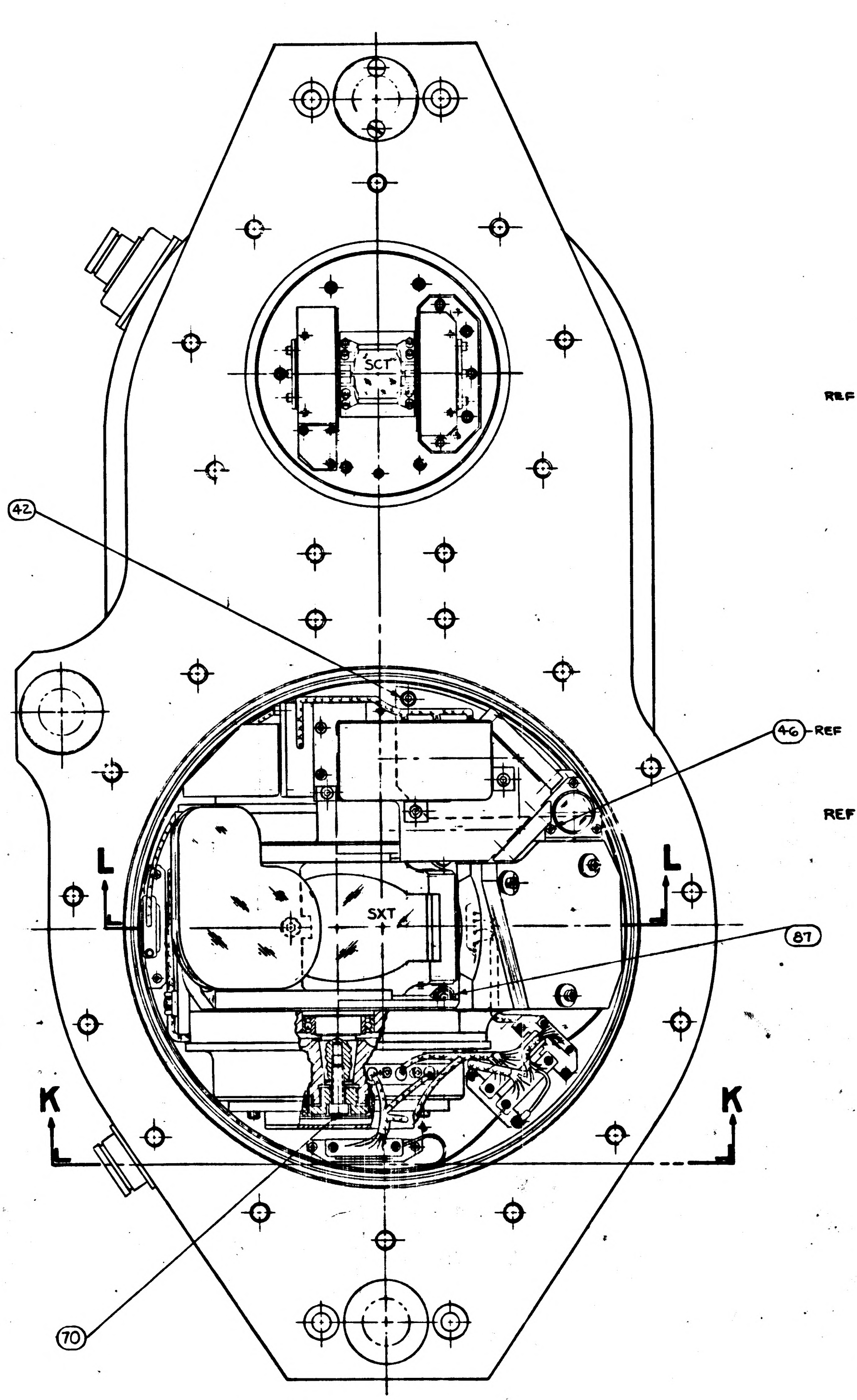
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

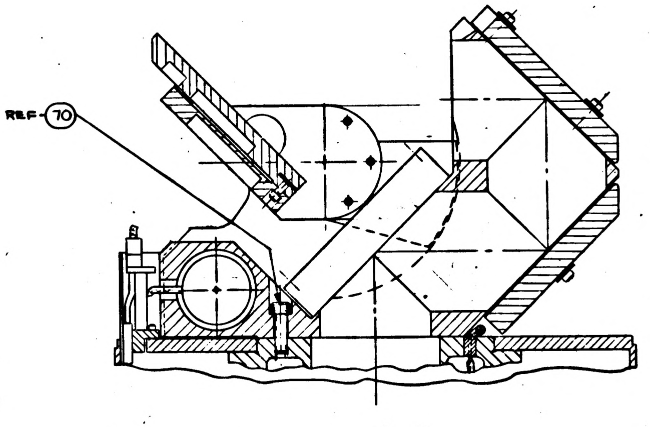
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 4

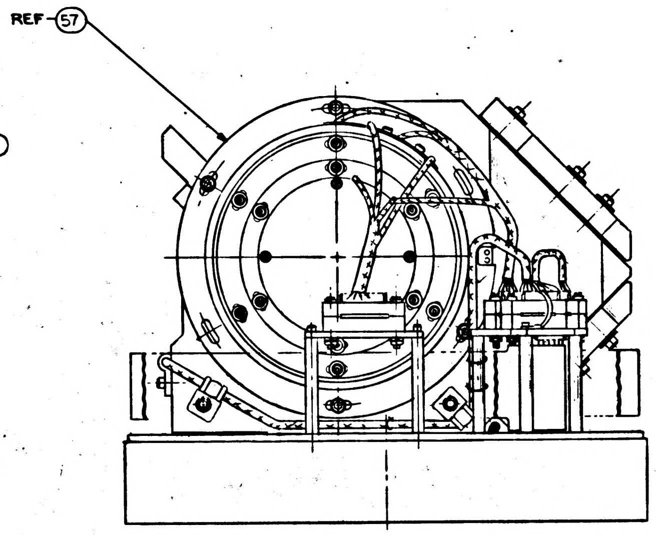
2011890 C

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15352	1/6/65	WK
B		REVISED PER TDRR 19852	4/5/65	WK
C		REVISED PER TDRR 20177	[illegible]	WK





PARTIAL SECTION L-L



PARTIAL VIEW K-K

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
		93									
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90		NAS1081C02A4L				SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
QTY REQ'D											

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 4

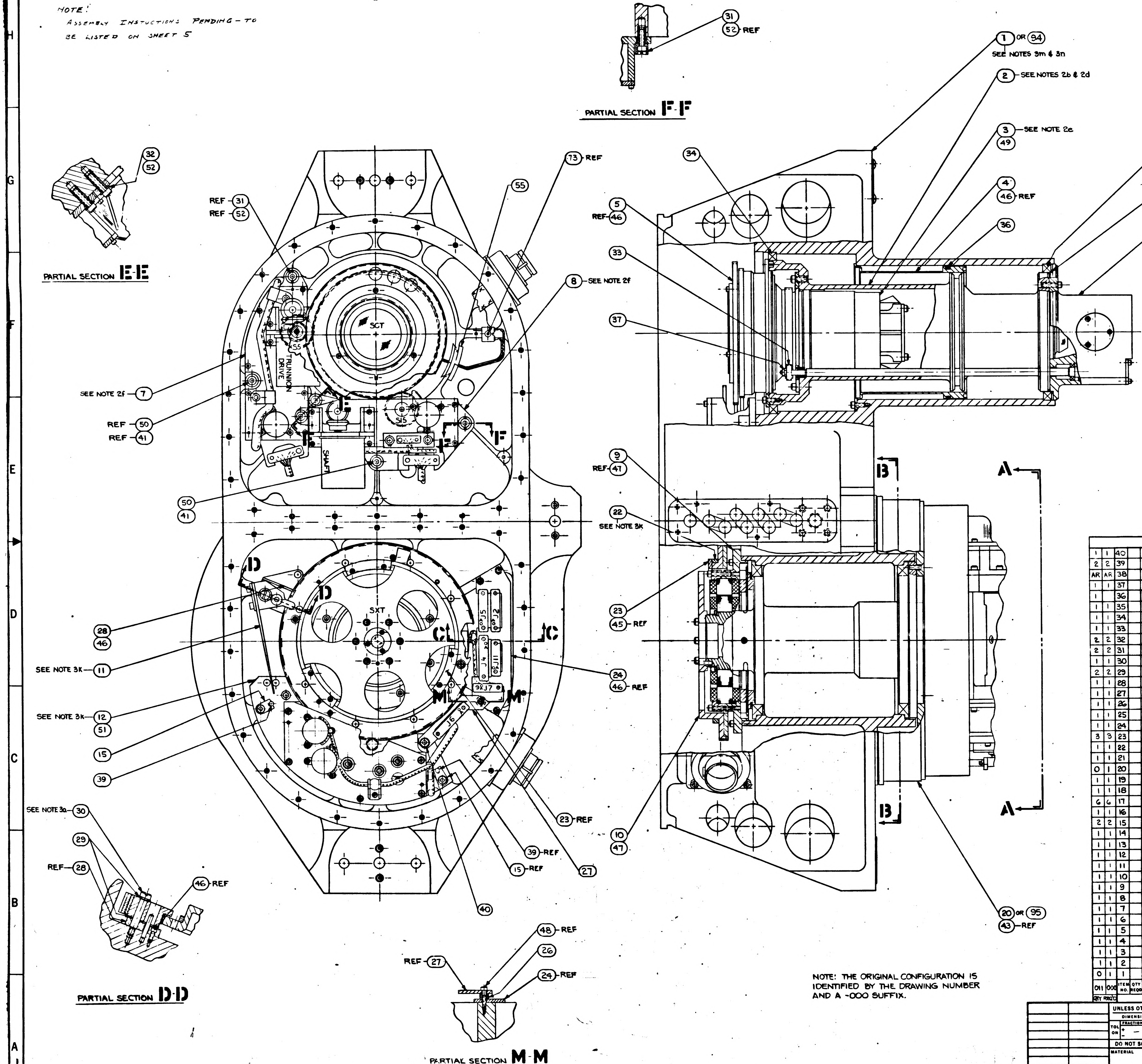
2011890 C

D 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		

REVISIONS 12217

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO BE LISTED ON SHEET 5


PARTIAL SECTION F-F
31
52 REF
PARTIAL SECTION E-E
32
52
REF 31
REF 52
55
73 REF
8 SEE NOTE 2f
SCT
TRUNNION DRIVE
SHAFT
S5
S15
SEE NOTE 2f 7
REF 50
REF 41
50
41
D
SXT
C
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
28
46
24
46 REF
M
23 REF
39 REF
15 REF
27
40
SEE NOTE 3a 30
29
REF 28
46 REF
PARTIAL SECTION D-D
REF 27
48 REF
26
24 REF
PARTIAL SECTION M-M
1 OR 94
SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
4
46 REF
35
38 SEE NOTE 2a
6
48
34
5
REF 46
36
33
37
9
REF 47
22
SEE NOTE 3K
23
45 REF
10
47
20 OR 95
43 REF
A
B

SEE SHEET 2 FOR ITEMS 41 THRU 55

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS1352C08LL10	74455157028		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO -12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1		36			MS3021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED 8/27/69
APPROVAL 8/27/66
APPROVAL E. Murray 8/31/69
NASA APPROVAL
MIT APPROVAL

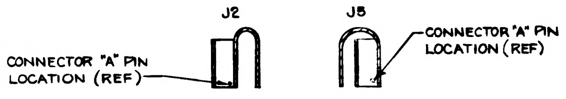
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

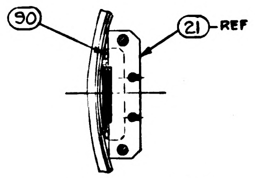
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 5

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350		
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		

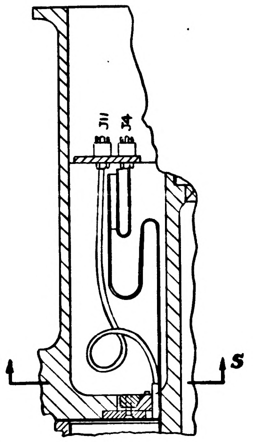
REVISIONS 12217


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

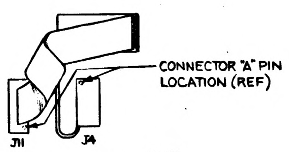
PARTIAL SECTION **N-N**
SCALE: NONE



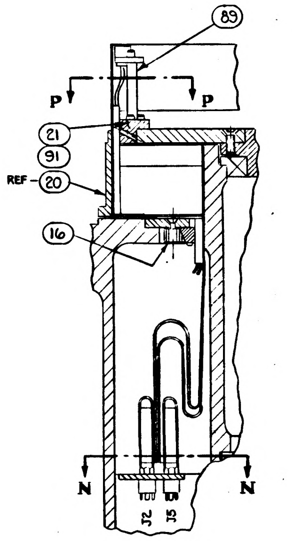
PARTIAL SECTION **P-P**



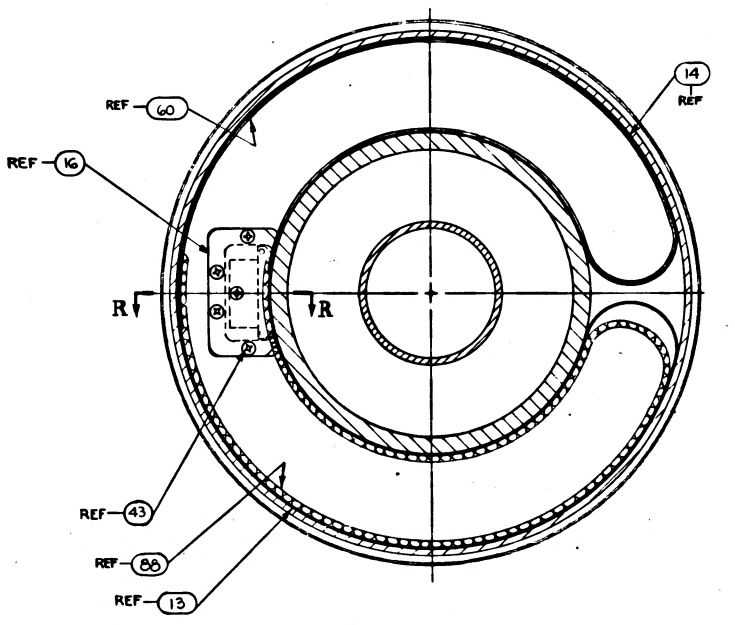
PARTIAL SECTION **R-R**


CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION **S-S**


89
P
P
21
91
REF - 20
16
N
N
J2
J5

PARTIAL SECTION **C-C**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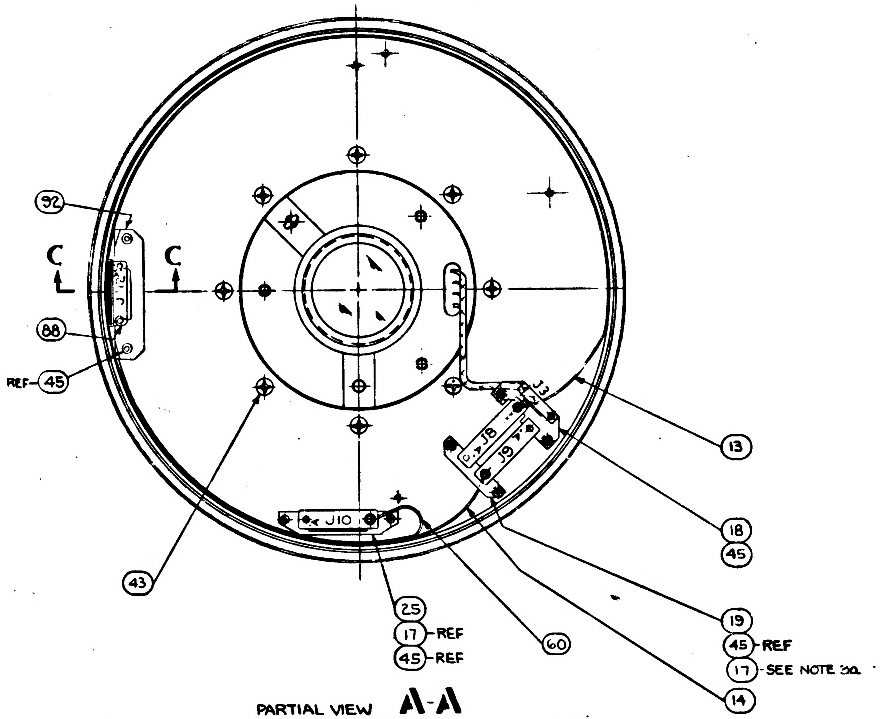
REF - 16
14 REF
R
R
REF - 43
REF - 88
REF - 13

PARTIAL SECTION **B-B**


92
C
C
88
REF - 45
J3
18
19
J10
13
18
45
43
25
17 - REF
45 - REF
60
19
45 - REF
17 - SEE NOTE 3a.
14

PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
4	4	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
3	3	51		NAS	1352C08LL8	74455157027					
2	2	50		NAS	1352C08LL6	74455157026					
4	.	49		NAS	1352C06LL4	74455157018					
8	8	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
15	15	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-13			SCREW, FLAT HD SELF LOCKING SOC. HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

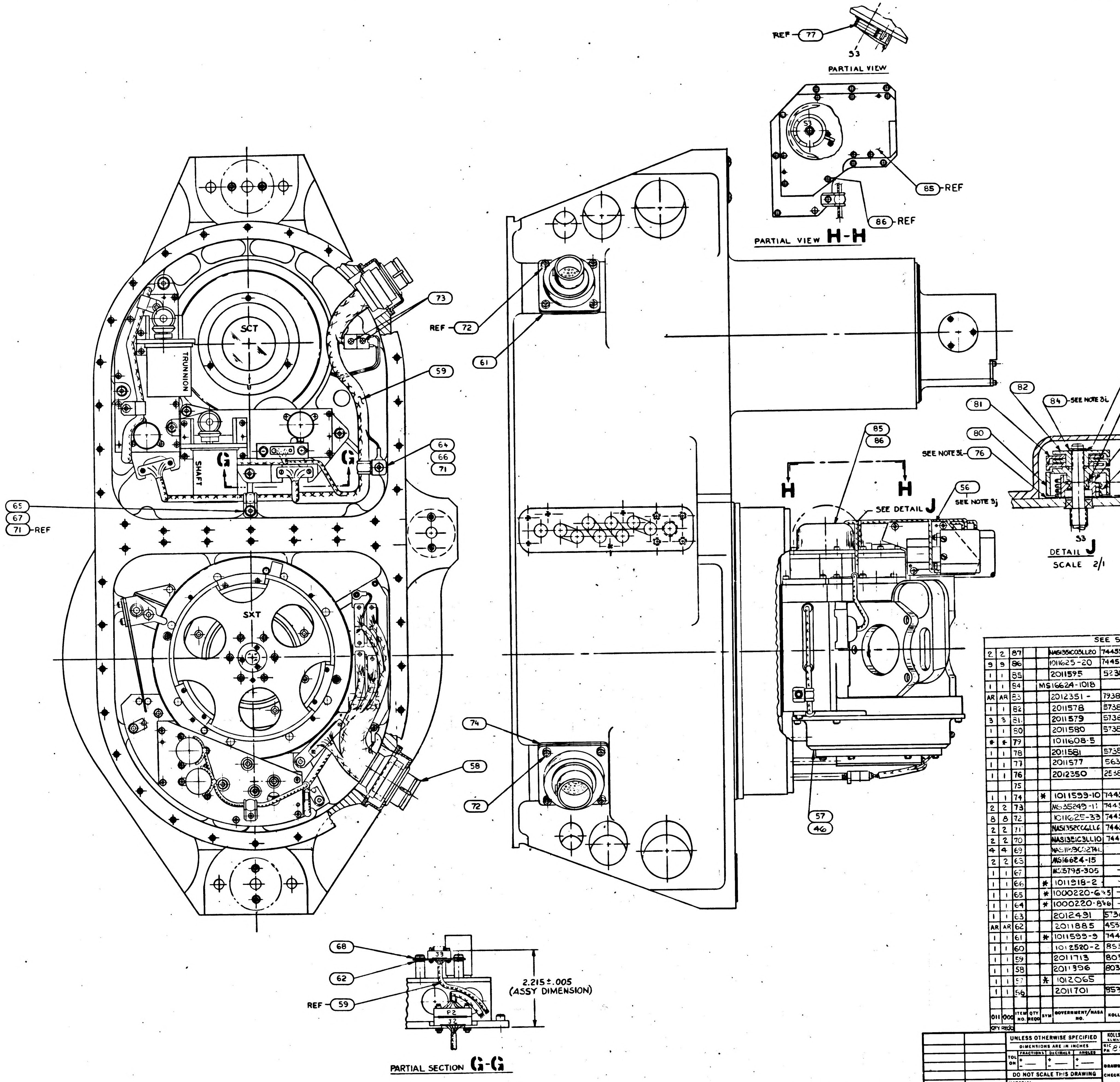
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

2011890 D

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 12217		
A		REVISED PER TDRR NO. 15350	4/65	WR
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		


REF 77
53
PARTIAL VIEW
85 REF
86 REF
PARTIAL VIEW H-H
73
REF 72
61
59
TRUNNION
SCT
SHAFT
G
G
64
66
71
65
67
71 REF
SXT
74
58
72
83
79
82
84 SEE NOTE 3L
78
81
77
80
SEE NOTE 3L 76
H
H
85
86
SEE DETAIL J
56
SEE NOTE 3j
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
57
46
68
62
REF 59
33
2.215±.005 (ASSY DIMENSION)
P2
J2
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 4 FOR ITEMS 88 AND UP

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	87			NAS1351C05LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
9	9	86			1011625-20	74455151020		SCREW, CAP, SOC HD SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-33	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	63			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-645	—		CLAMP, CABLE			
1	1	64		*	1000220-846	—		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011396	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	85386910150	—	SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 2-7-64
CHECKED C. Langstaff 2-7-64
APPROVAL
APPROVAL E. Morey 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

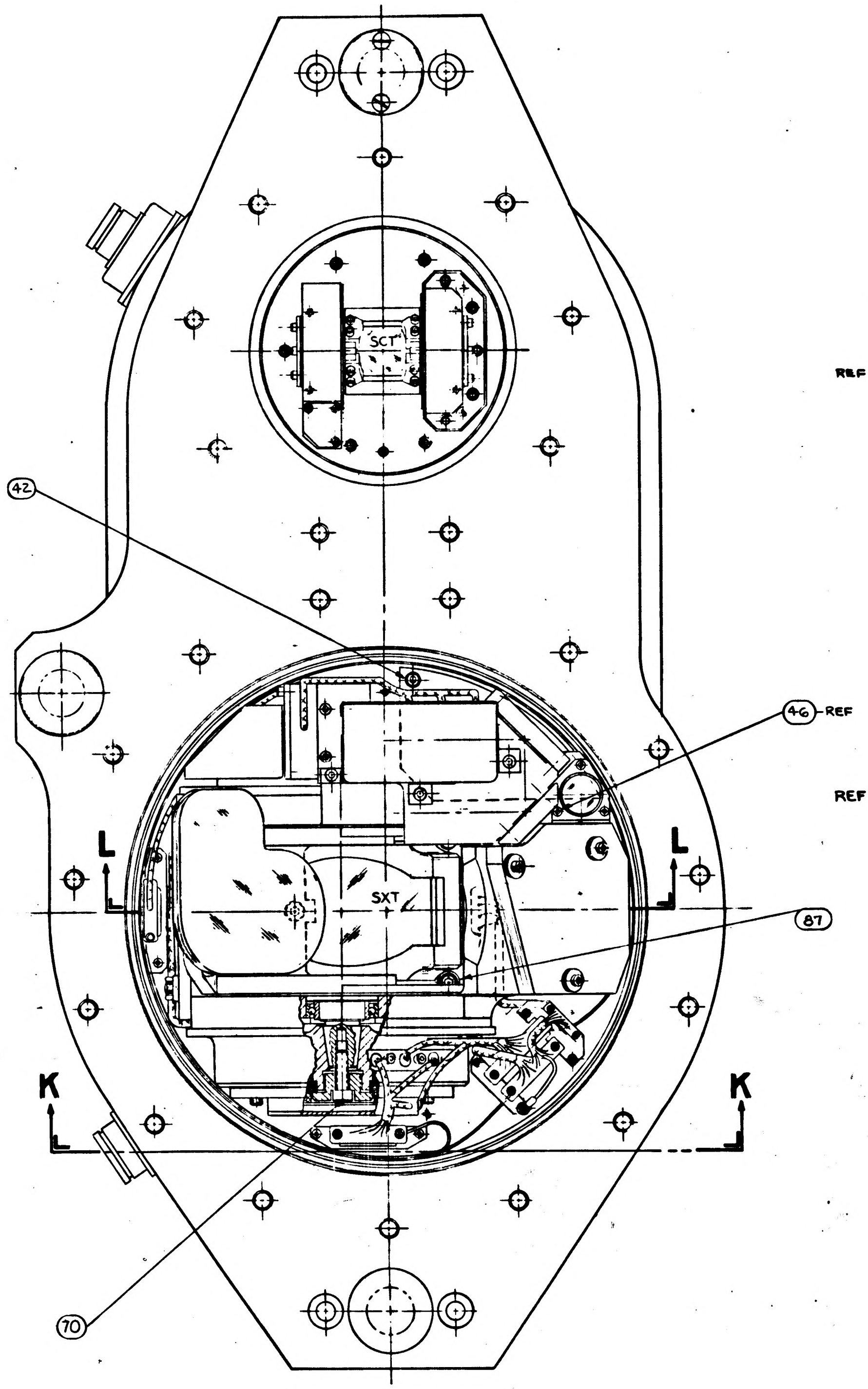
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 3 OF 5

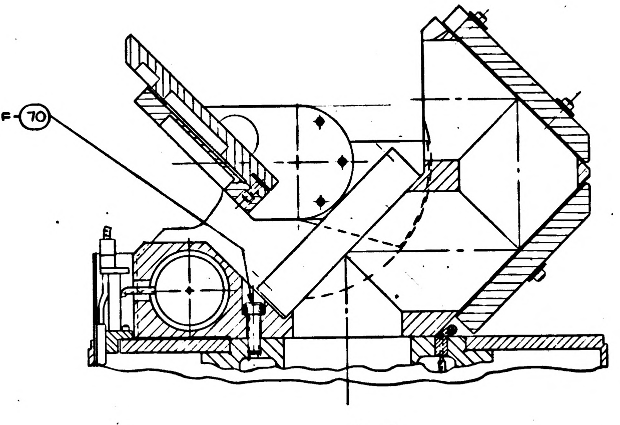
2011890 D

D 2011890

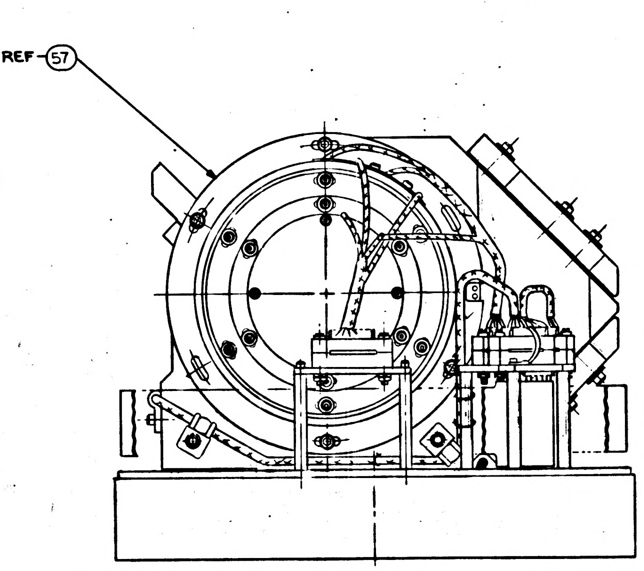
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5350	6/65	wk
B		REVISED PER TDRR 19852	5/65	wk
C		REVISED PER TDRR 20177	3/65	wk
D		REVISED PER TDRR 20200	5/65	wk

REVISIONS 12217





PARTIAL SECTION L-L



PARTIAL VIEW K-K

2011890 D

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	95			2012621	57386911650		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
		93									
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
QTY REQ'D											

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/?/64
NASA APPROVAL
MIT APPROVAL W. [illegible] 10/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 00230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

2011890 D

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	[illegible]	wl

NOTES:

1. GENERAL REQUIREMENTS

a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.

e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET.

3. SEXTANT (SXT) REQUIREMENTS

a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10.

l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

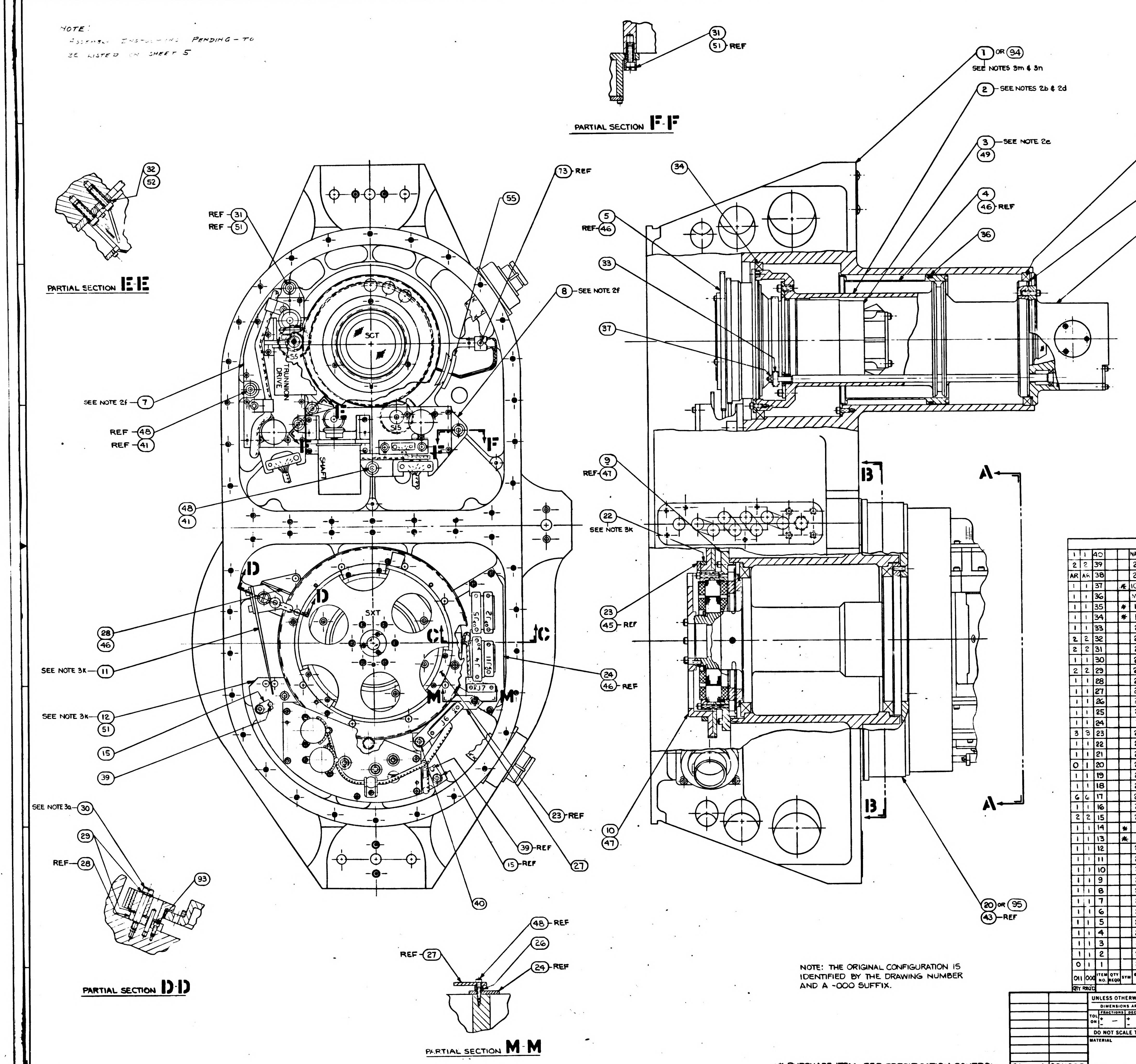
2011000	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± —; DECIMALS ± —; ANGLES ± — DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 85386910690	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL	DRAWN V. AMATO DATE 6-11-65 CHECKED F. Haymond 6-22-65 APPROVAL APPROVAL E. Thoma 7-2-65	TITLE OPTICAL UNIT SUBASSEMBLY STAGE II
APPLICATION		CONTRACT	NASA APPROVAL W J R 7-13-65 MIT APPROVAL W. Kupfer 12/65	CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011890 SCALE 1/1 WEIGHT CALC ACTUAL SHEET 5 OF 5

MASTER

E	2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15352	4/6/	WK
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		
E		REVISED PER TDRR 20351		

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO
BE LISTED ON SHEET 5


PARTIAL SECTION F-F
PARTIAL SECTION E-E
PARTIAL SECTION D-D
PARTIAL SECTION M-M
SGT
SXT
TRUNNION DRIVE
SHAFT
S5
S15
J4
J5
J6
J7
J12
A
B
C
D
E
F
M
REF
SEE NOTES 3m & 3n
SEE NOTES 2b & 2d
SEE NOTE 2e
SEE NOTE 2a
SEE NOTE 2f
SEE NOTE 3k
SEE NOTE 3a
1 OR 94
2
3
49
4
46 REF
5
REF 46
6
48
8
9
REF 47
10
47
7
11
12
51
15
15 REF
20 OR 95
43 REF
22
23
45 REF
23 REF
24
46 REF
26
24 REF
REF 27
27
28
46
REF 28
29
30
31
51 REF
REF 31
REF 51
32
52
33
34
35
36
37
38
39
39 REF
40
REF 48
REF 41
48
41
48 REF
55
73 REF
93

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

SEE SHEET 2 FOR ITEMS 41 THRU 55

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS 352C08LL10	74455157028		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	2	39			2011684	46386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO -12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13 64
CHECKED 8/27/69
APPROVAL 8/27/66
APPROVAL E. Thorup 8/21/69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

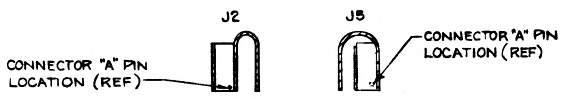
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

E 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK

REVISIONS 12217


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

PARTIAL SECTION **N-N**
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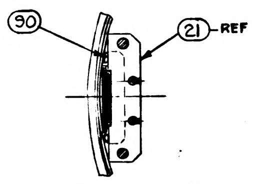
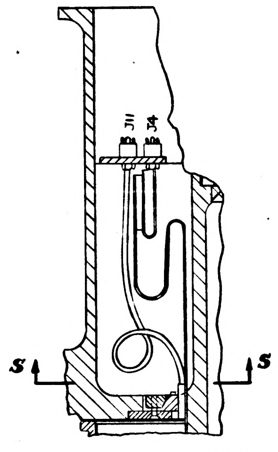
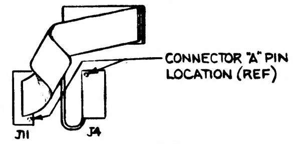


PARTIAL SECTION **P-P**



PARTIAL SECTION **R-R**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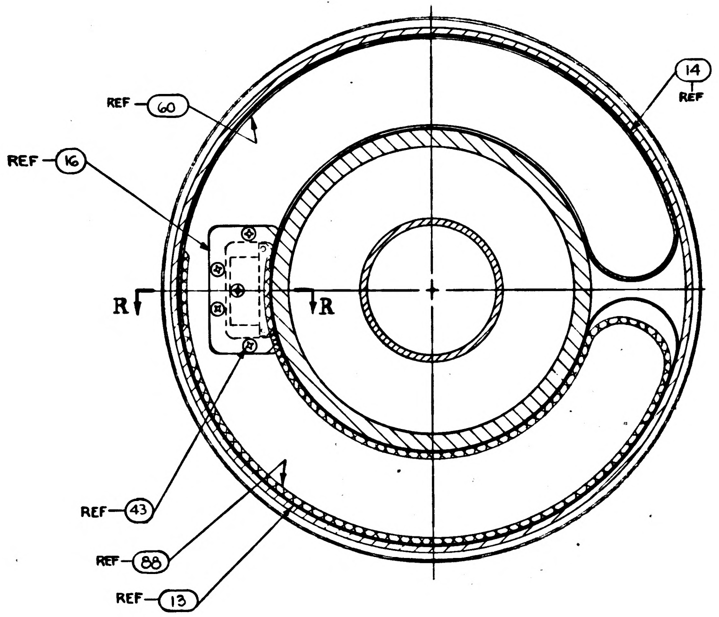
J11
J4

PARTIAL SECTION **S-S**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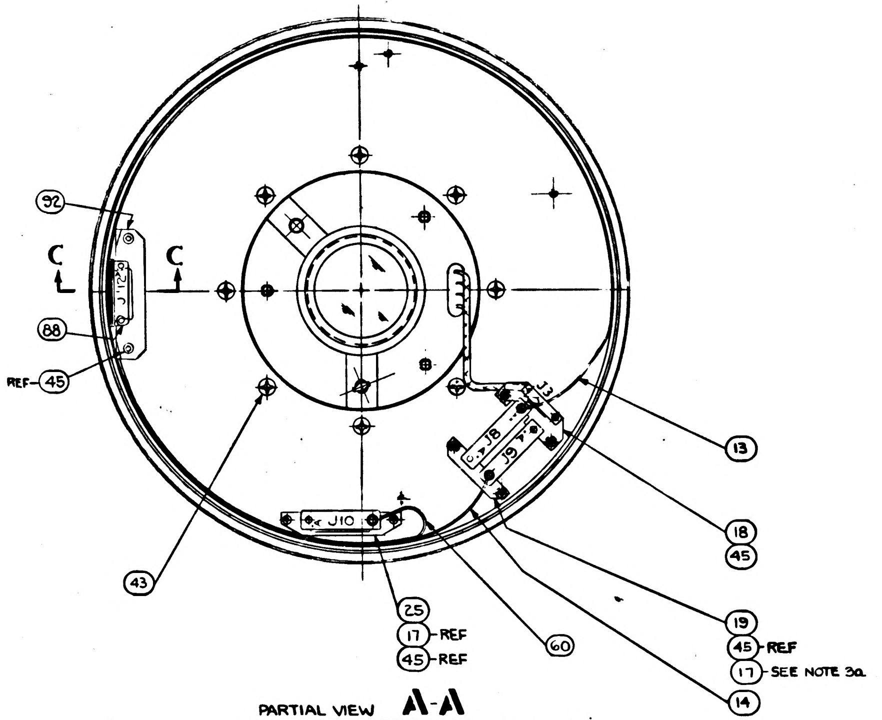
PARTIAL SECTION **B-B**


92
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J12
88
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J8
J9
18
45
43
J10
25
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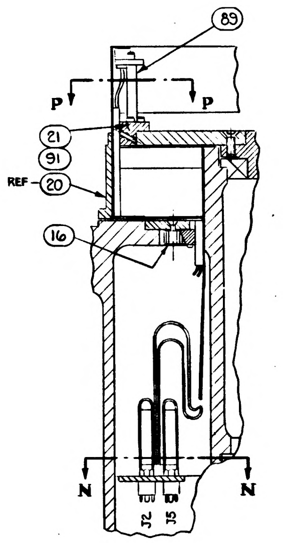
60
19
45 REF
17 SEE NOTE 3a.
14

PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)


89
P
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91
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N
N
J2
J5

PARTIAL SECTION **C-C**

SEE SHEET 3 FOR ITEMS 56 THRU 87

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
5	5	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
		50									
4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC HD, SELF LOCKING			
10	10	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
14	14	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. Thorup
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
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TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

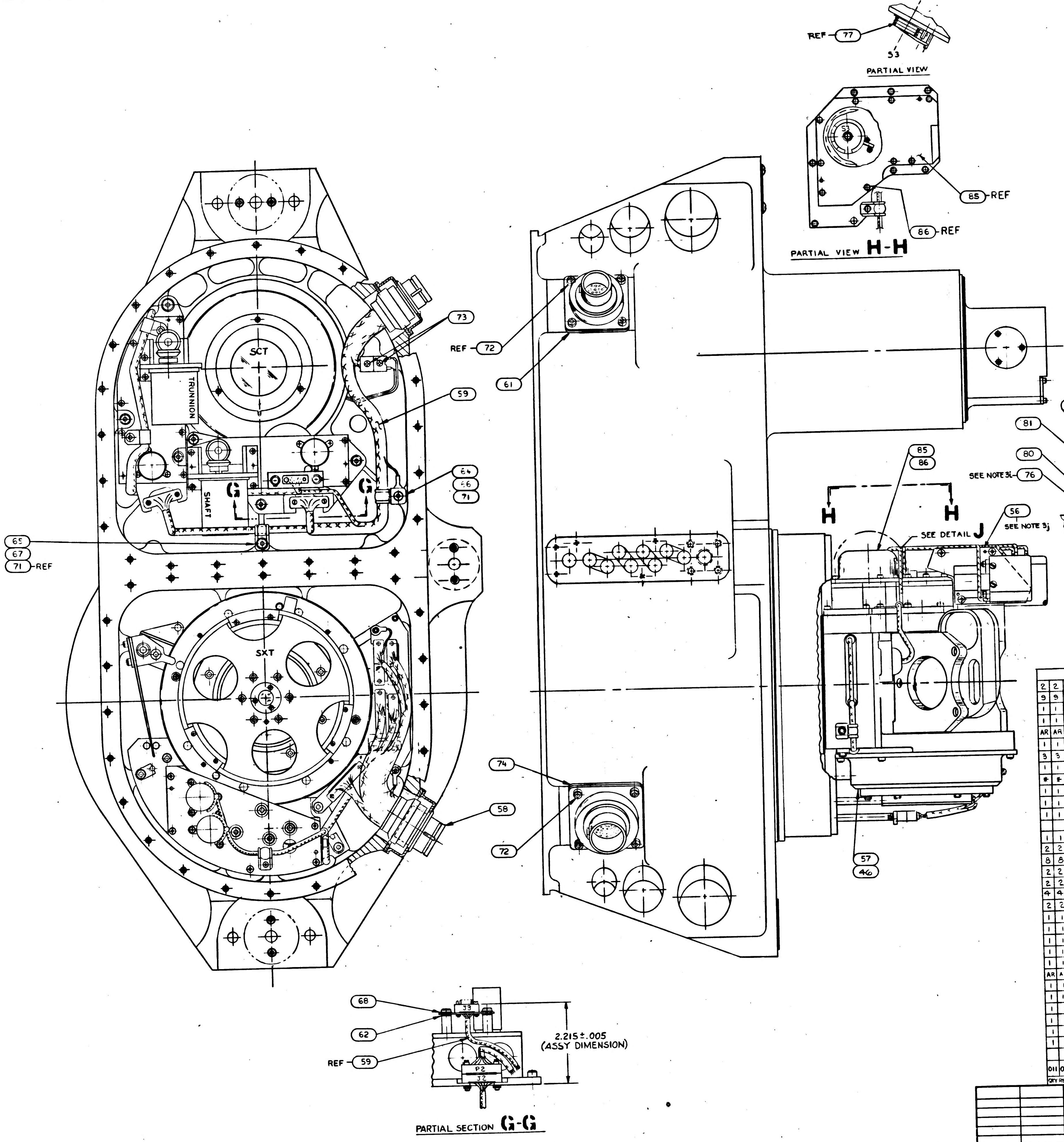
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

2011890 E

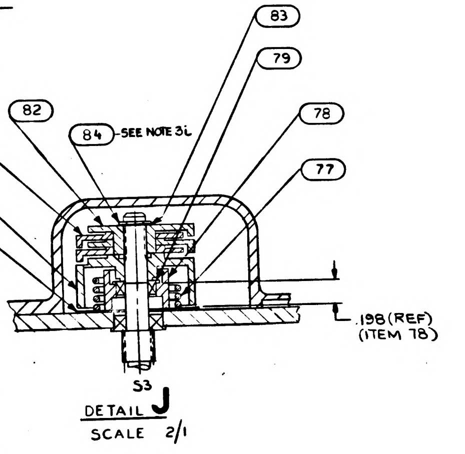
2011890 E

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 15330	[illegible]/65	WR
B		REVISED PER TDRR NO.19852	[illegible]	[illegible]
C		REVISED PER TDRR NO. 20177	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20200	[illegible]	[illegible]
E		REVISED PER TDRR 20351	[illegible]	[illegible]

REVISIONS 12217



REF 77
53
PARTIAL VIEW
65 REF
86 REF
PARTIAL VIEW H-H
SCT
TRUNNION
SHAFT
G
G
73
REF 72
61
59
64
66
71
65
67
71 REF
SXT
74
72
58
85
86
H
H
SEE DETAIL J
56
SEE NOTE 3j
SEE NOTE 3i 76
57
46
68
62
REF 59
33
P2
32
2.215 ± .005 (ASSY DIMENSION)
PARTIAL SECTION G-G



83
79
82
84 SEE NOTE 3i
78
81
77
80
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 4 FOR ITEMS 88 AND UP

011 QTY REQD	000 QTY REQD	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
9	9	86			1011625-20	74455151020		SCREW, CAP, SOC HD SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351-	79386910101 79386910102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC HEAD, SELF LOCKING			
4	4	69			NAS1189C0274L			SCREW, FLAT HD, SELF LOCKING			
2	2	68			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6&5	—		CLAMP, CABLE			
1	1	64		*	1000220-8&6	—		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	35386910150		SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R. BRUNELLE DATE 8-7-69
CHECKED C. Longstaff 8-7-69
APPROVAL
APPROVAL E. [illegible] 8/31/69
NASA APPROVAL
MIT APPROVAL

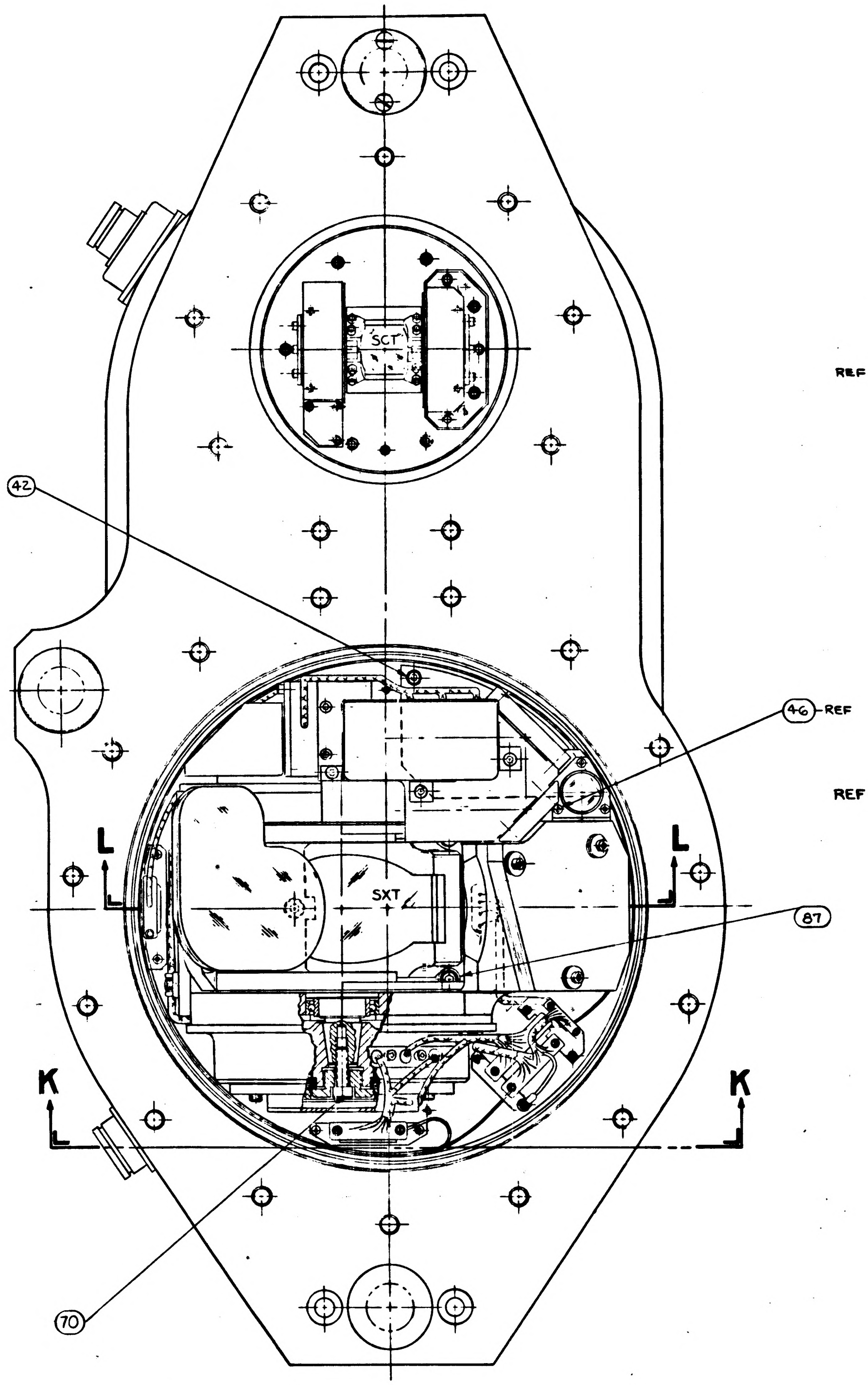
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

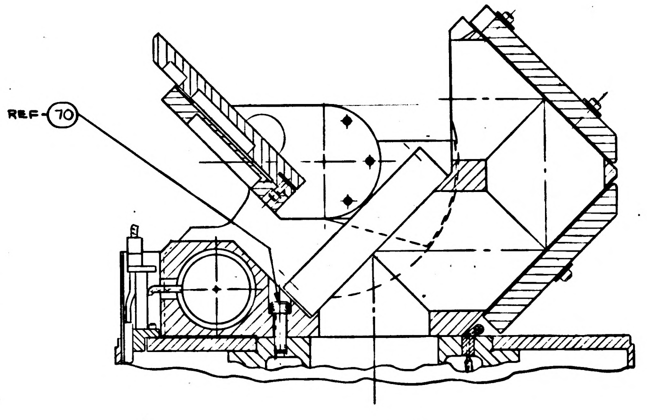
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

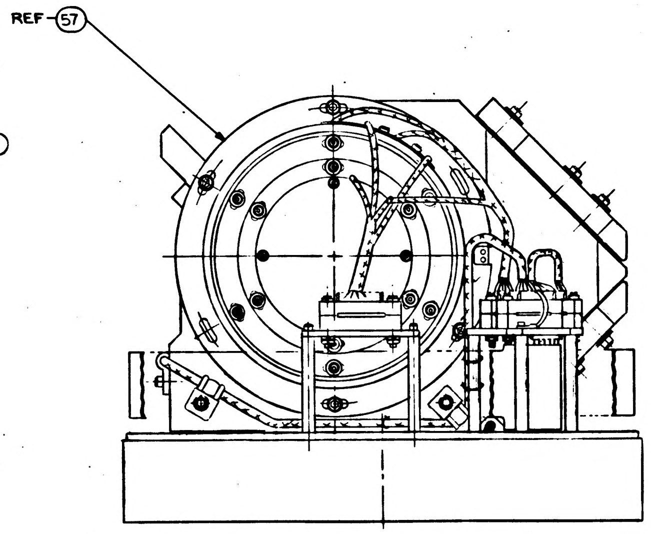
2011890 E

SYM	ZONE	REVISIONS 12217 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5352	0/65	
B		REVISED PER TDRR 19852		
C		REVISED PER TDRR 20177		
D		REVISED PER TDRR 20200		
E		REVISED PER TDRR 20351		





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	93		*	1011625-28	74455151028		SCREW, CAP, HEX., SOC. HD., SELF LOCKING			
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
QTY REQ'D		LIST OF PARTS AND MATERIALS									

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOLERANCE	FRACTIONS	DECIMALS	ANGLES
TOL ON	+ —	+ —	+ —

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL W. [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

2011890 E

2011890 E

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	[illegible]	
E		REVISED PER TDRR 20351	7/21/65	

NOTES:

1. GENERAL REQUIREMENTS

   a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

   a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

   b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

   c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

   d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.

   e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

   f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

   g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

   h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET.

3. SEXTANT (SXT) REQUIREMENTS

   a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

   b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

   c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

   d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

   e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

   f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

   g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

   h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

   i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

   j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

   k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10.

   l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

   m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

   n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

   o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

   a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

   b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V.AMATO DATE 6-11-65
CHECKED
APPROVAL
APPROVAL 7-2-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

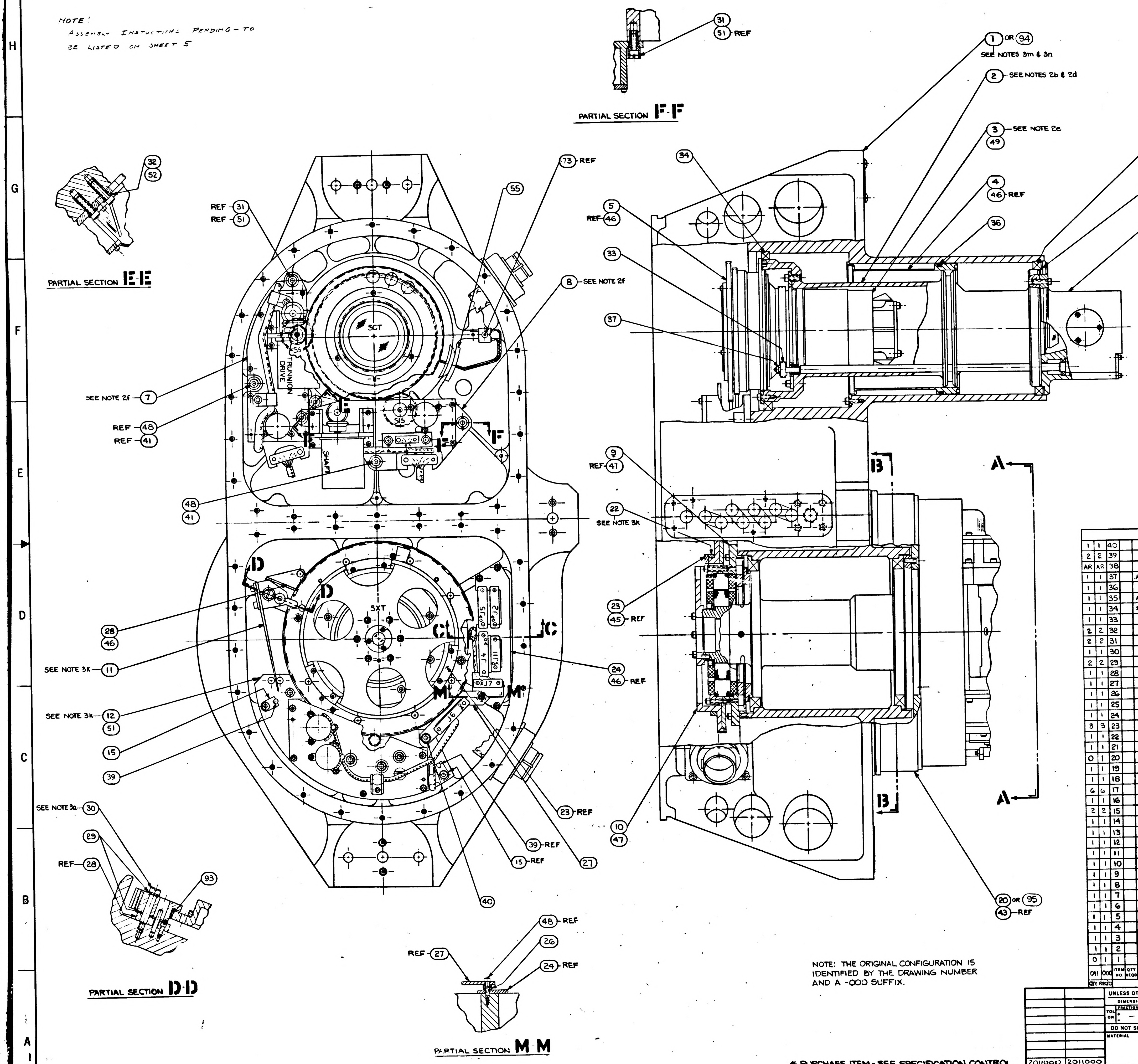
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 5

2011890

NOTE:
ASSEMBLY INSTUCTIONS PENDING – TO
BE LISTED ON SHEET 5

2011890 F

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK



31
51 REF
1 OR 94
SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
34
35
4
46 REF
38 SEE NOTE 2a
36
5
REF 46
6
48
33
37
32
52
73 REF
55
REF 31
REF 51
SCT
S5
TRUNNION DRIVE
8 SEE NOTE 2f
SEE NOTE 2f 7
REF 48
REF 41
S15
SHAFT
F
48
41
9
REF 47
22
SEE NOTE 3K
B
A
D
SXT
C
M
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
23
45 REF
24
46 REF
23 REF
39 REF
15 REF
27
40
10
47
20 OR 95
43 REF
SEE NOTE 3a 30
29
REF 28
93
48 REF
26
24 REF
REF 27

PARTIAL SECTION F-F

PARTIAL SECTION E-E

PARTIAL SECTION D-D

PARTIAL SECTION M-M

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 2 FOR ITEMS 41 THRU 55

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS 352C08LL	74455157028		SCREW, CAP, HEX SOC HD. SELF LOCKING			
2	2	39			2011684	46386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO -12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386310260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-13 64
CHECKED 8/27/69
APPROVAL E. Kuhlman 8/27/66
APPROVAL 8/31/69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

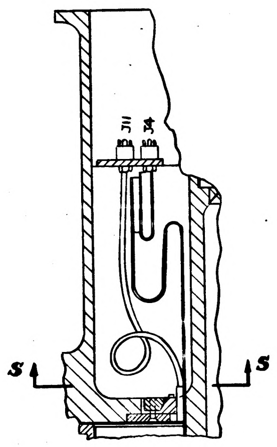
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

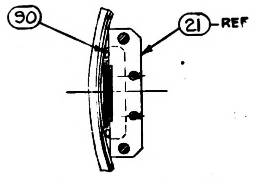
2011890 F

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK
B		REVISED PER TDRR NO. 19852	6/8/65	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	7/9/65	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK

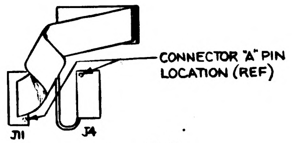
REVISIONS 12217



PARTIAL SECTION R-R

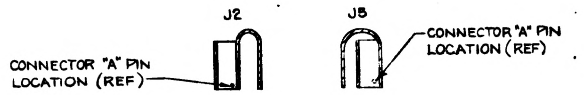


PARTIAL SECTION P-P



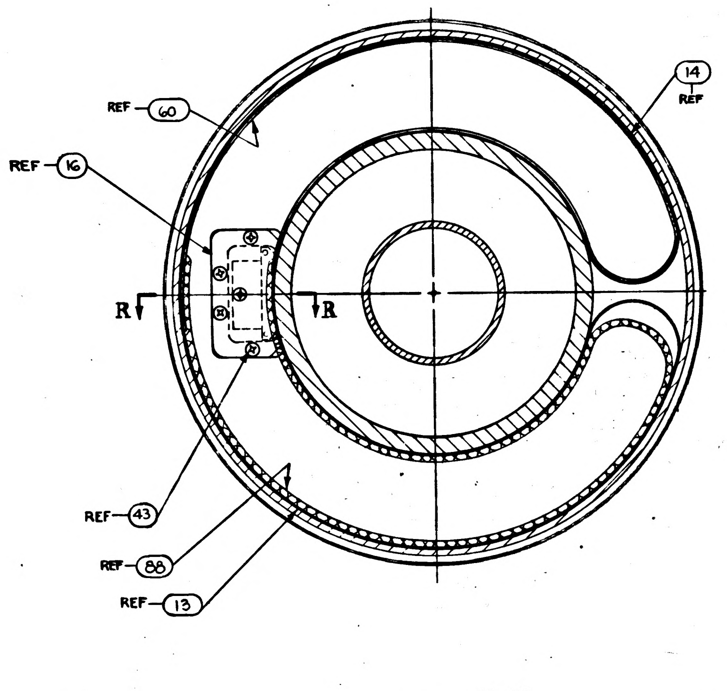
CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION S-S



J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

PARTIAL SECTION N-N
SCALE: NONE



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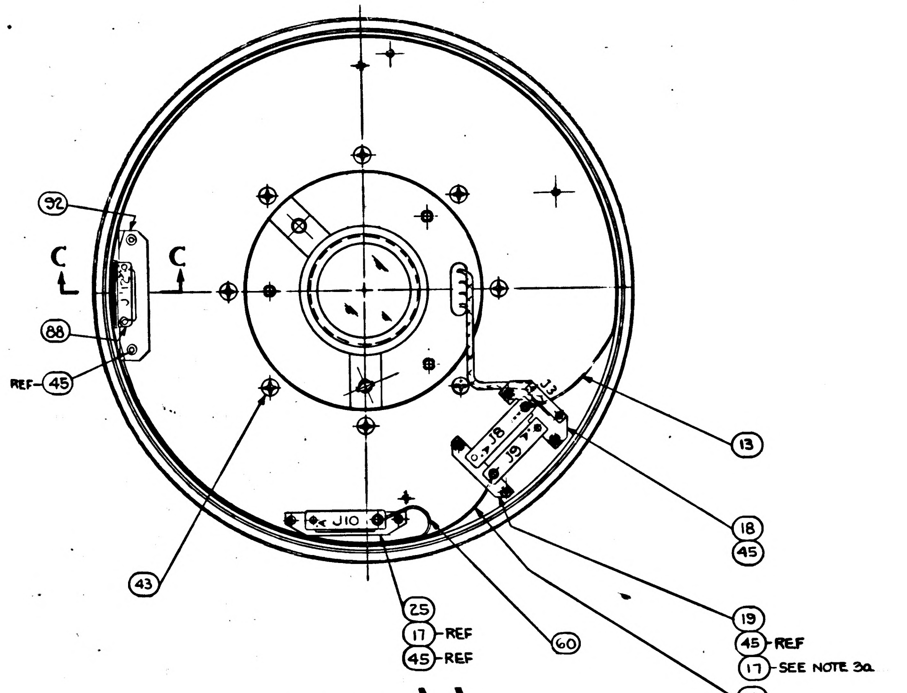
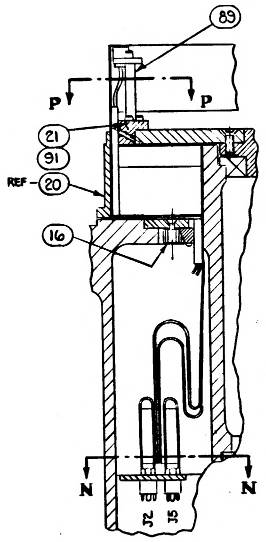
14 REF
REF - 16
R
R
REF - 43
REF - 88
REF - 13

PARTIAL SECTION B-B



92
C
C
88
REF - 45
J8
J9
J10
13
18
45
43
25
17 - REF
45 - REF
60
19
45 - REF
17 - SEE NOTE 3a.
14

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)



89
P
P
21
91
REF - 20
16
N
N
J2
J5

PARTIAL SECTION C-C

SEE SHEET 3 FOR ITEMS 56 THRU 87

011 QTY REQ'D	000 QTY REQ'D	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD, SELF LOCKING			
5	5	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
		50									
4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC HD, SELF LOCKING			
10	10	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
14	14	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL E. [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

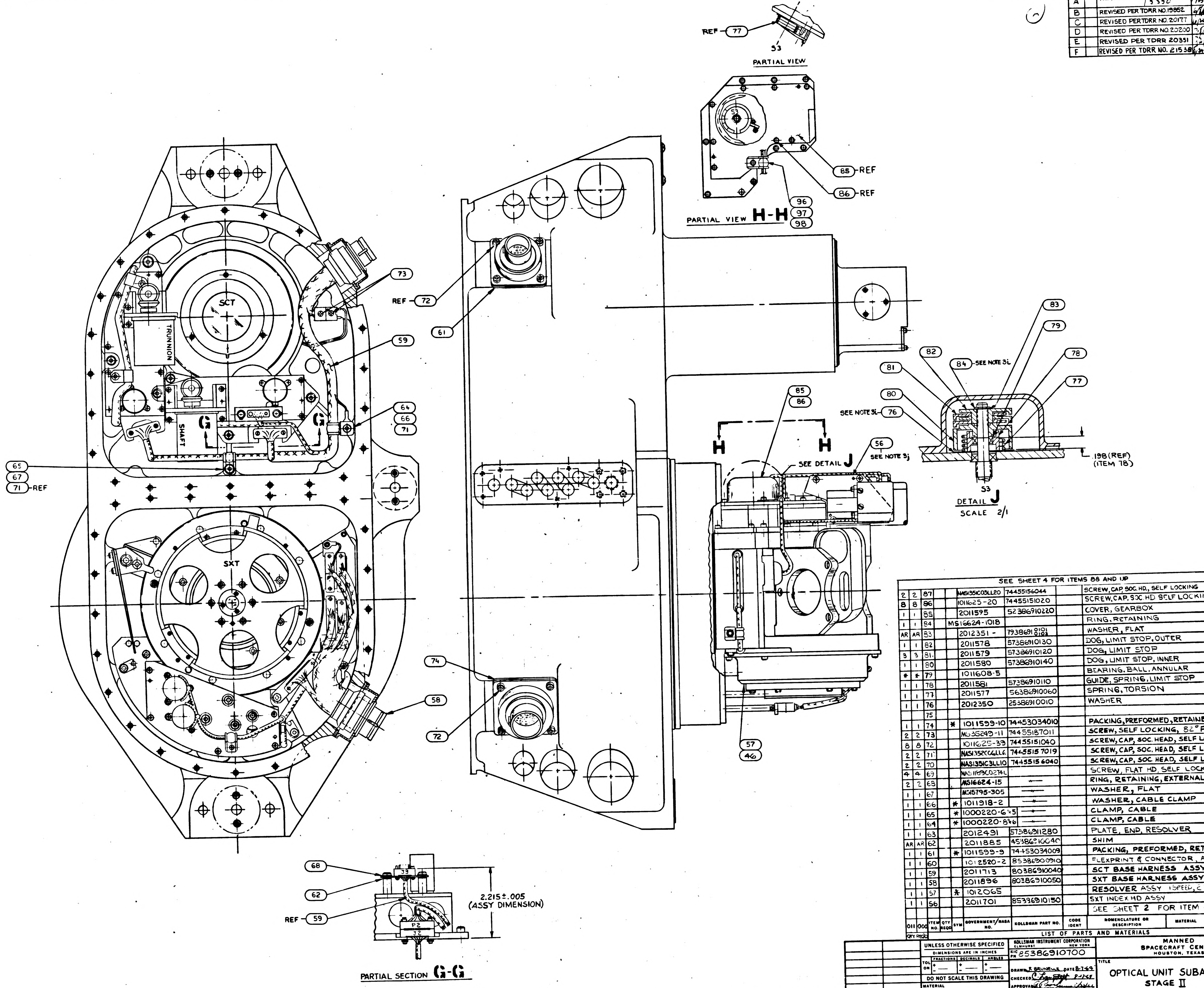
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC
ACTUAL
SHEET 2 OF 5

2011890 F

2011890 F

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRB NO. 15350	[illegible]	WR
B		REVISED PER TDRR NO.19852	[illegible]	WR
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	WR
F		REVISED PER TDRR NO. 21538	[illegible]	[illegible]

REVISIONS 12217


REF 77
53
PARTIAL VIEW
85 REF
86 REF
96
97
98
PARTIAL VIEW H-H
73
REF 72
61
59
SCT
TRUNNION
SHAFT
G
G
64
66
71
65
67
71 REF
SXT
74
58
72
83
79
82
84 SEE NOTE 3L
81
78
80
77
SEE NOTE 3L 76
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
85
86
H
H
SEE DETAIL J
56 SEE NOTE 3j
57
46
68
62
REF 59
P2
2.215±.005 (ASSY DIMENSION)
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 4 FOR ITEMS 88 AND UP

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	86			1011625-20	74455151020		SCREW, CAP, SOC. HD. SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	68			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6%5	—		CLAMP, CABLE			
1	1	64		*	1000220-8%6	—		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			

LIST OF PARTS AND MATERIALS

2011890F

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

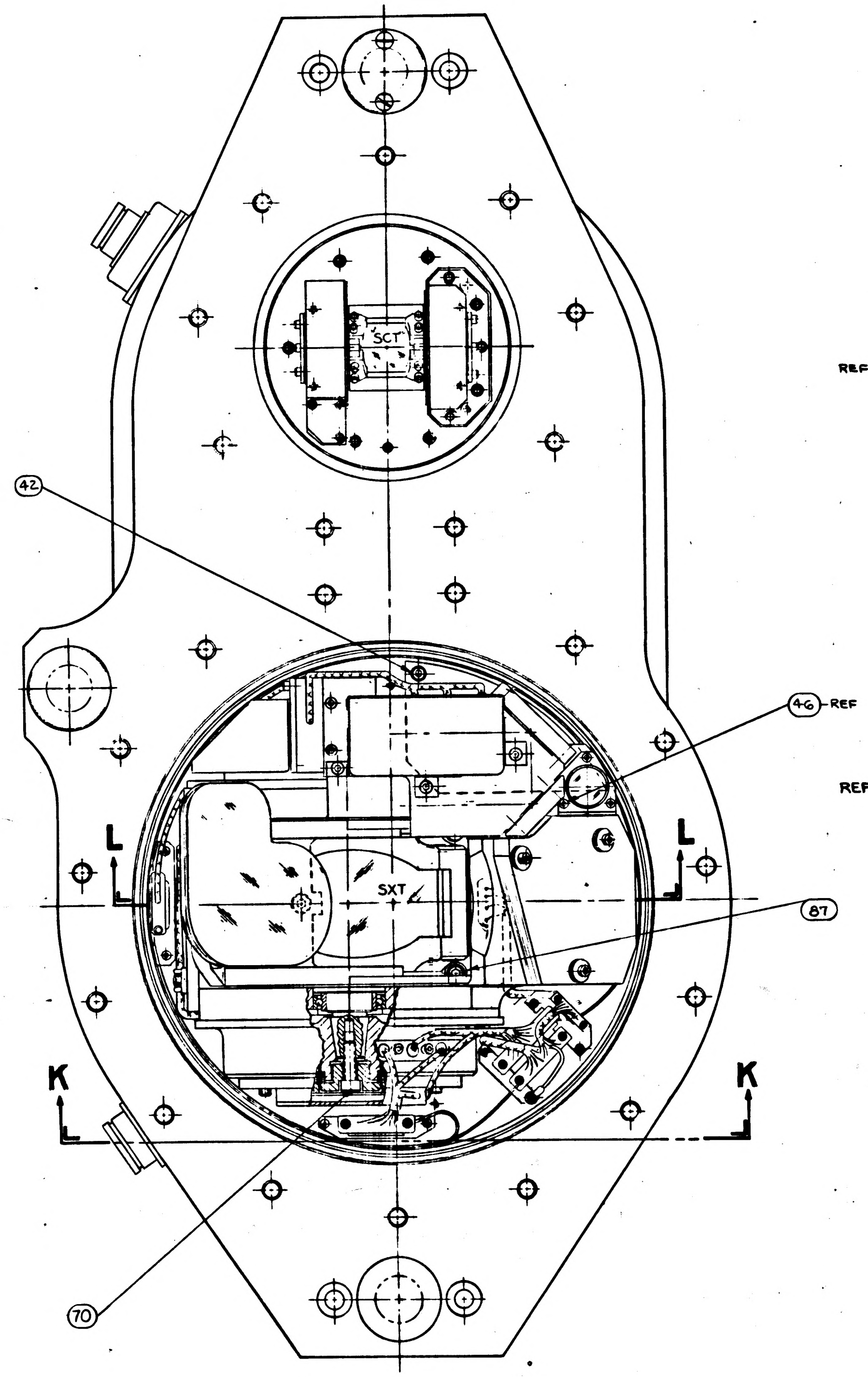
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R BRUNELLE DATE 8-7-64
CHECKED C. Langstaff 8-7-64
APPROVAL [illegible]
APPROVAL E. Thorup 8/21/64
NASA APPROVAL
MIT APPROVAL

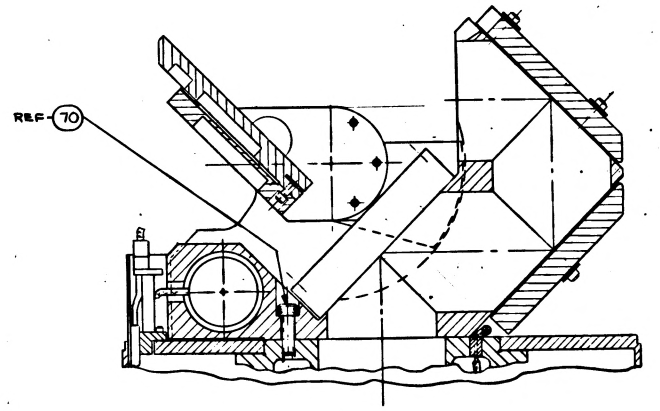
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

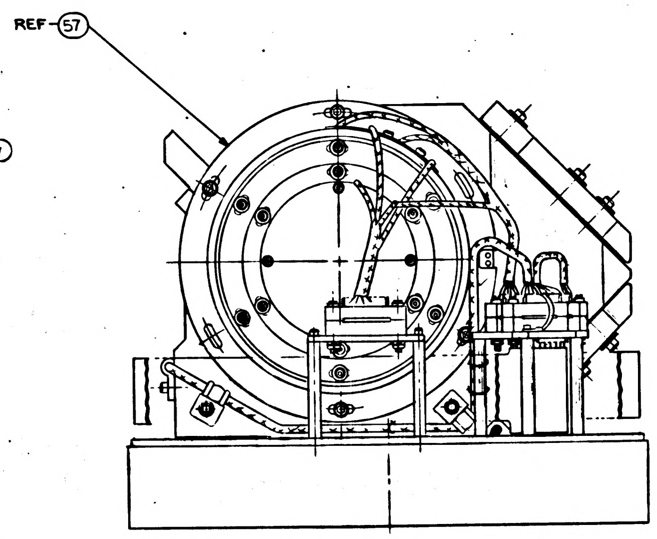
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

REVISIONS				12217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5352	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	WK
D		REVISED PER TDRR 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	98		*	1000220-5			CLAMP, CABLE			
1	1	97		*	1011918-1			WASHER, CLAMP, CABLE			
1	1	96			NAS1352C03LL8	74455157011		SCREW, CAP. SOC HD, SELF LOCKING			
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	93		*	1011625-28	74455151028		SCREW, CAP. HEX., SOC. HD., SELF LOCKING			
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED 8/27/64
APPROVAL 8/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

2011890 F

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	[illegible]	wk
E		REVISED PER TDRR 20351	[illegible]	wk
F		REVISED PER TDRR 21538	[illegible]	wk

NOTES:

1. GENERAL REQUIREMENTS
   - a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS
   - a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.
   - b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.
   - c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).
   - d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.
   - e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792; PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.
   - f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.
   - g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.
   - h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET.

3. SEXTANT (SXT) REQUIREMENTS
   - a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.
   - b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).
   - c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.
   - d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.
   - e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.
   - f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.
   - g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.
   - h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.
   - i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.
   - j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.
   - k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10.
   - l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.
   - m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.
   - n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)
   - o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS
   - a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.
   - b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V. AMATO DATE 6-11-65
CHECKED F. Raymond 6-30-65
APPROVAL
APPROVAL [illegible] 7-2-65
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 5

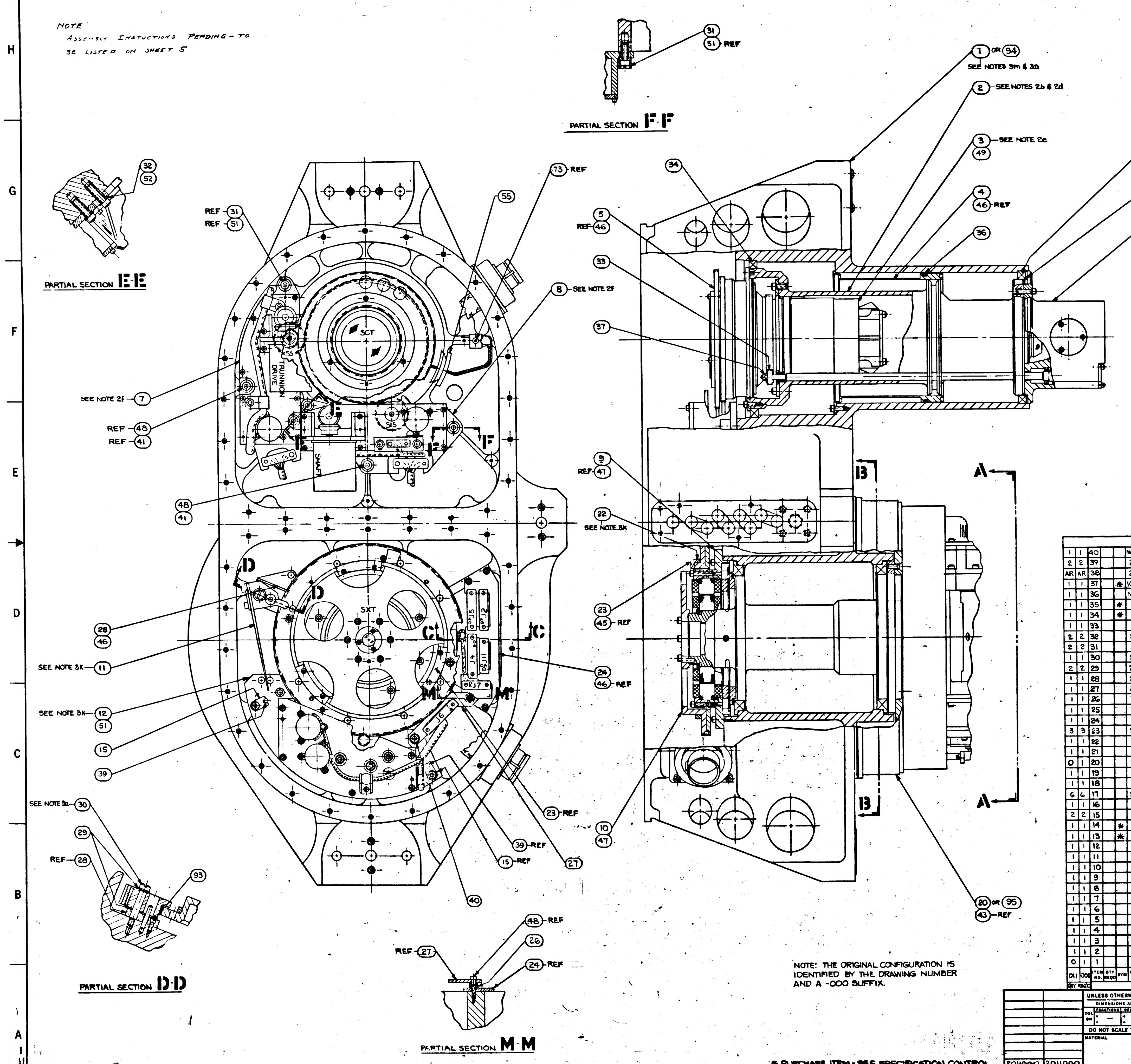
MASTER

NOTE
Assembly Instructions Pending - to be listed on sheet 5

	0681102
G	2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		
E		REVISED PER TDRR 20351		
F		REVISED PER TDRR 21538		
G		REVISED PER TDRR 21536		

REVISIONS 12217


PARTIAL SECTION E-E
PARTIAL SECTION F-F
PARTIAL SECTION D-D
PARTIAL SECTION M-M
SCT
SXT
TRUNNION DRIVE
SHAFT
1 OR 94 SEE NOTES 3m & 3a
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
4
46 REF
5
REF 46
6
48
8 SEE NOTE 2f
9
REF 47
10
47
20 OR 95
43 REF
22
SEE NOTE 3K
23
45 REF
24
46 REF
SEE NOTE 2f 7
REF 48
REF 41
48
41
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
SEE NOTE 3a 30
29
REF 28
93
REF 31
REF 51
31
51 REF
32
52
33
34
35
36
37
38 SEE NOTE 2a
55
73 REF
23 REF
39 REF
15 REF
27
40
48 REF
26
24 REF
REF 27
A
B
C
D
F
M

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 2 FOR ITEMS 41 THRU 55

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS1352C08L10	74455157028		SCREW, CAP, HEX SOC HD. SELF LOCKING			
2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO 12	7938691 0481 THRU 0512		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	36			MS 3021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT., ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011306	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

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DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-18-64
CHECKED 8/28/64
APPROVAL 8/27/64
APPROVAL E. Weng 8/31/64
NASA APPROVAL
MIT APPROVAL

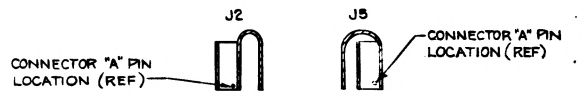
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

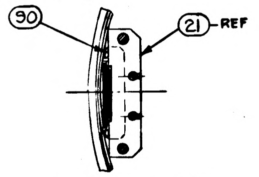
G 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 12217		
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO. 19852	4/8/65	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	7/9/65	WK
E		REVISED PER TDRR 20351	7/24/65	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]

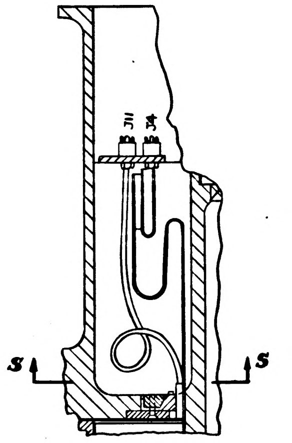


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

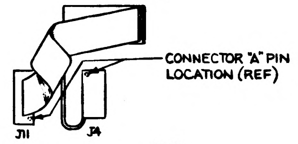
PARTIAL SECTION N-N
SCALE: NONE



PARTIAL SECTION P-P

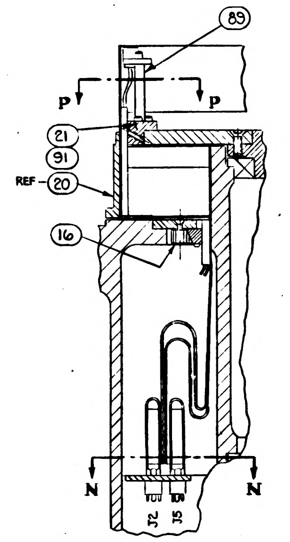


PARTIAL SECTION R-R



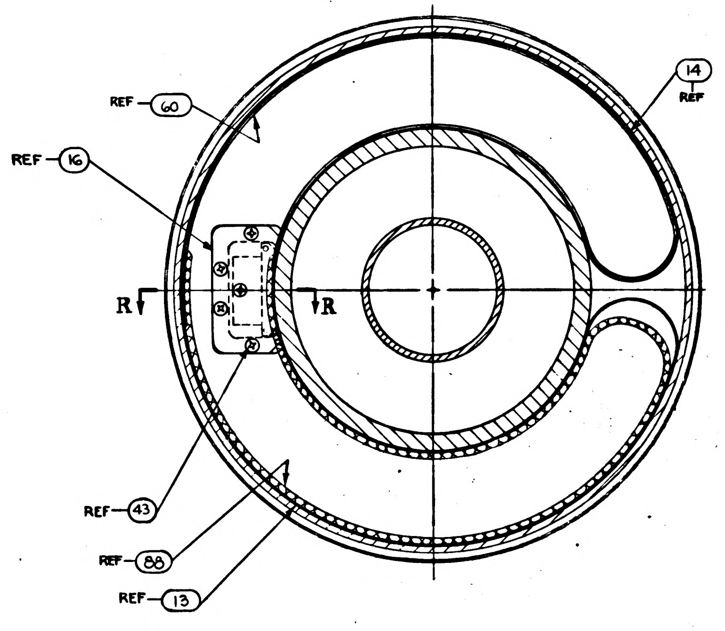
CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION S-S



89
P
P
21
91
REF - 20
16
N
N
J2
J5

PARTIAL SECTION C-C



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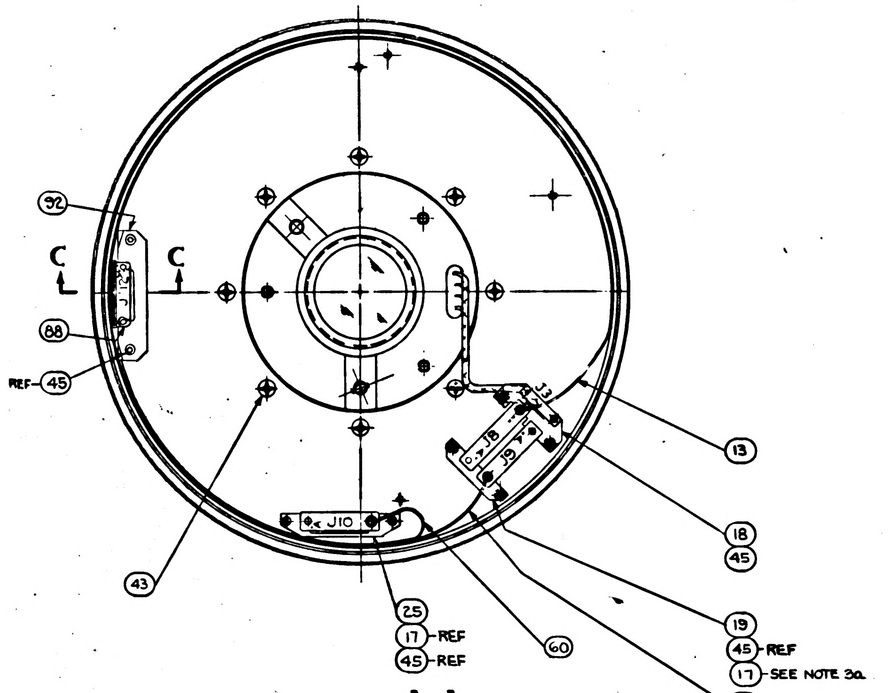
REF - 16
14 REF
R
R
REF - 43
REF - 88
REF - 13

PARTIAL SECTION B-B



92
C
C
88
REF - 45
J10
J5
J4
13
18
45
43
25
17 - REF
45 - REF
60
19
45 - REF
17 - SEE NOTE 3a.
14

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87											
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
5	5	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
		50									
4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC. HD, SELF LOCKING			
10	10	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
14	14	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			
011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
QTY REQ'D		LIST OF PARTS AND MATERIALS									

UNLESS OTHERWISE SPECIFIED
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TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL
CONTRACT

NEXT ASSY	USED ON
2011000	2011000
APPLICATION	

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. Thomas
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

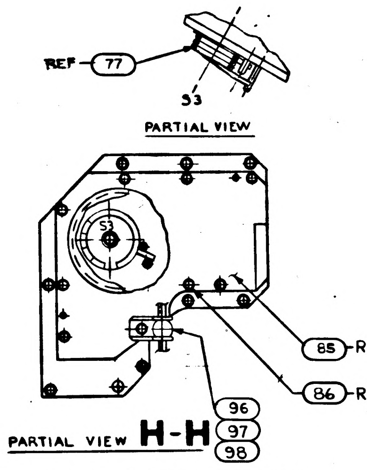
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

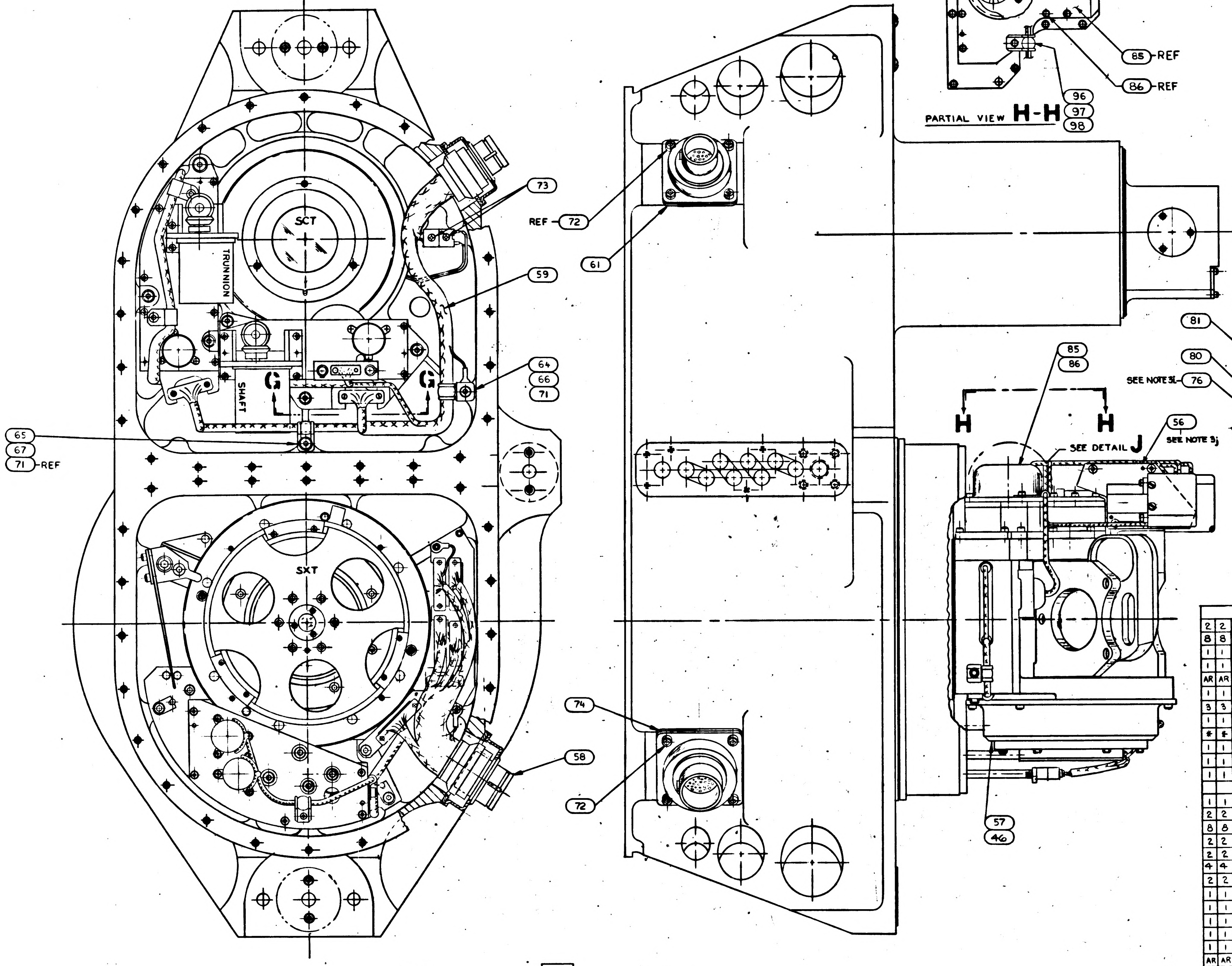
2011890 G

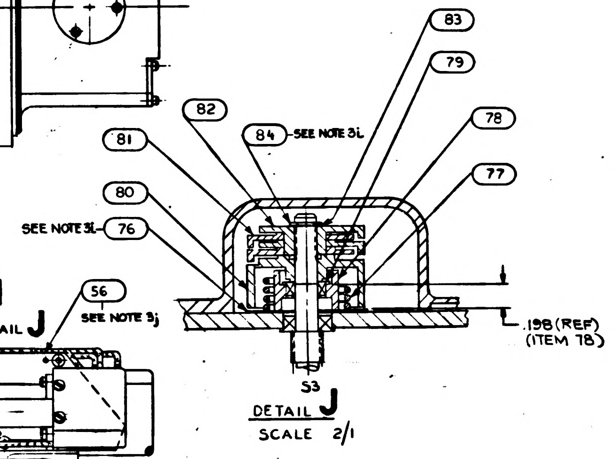
2011890 G

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 12 217		
A		REVISED PER TDRR NO. 5350	4/65	WR
B		REVISED PER TDRR NO.19852	[illegible]	WR
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	WR
F		REVISED PER TDRR NO. 21538	[illegible]	WR
G		REVISED PER TDRR 21536	[illegible]	[illegible]

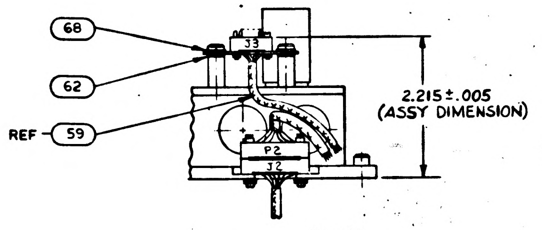


PARTIAL VIEW H-H





DETAIL J
SCALE 2/1



PARTIAL SECTION G-G

SEE SHEET 4 FOR ITEMS 88 AND UP

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	86			1011625-20	74455151020		SCREW, CAP, SOC. HD. SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351 -	79386910101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	68			MS16624-15	———		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	———		WASHER, FLAT			
1	1	66		*	1011918-2	———		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6%5	———		CLAMP, CABLE			
1	1	64		*	1000220-8%6	———		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	85386910150	—	SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			
QTY REQD											

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

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DIMENSIONS ARE IN INCHES
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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. [illegible] 8-7-64
APPROVAL [illegible]
APPROVAL E. Monez 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

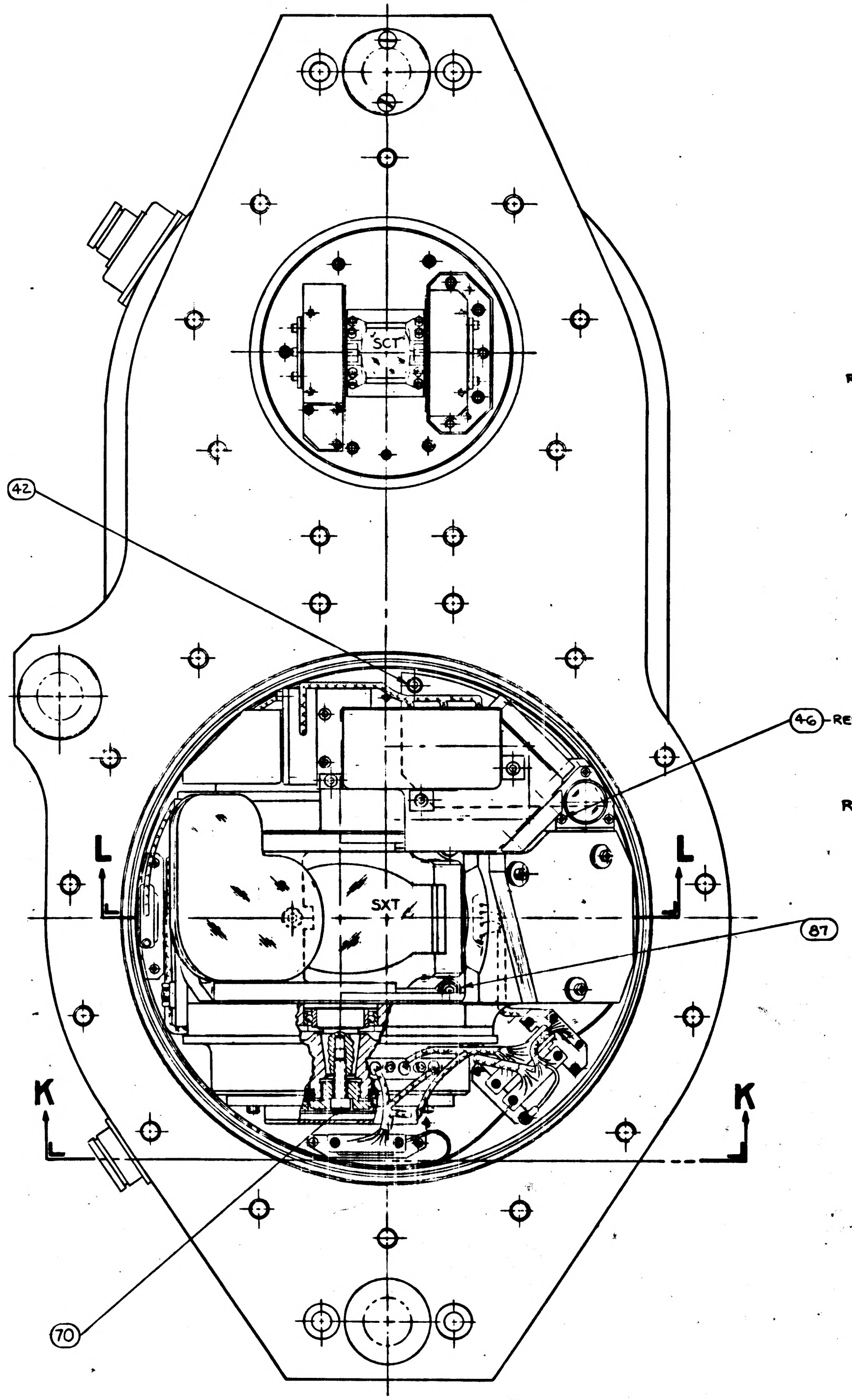
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

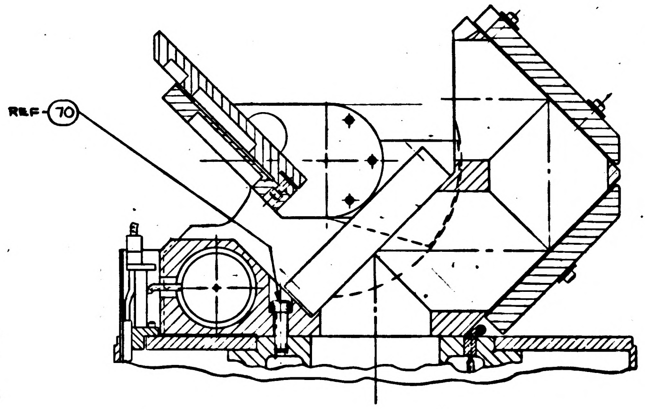
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

G | 2011890

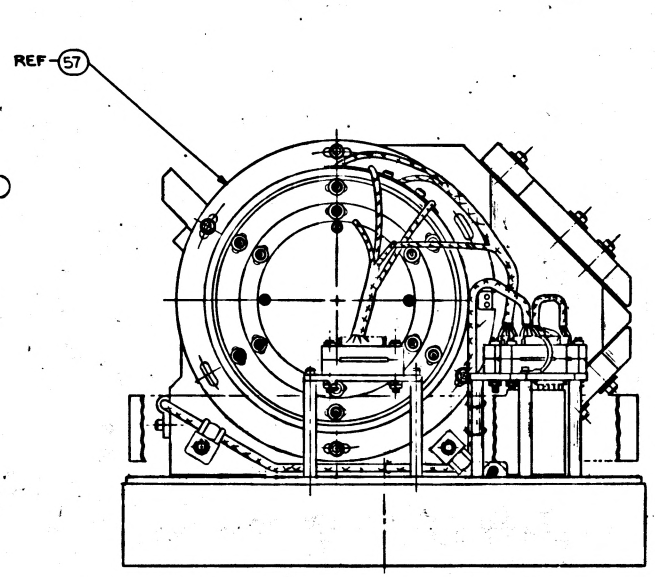
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	wk
B		REVISED PER TDRR 19852	[illegible]	wk
C		REVISED PER TDRR 20177	[illegible]	wk
D		REVISED PER TDRR 20200	[illegible]	wk
E		REVISED PER TDRR 20351	[illegible]	wk
F		REVISED PER TDRR 21538	[illegible]	wk
G		REVISED PER TDRR 21536	[illegible]	[illegible]

REVISIONS 12217





PARTIAL SECTION L-L



PARTIAL VIEW K-K

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	98		*	1000220-5			CLAMP, CABLE			
1	1	97		*	1011918-1			WASHER, CLAMP, CABLE			
1	1	96			NAS1352C03LL8	7445157011		SCREW, CAP, SOC HD, SELF LOCKING			
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	93		*	1011625-28	74455151028		SCREW, CAP, HEX., SOC. HD., SELF LOCKING			
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	7445515011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	6820106701		CABLE (FLAT) AND CONNECTOR ASSY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

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CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. [illegible] DATE 8-7-64
CHECKED [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL [illegible] 1964

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SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

2011890 G

2011890 G

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
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E		REVISED PER TDRR 20351	7/21/65	wk
F		REVISED PER TDRR 21538	[illegible]	wk
G		REVISED PER TDRR 21536	[illegible]	[illegible]

NOTES:

1. GENERAL REQUIREMENTS

a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.

e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET.

3. SEXTANT (SXT) REQUIREMENTS

a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS 15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387

l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V. AMATO DATE 6-11-65
CHECKED [illegible] 6-30-65
APPROVAL
APPROVAL [illegible] 7-2-65
NASA APPROVAL [illegible] 7-?-65
MIT APPROVAL [illegible] 6-12-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

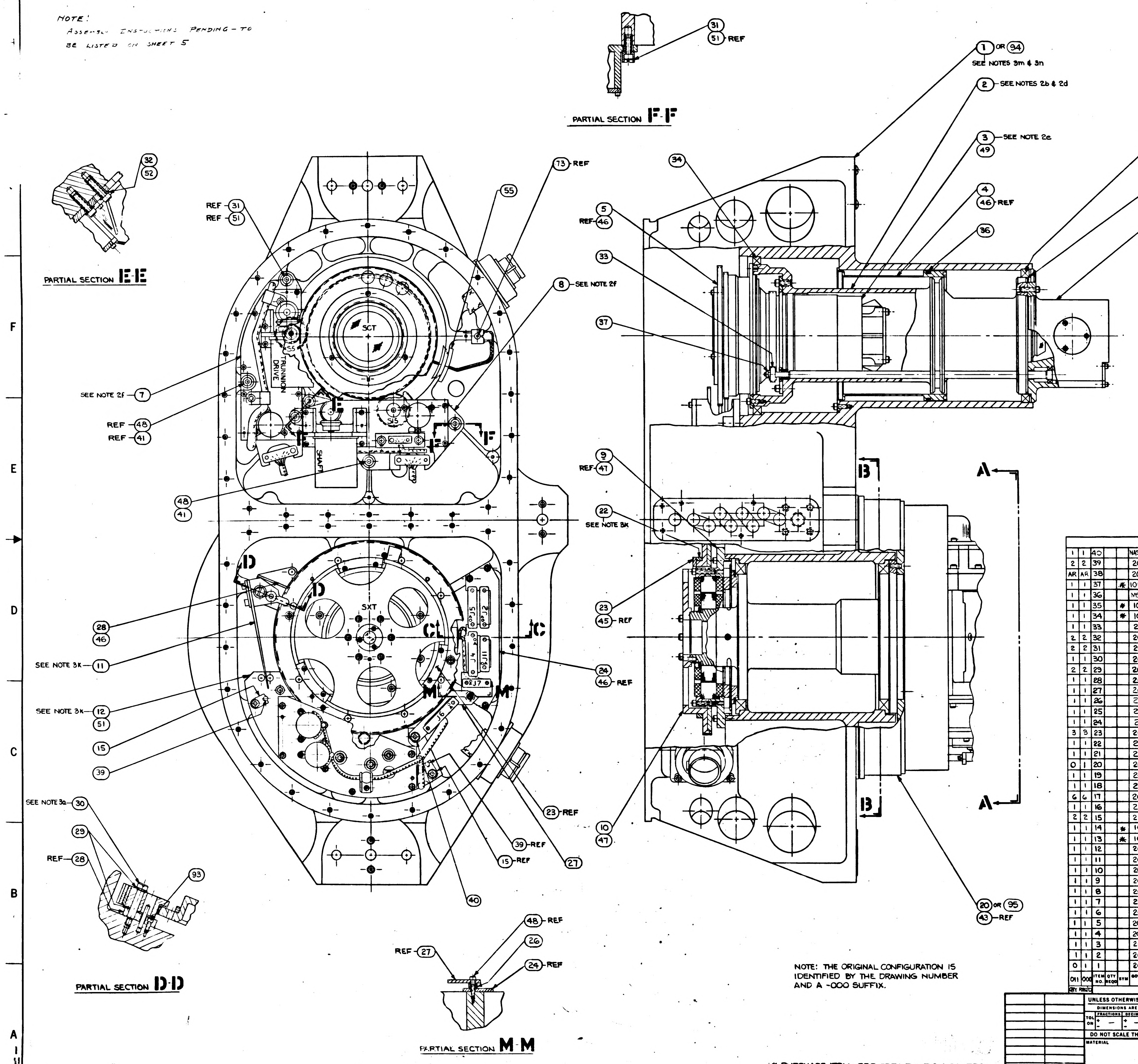
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 5

H 0681102

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]

NOTE:
ASSEMBLY INSTUCTIONS PENDING - TO
BE LISTED ON SHEET 5


PARTIAL SECTION F-F
31
51 REF
PARTIAL SECTION E-E
32
52
1 OR 94
SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
4
46 REF
5
REF 46
34
35
38 SEE NOTE 2a
6
48
36
33
37
73 REF
55
REF 31
REF 51
8 SEE NOTE 2f
SCT
TRUNNION DRIVE
S5
S15
SHAFT
SEE NOTE 2f 7
REF 48
REF 41
48
41
9
REF 47
22
SEE NOTE 3K
B
A
SXT
D
C
M
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
23
45 REF
24
46 REF
SEE NOTE 3a 30
29
REF 28
93
23 REF
39 REF
15 REF
27
10
47
40
20 OR 95
43 REF
PARTIAL SECTION D-D
48 REF
26
24 REF
REF 27
PARTIAL SECTION M-M

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 2 FOR ITEMS 41 THRU 55

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	40			NAS1352C08LL10	74455157028		SCREW, CAP, HEX SOC HD SELF LOCKING			
2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	38			2011877-1 TO 12	7938691 0401 THRU 0412		SPACER			
1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED 8/27/69
APPROVAL E. Kinkum 8/27/66
APPROVAL E. Mourup 8/31/69
NASA APPROVAL
MIT APPROVAL

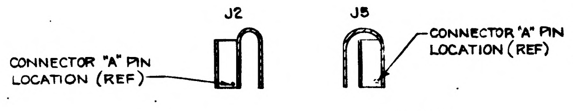
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

H 0681102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 12217		
A		REVISED PER TDRR NO. 15350	1/6/65	WR
B		REVISED PER TDRR NO. 19852	[illegible]	[illegible]
C		REVISED PER TDRR NO. 20177	[illegible]	[illegible]
D		REVISED PER TDRR NO. 20200	[illegible]	[illegible]
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]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J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

PARTIAL SECTION **N-N**
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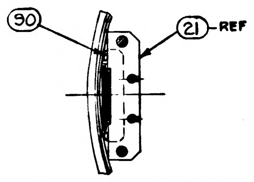
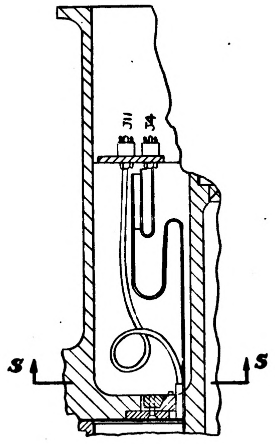
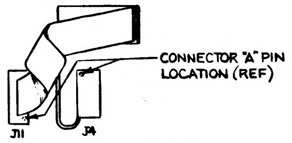


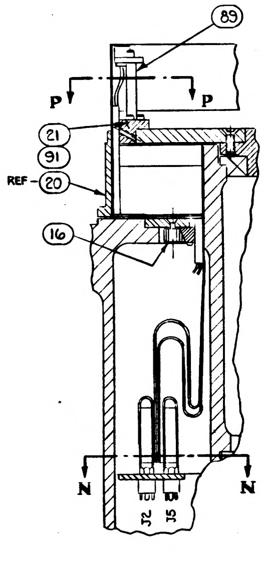
PARTIAL SECTION **P-P**



PARTIAL SECTION **R-R**


CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION **S-S**


89
P
P
21
91
REF-20
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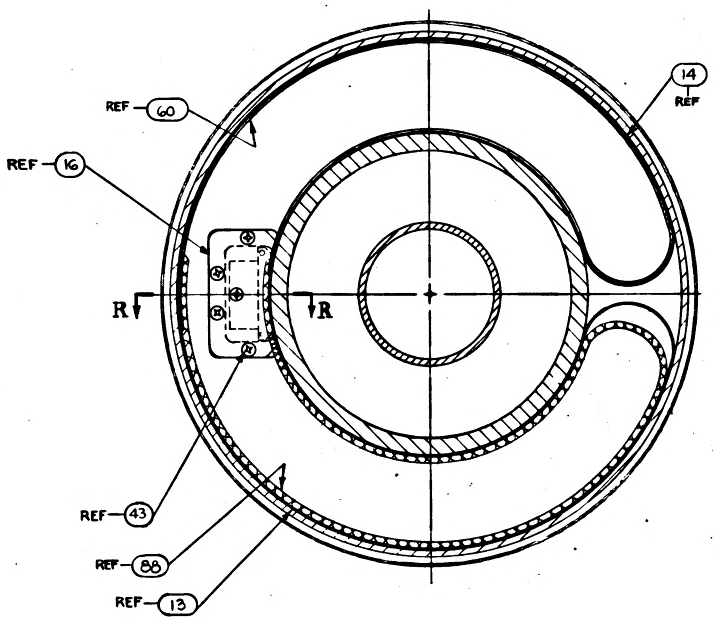
N
N
J2
J5

PARTIAL SECTION **C-C**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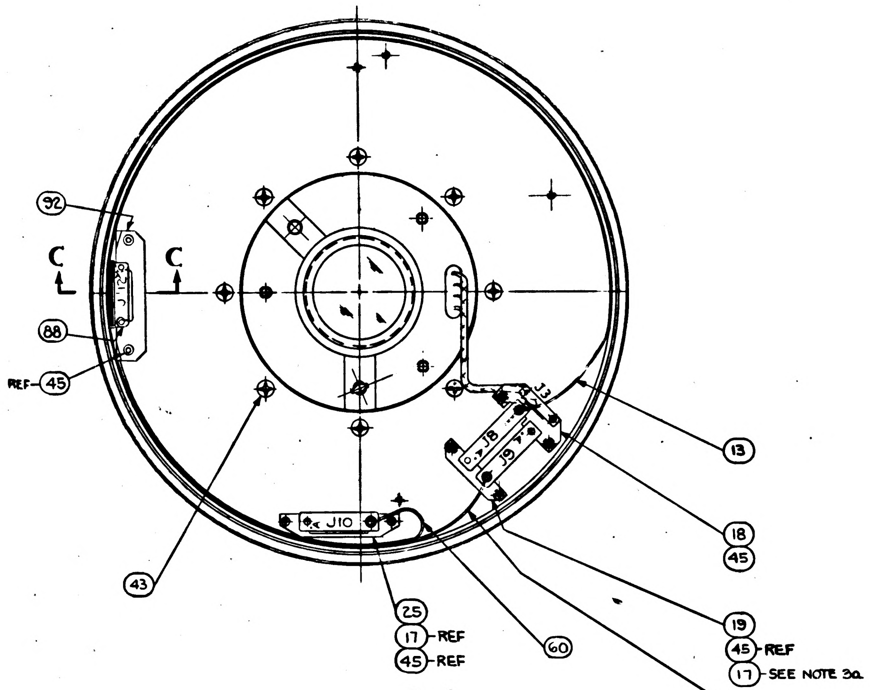
REF-13

PARTIAL SECTION **B-B**


92
C
C
88
REF-45
J12
J3
J8
J9
J10
13
18
45
43
25
17-REF
45-REF
60
19
45-REF
17-SEE NOTE 3a.
14

PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	55			2012164	26386910060		GROMMET			
		54									
		53									
2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
5	5	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
		50									
4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC HD, SELF LOCKING			
10	10	48		NAS	1352C04LL8	74455157015					
14	14	47		NAS	1352C04LL6	74455157014					
14	14	46		NAS	1352C04LL4	74455157013					
14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
		44									
12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC. HEX			
2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
								SEE SHEET 1 FOR ITEMS 1 THRU 40			

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL E. Thorup 8/21/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

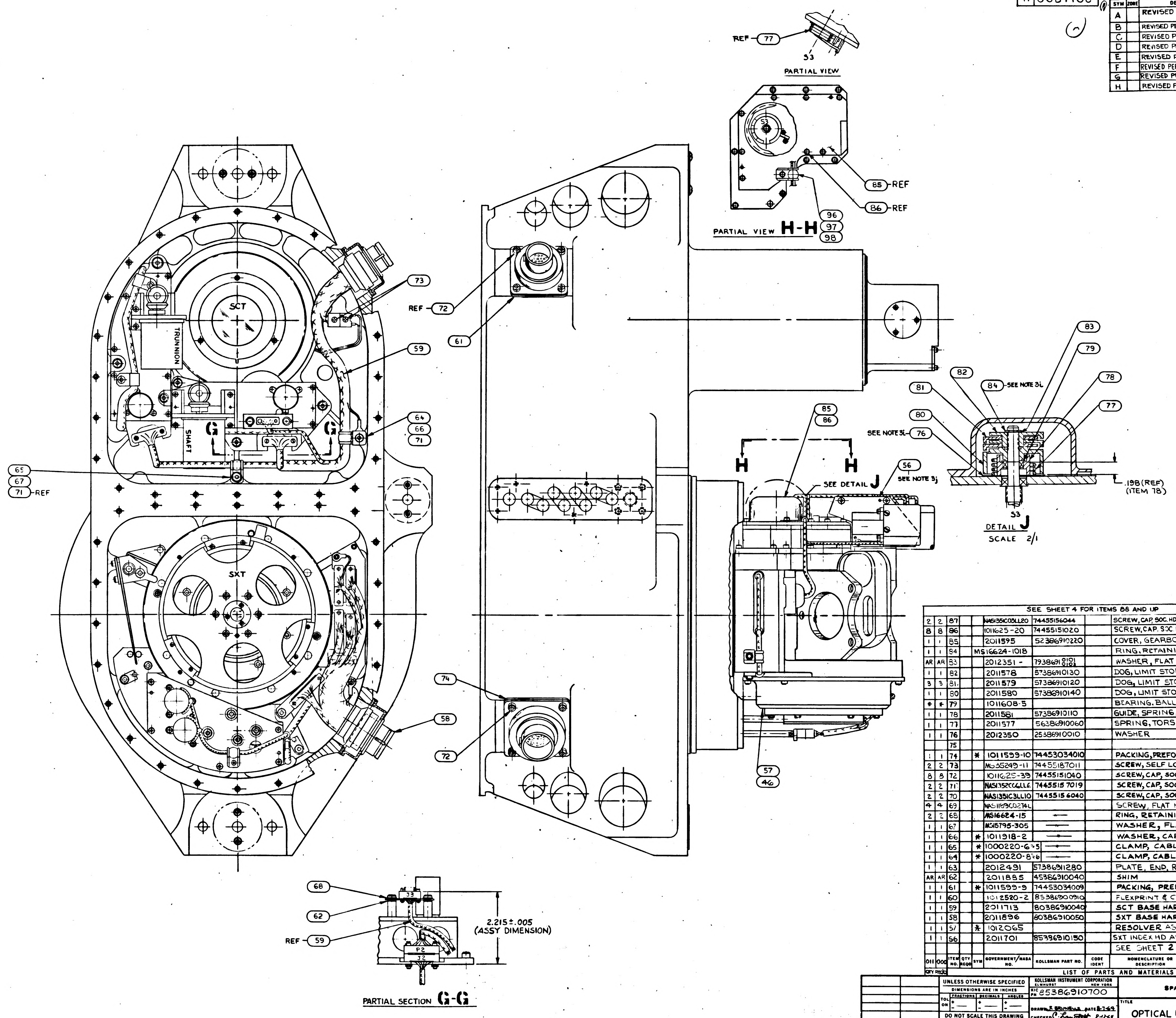
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

H | 0681102

REVISIONS				2217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 15356	1/4/65	WR
B		REVISED PER TDRR NO.19852	[illegible]	WR
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR NO. 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]



REF 77
53
PARTIAL VIEW
53
85 REF
86 REF
96
97
98
PARTIAL VIEW H-H
83
79
82
84 SEE NOTE 3L
78
81
77
80
SEE NOTE 3L 76
56
SEE NOTE 3j
SEE DETAIL J
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
85
86
H
H
57
46
73
REF 72
61
SCT
TRUNNION
59
SHAFT
G
G
64
66
71
65
67
71 REF
SXT
74
58
72
72
68
33
62
2.215±.005 (ASSY DIMENSION)
REF 59
P2
32
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 4 FOR ITEMS 88 AND UP

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	87			NAS1351C05LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	86			1011625-20	74455151020		SCREW, CAP. SOC HD SELF LOCKING			
1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
*	*	79			1011608-5			BEARING, BALL, ANNULAR			
1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	76			2012350	25386910010		WASHER			
		75									
1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	68			MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	67			MS15795-305	—		WASHER, FLAT			
1	1	66		*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	65		*	1000220-6-5	—		CLAMP, CABLE			
1	1	64		*	1000220-8-6	—		CLAMP, CABLE			
1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	62			2011885	45386910040		SHIM			
1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	57		*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
								SEE SHEET 2 FOR ITEM 41 THRU 55			

QTY REQD

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R BRUNELLE DATE 8-7-69
CHECKED C. Langstaff 8-7-69
APPROVAL
APPROVAL E. Morey 8/21/69
NASA APPROVAL
MIT APPROVAL

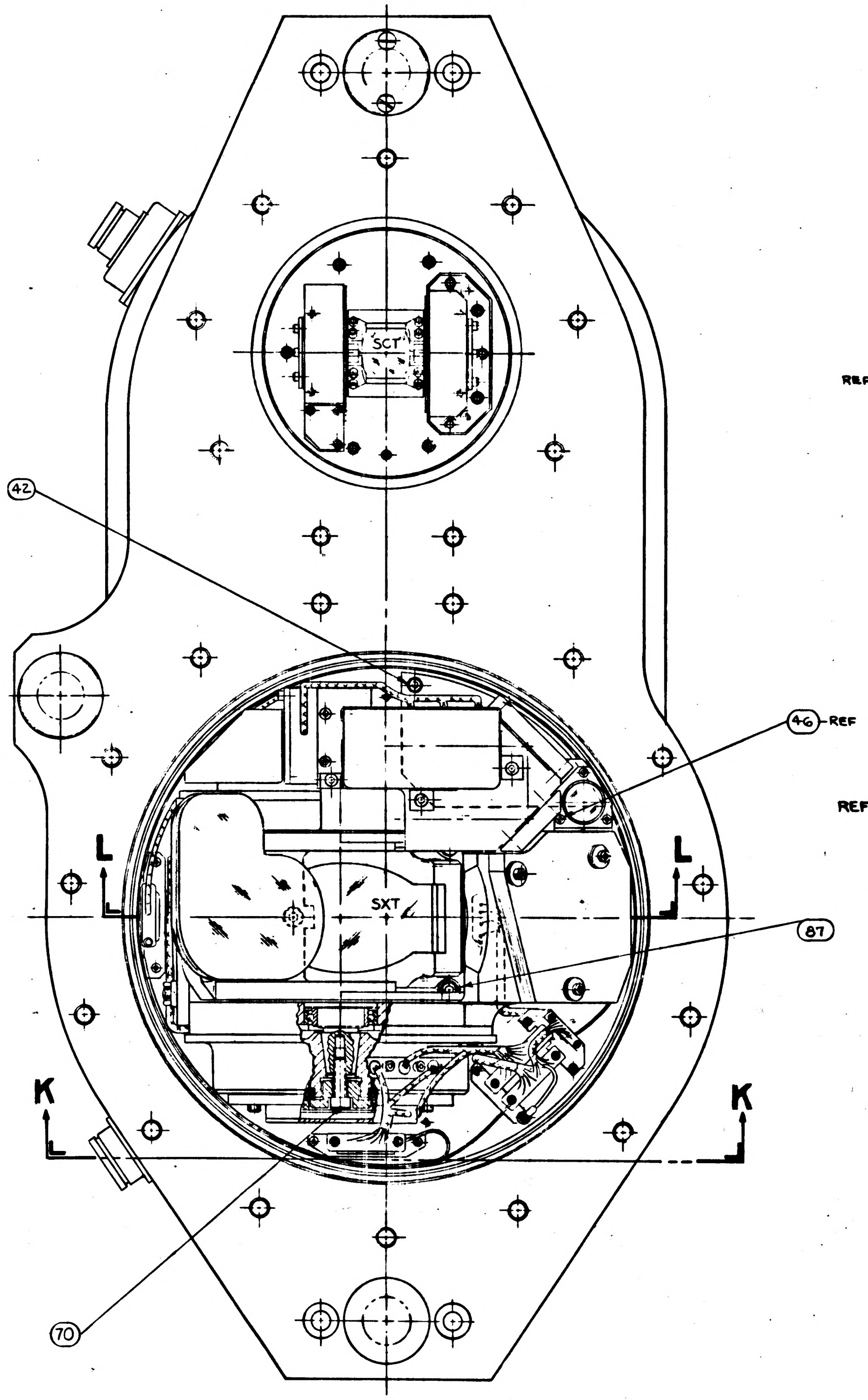
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

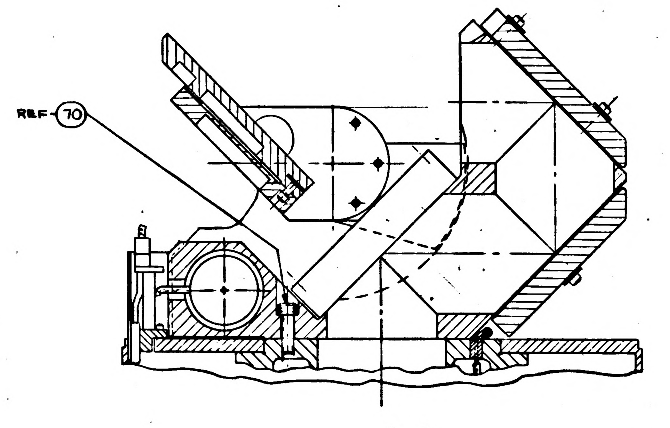
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

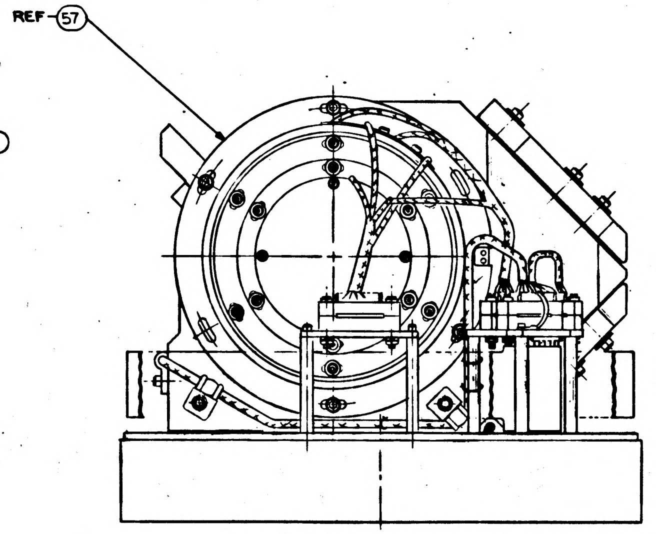
2011890 H

REVISIONS				2217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5350	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	WK
D		REVISED PER TDRR 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	9/14/65	[illegible]





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

QTY REQ'D 011	QTY REQ'D 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	98		*	1000220-5			CLAMP, CABLE			
1	1	97		*	1011918-1			WASHER, CLAMP, CABLE			
1	1	96			NAS1352C03LL8	74455157011		SCREW, CAP, SOC HD, SELF LOCKING			
1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	93		*	1011625-28	74455151028		SCREW, CAP, HEX., SOC. HD., SELF LOCKING			
1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

H	0681102

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	7/1/65	WR
E		REVISED PER TDRR 20351	7/21/65	WR
F		REVISED PER TDRR 21538	9/2/65	WR
G		REVISED PER TDRR 21536	9/5/65	
H		REVISED PER TDRR 21660	9/14/65	

NOTES:

1. GENERAL REQUIREMENTS

a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.

e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET. BACKLASH BETWEEN COUNTER BEVEL GEARS SHALL BE BETWEEN .001 & .005 THROUGH ONE COMPLETE REVOLUTION OF LARGER GEAR.

3. SEXTANT (SXT) REQUIREMENTS

a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387

l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN V. AMATO DATE 6-11-65
CHECKED F. Raymond 6-30-65
APPROVAL
APPROVAL 7-2-65
NASA APPROVAL 7-13-65
MIT APPROVAL 12-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

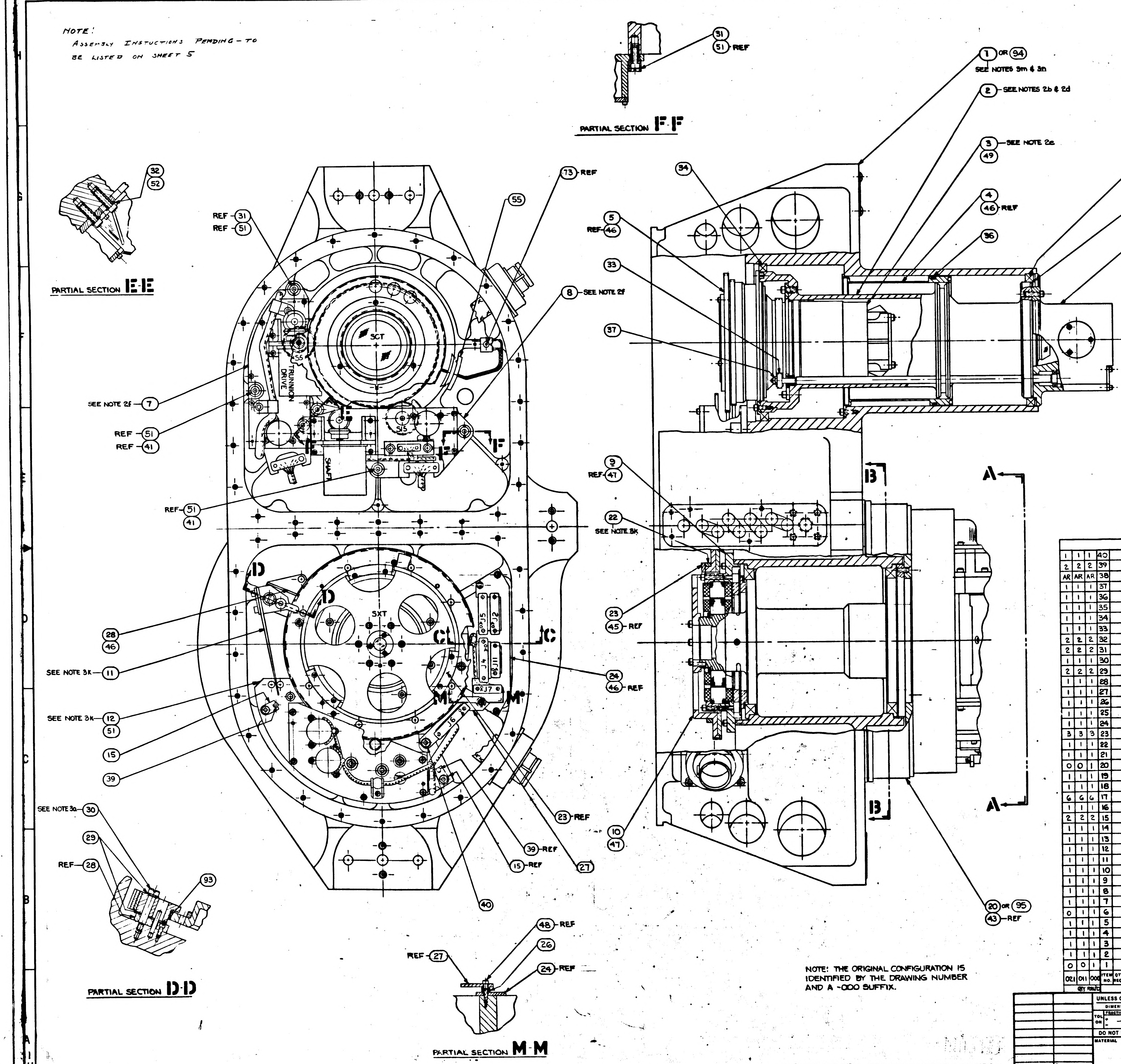
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 5

J 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK

REVISIONS 1227

NOTE: ASSEMBLY INSTRUCTIONS PENDING – TO BE LISTED ON SHEET 5


PARTIAL SECTION F-F
31
51 REF
PARTIAL SECTION E-E
32
52
REF 31
REF 51
55
73 REF
8 SEE NOTE 2f
SCT
TRUNNION DRIVE
SHAFT
SEE NOTE 2f 7
REF 51
REF 41
REF 51
41
F
D
C
M
SXT
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
SEE NOTE 3a 30
29
REF 28
93
PARTIAL SECTION D-D
24 REF
46 REF
23 REF
39 REF
15 REF
27
40
48 REF
26
24 REF
REF 27
PARTIAL SECTION M-M
1 OR 34
SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
34
4
46 REF
5
REF 46
36
35
38 SEE NOTE 2a
6 OR 102
48
33
37
9
REF 47
22
SEE NOTE 3K
23
45 REF
10
47
B
A
20 OR 95
43 REF

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

SEE SHEET 2 FOR ITEMS 41 THRU 55

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	1	40			NAS1352C08LL10	74455157028		SCREW, CAP, HEX. SOC. HD. SELF LOCKING			
2	2	2	39			2011684	48386910030		PIN, THREADED			
AR	AR	AR	38			2011877-1 TO -12	79386910401 THRU 0412		SPACER			
1	1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	1	35		*	1011606-1	30205772240		BEARING, BALL			
1	1	1	34		*	1011606-2	30205772720		BEARING, BALL			
1	1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	1	9			2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
0	1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED 8/27/69
APPROVAL 8/27/69
APPROVAL E. [illegible] 8/31/69
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

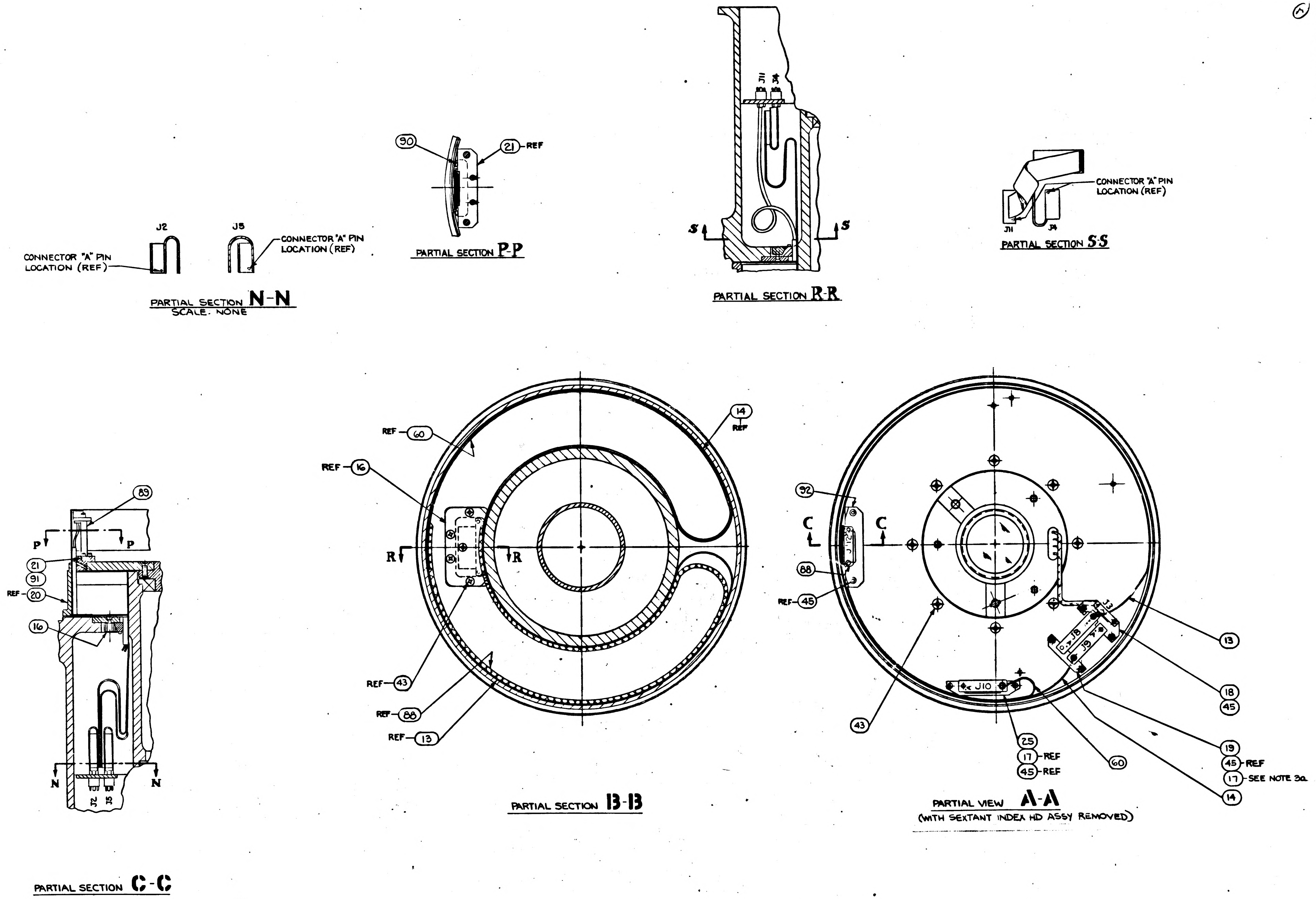
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

J | 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	[illegible]	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	wk
D		REVISED PER TDRR NO. 20200	[illegible]	wk
E		REVISED PER TDRR 20351	7-2-65	wk
F		REVISED PER TDRR 21538	[illegible]	wk
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	wk

REVISIONS 12217



J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)
90
21 - REF
J11
J4
S
S
CONNECTOR "A" PIN LOCATION (REF)
J11
J4
89
P
P
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91
REF - 20
16
N
N
J2
J5
REF - 60
14 REF
REF - 16
R
R
REF - 43
REF - 88
REF - 13
92
C
C
J12
88
REF - 45
J13
J10
13
18
45
19
45 - REF
17 - SEE NOTE 3a.
14
25
17 - REF
45 - REF
60
43

PARTIAL SECTION N-N
SCALE: NONE

PARTIAL SECTION P-P

PARTIAL SECTION R-R

PARTIAL SECTION S-S

PARTIAL SECTION C-C

PARTIAL SECTION B-B

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	1	55			2012164	26386910060		GROMMET			
			54									
			53									
2	2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC HD, SELF LOCKING			
7	7	7	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
			50									
4	4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC HD, SELF LOCKING			
8	8	8	48		NAS	1352C04LL8	74455157015					
14	14	14	47		NAS	1352C04LL6	74455157014					
14	14	14	46		NAS	1352C04LL4	74455157013					
14	14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
			44									
12	12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
									SEE SHEET 1 FOR ITEMS 1 THRU 40			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	201.000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

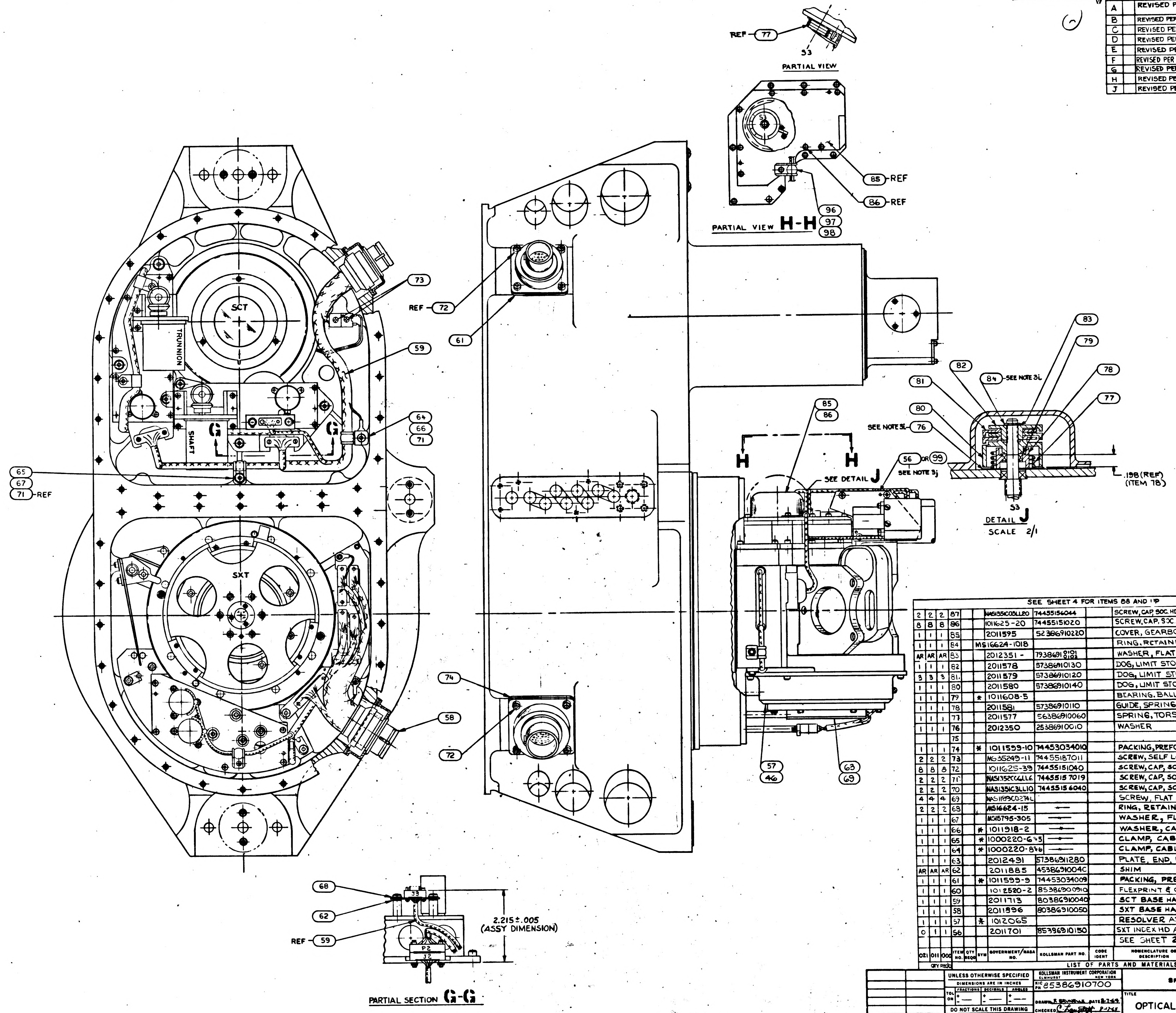
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

J 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRB NO. 1339C	[illegible]	WR
B		REVISED PER TDRR NO.19852	[illegible]	[illegible]
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR NO. 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]

REVISIONS 12217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PARTIAL VIEW
85 REF
86 REF
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TRUNNION
SHAFT
G
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67
71 REF
SXT
74
58
72
83
79
82
84 SEE NOTE 3L
78
81
77
80
SEE NOTE 3L 76
85
86
H
H
56 OR 99
SEE DETAIL J
SEE NOTE 3j
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
57
46
63
69
68
62
33
2.215 ± .005 (ASSY DIMENSION)
REF 59
P2
J2
PARTIAL SECTION G-G
10
9
8
7
6
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4
3
2
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E
D
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B

SEE SHEET 4 FOR ITEMS 88 AND UP

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	8	86			1011625-20	74455151020		SCREW, CAP, SOC. HD SELF LOCKING			
1	1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
1	1	1	79		*	1011608-5			BEARING, BALL, ANNULAR			
1	1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	1	76			2012350	25386910010		WASHER			
			75									
1	1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	4	69			NAS1189C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	2	68			MS16624-15	——		RING, RETAINING, EXTERNAL, BASIC			
1	1	1	67			MS15795-305	——		WASHER, FLAT			
1	1	1	66		*	1011918-2	——		WASHER, CABLE CLAMP			
1	1	1	65		*	1000220-6-5	——		CLAMP, CABLE			
1	1	1	64		*	1000220-8-6	——		CLAMP, CABLE			
1	1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	AR	62			2011885	4538691004C		SHIM			
1	1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	1	57		*	1012065			RESOLVER ASSY 1SPEED, 2 SPEED, 64 SPEED			
0	1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
									SEE SHEET 2 FOR ITEM 41 THRU 55			

QTY REQD

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED C. Lampsteff 8-17-64
APPROVAL [illegible]
APPROVAL E. Henry 8/31/64
NASA APPROVAL
MIT APPROVAL

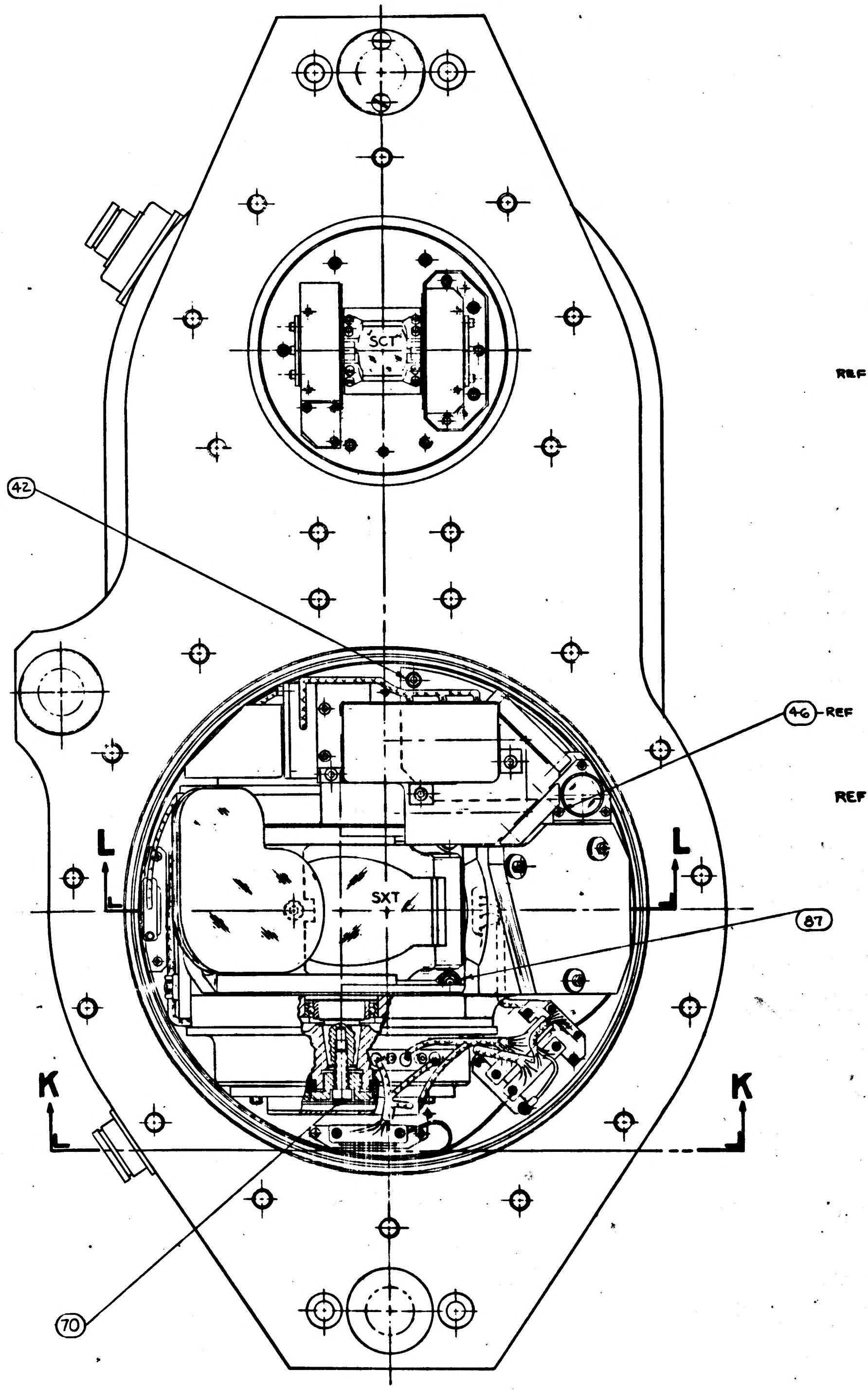
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

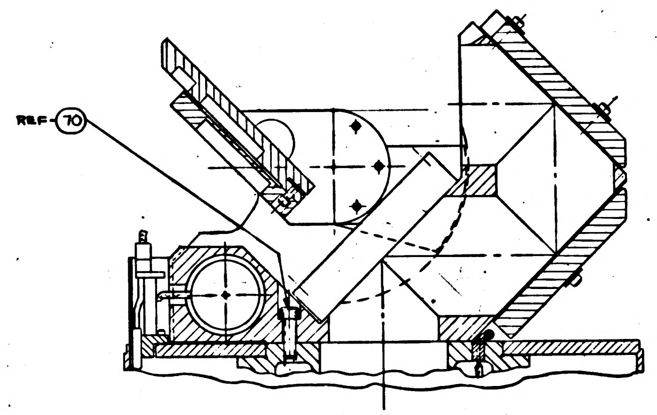
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

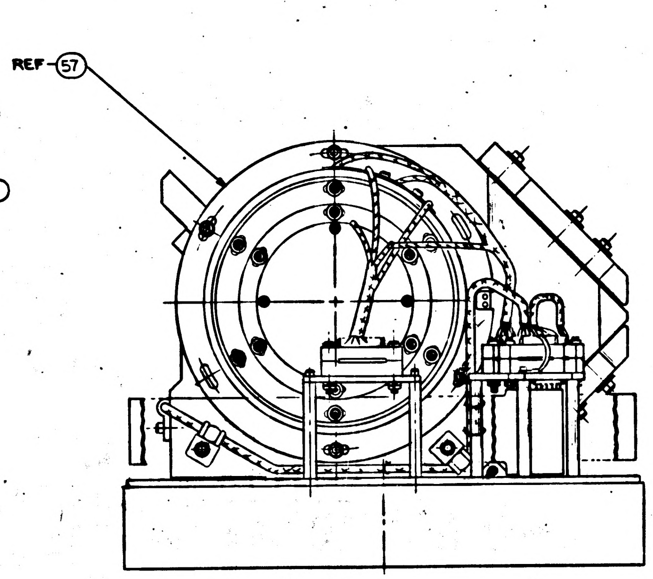
J 0681102

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5350	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	[illegible]
D		REVISED PER TDRR 20200	[illegible]	[illegible]
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]





PARTIAL SECTION L-L



PARTIAL VIEW K-K

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	102			2011215-011			TELESCOPE TRUNNION AXIS ASSY			
			101									
			100									
1	0	0	99			2011701-011			SEXTANT INDEX HEAD ASSY			
1	1	1	98		*	1000220-5			CLAMP, CABLE			
1	1	1	97		*	1011918-1			WASHER, CLAMP, CABLE			
1	1	1	96			NAS1352C03LL8	74455157011		SCREW, CAP, SOC HD, SELF LOCKING			
1	1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	1	93		*	1011625-28	74455151028		SCREW, CAP, HEX., SOC. HD., SELF LOCKING			
1	1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
QTY REQ'D			LIST OF PARTS AND MATERIALS									

APPLICATION	
NEXT ASSY	USED ON
2011000	2011000

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. Brunelle DATE 8-7-69
CHECKED C. [illegible] 8/27/69
APPROVAL [illegible] 8/27/69
APPROVAL E. [illegible] 8/31/69
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

J 2011890

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	[illegible]	wk
E		REVISED PER TDRR 20351	[illegible]	wk
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	9/8/65	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK

NOTES:

1. GENERAL REQUIREMENTS

a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF 15 IN-OZ.

e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792; PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET. BACKLASH BETWEEN COUNTER BEVEL GEARS SHALL BE BETWEEN .001 & .005 THROUGH ONE COMPLETE REVOLUTION OF LARGER GEAR.

3. SEXTANT (SXT) REQUIREMENTS

a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS 15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387

l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V. AMATO DATE 6-11-65
CHECKED F. Raymond 6-30-65
APPROVAL
APPROVAL E. Thomas 7-2-65
NASA APPROVAL W. J. R. 7-23-65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

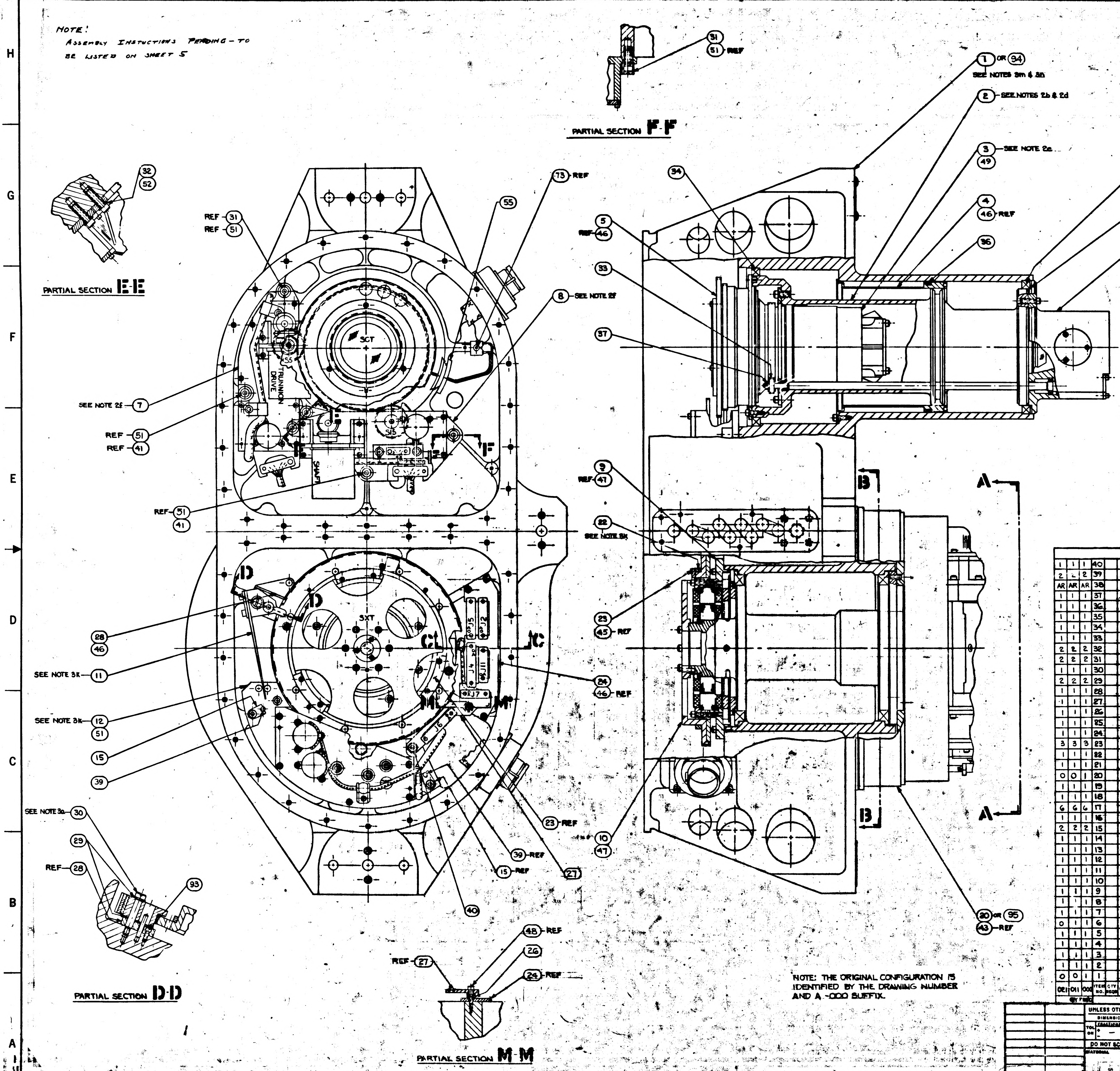
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 5

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO
BE LISTED ON SHEET 5

2011890 K

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350		
B		REVISED PER TDRR NO. 19852		
C		REVISED PER TDRR NO. 20177		
D		REVISED PER TDRR NO. 20200		
E		REVISED PER TDRR 20351		
F		REVISED PER TDRR 21538		
G		REVISED PER TDRR 21536		
H		REVISED PER TDRR 21660		
J		REVISED PER TDRR 22643		
K		REVISED PER TDRR 22658		

REVISIONS 1227



NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

SEE SHEET 2 FOR ITEMS 41 THRU 55

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	1	40			MS135208[illegible]	74455157028		SCREW, CAP, HEX. SOC HD. SELF LOCKING			
2	2	2	39			2011684	[illegible]910030		PIN, THREADED			
AR	AR	AR	38			2011877-[illegible]	793869[illegible]		SPACER			
1	1	1	37		*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	1	36			MS9021-154			PACKING, PREFORMED			
1	1	1	35		*	1011606-1	30205T72240		BEARING, BALL			
1	1	1	34		*	1011606-2	30205T72720		BEARING, BALL			
1	1	1	33			2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	2	32			2011562	57386910580		BUSHING, LOCATING			
2	2	2	31			2011561	57386910590		BUSHING, ECCENTRIC			
1	1	1	30			2011344	45386910020		SCREW, SHOULDER			
2	2	2	29			2011353	56386910260		SPACER, SPRING HOLDER			
1	1	1	28			2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	1	27			2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	1	26			2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	1	25			2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	1	24			2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	3	23			2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	1	22			2011342	57386910570		RING, LIMIT STOP			
1	1	1	21			2011320	52386910160		PLATE, FLEXPRINT GUIDE			
0	0	1	20			2011616	57386910020		RING, MOUNTING, COVER			
1	1	1	19			2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	1	18			2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	6	17			2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	1	16			2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	2	15			2011686	56386910310		RETAINER, PIN			
1	1	1	14		*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	13		*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	12			2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT., ASSY OF			
1	1	1	11			2011714	85386910460		LIMIT STOP ASSY			
1	1	1	10			2012387	85386911110		GEAR & SPRING, ASS'Y OF			
1	1	1	9			2011506	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	1	8			2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	1	7			2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
0	1	1	6			2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	1	5			2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	1	4			2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	1	3			2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	1	2			2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	0	1	1			2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011880	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC FN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVED
APPROVAL
NASA APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

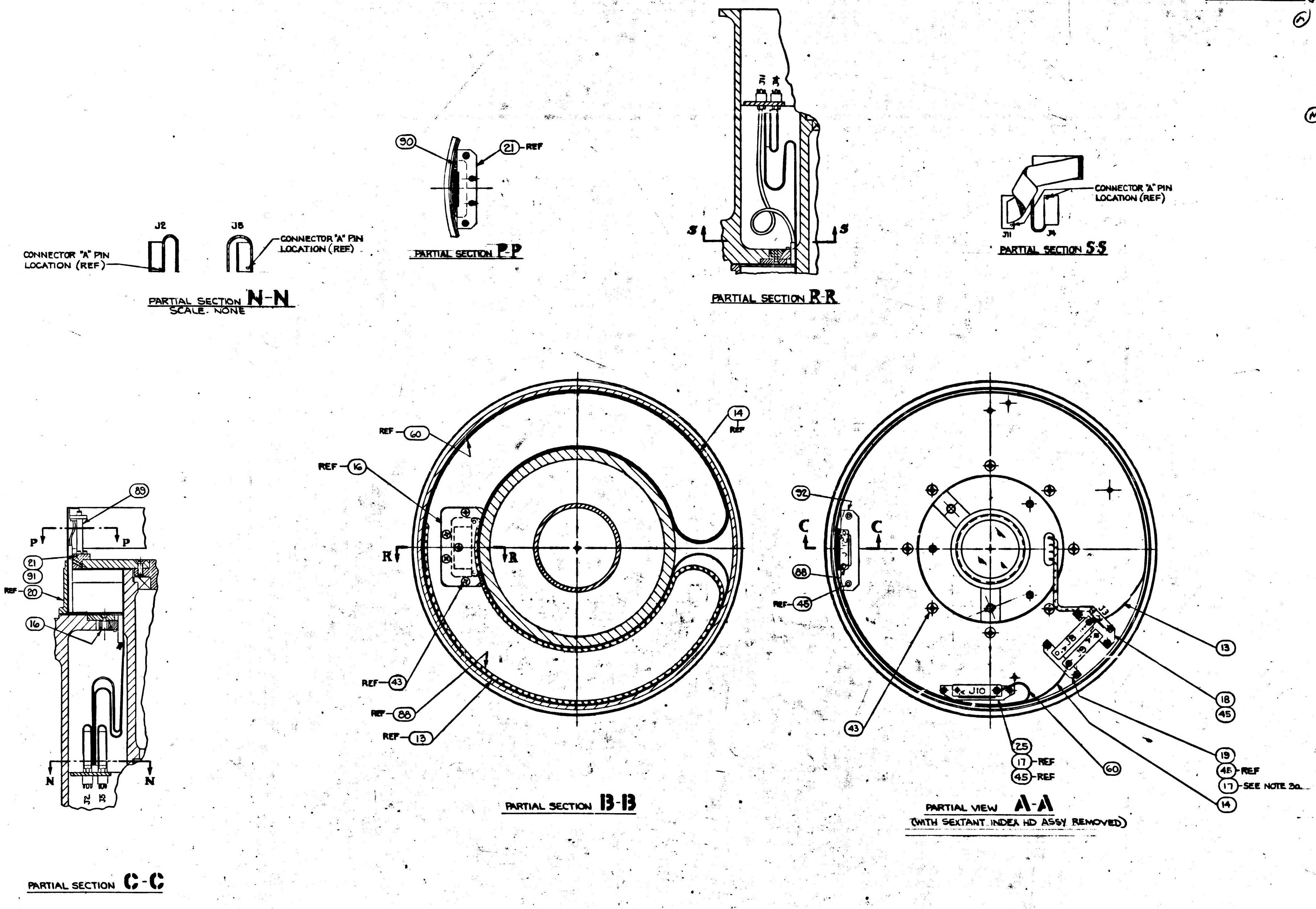
CODE IDENT NO. | SIZE E | NASA NUMBER 2011890
SCALE 1/1 | WEIGHT | SHEET 1

2011890 K

2011890 K

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350		WK
B		REVISED PER TDRR NO. 19852		WK
C		REVISED PER TDRR NO. 20177		WK
D		REVISED PER TDRR NO. 20200	7/65	WK
E		REVISED PER TDRR 20551		WK
F		REVISED PER TDRR 21538		WK
G		REVISED PER TDRR 21536		
H		REVISED PER TDRR 21660		
J		REVISED PER TDRR 22643		
K		REVISED PER TDRR 22638		WK

REVISIONS 12217



J2
J3
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)
PARTIAL SECTION N-N
SCALE: NONE
90
21 - REF
PARTIAL SECTION P-P
J11
J4
S
S
PARTIAL SECTION R-R
CONNECTOR "A" PIN LOCATION (REF)
J11
J4
PARTIAL SECTION S-S
89
P
P
21
91
REF 20
16
N
N
J2
J3
PARTIAL SECTION C-C
REF 60
REF 16
14 REF
R
R
REF 43
REF 88
REF 13
PARTIAL SECTION B-B
92
C
C
88
REF 48
J10
43
25
17 REF
45 REF
60
13
18
45
19
46 REF
17 SEE NOTE 3a.
14
PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 87

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	1	1	55			2012164	26386910060		GROMMET			
			54									
			53									
2	2	2	52		NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD, SELF LOCKING			
7	7	7	51		NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
			50									
4	4	4	49		NAS	1352C06LL4	74455157018		SCREW, CAP, SOC. HD, SELF LOCKING			
8	8	8	48		NAS	1352C04LL8	74455157015					
14	14	14	47		NAS	1352C04LL6	74455157014					
14	14	14	46		NAS	1352C04LL4	74455157013					
14	14	14	45		NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
			44									
12	12	12	43		NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	1	42			1010628-19			SCREW, FLAT HD SELF LOCKING SOC, HEX			
2	2	2	41		AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
									SEE SHEET 1 FOR ITEMS 1 THRU 40			

QTY REQ'D

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

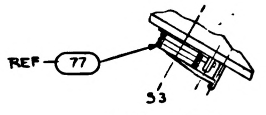
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
SHEET 2 OF 5

2011890 K

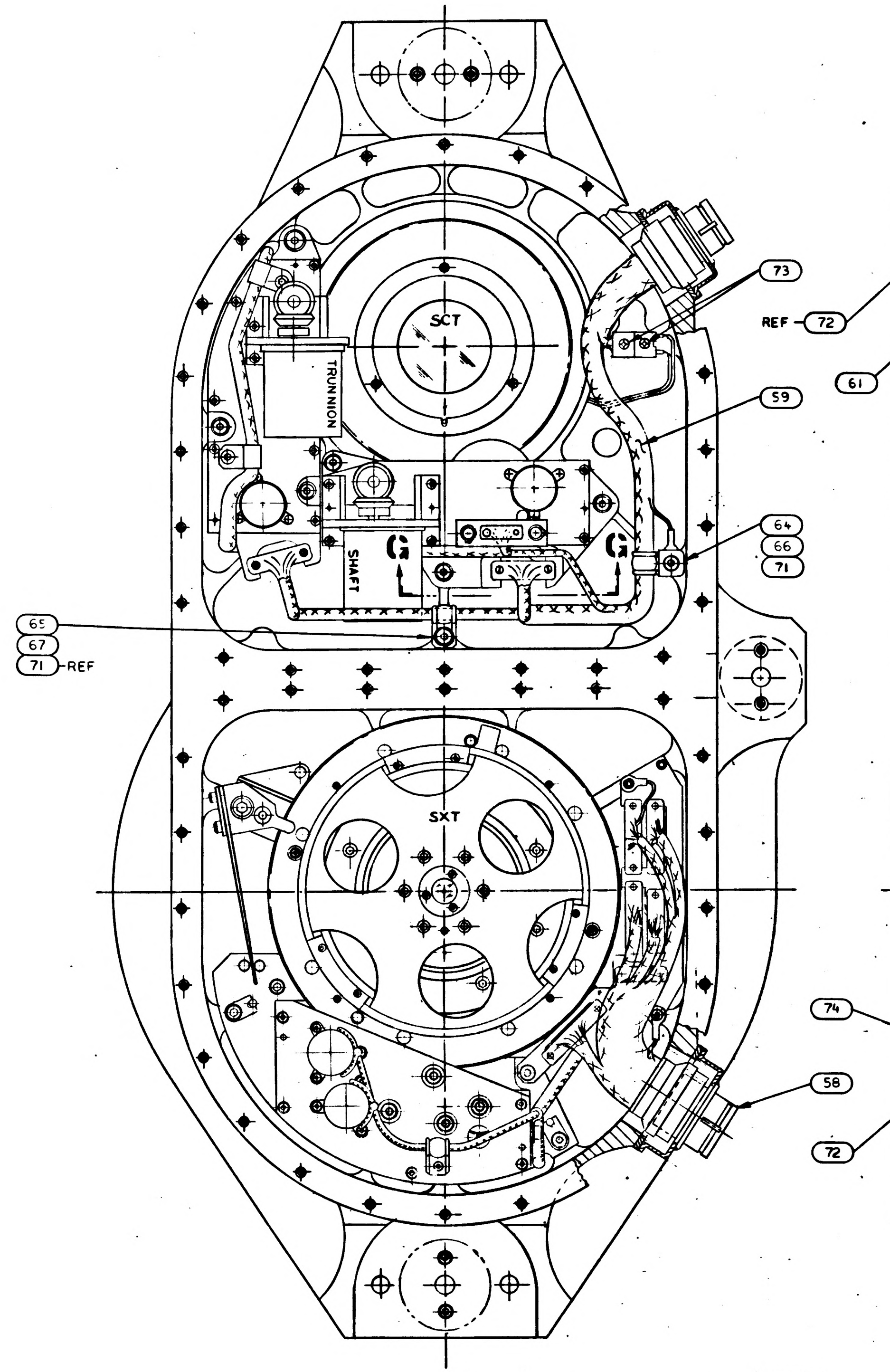
2011890 K

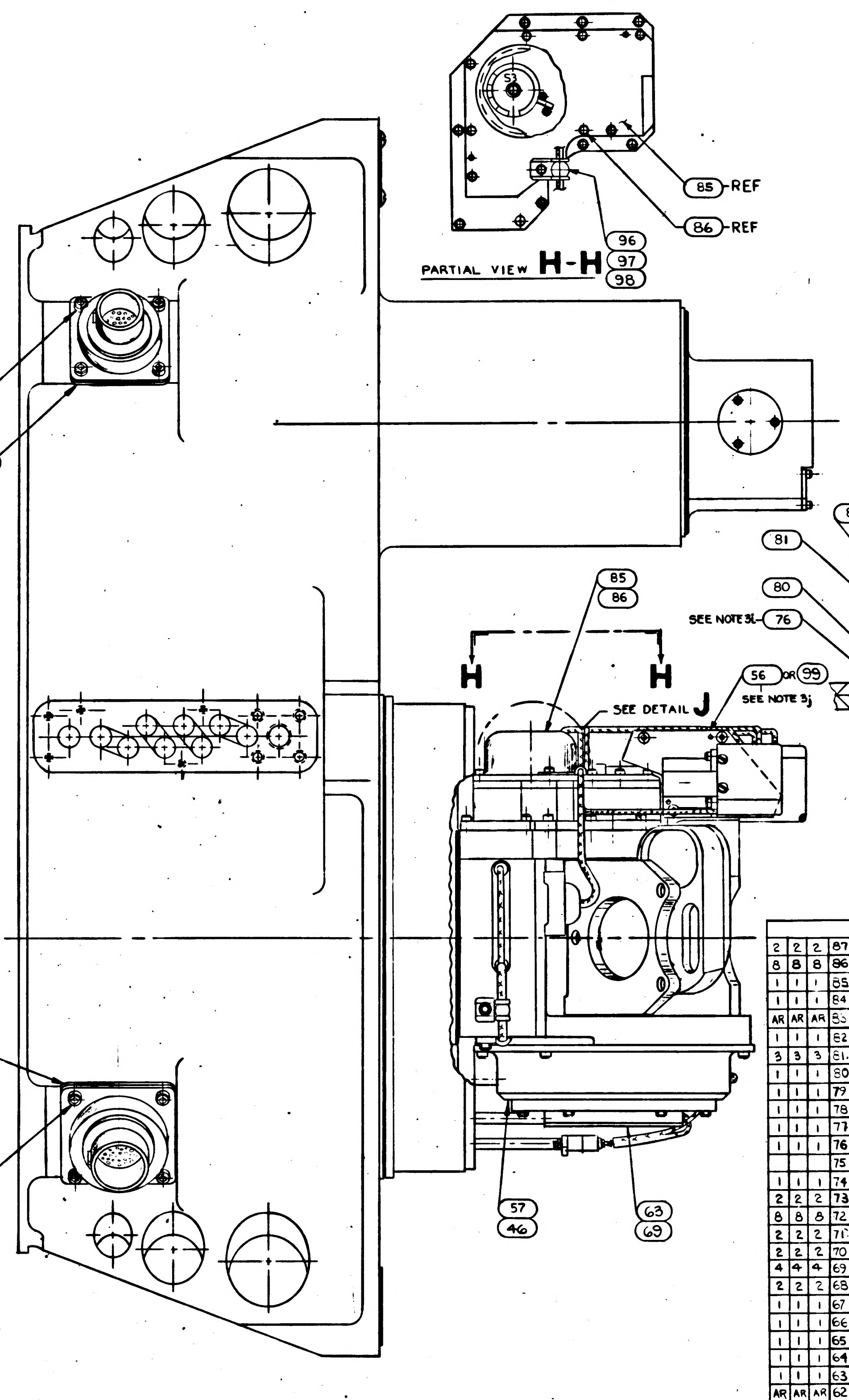
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS 12217		
A		REVISED PER TDRR NO. 15390	4/6/65	WR
B		REVISED PER TDRR NO.19852	6/8/65	WR
C		REVISED PER TDRR NO. 20177	6/24/65	WR
D		REVISED PER TDRR NO. 20200	7/1/65	WR
E		REVISED PER TDRR 20351	7/2/65	WR
F		REVISED PER TDRR NO. 21538	8/24/65	WR
G		REVISED PER TDRR 21536	9/8/65	[illegible]
H		REVISED PER TDRR 21660	9/-/65	[illegible]
J		REVISED PER TDRR 22643	9/-/65	[illegible]
K		REVISED PER TDRR 22638	10/-/65	W.(

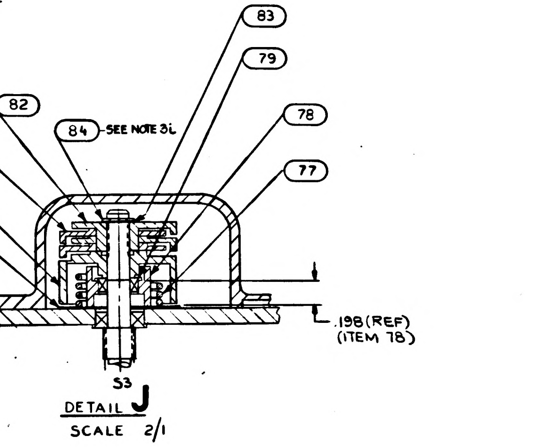


PARTIAL VIEW

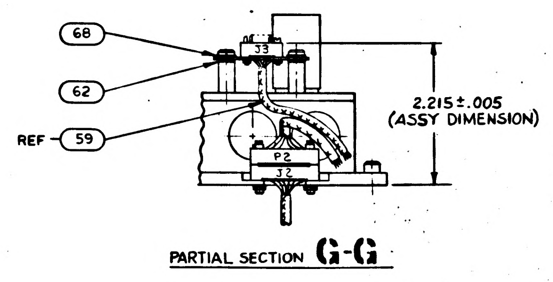
PARTIAL VIEW H-H







DETAIL J
SCALE 2/1



PARTIAL SECTION G-G

SEE SHEET 4 FOR ITEMS 88 AND UP

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	2	2	87			NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	8	86			1011625-20	74455151020		SCREW, CAP, SOC HD SELF LOCKING			
1	1	1	85			2011595	52386910220		COVER, GEARBOX			
1	1	1	84			MS16624-1018			RING, RETAINING			
AR	AR	AR	83			2012351 -	7938691 0101 0102		WASHER, FLAT			
1	1	1	82			2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	3	81			2011579	57386910120		DOG, LIMIT STOP			
1	1	1	80			2011580	57386910140		DOG, LIMIT STOP, INNER			
1	1	1	79		*	1011608-5			BEARING, BALL, ANNULAR			
1	1	1	78			2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	1	77			2011577	56386910060		SPRING, TORSION			
1	1	1	76			2012350	25386910010		WASHER			
			75									
1	1	1	74		*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	2	73			MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	8	72			1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	71			NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	70			NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	4	69			NAS1169C02T4L			SCREW, FLAT HD, SELF LOCKING			
2	2	2	68			MS16624-15	—•—		RING, RETAINING, EXTERNAL, BASIC			
1	1	1	67			MS15795-305	—•—		WASHER, FLAT			
1	1	1	66		*	1011918-2	—•—		WASHER, CABLE CLAMP			
1	1	1	65		*	1000220-6&5	—•—		CLAMP, CABLE			
1	1	1	64		*	1000220-8&6	—•—		CLAMP, CABLE			
1	1	1	63			2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	AR	62			2011885	45386910040		SHIM			
1	1	1	61		*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	1	60			1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	1	59			2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	1	58			2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	1	57		*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
0	1	1	56			2011701	85386910150		SXT INDEX HD ASSY			
									SEE SHEET 2 FOR ITEM 41 THRU 55			

QTY REQD

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN F. BRUNELLE DATE 8-7-64
CHECKED C. Langstaff 8-17-64
APPROVAL [illegible] 8-[illegible]
APPROVAL E. Bhoruz 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 5

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

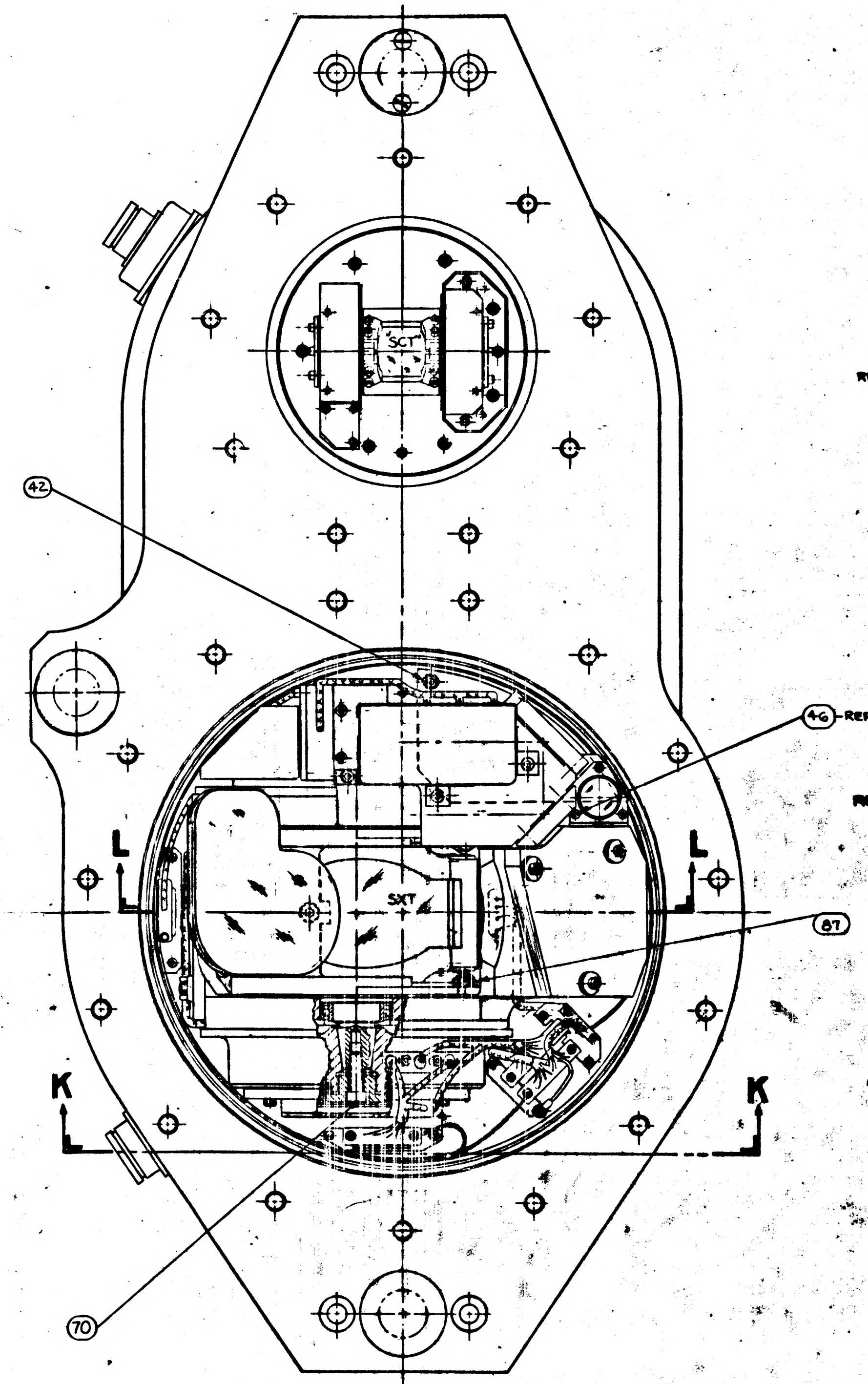
CONTRACT

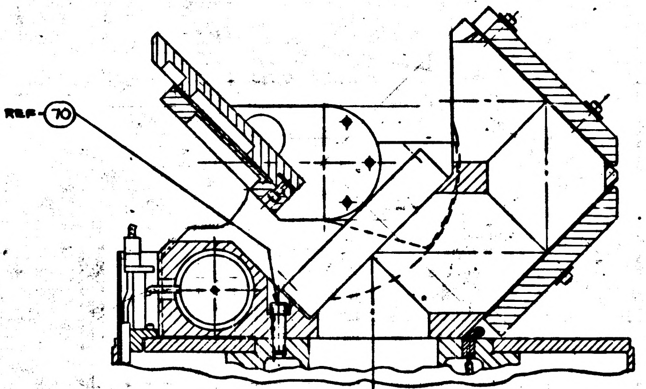
* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

2011890 K

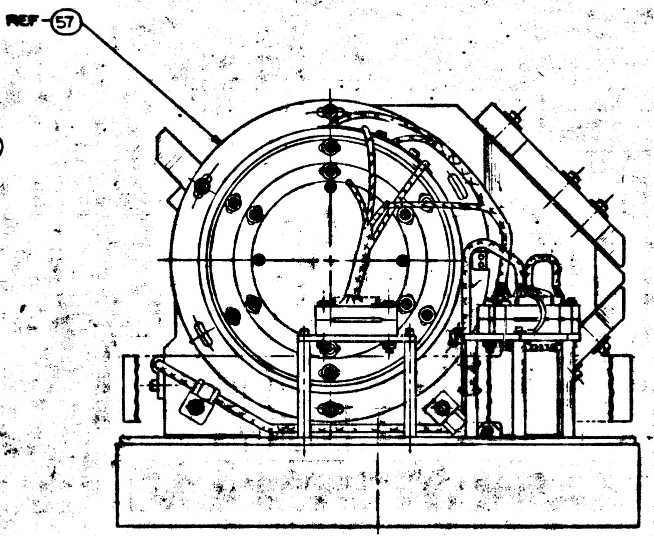
2011890 K

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15355	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	WK
D		REVISED PER TDRR 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK
K		REVISED PER TDRR 22638	[illegible]	WK





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	0	102			2011215-011			TELESCOPE TRUNNION AXIS ASSY			
			101									
			100									
1	0	0	99			2011701-011			SEXTANT INDEX HEAD ASSY			
1	1	1	98		*	1000220-5			CLAMP, CABLE			
1	1	1	97		*	1011918-1			WASHER, CLAMP, CABLE			
1	1	1	96			NAS1352C03LL8	74455157011		SCREW, CAP. SOC HD. SELF LOCKING			
1	1	0	95			2012621	57386911680		RING, MOUNTING COVER			
1	1	0	94			2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	1	93		*	1011623-28	74455151028		SCREW, CAP, HEX., SOC. HD., SELF LOCKING			
1	1	1	92			2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	2	91		*	1011625-11	74455151011		SCREW, CAP, SOC HD, SELF LOCKING			
2	2	2	90			NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	2	89			2012432	53386910050		POST, CONNECTOR PLATE			
1	1	1	88			1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			

QTY REQ'D

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R. [illegible] DATE [illegible]
CHECKED [illegible] 2/27/69
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
UNIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 4 OF

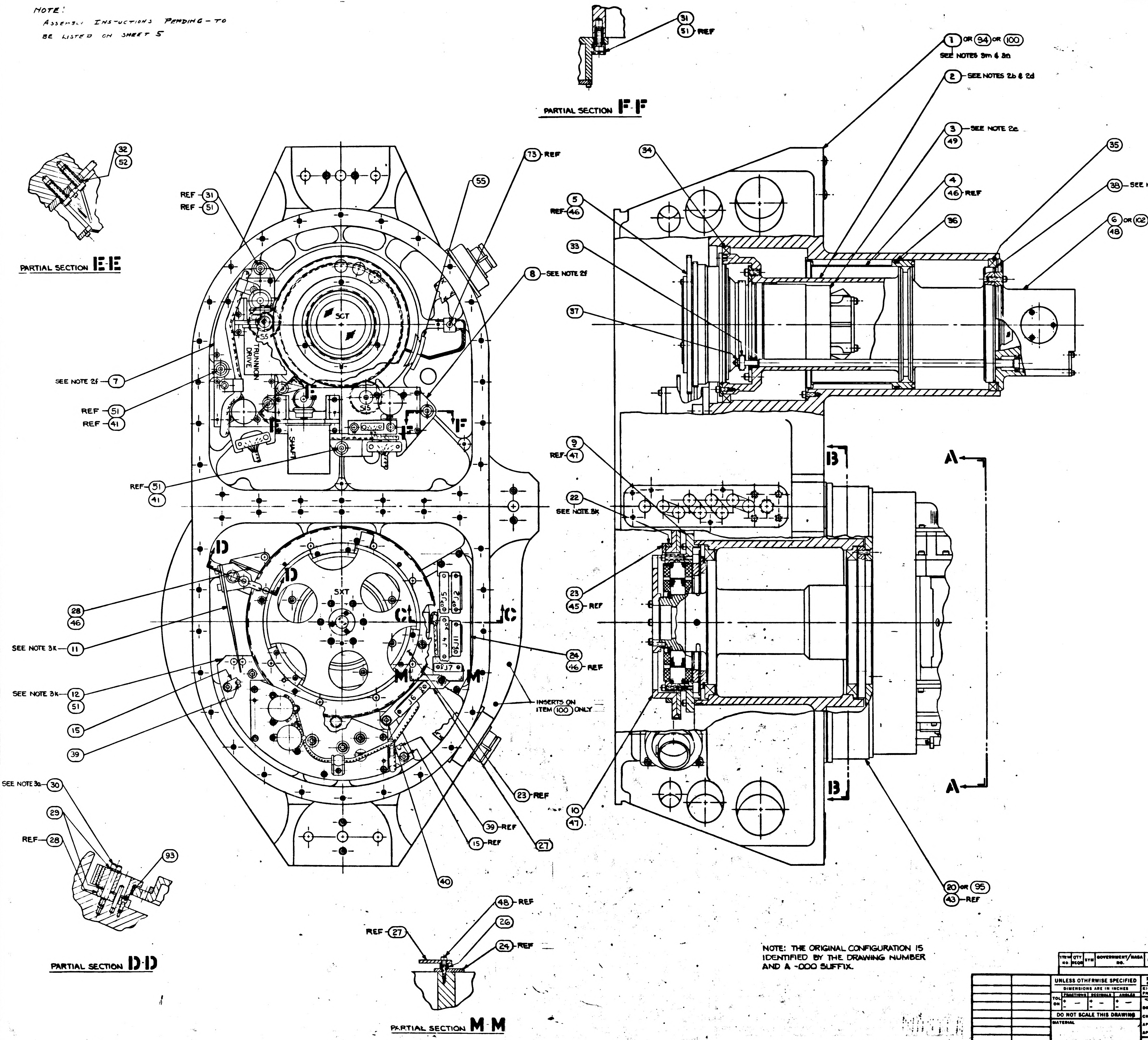
2011890 K

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO
BE LISTED ON SHEET 5

2011890 L

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	[illegible]	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK
K		REVISED PER TDRR 22638	[illegible]	WK
L		REVISED PER TDRR 23069	[illegible]	[illegible]

REVISIONS 12217


PARTIAL SECTION F-F
31
51 REF
PARTIAL SECTION E-E
32
52
PARTIAL SECTION D-D
PARTIAL SECTION M-M
1 OR 94 OR 100 SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
4
46 REF
35
38 SEE NOTE 2a
6 OR 102
48
34
5
REF 46
36
33
37
8 SEE NOTE 2f
73 REF
55
REF 31
REF 51
SEE NOTE 2f 7
REF 51
REF 41
REF 51
41
SCT
SXT
TRUNNION DRIVE
SHAFT
9
REF 47
22
SEE NOTE 3K
23
45 REF
24
46 REF
INSERTS ON ITEM 100 ONLY
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
SEE NOTE 3a 30
29
REF 28
93
23 REF
39 REF
15 REF
27
40
10
47
20 OR 95
43 REF
A
B
C
D
M
E
F
48 REF
26
24 REF
REF 27

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
UNIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

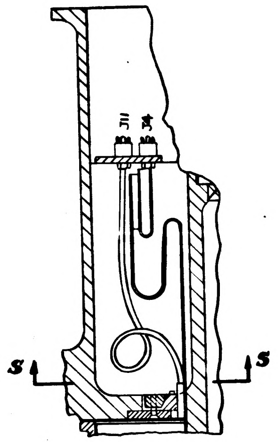
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 6

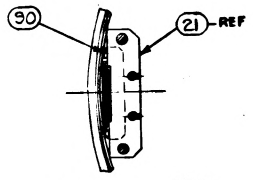
2011890 L

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350		WK
B		REVISED PER TDRR NO. 19852		WK
C		REVISED PER TDRR NO. 20177		WK
D		REVISED PER TDRR NO. 20200		WK
E		REVISED PER TDRR 20351		WK
F		REVISED PER TDRR 21538		WK
G		REVISED PER TDRR 21536		
H		REVISED PER TDRR 21660		
J		REVISED PER TDRR 22643		WK
K		REVISED PER TDRR 22638		WK
L		REVISED PER TDRR 23069		WK

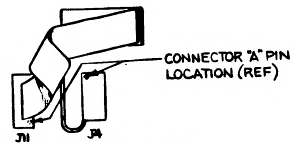
REVISIONS 12217



PARTIAL SECTION R-R

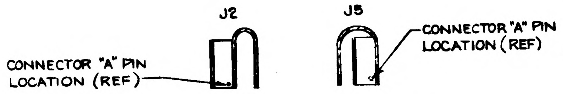


PARTIAL SECTION P-P



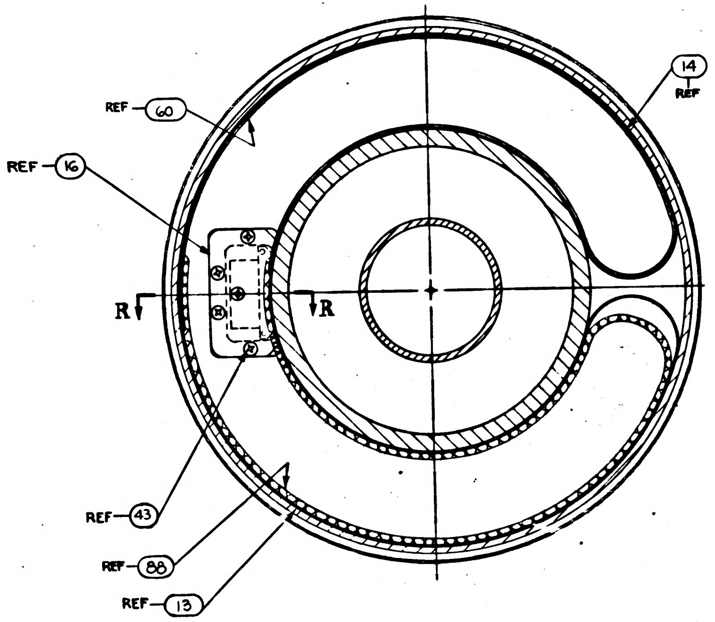
CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION S-S



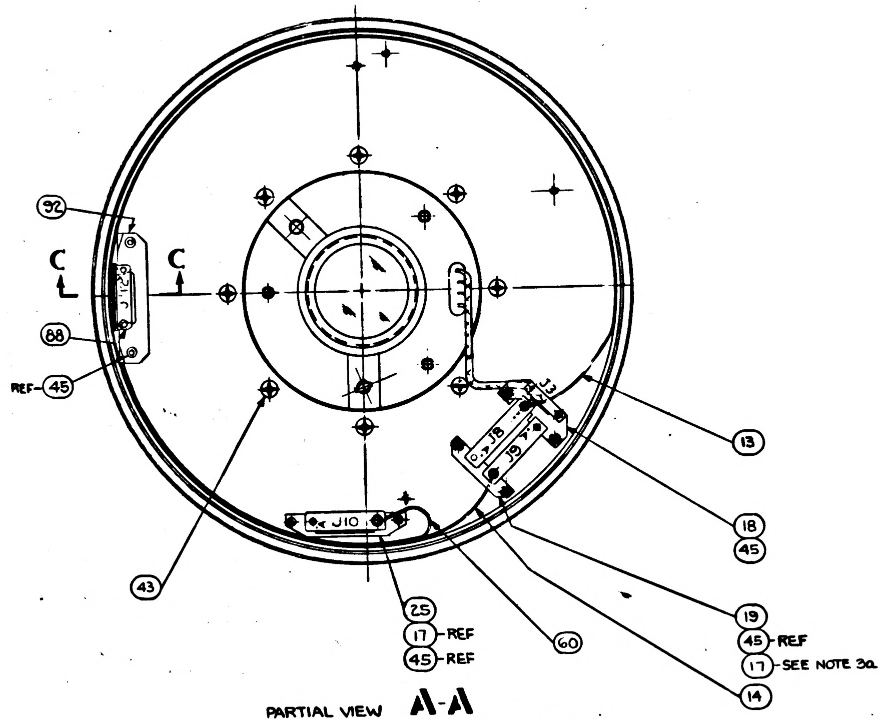
J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

PARTIAL SECTION N-N
SCALE: NONE



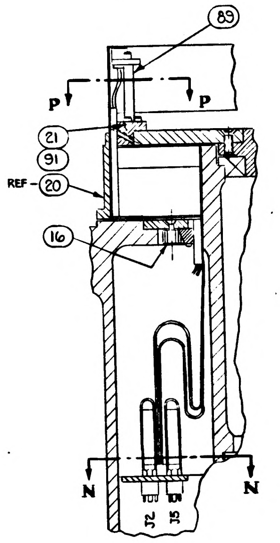
14 REF
REF 60
REF 16
R
R
REF 43
REF 88
REF 13

PARTIAL SECTION B-B



92
C
C
88
REF 45
J11
J4
J10
13
18
45
43
25
17 REF
45 REF
60
19
45 REF
17 SEE NOTE 3a.
14

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)



89
P
P
21
91
REF 20
16
N
N
J2
J5

PARTIAL SECTION C-C

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. Morgo
NASA APPROVAL
MIT APPROVAL

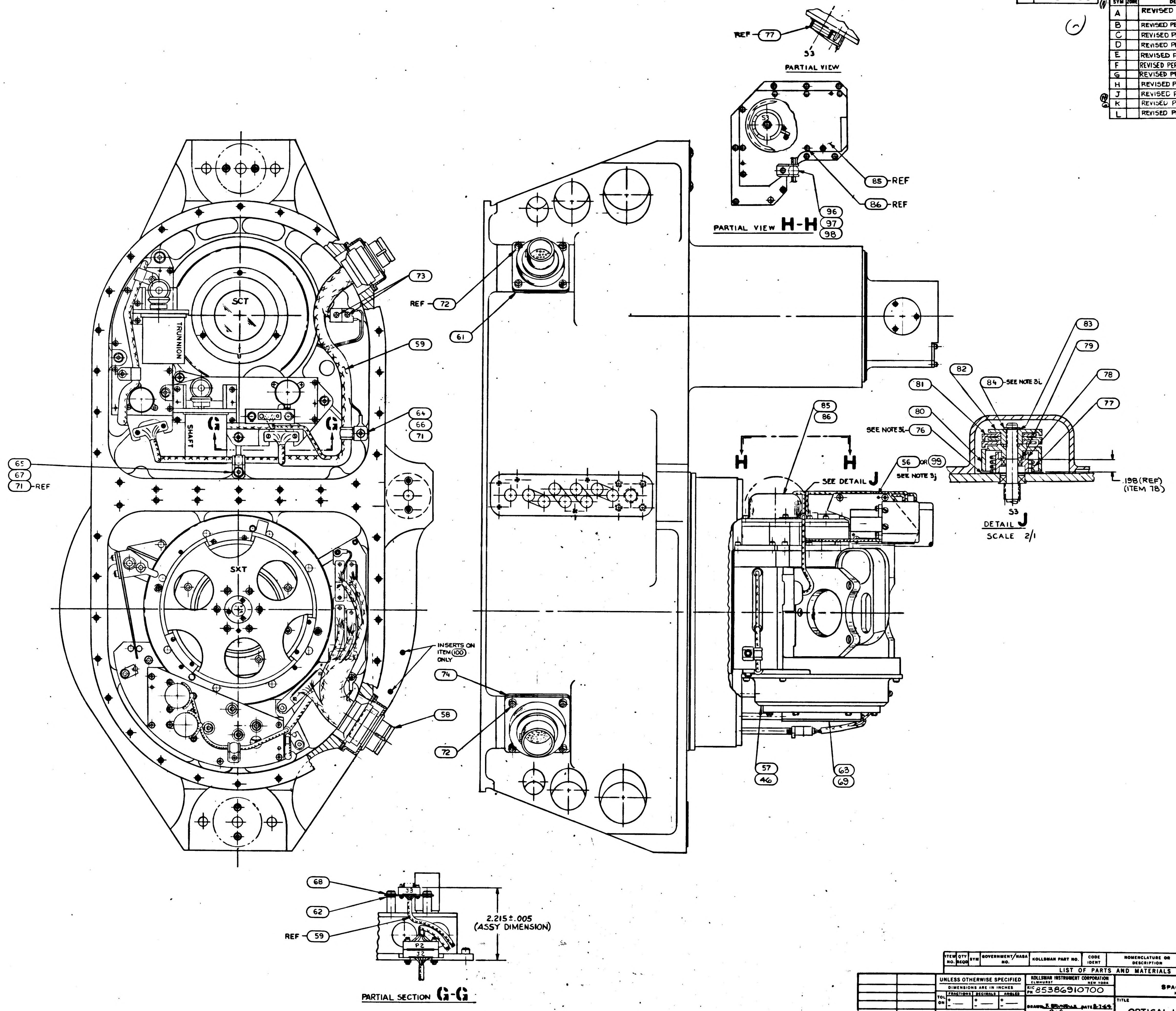
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 6

7 0681102 L

REVISIONS				2217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15330	[illegible]	WR
B		REVISED PER TDRR NO. 19852	[illegible]	[illegible]
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	[illegible]
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR NO. 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	[illegible]


REF 77
53
PARTIAL VIEW
85 REF
86 REF
96
97
98
PARTIAL VIEW H-H
73
REF 72
61
SCT
TRUNNION
59
SHAFT
G
G
64
66
71
65
67
71 REF
SXT
INSERTS ON ITEM 100 ONLY
74
58
72
83
79
82
84 SEE NOTE 3L
78
81
77
80
SEE NOTE 3L 76
85
86
H
H
56 OR 99
SEE NOTE 3j
SEE DETAIL J
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
57
46
63
69
68
62
REF 59
33
P2
32
2.215 ± .005 (ASSY DIMENSION)
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

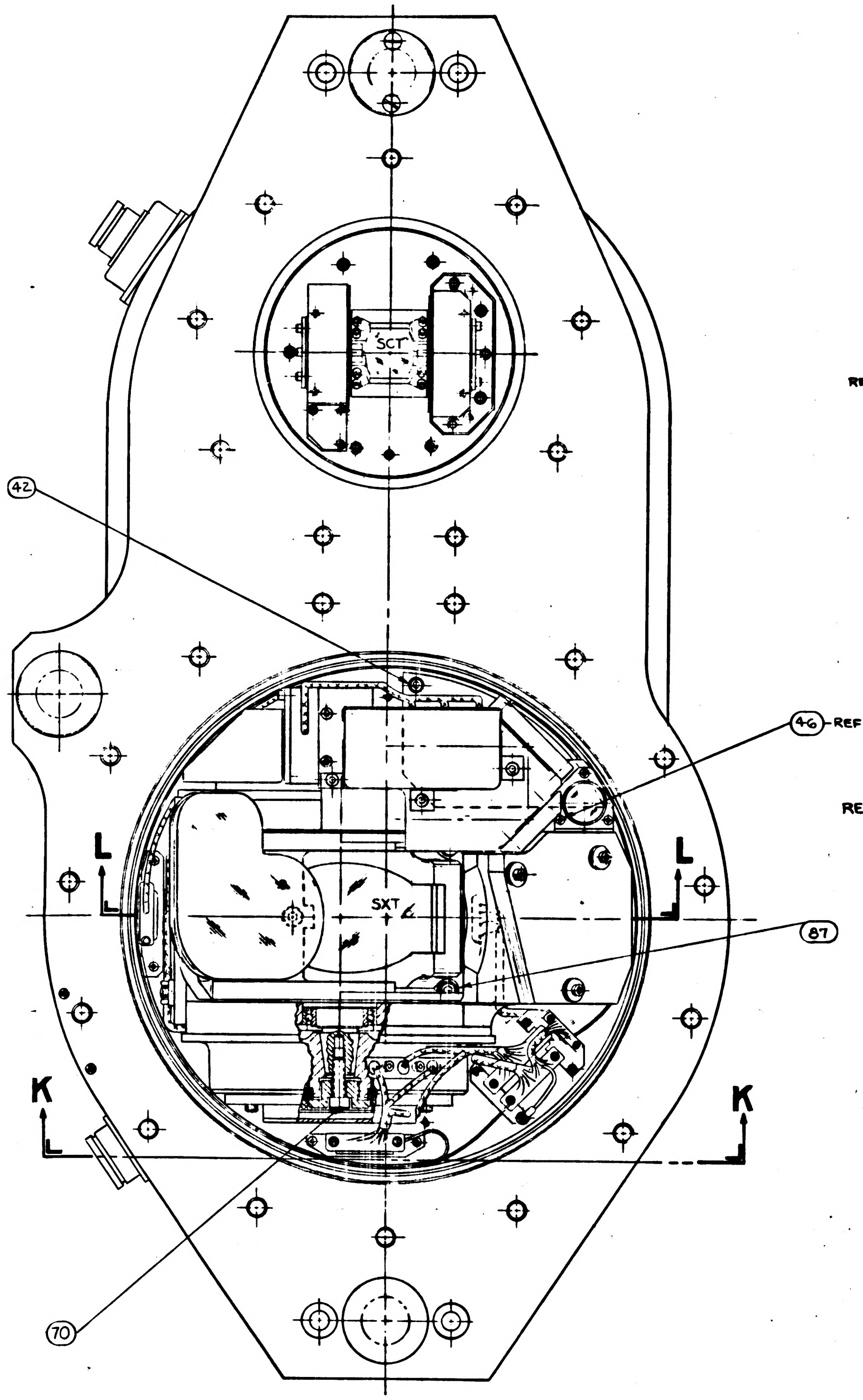
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN F. BRUNELLE DATE 8-7-64
CHECKED C. [illegible] 9-1-64
APPROVAL [illegible]
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

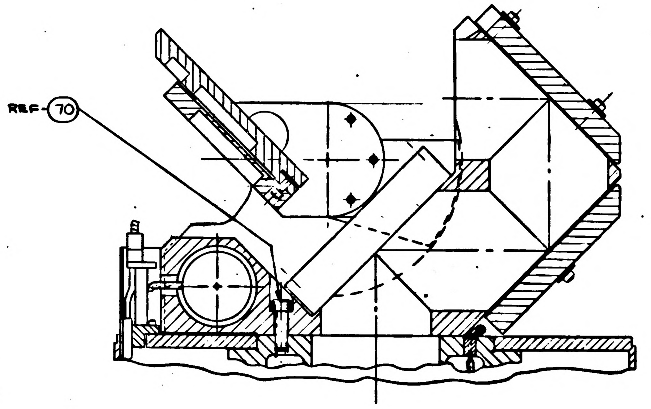
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 6

2011890

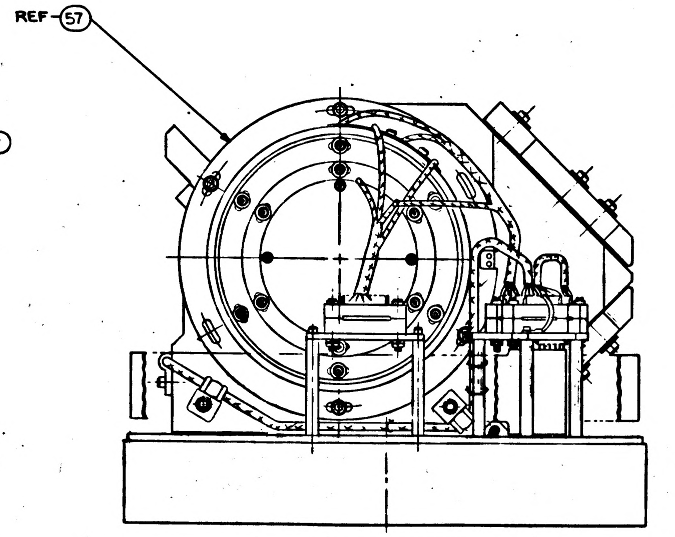
7 0681102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	WK
D		REVISED PER TDRR 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	[illegible]





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED 8/27/64
APPROVAL 8/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 6

2011890

L 2011890

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	7/16/65	WK
E		REVISED PER TDRR 20351	7/21/65	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	9/8/65	[illegible]
H		REVISED PER TDRR 21660	9/14/65	[illegible]
J		REVISED PER TDRR 22643	9/28/65	WK
K		REVISED PER TDRR 22638	10/6/65	WK
L		REVISED PER TDRR 23069	10/24/65	WK

NOTES:

1. GENERAL REQUIREMENTS
   - a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS
   - a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.
   - b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.
   - c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).
   - d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF $13^{\pm 2}$ IN.OZ. AND WITHIN 1 IN.OZ. OF EACH OTHER. THE TIGHTENING TORQUE SHALL BE DEFINED AS THE TORQUE IN EXCESS OF THE THREADING TORQUE MEASURED ON AN INDIVIDUAL SCREW BASIS.
   - e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.
   - f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.
   - g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.
   - h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3e HAVE BEEN MET. BACKLASH BETWEEN COUNTER BEVEL GEARS SHALL BE BETWEEN .001 & .005 THROUGH ONE COMPLETE REVOLUTION OF LARGER GEAR.

3. SEXTANT (SXT) REQUIREMENTS
   - a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.
   - b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).
   - c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.
   - d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.
   - e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.
   - f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.
   - g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.
   - h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.
   - i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.
   - j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.
   - k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387
   - l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.
   - m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.
   - n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)
   - o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS
   - a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.
   - b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

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DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V. AMATO DATE 6-11-65
CHECKED F. Raymond 6-30-65
APPROVAL
APPROVAL 7-2-65
NASA APPROVAL 7-23-65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 6

MASTER

L 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
L		REVISED PER TDRR 23069	10/21/65	WK

031	021	011	000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	HOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
				101								
1	0	0	0	100		2011889-021			OPTICAL UNIT SUB-ASSY STAGE I			
1	1	0	0	99		2011701-011			SXT INDEX HEAD ASSEMBLY			
1	1	1	1	98	*	1000220-5			CLAMP, CABLE			
1	1	1	1	97	*	1011918-1			WASHER, CLAMP, CABLE			
1	1	1	1	96		NAS1352C08LL8	74455157011		SCREW, CAP, SOC.HD., SELF LOCKING			
0	1	1	0	95		2012621	57386911630		RING, MOUNTING COVER			
0	1	1	0	94		2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	1	1	93	*	1011625-28	74455151028		SCREW, CAP HEX., SOC.HD., SELF LOCKING			
1	1	1	1	92		2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	2	2	91	*	1011625-11	74455151011		SCREW, CAP, SOC.HD., SELF LOCKING			
2	2	2	2	90		NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	2	2	89		2012432	53386910050		POST, CONNECTOR PLATE			
1	1	1	1	88		1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
2	2	2	2	87		NAS1351C03LL20	74455156044		SCREW, CAP, SOC.HD., SELF LOCKING			
8	8	8	8	86		1011625-20	74455151020		SCREW, CAP, SOC. HD., SELF LOCKING			
1	1	1	1	85		2011595	52386910220		COVER, GEARBOX			
1	1	1	1	84		MS16624-1018			RING, RETAINING			
AR	AR	AR	AR	83		2012351	7938691 0101 0103		WASHER, FLAT			
1	1	1	1	82		2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	3	3	81		2011579	57386910120		DOG, LIMIT STOP			
1	1	1	1	80		2011580	57386910140		DOG, LIMIT STOP, INNER			
1	1	1	1	79		1011608-5			BEARING, BALL, ANNULAR			
1	1	1	1	78		2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	1	1	77		2011577	56386910060		SPRING, TORSION			
1	1	1	1	76		2012350	25386910010		WASHER			
				75								
1	1	1	1	74	*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	2	2	73		MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	8	8	72		1011625-39	74455151040		SCREW, CAP, SOC.HEAD, SELF LOCKING			
2	2	2	2	71		NAS1352C06LL6	74455157019		SCREW, CAP, SOC.HEAD, SELF LOCKING			
2	2	2	2	70		NAS1351C3LL10	74455156040		SCREW, CAP, SOC.HEAD, SELF LOCKING			
4	4	4	4	69		NAS1189C02T4L			SCREW, FLAT HD., SELF LOCKING			
2	2	2	2	68		MS16624-15	—+—		RING, RETAINING, EXTERNAL, BASIC			
1	1	1	1	67		MS15795-305	—+—		WASHER, FLAT			
1	1	1	1	66	*	1011918-2	—+—		WASHER, CABLE CLAMP			
1	1	1	1	65	*	1000220-6 OR 5	—+—		CLAMP, CABLE			
1	1		1	64	*	1000220-8 OR 6	—+—		CLAMP, CABLE			
1	1	1	1	63		2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	AR	AR	62		2011885	45386910040		SHIM			
1	1	1	1	61	*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	1	1	60		1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	1	1	59		2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	1	1	58		2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	1	1	57	*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
0	0	1	1	56		2011701	85386910150		SXT INDEX HD ASSY			
1	1	1	1	55		2012164	26386910060		GROMMET			
				54								
				53								
2	2	2	2	52	NAS	1352C08LL12	74455157029		SCREW, CAP, SOC.HD., SELF LOCKING			
7	7	7	7	51	NAS	1352C08LL8	74455157027		SCREW, CAP, SOC.HD., SELF LOCKING			
				50								
4	4	4	4	49	NAS	1352C06LL4	74455157018		SCREW, CAP, SOC.HD., SELF LOCKING			
8	8	8	8	48	NAS	1352C04LL8	74455157015		↕			
14	14	14	14	47	NAS	1352C04LL6	74455157014		↕			
14	14	14	14	46	NAS	1352C04LL4	74455157013		↕			
14	14	14	14	45	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC.HD., SELF LOCKING			
				44								
12	12	12	12	43	NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	1	1	42		1010628-19			SCREW, FLAT HD., SELF LOCKING, SOC. HEX			
2	2	2	2	41	AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
1	1	1	1	40		NAS1352C08LL10	74455157028		SCREW, CAP, HEX SOC.HD., SELF LOCKING			
2	2	2	2	39		2011684	48386910030		PIN, THREADED			
AR	AR	AR	AR	38		2011877-1 TO 12	7938691 0401 THRU 0412		SPACER			
1	1	1	1	37	*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	1	1	36		MS9021-154			PACKING, PREFORMED			
1	1	1	1	35	*	1011606-1	30205772240		BEARING, BALL			
1	1	1	1	34	*	1011606-2	30205772720		BEARING, BALL			
1	1	1	1	33		2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	2	2	32		2011562	57386910580		BUSHING, LOCATING			
2	2	2	2	31		2011561	57386910590		BUSHING, ECCENTRIC			
1	1	1	1	30		2011344	45386910020		SCREW, SHOULDER			
2	2	2	2	29		2011353	56386910260		SPACER, SPRING HOLDER			
1	1	1	1	28		2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	1	1	27		2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	26		2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	1	1	25		2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	24		2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	3	3	23		2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	1	1	22		2011342	57386910570		RING, LIMIT STOP			
1	1	1	1	21		2011320	52386910160		PLATE, FLEXPRINT GUIDE			
1	0	0	1	20		2011616	57386910020		RING, MOUNTING, COVER			
1	1	1	1	19		2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	18		2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	6	6	17		2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	1	1	16		2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	2	2	15		2011686	56386910310		RETAINER, PIN			
1	1	1	1	14	*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	13	*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	12		2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	1	1	11		2011714	85386910460		LIMIT STOP ASSY			
1	1	1	1	10		2012387	85386911110		GEAR & SPRING, ASSY OF			
1	1	1	1	9		2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	1	1	8		2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	1	1	7		2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
0	0	1	1	6		2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	1	1	5		2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	1	1	4		2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	1	1	3		2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	1	1	2		2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
0	0	0	1	1		2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

031	021	011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	HOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
				142									
				141									
				140									
				139									
				138									
				137									
				136									
				135									
				134									
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				132									
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				112									
				111									
				110									
				109									
				108									
				107									
				106									
				105									
				104									
				103									
1	1	0	0	102			2011215-011			TELESCOPE TRUNNION AXIS ASSY			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
APPLICATION	

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HOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN A.C.WILLIAMS DATE 10-8-65
CHECKED H.E.Prusey 10-18-65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

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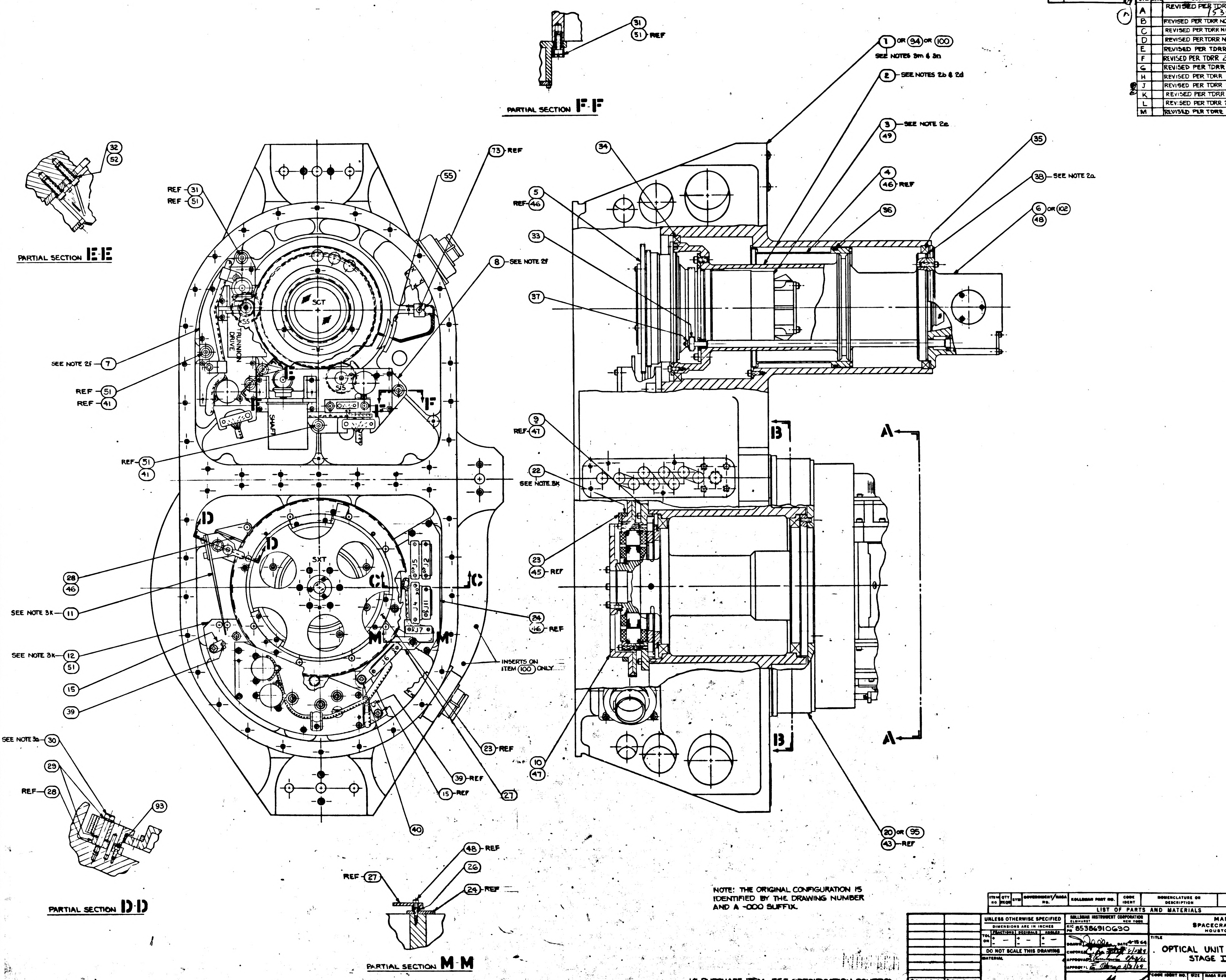
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE
WEIGHT CALC ACTUAL
SHEET 6 OF 6

W	0681102

REVISIONS 12217				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO. 19852		WK
C		REVISED PER TDRR NO. 20177		WK
D		REVISED PER TDRR NO. 20200		WK
E		REVISED PER TDRR 20351		WK
F		REVISED PER TDRR 21538		WK
G		REVISED PER TDRR 21536		
H		REVISED PER TDRR 21660		
J		REVISED PER TDRR 22643		WK
K		REVISED PER TDRR 22638		WK
L		REVISED PER TDRR 23069		
M		REVISED PER TDRR 23361		



PARTIAL SECTION F-F
31
51 - REF
PARTIAL SECTION E-E
32
52
REF - 31
REF - 51
55
73 - REF
SGT
SS
TRUNNION DRIVE
SEE NOTE 2f - 7
REF - 51
REF - 41
SHAFT
SS
8 - SEE NOTE 2f
F
REF - 51
41
D
SXT
C
J5
J12
J4
J11
RJ7
M
28
46
SEE NOTE 3K - 11
SEE NOTE 3K - 12
51
15
39
24
46 - REF
INSERTS ON ITEM 100 ONLY
23 - REF
39 - REF
15 - REF
27
40
SEE NOTE 3a - 30
29
REF - 28
93
PARTIAL SECTION D-D
48 - REF
26
24 - REF
REF - 27
PARTIAL SECTION M-M
1 OR 94 OR 100
SEE NOTES 3m & 3n
2 - SEE NOTES 2b & 2d
3 - SEE NOTE 2e
49
34
35
38 - SEE NOTE 2a
4
46 - REF
36
5
REF - 46
6 OR 102
48
33
37
9
REF - 47
22
SEE NOTE 3K
23
45 - REF
B
A
10
47
20 OR 95
43 - REF

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
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COMMENT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-15-64
CHECKED
APPROVAL
APPROVAL E. Mang 8/31/64
APPROVAL
APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

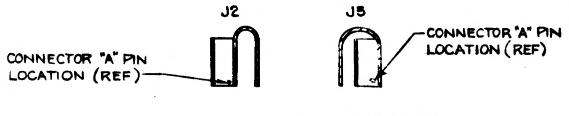
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
SHEET 1 OF 6

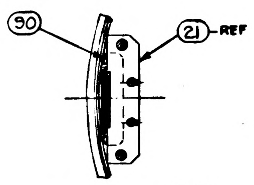
2011890 M

W 0681102

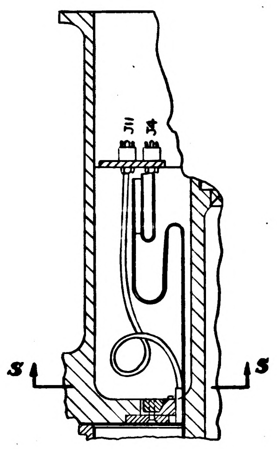
SYM	ZONE	REVISIONS 12 217 DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	[illegible]	WK
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20551	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK
K		REVISED PER TDRR 22638	[illegible]	WK
L		REVISED PER TDRR 23069	[illegible]	WK
M		REVISED PER TDRR 23361	[illegible]	WK


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

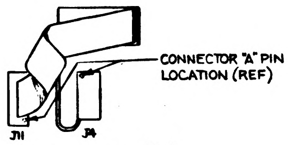
PARTIAL SECTION N-N
SCALE: NONE



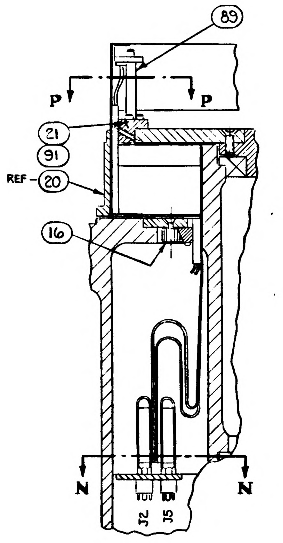
PARTIAL SECTION P-P



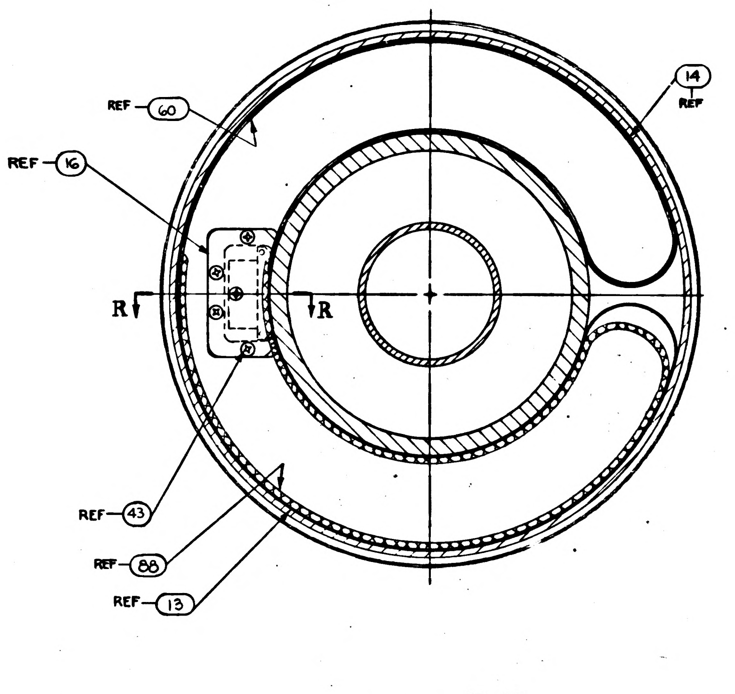
PARTIAL SECTION R-R


CONNECTOR "A" PIN LOCATION (REF)
J11
J4

PARTIAL SECTION S-S


89
P
P
21
91
REF - 20
16
N
N
J2
J5

PARTIAL SECTION C-C


REF - 60
14 REF
REF - 16
R
R
REF - 43
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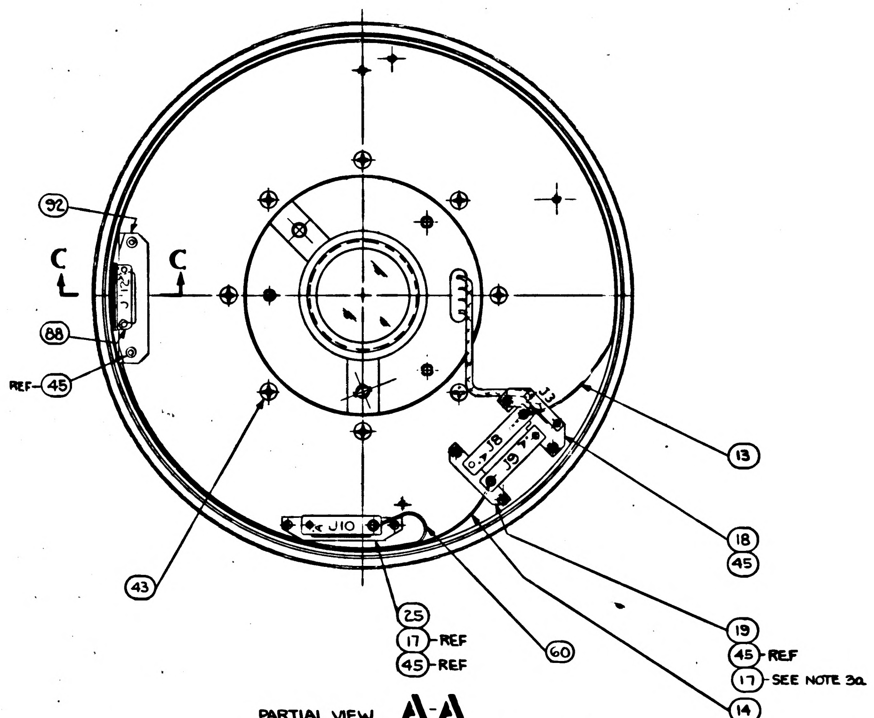
REF - 13

PARTIAL SECTION B-B


92
C
C
88
REF - 45
J10
J11
18
J9
13
18
45
43
25
17 - REF
45 - REF
60
19
45 - REF
17 - SEE NOTE 3a.
14

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

2011890 M

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

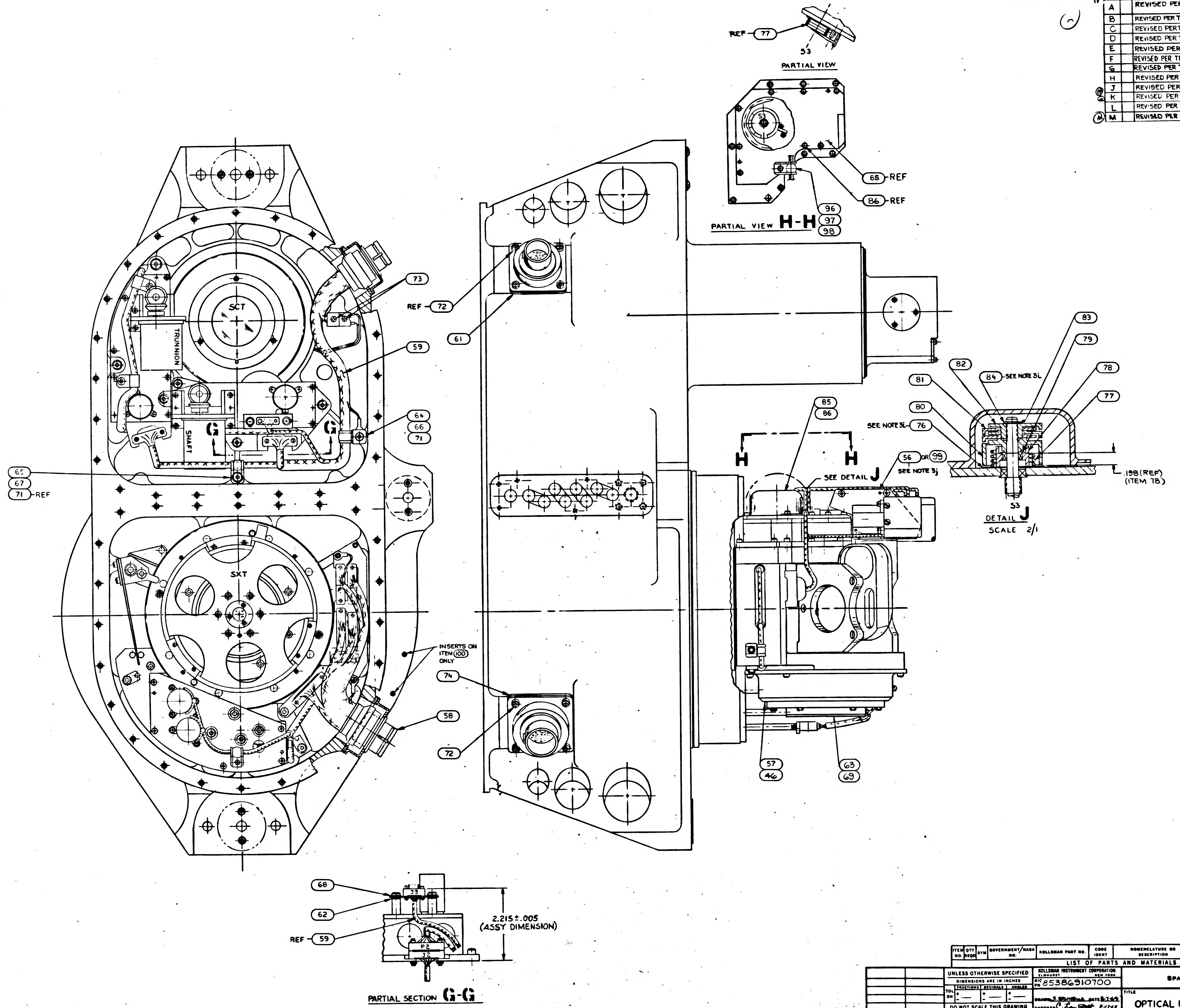
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 6

W 0681102 2011890 M

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRB NO. 15390	[illegible]	WR
B		REVISED PER TDRR NO. 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR NO. 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	[illegible]
M		REVISED PER TDRR 28361	[illegible]	[illegible]

REVISIONS 12217



REF 77
53
PARTIAL VIEW
53
85 REF
86 REF
PARTIAL VIEW H-H
96
97
98
73
REF 72
61
SCT
TRUNNION
59
64
66
71
SHAFT
G
G
65
67
71 REF
83
79
78
77
82
84 SEE NOTE 3L
81
80
SEE NOTE 3L 76
85
86
H
H
56 OR 99
SEE NOTE 3j
SEE DETAIL J
.198 (REF) (ITEM 78)
53
DETAIL J
SCALE 2/1
SXT
INSERTS ON ITEM 100 ONLY
74
58
72
57
46
63
69
68
62
REF 59
33
P2
32
2.215 ± .005 (ASSY DIMENSION)
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN [illegible] DATE 2-7-64
CHECKED C. [illegible] 2-7-64
APPROVAL [illegible]
APPROVAL E. [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

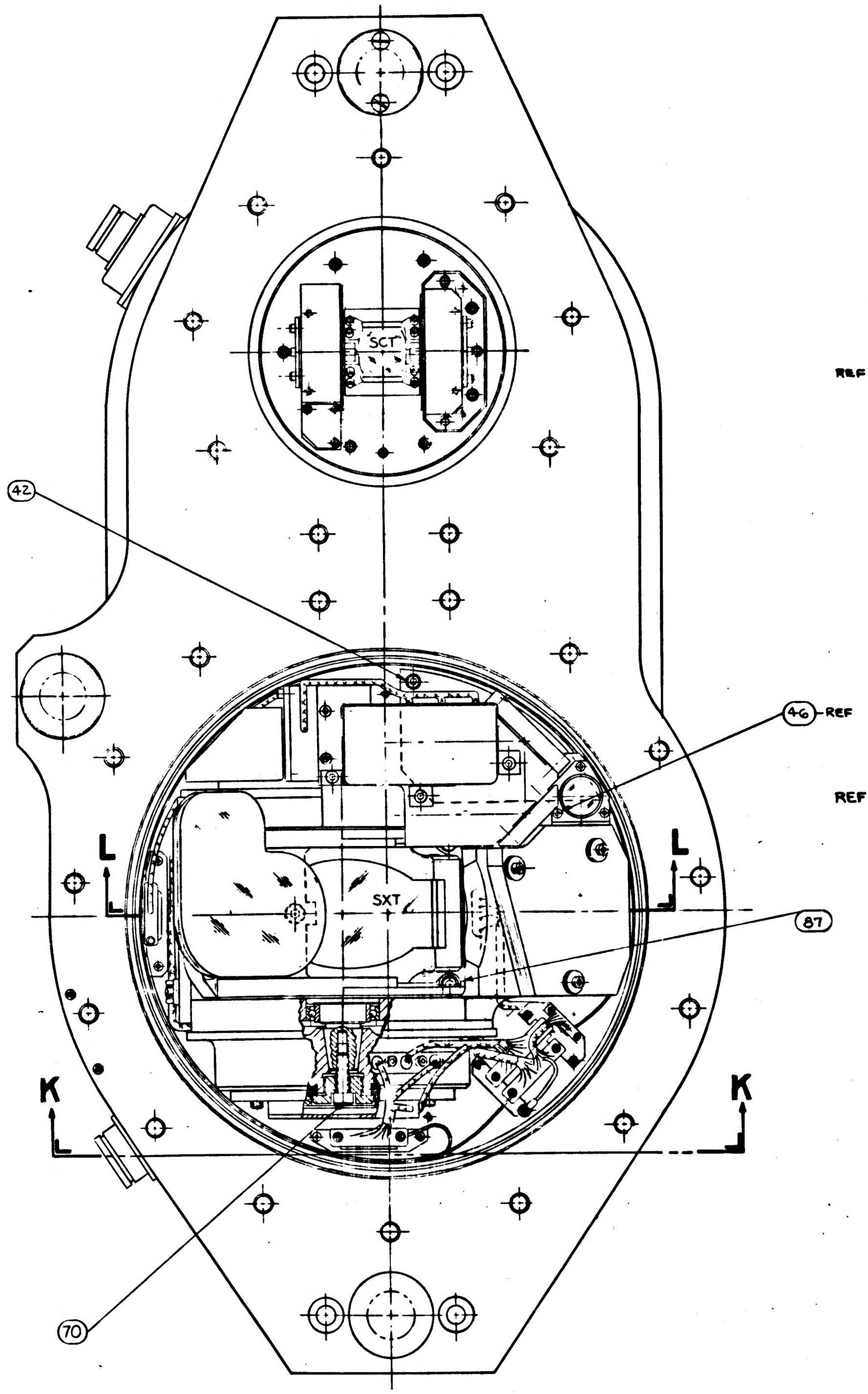
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

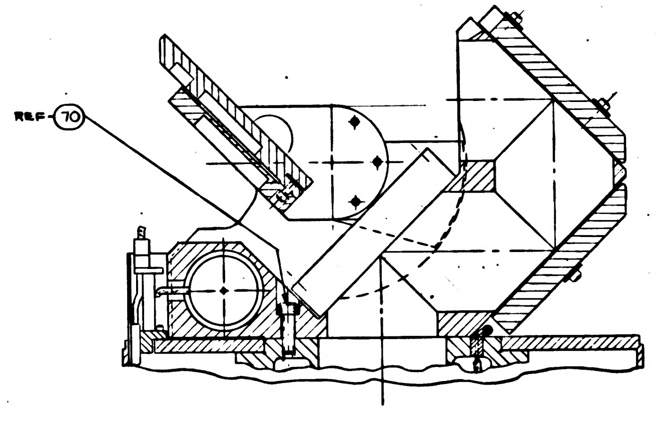
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 6

2011890 M

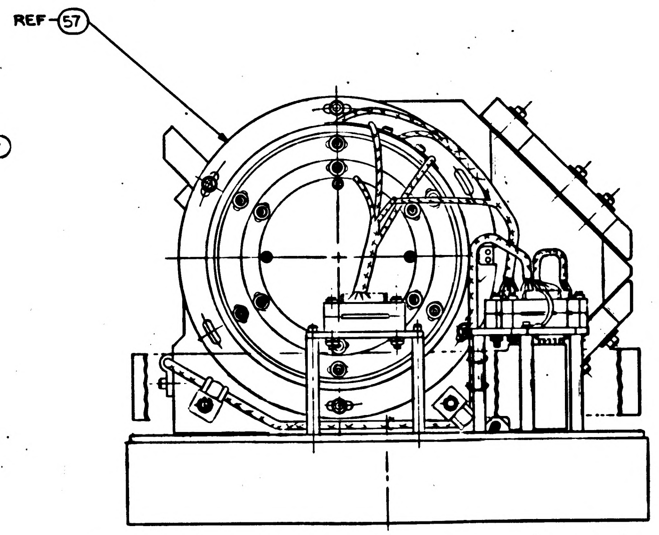
2011890 M

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15352	1/6/65	WK
B		REVISED PER TDRR 19852	[illegible]	WK
C		REVISED PER TDRR 20177	[illegible]	WK
D		REVISED PER TDRR 20200	[illegible]	WK
E		REVISED PER TDRR 20351	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK
K		REVISED PER TDRR 22638	[illegible]	WK
L		REVISED PER TDRR 23069	[illegible]	WK
M		REVISED PER TDRR 23361	[illegible]	WK





PARTIAL SECTION L-L



PARTIAL VIEW K-K

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011300	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN R. [illegible] DATE [illegible]
CHECKED [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 6

2011890 M

2011890 M

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20200	[illegible]	[illegible]
E		REVISED PER TDRR 20351	[illegible]	[illegible]
F		REVISED PER TDRR 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	[illegible]
M		REVISED PER TDRR 2336'	[illegible]	[illegible]

NOTES:

1. GENERAL REQUIREMENTS

   a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

   a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

   b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

   c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

   d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF $13^{\pm 2}$ IN.OZ. AND WITHIN 1 IN.OZ. OF EACH OTHER. THE TIGHTENING TORQUE SHALL BE DEFINED AS THE TORQUE IN EXCESS OF THE THREADING TORQUE MEASURED ON AN INDIVIDUAL SCREW BASIS.

   e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

   f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

   g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

   h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET. BACKLASH BETWEEN COUNTER BEVEL GEARS SHALL BE BETWEEN .001 & .005 THROUGH ONE COMPLETE REVOLUTION OF LARGER GEAR.

3. SEXTANT (SXT) REQUIREMENTS

   a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

   b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

   c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

   d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

   e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

   f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

   g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

   h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

   i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

   j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

   k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS 15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387

   l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

   m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

   n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

   o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

   a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

   b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN V. AMATO DATE 6-11-65
CHECKED [illegible] 6-11-65
APPROVAL
APPROVAL [illegible] 7-2-65
NASA APPROVAL [illegible] 7-15-65
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 5 OF 6

MASTER

E-100

2011890 M

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
L		REVISED PER. TDRR 23069	9/24/65	wk
M		REVISED PER TDRR 23361	11/8/65	wk

001	031	021	011	000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
					101								
0	1	0	0	0	100		2011889-021			OPTICAL UNIT SUB-ASSY STAGE I			
1	1	1	0	0	99		2011701-011			SXT INDEX HEAD ASSEMBLY			
1	1	1	1	1	98	*	1000220-5			CLAMP, CABLE			
1	1	1	1	1	97	*	1011918-1			WASHER, CLAMP, CABLE			
1	1	1	1	1	96		NAS1352C08LL8	74455157011		SCREW, CAP, SOC. HD., SELF LOCKING			
0	0	1	1	0	95		2012621	57386911630		RING, MOUNTING COVER			
0	0	1	1	0	94		2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	1	1	1	93	*	1011625-28	74455151028		SCREW, CAP HEX., SOC. HD., SELF LOCKING			
1	1	1	1	1	92		2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	2	2	2	91	*	1011625-11	74455151011		SCREW, CAP, SOC. HD., SELF LOCKING			
2	2	2	2	2	90		NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	2	2	2	89		2012432	53386910050		POST, CONNECTOR PLATE			
1	1	1	1	1	88		1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
2	2	2	2	2	87		NAS1351C03LL20	74455156044		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	8	8	8	86		1011625-20	74455151020		SCREW, CAP, SOC. HD., SELF LOCKING			
1	1	1	1	1	85		2011595	52386910220		COVER, GEARBOX			
1	1	1	1	1	84		MS16624-1018			RING, RETAINING			
AR	AR	AR	AR	AR	83		2012351	7938691 0101 0103		WASHER, FLAT			
1	1	1	1	1	82		2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	3	3	3	81		2011579	57386910120		DOG, LIMIT STOP			
1	1	1	1	1	80		2011580	57386910140		DOG, LIMIT STOP, INNER			
1	1	1	1	1	79		1011608-5			BEARING, BALL, ANNULAR			
1	1	1	1	1	78		2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	1	1	1	77		2011577	56386910060		SPRING, TORSION			
1	1	1	1	1	76		2012350	25386910010		WASHER			
					75								
1	1	1	1	1	74	*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	2	2	2	73		MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	8	8	8	72		1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	2	2	71		NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	2	2	70		NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	4	4	4	69		NAS1189C02T4L			SCREW, FLAT HD., SELF LOCKING			
2	2	2	2	2	68		MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
1	1	1	1	1	67		MS15795-305	—		WASHER, FLAT			
1	1	1	1	1	66	*	1011918-2	—		WASHER, CABLE CLAMP			
1	1	1	1	1	65	*	1000220-6 OR 5	—		CLAMP, CABLE			
1	1	1	1	1	64	*	1000220-8 OR 6	—		CLAMP, CABLE			
1	1	1	1	1	63		2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	AR	AR	AR	62		2011885	45386910040		SHIM			
1	1	1	1	1	61	*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
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1	1	1	1	1	59		2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	1	1	1	58		2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	1	1	1	57	*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
0	0	0	1	1	56		2011701	85386910150		SXT INDEX HD ASSY			
1	1	1	1	1	55		2012164	26386910060		GROMMET			
					54								
					53								
2	2	2	2	2	52	NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD., SELF LOCKING			
7	7	7	7	7	51	NAS	1352C08LL8	74455157027		SCREW, CAP, SOC. HD., SELF LOCKING			
					50								
4	4	4	4	4	49	NAS	1352C06LL4	74455157018		SCREW, CAP, SOC. HD., SELF LOCKING			
8	8	8	8	8	48	NAS	1352C04LL8	74455157015		↕			
14	14	14	14	14	47	NAS	1352C04LL6	74455157014		↕			
14	14	14	14	14	46	NAS	1352C04LL4	74455157013		↕			
14	14	14	14	14	45	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD., SELF LOCKING			
					44								
12	12	12	12	12	43	NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	1	1	1	42		1010628-19			SCREW, FLAT HD., SELF LOCKING, SOC. HEX			
2	2	2	2	2	41	AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
1	1	1	1	1	40		NAS1352C08LL10	74455157028		SCREW, CAP, HEX SOC. HD., SELF LOCKING			
2	2	2	2	2	39		2011684	48386910030		PIN, THREADED			
AR	AR	AR	AR	AR	38		2011877-1 TO 12	7938691 0401 THRU 0412		SPACER			
1	1	1	1	1	37	*	1[illegible]2525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	1	1	1	36		MS9021-154			PACKING, PREFORMED			
1	1	1	1	1	35	*	1011606-1	30205772240		BEARING, BALL			
1	1	1	1	1	34	*	1011606-2	30205772720		BEARING, BALL			
1	1	1	1	1	33		2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	2	2	2	32		2011562	57386910580		BUSHING, LOCATING			
2	2	2	2	2	31		2011561	57386910590		BUSHING, ECCENTRIC			
1	1	1	1	1	30		2011344	45386910020		SCREW, SHOULDER			
2	2	2	2	2	29		2011353	56386910260		SPACER, SPRING HOLDER			
1	1	1	1	1	28		2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	1	1	1	27		2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	26		2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	1	1	1	25		2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	24		2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	3	3	3	23		2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	1	1	1	22		2011342	57386910570		RING, LIMIT STOP			
1	1	1	1	1	21		2011320	52386910160		PLATE, FLEXPRINT GUIDE			
1	1	0	0	1	20		2011616	57386910020		RING, MOUNTING, COVER			
1	1	1	1	1	19		2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	18		2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	6	6	6	17		2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	1	1	1	16		2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	2	2	2	15		2011686	56386910310		RETAINER, PIN			
1	1	1	1	1	14	*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	1	13	*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	1	12		2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	1	1	1	11		2011714	85386910460		LIMIT STOP ASSY			
1	1	1	1	1	10		2012387	85386911110		GEAR & SPRING, ASSY OF			
1	1	1	1	1	9		2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	1	1	1	8		2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	1	1	1	7		2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
0	0	0	1	1	6		2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	1	1	1	5		2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	1	1	1	4		2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	1	1	1	3		2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	1	1	1	2		2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
1	0	0	0	1	1		2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD — LIST OF PARTS AND MATERIALS

001	031	021	011	000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
					142								
					141								
					140								
					139								
					138								
					137								
					136								
					135								
					134								
					133								
					132								
					131								
					130								
					129								
					128								
					127								
					126								
					125								
					124								
					123								
					122								
					121								
					120								
					119								
					118								
					117								
					116								
					115								
					114								
					113								
					112								
					111								
					110								
					109								
					108								
					107								
					106								
					105								
					104								
					103								
1	1	1	0	0	102		2011215-011			TELESCOPE TRUNNION AXIS ASSY			

QTY REQD — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN A.C. WILLIAMS DATE 10-8-65
CHECKED KEPrussy 10-18-65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer 9 Nov 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

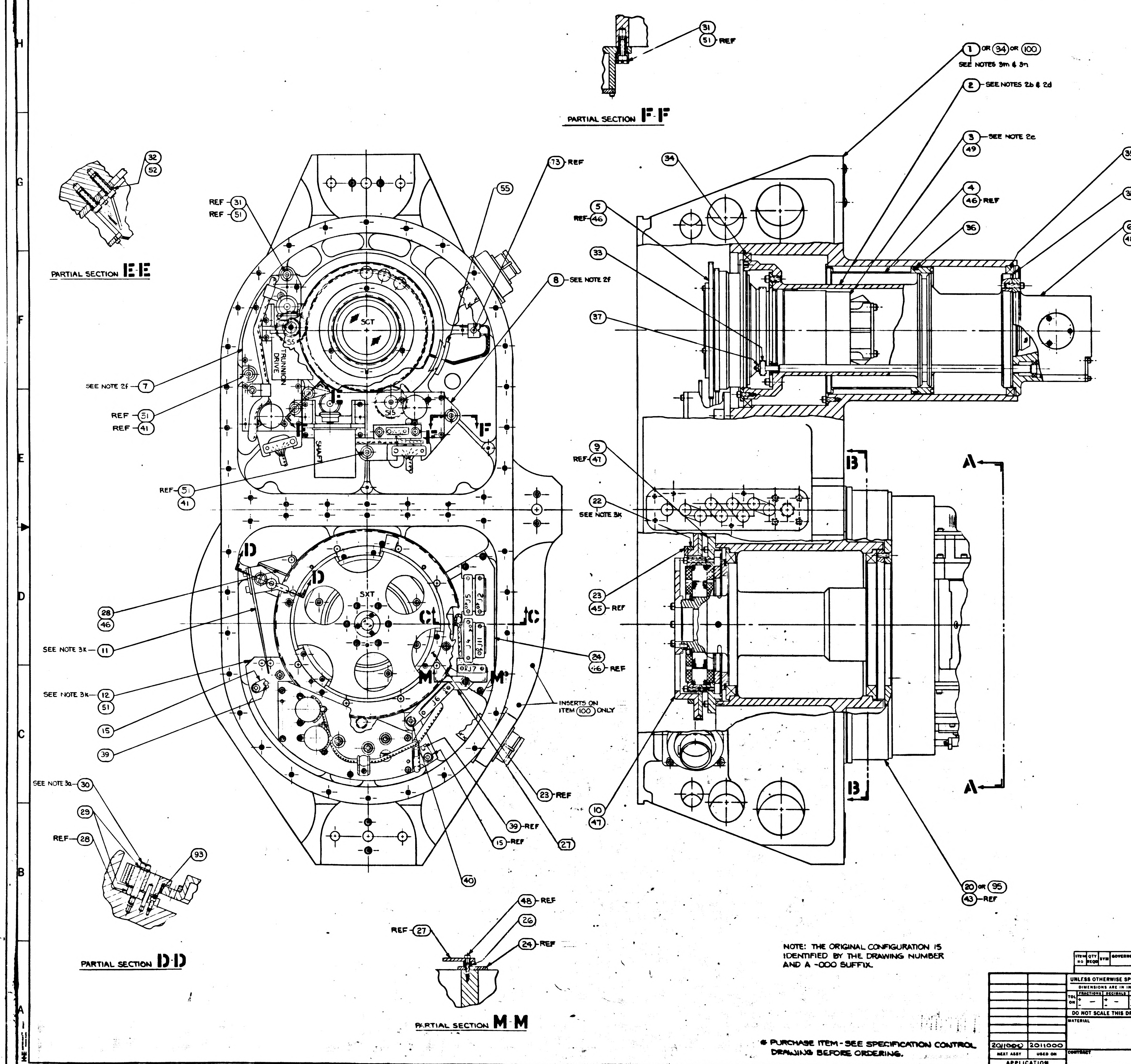
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE
WEIGHT CALC ACTUAL
SHEET 6 OF 6

N 0681102

2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	4/6/65	WK
B		REVISED PER TDRR NO 19852	[illegible]	WK
C		REVISED PER TDRR NO. 20177	[illegible]	WK
D		REVISED PER TDRR NO. 20200	7/1/65	WK
E		REVISED PER TDRR 20351	7/24/65	[illegible]
F		REVISED PER TDRR 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	
M		REVISED PER TDRR 23361	[illegible]	
N		REVISED PER TDRR 25078	[illegible]	


PARTIAL SECTION F-F
31
51 REF
PARTIAL SECTION E-E
32
52
PARTIAL SECTION D-D
SEE NOTE 3a 30
29
REF 28
93
PARTIAL SECTION M-M
REF 27
48 REF
26
24 REF
REF 31
REF 51
55
73 REF
SCT
S5
TRUNNION DRIVE
SEE NOTE 2f 7
REF 51
REF 41
S15
SHAFT
F
REF 51
41
SXT
D
C
M
28
46
SEE NOTE 3K 11
SEE NOTE 3K 12
51
15
39
23 REF
39 REF
15 REF
40
27
24
46 REF
INSERTS ON ITEM 100 ONLY
1 OR 34 OR 100
SEE NOTES 3m & 3n
2 SEE NOTES 2b & 2d
3 SEE NOTE 2e
49
4
46 REF
36
35
38 SEE NOTE 2a
6 OR 102
48
34
5
REF 46
33
37
8 SEE NOTE 2f
9
REF 47
22
SEE NOTE 3K
23
45 REF
10
47
B
A
20 OR 95
43 REF

NOTE: THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

✱ PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN [illegible] DATE 4-13-64
CHECKED [illegible]
APPROVAL [illegible] 6/27/64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNE[D]
SPACECRAFT [C]ENTER
HOUSTON, T[EX]AS

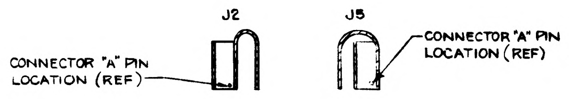
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 6

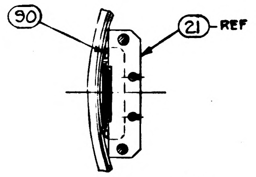
N 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15350	[illegible]	WR
B		REVISED PER TDRR NO. 19852	[illegible]	WR
C		REVISED PER TDRR NO 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	WR
F		REVISED PER TDRR 21538	[illegible]	WR
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED FER TDRR 22643	[illegible]	WR
K		REVISED PER TDRR 22638	[illegible]	WR
L		REVISED PER TDRR 23069	[illegible]	WR
M		REVISED PER TDRR 23361	[illegible]	[illegible]
N		REVISED PER TDRR 25078	[illegible]	[illegible]

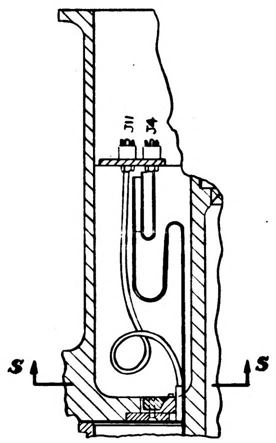
REVISIONS 12217


J2
J5
CONNECTOR "A" PIN LOCATION (REF)
CONNECTOR "A" PIN LOCATION (REF)

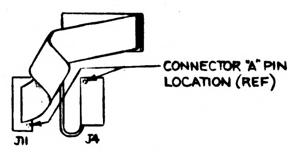
PARTIAL SECTION N-N
SCALE: NONE



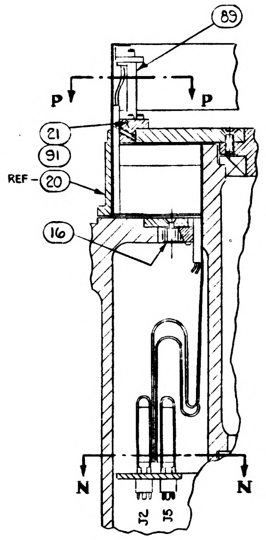
PARTIAL SECTION P-P



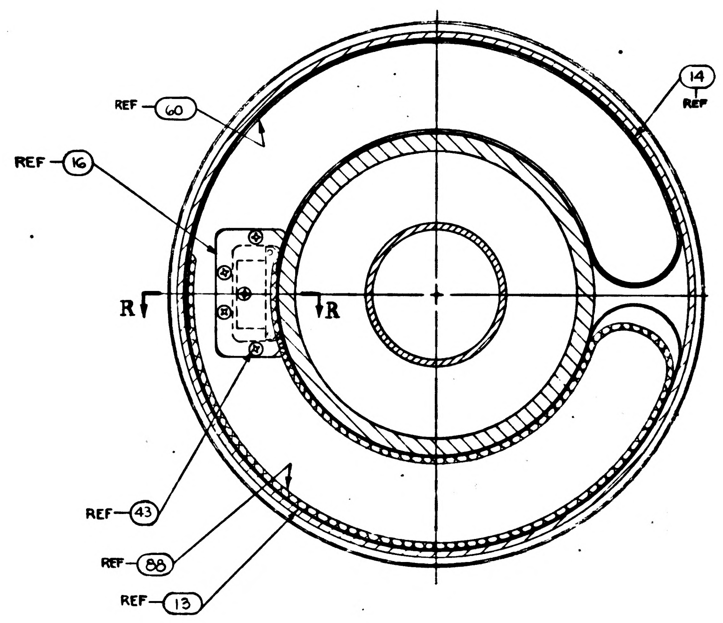
PARTIAL SECTION R-R


CONNECTOR "A" PIN LOCATION (REF)
J11
J4

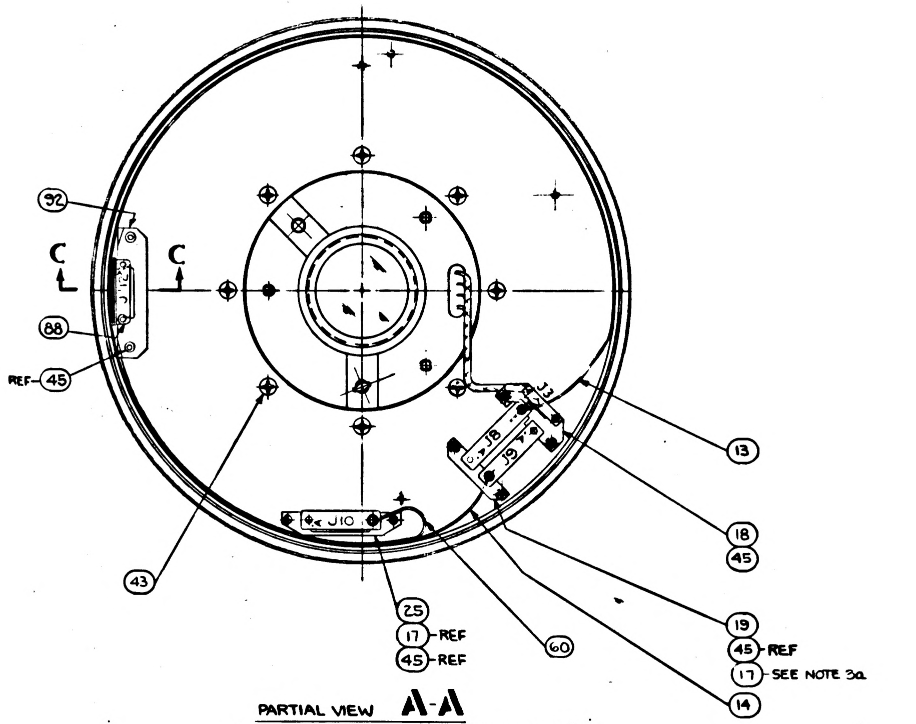
PARTIAL SECTION S-S


89
P
P
21
91
REF- 20
16
N
N
J2
J5

PARTIAL SECTION C-C


REF- 60
REF- 16
14 REF
R
R
REF- 43
REF- 88
REF- 13

PARTIAL SECTION B-B


92
C
C
J12
88
REF- 45
J3
J8
J9
J10
13
18
45
43
25
17 -REF
45 -REF
60
19
45 -REF
17 - SEE NOTE 3a
14

PARTIAL VIEW A-A
(WITH SEXTANT INDEX HD ASSY REMOVED)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. Thomas 8/3/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

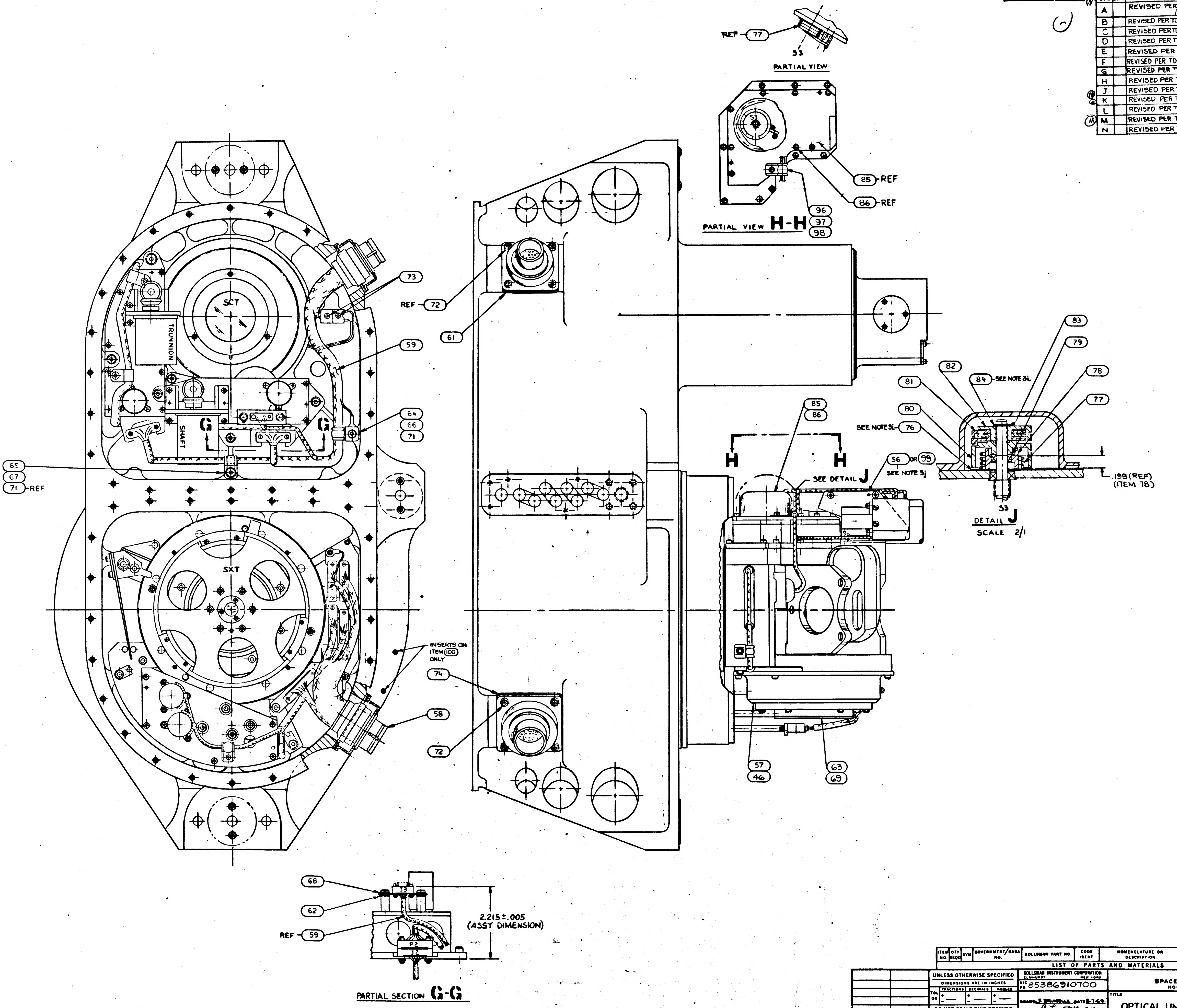
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 6

N 0681102

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15356	[illegible]	WR
B		REVISED PER TDRR NO.19852	[illegible]	WR
C		REVISED PER TDRR NO. 20177	[illegible]	WR
D		REVISED PER TDRR NO. 20200	[illegible]	WR
E		REVISED PER TDRR 20351	[illegible]	WR
F		REVISED PER TDRR NO. 21538	[illegible]	[illegible]
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	[illegible]
K		REVISED PER TDRR 22638	[illegible]	[illegible]
L		REVISED PER TDRR 23069	[illegible]	[illegible]
M		REVISED PER TDRR 28361	[illegible]	[illegible]
N		REVISED PER TDRR 25078	[illegible]	[illegible]

REVISIONS 2217



REF 77
S3
PARTIAL VIEW
S2
85 REF
86 REF
96
97
98
PARTIAL VIEW H-H
73
REF 72
61
59
SCT
TRUNNION
SHAFT
G
G
64
66
71
65
67
71 REF
H
H
85
86
SEE DETAIL J
56 OR 99
SEE NOTE 3j
83
79
82
84 SEE NOTE 3L
81
78
80
77
SEE NOTE 3L 76
.198 (REF) (ITEM 78)
S3
DETAIL J
SCALE 2/1
SXT
INSERTS ON ITEM 100 ONLY
74
58
72
57
46
63
69
68
S3
62
REF 59
P2
J2
2.215 ± .005 (ASSY DIMENSION)
PARTIAL SECTION G-G

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 853869107OO
DRAWN F. BRUNELLE DATE 8-7-64
CHECKED C. Langstaff 8-7-64
APPROVAL
APPROVAL E. Blaney 8/31/64
NASA APPROVAL
MIT APPROVAL

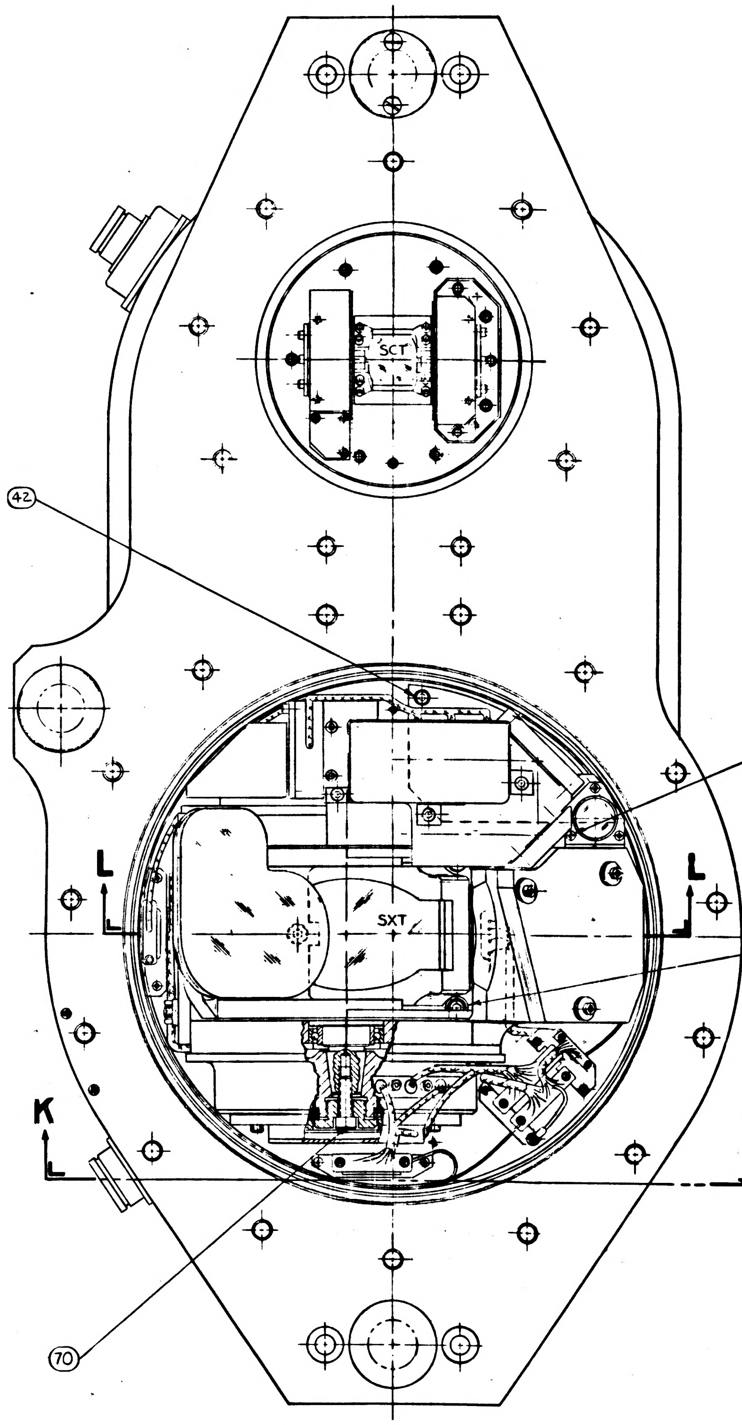
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

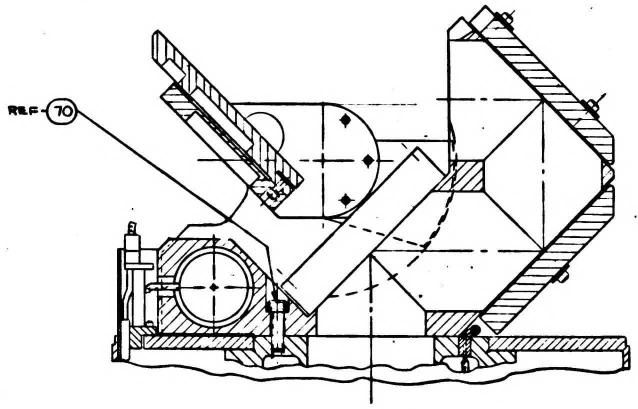
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 3 OF 6

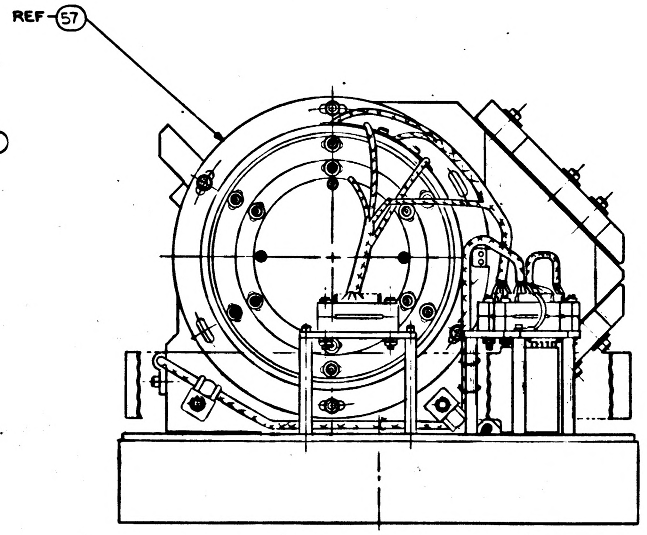
N 0681102

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 5352	1/6/65	wk
B		REVISED PER TDRR 19852	[illegible]	wk
C		REVISED PER TDRR 20177	[illegible]	wk
D		REVISED PER TDRR 20200	[illegible]	wk
E		REVISED PER TDRR 20351	[illegible]	wk
F		REVISED PER TDRR 21538	[illegible]	wk
G		REVISED PER TDRR 21536	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	wk
K		REVISED PER TDRR 22638	[illegible]	wk
L		REVISED PER TDRR 23069	[illegible]	wk
M		REVISED PER TDRR 23361	[illegible]	wk
N		REVISED PER TDRR 25078	[illegible]	wk





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN R. BRUNELLE DATE 8-7-64
CHECKED 8/27/64
APPROVAL 9/2/64
APPROVAL E. Olsen 9/3/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 9/9/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 6

N 2011890

N 2011890

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
D		REVISED PER TDRR 20[illegible]	[illegible]	WK
E		REVISED PER TDRR 20[illegible]51	[illegible]	WK
F		REVISED PER TDRR 21538	[illegible]	WK
G		REVISED PER TDRR 21530	[illegible]	[illegible]
H		REVISED PER TDRR 21660	[illegible]	[illegible]
J		REVISED PER TDRR 22643	[illegible]	WK
K		REVISED PER TDRR 22638	[illegible]	WK
L		REVISED PER TDRR 23069	[illegible]	WK
M		REVISED PER TDRR 23361	[illegible]	WK
N		REVISED PER TDRR 25078	[illegible]	WK

NOTES:

1. GENERAL REQUIREMENTS

   a. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

   b. IDENTIFY USING NASA DWG. NO., REV. LETTER, AND MANUFACTURER'S SYMBOL PER ND 1002019 BY TAGGING.

2. SCANNING TELESCOPE (SCT) REQUIREMENTS

   a. ITEM 38 SHALL BE SELECTED AND/OR ADJUSTED BY MACHINING AND REPASSIVATING TO PROVIDE A BEARING PRELOAD OF 75 ± 7.5 LBS. TO ITEMS 34 AND 35.

   b. THE SCT RETICLE CENTER (PART OF ITEM 2) SHALL BE WITHIN 50 ARC SECONDS OF THE SHAFT DRIVE AXIS IN THE DIRECTION PARALLEL TO THE TRUNNION AXIS OF ITEM 6.

   c. THE SCT RETICLE "R" LINE SHALL ALIGN WITH THE SCT TRUNNION TRACK WITHIN 4 ARC MINUTES VARIATION OVER ITS WHOLE LENGTH (FULL FIELD).

   d. THE REQUIREMENTS OF NOTES 2b AND 2c SHALL BE MET AFTER THE THREE RETICLE RETAINING SCREWS (PART NO. 2011688, PARTS OF ITEM 2) HAVE BEEN SECURED WITH A TIGHTENING TORQUE OF $13^{\pm 2}$ IN.OZ. AND WITHIN 1 IN.OZ. OF EACH OTHER. THE TIGHTENING TORQUE SHALL BE DEFINED AS THE TORQUE IN EXCESS OF THE THREADING TORQUE MEASURED ON AN INDIVIDUAL SCREW BASIS.

   e. THE AXIAL POSITION OF THE RELAY LENS ASSEMBLY (PART NO. 2011792, PART OF ITEM 3) SHALL BE ADJUSTED SO THAT A COLLIMATED TARGET RETICLE AT THE PANEL END IS SEEN AT THE SAME FOCUS AS THE SCT RETICLE WHEN BOTH ARE OBSERVED THROUGH THE SCT OBJECTIVE.

   f. ITEMS 7 AND 8 SHALL BE POSITIONED BY THEIR MOUNTING HARDWARE SO THAT THEY MESH WITH ITEM 5 AS TIGHTLY AS IS COMPATIBLE WITH THE REQUIREMENTS OF NOTES 2g AND 2h.

   g. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SCT TRUNNION AND SHAFT. THESE TORQUE LIMITS SHALL BE MAINTAINED THROUGHOUT THE OPERATING EXCURSION RANGE OF THE SCT EXCEPT AT THOSE POSITIONS WHERE THE RESPECTIVE ITEMS 7 AND 8 ANGLE COUNTER MASKS SHIFT (0° AND 180°). AT THESE POSITIONS THE PERMISSABLE BREAKAWAY FRICTION SHALL NOT EXCEED .052 IN-OZ.

   h. THE COUNTERS AND RESOLVERS OF THE SCT TRUNNION AND SHAFT DRIVES SHALL BE SET TO MEET THE SCT TDA AND SCT SDA REQUIREMENTS OF TABLE I OF PS 2011000 AFTER THE REQUIREMENTS OF NOTE 3o HAVE BEEN MET. BACKLASH BETWEEN COUNTER BEVEL GEARS SHALL BE BETWEEN .001 & .005 THROUGH ONE COMPLETE REVOLUTION OF LARGER GEAR.

3. SEXTANT (SXT) REQUIREMENTS

   a. VIBRATION PROOF ITEMS 17 AND 30, USING LOCKING COMPOUND GRADE "CV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.

   b. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO ZERO SLOS, THE SLOS AND LLOS SHALL BE LATERALLY PARALLEL WITHIN 20 ARC SECONDS ("R" LINE COINCIDENCE).

   c. WITH SXT TRUNNION ROTATED TO THE POSITION CORRESPONDING TO 90° SLOS IN WHICH THE SXT RETICLE IS REFLECTED BACK UPON ITSELF, THE "R" LINE OF THE REFLECTED IMAGE SHALL COINCIDE WITH THE RETICLE "R" LINE WITHIN 10 ARC SECONDS.

   d. THE DIFFERENCE BETWEEN MEASUREMENTS 3b AND 3c TAKING DIRECTION INTO ACCOUNT SHALL NOT EXCEED 20 ARC SECONDS.

   e. THE SUM OF THE MEASUREMENTS 3b AND 3c SHALL NOT EXCEED 25 ARC SECONDS IGNORING DIRECTION.

   f. THE RETICLE AS OBSERVED THROUGH THE LLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 10 ARC SECONDS.

   g. THE SXT RETICLE AS OBSERVED THROUGH THE SLOS SHALL BE COINCIDENT WITH THE SHAFT AXIS WITHIN 20 ARC SECONDS. THAT IS, MEASUREMENTS 3b AND 3f SHALL NOT HAVE ADDITIVE TOLERANCES.

   h. THE SXT RETICLE "R" LINE SHALL ALIGN WITH THE SXT TRUNNION TRACK WITHIN 5 ARC SECONDS VARIATION OVER ITS WHOLE LENGTH.

   i. THE SXT TRUNNION LIMIT STOP, ITEMS 76 THRU 84, SHALL BE SET TO PROVIDE EQUAL OVERTRAVEL WITHIN 3° AT THE 0° AND 90° SLOS POSITIONS.

   j. THE SXT TRUNNION ANTI-BACKLASH SPRING, (PART OF ITEM 56) SHALL BE WOUND UP 1/4 TURN CLOCKWISE AND CLAMPED WHEN THE TRUNNION IS AT THE 90° SLOS POSITION.

   k. THE SXT SHAFT SHALL BE AT ITS ZERO POSITION DURING THE ASSEMBLY OF ITEMS 11, 12, AND 22 WITH THEIR MOUNTING HARDWARE. THE RSVR'S ON ITEM 12 SHALL BE PRESET TO THEIR ELECTRICAL ZERO REFERENCE WHEN ITEM 12 IS MESHED WITH ITEM 10. ITEM 22 SHALL BE POSITIONED WITH ITS STOP DOG IN THE LARGER SECTOR BETWEEN THE TWO PINS OF ITEM 10. REMOVE NAS 1352C02-4 & MS 15795-802 WHICH ARE ITEMS 4 & 5 OF 2012387

   l. A MAXIMUM BREAKAWAY FRICTIONAL TORQUE OF .04 IN-OZ AND A MAXIMUM RUNNING FRICTIONAL TORQUE OF .03 IN-OZ SHALL BE REQUIRED AT THE RESPECTIVE DRIVE MOTOR SHAFTS TO DRIVE THE SXT TRUNNION AND SHAFT IN EITHER DIRECTION THROUGHOUT THEIR OPERATING EXCURSIONS.

   m. AFTER SXT RETICLE POSITION IS FINALIZED, SECURE BY APPLYING 2.8 IN-LBS LOCKING TORQUE TO (3) RETICLE LOCKING SCREWS (NAS 1352C02LL6) WHICH ARE PART OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1). VIBRATION PROOF SXT RETICLE LOCKING RING (PART OF ITEM 1) USING 1 DROP OF LOCKING COMPOUND, GRADE H PER MIL-S-22473. THE SURFACES SHALL HAVE BEEN PREVIOUSLY PREPARED IN ACCORDANCE WITH ND 1002211.

   n. AFTER THE REQUIREMENTS OF NOTE 3m HAVE BEEN ACCOMPLISHED REMOVE (3) BEVEL RETAINERS AND (3) HEX SOC HD CAP SCREWS (MS 16995-3) WHICH ARE PARTS OF THE SXT RETICLE ASSEMBLY (PART OF ITEM 1.)

   o. THE RSVR'S ASSOCIATED WITH THE SXT TRUNNION AND SHAFT SHALL BE SET TO MEET THE SXT TDA AND SDA REQUIREMENTS OF TABLE 1 OF PS 2011000

4. STAR TRACKER AND HORIZON SENSOR REQUIREMENTS

   a. THE SXT SLOS AND THE STAR TRACKER LOS SHALL BE PARALLEL TO WITHIN 20 ARC SECONDS IN THE TRUNNION AXIS DIRECTION AND 3 ARC MINUTES IN THE CROSS TRUNNION AXIS DIRECTION.

   b. THE SXT LLOS AND THE PHOTOMETER LOS SHALL BE PARALLEL TO WITHIN 3 ARC MINUTES.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011000	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 85386910690	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL	DRAWN V. AMATO DATE 6-11-65 CHECKED F. Raymond 6-30-65 APPROVAL APPROVAL E. Thomas 7-2-65	TITLE OPTICAL UNIT SUBASSEMBLY STAGE II
APPLICATION		CONTRACT	NASA APPROVAL 7-13-65 MIT APPROVAL 12-6-65	CODE IDENT NO. 80230 SIZE E NASA NUMBER 2011890 SCALE 1/1 WEIGHT CALC ACTUAL SHEET 5 OF 6

2011890

N | 2011890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
L		REVISED PER TDRR 23069	[illegible]	wk
M		REVISED PER TDRR 23361	11/5/65	wk
N		REVISED PER TDRR 25078	[illegible]	wk

001	031	021	011	000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
					101								
0	1	0	0	0	100		2011889-021			OPTICAL UNIT SUB-ASSY STAGE I			
1	1	1	0	0	99		2011701-011			SXT INDEX HEAD ASSEMBLY			
1	1	1	1	1	98	*	1000220-5			CLAMP, CABLE			
1	1	1	1	1	97	*	1011918-1			WASHER, CLAMP, CABLE			
1	1	1	1	1	96		NAS1352C03LL8	74455157011		SCREW, CAP, SOC.HD., SELF LOCKING			
0	0	1	1	0	95		2012621	57386911630		RING, MOUNTING COVER			
0	0	1	1	0	94		2011889-011			OPTICAL UNIT SUB-ASSY			
1	1	1	1	1	93	*	1011625-28	74455151028		SCREW, CAP HEX, SOC.HD., SELF LOCKING			
1	1	1	1	1	92		2012431	56386910580		PLATE, MOUNTING, CONNECTOR			
2	2	2	2	2	91	*	1011625-11	74455151011		SCREW, CAP, SOC.HD., SELF LOCKING			
2	2	2	2	2	90		NAS1081C02A4L			SET SCREW, SELF LOCKING			
2	2	2	2	2	89		2012432	53386910050		POST, CONNECTOR PLATE			
1	1	1	1	1	88		1012522	68201016701		CABLE (FLAT) AND CONNECTOR ASSY			
2	2	2	2	2	87		NAS1351C03LL20	74455156044		SCREW, CAP, SOC.HD., SELF LOCKING			
8	8	8	8	8	86		1011625-20	74455151020		SCREW, CAP, SOC. HD., SELF LOCKING			
1	1	1	1	1	85		2011595	52386910220		COVER, GEARBOX			
1	1	1	1	1	84		MS16624-1018			RING, RETAINING			
AR	AR	AR	AR	AR	83		2012351	7938691 0101 0103		WASHER, FLAT			
1	1	1	1	1	82		2011578	57386910130		DOG, LIMIT STOP, OUTER			
3	3	3	3	3	81		2011579	57386910120		DOG, LIMIT STOP			
1	1	1	1	1	80		2011580	57386910140		DOG, LIMIT STOP, INNER			
1	1	1	1	1	79		1011608-5			BEARING, BALL, ANNULAR			
1	1	1	1	1	78		2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
1	1	1	1	1	77		2011577	56386910060		SPRING, TORSION			
1	1	1	1	1	76		2012350	25386910010		WASHER			
					75								
1	1	1	1	1	74	*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
2	2	2	2	2	73		MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
8	8	8	8	8	72		1011625-39	74455151040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
2	2	2	2	2	71		NAS1352C06LL6	74455157019		SCREW, CAP, SOC.HEAD, SELF LOCKING			
2	2	2	2	2	70		NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
4	4	4	4	4	69		NAS1189C02T4L			SCREW, FLAT HD., SELF LOCKING			
2	2	2	2	2	68		MS16624-15	—#—		RING, RETAINING, EXTERNAL, BASIC			
1	1	1	1	1	67		MS15795-305	—#—		WASHER, FLAT			
1	1	1	1	1	66	*	1011918-2	—#—		WASHER CABLE CLAMP			
1	1	1	1	1	65	*	1000220-6 OR 5	—#—		CLAMP, CABLE			
1	1	1	1	1	64	*	1000220-8 OR 6	—#—		CLAMP, CABLE			
1	1	1	1	1	63		2012491	57386911280		PLATE, END, RESOLVER			
AR	AR	AR	AR	AR	62		2011885	45386910040		SHIM			
1	1	1	1	1	61	*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
1	1	1	1	1	60		1012520-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
1	1	1	1	1	59		2011713	80386910040		SCT BASE HARNESS ASSY			
1	1	1	1	1	58		2011896	80386910050		SXT BASE HARNESS ASSY			
1	1	1	1	1	57	*	1012065			RESOLVER ASSY 1 SPEED, 2 SPEED, 64 SPEED			
0	0	0	1	1	56		2011701	85386910150		SXT INDEX HD ASSY			
1	1	1	1	1	55		2012164	26386910060		GROMMET			
					54								
					53								
2	2	2	2	2	52	NAS	1352C08LL12	74455157029		SCREW, CAP, SOC.HD., SELF LOCKING			
7	7	7	7	7	51	NAS	1352C08LL8	74455157027		SCREW, CAP, SOC.HD., SELF LOCKING			
					50								
4	4	4	4	4	49	NAS	1352C06LL4	74455157018		SCREW, CAP, SOC.HD., SELF LOCKING			
8	8	8	8	8	48	NAS	1352C04LL8	74455157015		↕			
14	14	14	14	14	47	NAS	1352C04LL6	74455157014		↕			
14	14	14	14	14	46	NAS	1352C04LL4	74455157013		↕			
14	14	14	14	14	45	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC.HD., SELF LOCKING			
					44								
12	12	12	12	12	43	NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
1	1	1	1	1	42		1010628-19			SCREW, FLAT HD., SELF LOCKING, SOC. HEX			
2	2	2	2	2	41	AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
1	1	1	1	1	40		NAS1352C08LL10	74455157028		SCREW, CAP, HEX SOC.HD., SELF LOCKING			
2	2	2	2	2	39		2011684	48386910030		PIN, THREADED			
1	1	1	1	1	38		2011877	45386910250		SPACER			
1	1	1	1	1	37	*	1012525-005	74443162005		NUT, SELF LOCKING, HEX, THIN			
1	1	1	1	1	36		MS9021-154			PACKING, PREFORMED			
1	1	1	1	1	35	*	1011606-1	30205772240		BEARING, BALL			
1	1	1	1	1	34	*	1011606-2	30205772720		BEARING, BALL			
1	1	1	1	1	33		2011825	33386910170		GEAR, SPUR (42T-96P)			
2	2	2	2	2	32		2011562	57386910580		BUSHING, LOCATING			
2	2	2	2	2	31		2011561	57386910590		BUSHING, ECCENTRIC			
1	1	1	1	1	30		2011344	45386910020		SCREW, SHOULDER			
2	2	2	2	2	29		2011353	56386910260		SPACER, SPRING HOLDER			
1	1	1	1	1	28		2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
1	1	1	1	1	27		2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	26		2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
1	1	1	1	1	25		2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	24		2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
3	3	3	3	3	23		2011341	57386910560		PLATE, RETAINING, STOP RING			
1	1	1	1	1	22		2011342	57386910570		RING, LIMIT STOP			
1	1	1	1	1	21		2011320	52386910160		PLATE, FLEXPRINT GUIDE			
1	1	0	0	1	20		2011616	57386910020		RING, MOUNTING, COVER			
1	1	1	1	1	19		2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
1	1	1	1	1	18		2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
6	6	6	6	6	17		2011323	53386910020		POST, SHOULDERED, THREADED			
1	1	1	1	1	16		2012440	85386911240		FLEXPRINT RETAINING ASSY			
2	2	2	2	2	15		2011686	56386910310		RETAINER, PIN			
1	1	1	1	1	14	*	1012520-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	1	13	*	1012519	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
1	1	1	1	1	12		2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT, ASSY OF			
1	1	1	1	1	11		2011714	85386910460		LIMIT STOP ASSY			
1	1	1	1	1	10		2012387	85386911110		GEAR & SPRING, ASSY OF			
1	1	1	1	1	9		2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
1	1	1	1	1	8		2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
1	1	1	1	1	7		2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
0	0	0	1	1	6		2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
1	1	1	1	1	5		2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
1	1	1	1	1	4		2011731	85386910530		HOUSING & LAMP, ASSY OF			
1	1	1	1	1	3		2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
1	1	1	1	1	2		2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
1	0	0	0	1	1		2011889-000	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

QTY REQD

LIST OF PARTS AND MATERIALS

001	031	021	011	000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
					142								
					141								
					140								
					139								
					138								
					137								
					136								
					135								
					134								
					133								
					132								
					131								
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					114								
					113								
					112								
					111								
					110								
					109								
					108								
					107								
					106								
					105								
					104								
					103								
1	1	1	0	0	102		2011215-011			TELESCOPE TRUNNION AXIS ASSY			

QTY REQD

LIST OF PARTS AND MATERIALS

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± | DECIMALS ± | ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC
PN
DRAWN A.C.WILLIAMS DATE 10-8-65
CHECKED H.C.Pressey 10-18-65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer 9Nov65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO. 80230 | SIZE E | NASA NUMBER 2011890
SCALE | WEIGHT CALC ACTUAL | SHEET 6 OF 6

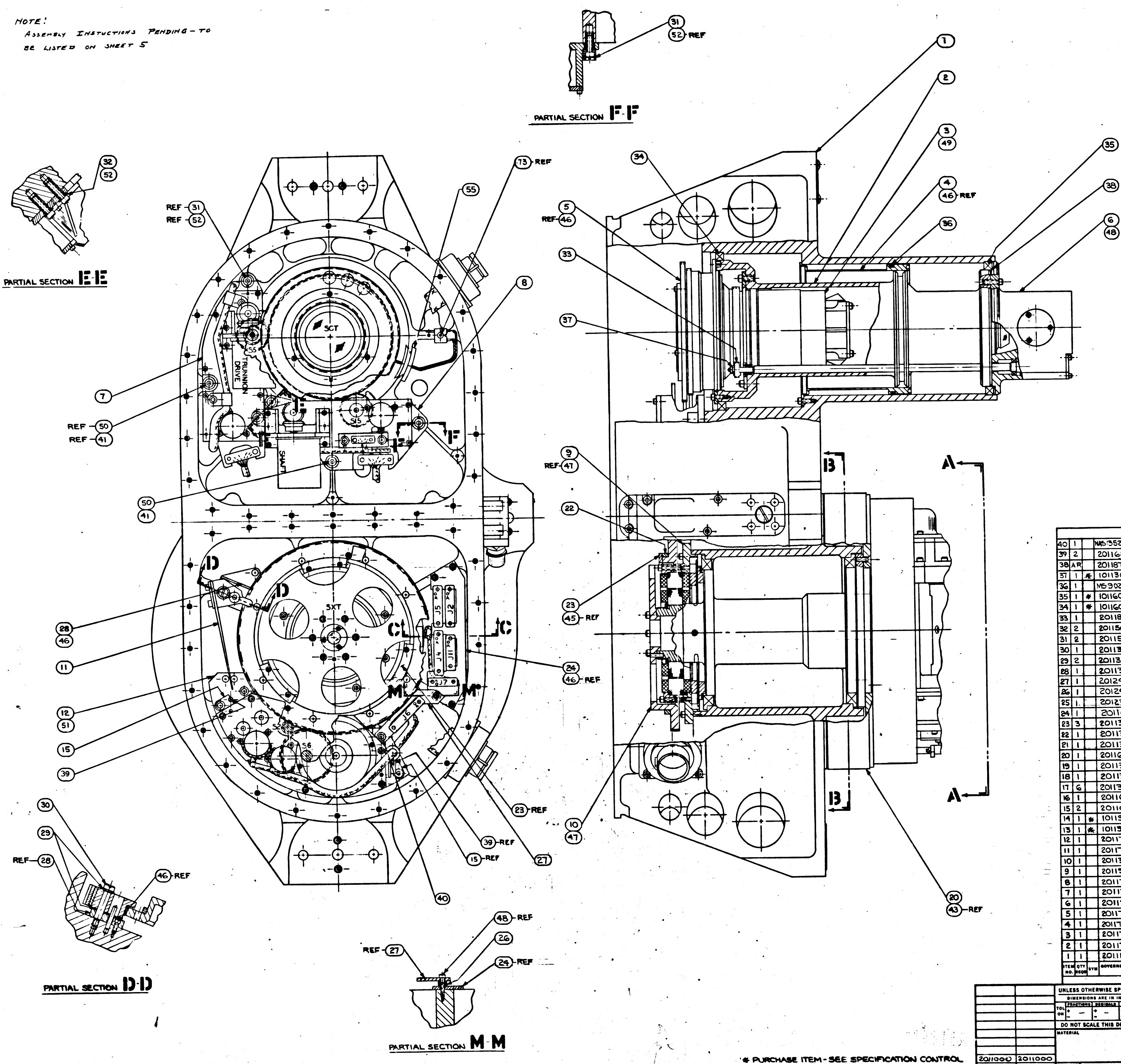
2011890

0681102

REVISIONS 2217

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTE:
ASSEMBLY INSTRUCTIONS PENDING - TO
BE LISTED ON SHEET 5



PARTIAL SECTION F-F
31
52 REF
32
52
PARTIAL SECTION E-E
REF 31
REF 52
55
73 REF
8
SCT
S5
TRUNNION DRIVE
S15
SHAFT
F
7
REF 50
REF 41
50
41
D
C
M
SXT
J1
J2
J3
J4
J5
J6
J7
S6
28
46
11
12
51
15
39
24
46 REF
23 REF
39 REF
15 REF
27
40
30
29
REF 28
46 REF
PARTIAL SECTION D-D
48 REF
26
REF 27
24 REF
PARTIAL SECTION M-M
1
2
3
49
4
46 REF
36
34
35
38
6
48
5
REF 46
33
37
9
REF 47
22
23
45 REF
10
47
20
43 REF
A
B

SEE SHEET 2 FOR ITEMS 41 THRU 55

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
40	1		NAS1352C08LL10	74455157028		SCREW, CAP, HEX. SOC HD. SELF LOCKING			
39	2		2011684	48386910030		PIN, THREADED			
38	AR		2011877-1 TO -6	79386910481 THRU 0486		SPACER			
37	1	*	1011363-1	74443127001		NUT, HEX, (SELF-LOCKING)			
36	1		MS9021-154			PACKING, PREFORMED			
35	1	*	1011606-1	30205772240		BEARING, BALL			
34	1	*	1011606-2	30205772720		BEARING, BALL			
33	1		2011825	33386910170		GEAR, SPUR (42T-96P)			
32	2		2011562	57386910580		BUSHING, LOCATING			
31	2		2011561	57386910590		BUSHING, ECCENTRIC			
30	1		2011344	45386910020		SCREW, SHOULDER			
29	2		2011353	56386910260		SPACER, SPRING HOLDER			
28	1		2011351	52386910560		BRACKET, MOUNTING, SPRING HOLDER			
27	1		2012487	56386910550		PLATE, MOUNTING, CONNECTOR			
26	1		2012486	57386911240		SPACER, CONNECTOR, MOUNTING PLATE			
25	1		2012374	56386910030		PLATE, MOUNTING, CONNECTOR			
24	1		2011622	56386910290		PLATE, MOUNTING, CONNECTOR			
23	3		2011341	57386910560		PLATE, RETAINING, STOP RING			
22	1		2011342	57386910570		RING, LIMIT STOP			
21	1		2011320	52386910160		PLATE, FLEXPRINT GUIDE			
20	1		2011616	57386910020		RING, MOUNTING, COVER			
19	1		2011321	56386910020		PLATE, MOUNTING, CONNECTOR			
18	1		2011322	56386910300		PLATE, MOUNTING, CONNECTOR			
17	6		2011323	53386910020		POST, SHOULDERED, THREADED			
16	1		2011623	52386910170		PLATE, FLEXPRINT GUIDE			
15	2		2011686	56386910310		RETAINER, PIN			
14	1	*	1011908-1	85386900910		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
13	1	*	1011907	85386900900		FLEXPRINT & CONNECTOR, ASSY OF (SXT)			
12	1		2011705	85386910490		SHAFT DRIVE GEAR BOX, SXT., ASSY OF			
11	1		2011714	85386910460		LIMIT STOP ASSY			
10	1		2011340	85386910450		GEAR & PIN, ASSY OF			
9	1		2011906	85386910440		HOUSING, STATOR & LAMP, ASSY OF			
8	1		2011703	85386910200		SHAFT DRIVE, GEAR BOX, SCT, ASSY OF			
7	1		2011702	85386910630		TRUNNION DRIVE GEAR BOX, SCT, ASSY OF			
6	1		2011215	85386910380		TELESCOPE TRUNNION AXIS ASSY			
5	1		2011723	85386910500		DRIVE GEAR, CLUSTER ASSY			
4	1		2011731	85386910530		HOUSING & LAMP, ASSY OF			
3	1		2011724	85386910430		INNER TELESCOPE TUBE, ASSY OF			
2	1		2011722	85386910300		OUTER TELESCOPE TUBE ASSY			
1	1		2011889	85386910680		OPTICAL UNIT SUBASSY - STAGE I			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690

DRAWN DATE 4-15-64
CHECKED 8/12/64
APPROVAL 8/27/64
APPROVAL E. Manning 8/31/64
NASA APPROVAL
UNIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

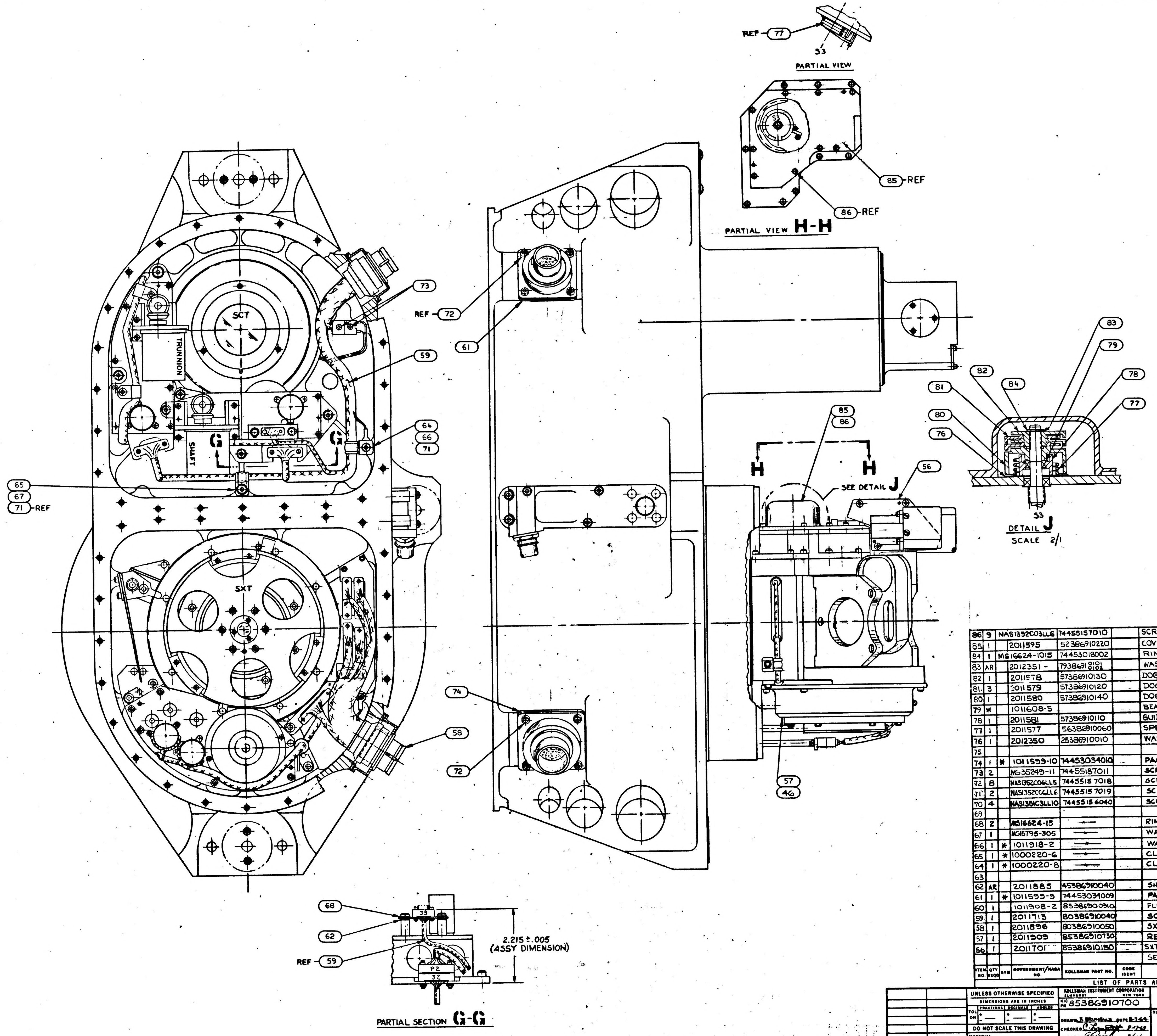
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 5

2011890

2011890

REVISIONS				2217
SYM	ZONE	DESCRIPTION	DATE	APPROVAL



PARTIAL VIEW

PARTIAL VIEW H-H

DETAIL J
SCALE 2/1

PARTIAL SECTION G-G

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
86	9		NAS1352C03LL6	74455157010		SCREW, CAP, SOC. HD. SELF LOCKING			
85	1		2011595	52386910220		COVER, GEARBOX			
84	1		MS16624-1015	74453018002		RING, RETAINING			
83	AR		2012351 -	7938691 0101 0102		WASHER, FLAT			
82	1		2011578	57386910130		DOG, LIMIT STOP, OUTER			
81	3		2011579	57386910120		DOG, LIMIT STOP			
80	1		2011580	57386910140		DOG, LIMIT STOP, INNER			
79	*		1011608-5			BEARING. BALL. ANNULAR			
78	1		2011581	57386910110		GUIDE, SPRING, LIMIT STOP			
77	1		2011577	56386910060		SPRING, TORSION			
76	1		2012350	25386910010		WASHER			
75									
74	1	*	1011599-10	74453034010		PACKING, PREFORMED, RETAINED			
73	2		MS35249-11	74455187011		SCREW, SELF LOCKING, 82° FLAT HEAD			
72	8		NAS1352C06LL5	74455157018		SCREW, CAP, SOC. HEAD, SELF LOCKING			
71	2		NAS1352C06LL6	74455157019		SCREW, CAP, SOC. HEAD, SELF LOCKING			
70	4		NAS1351C3LL10	74455156040		SCREW, CAP, SOC. HEAD, SELF LOCKING			
69									
68	2		MS16624-15	—		RING, RETAINING, EXTERNAL, BASIC			
67	1		MS15795-305	—		WASHER, FLAT			
66	1	*	1011918-2	—		WASHER, CABLE CLAMP			
65	1	*	1000220-6	—		CLAMP, CABLE			
64	1	*	1000220-8	—		CLAMP, CABLE			
63									
62	AR		2011885	45386910040		SHIM			
61	1	*	1011599-9	74453034009		PACKING, PREFORMED, RETAINED			
60	1		1011908-2	85386900910		FLEXPRINT & CONNECTOR, ASSY OF			
59	1		2011713	80386910040		SCT BASE HARNESS ASSY			
58	1		2011896	80386910050		SXT BASE HARNESS ASSY			
57	1		2011909	85386910730		RESOLVER AND CONNECTOR ASSY OF			
56	1		2011701	85386910150		SXT INDEX HD ASSY			
						SEE SHEET 2 FOR ITEM 41 THRU 55			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700

DRAWN [illegible] DATE 2-7-64
CHECKED C. [illegible] 2-17-64
APPROVAL [illegible]
APPROVAL E. [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

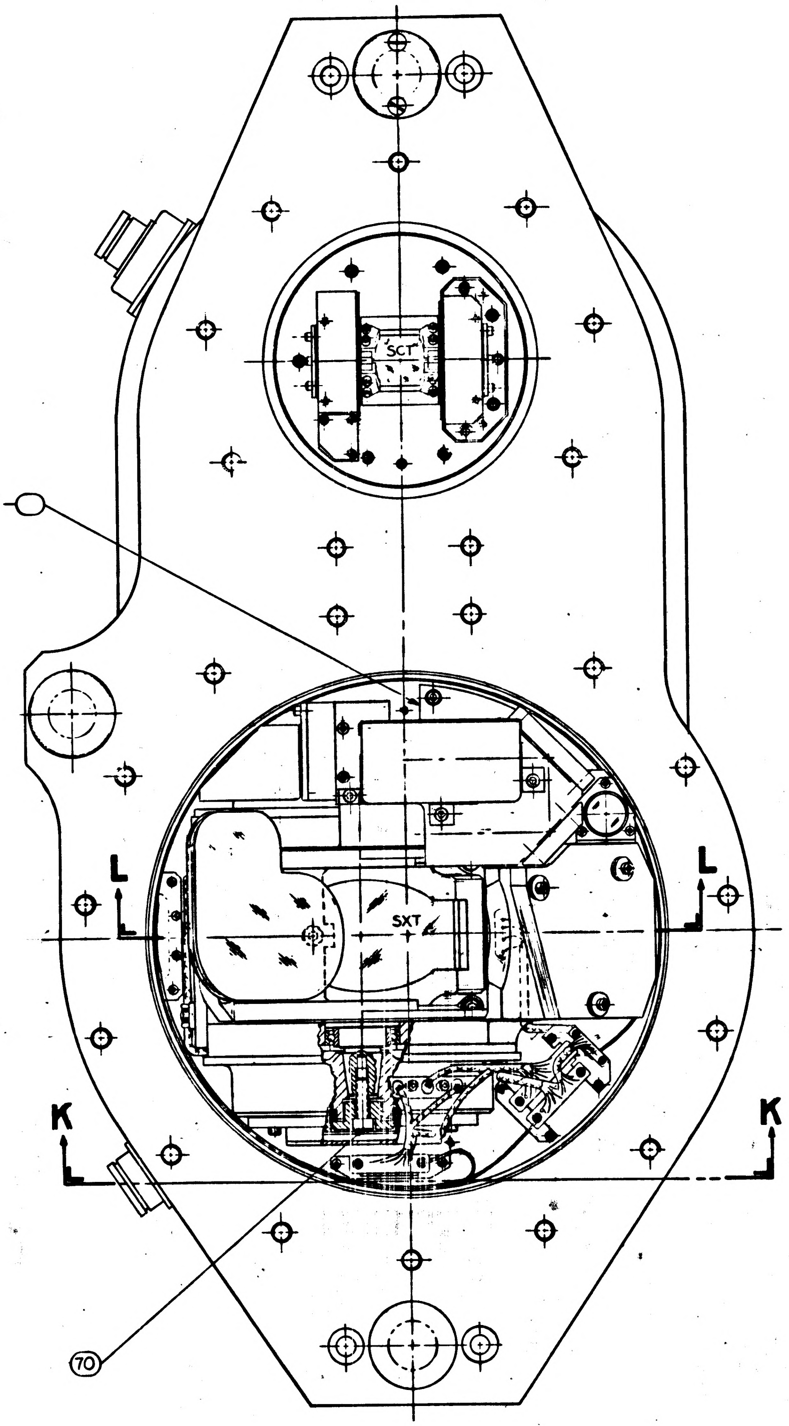
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

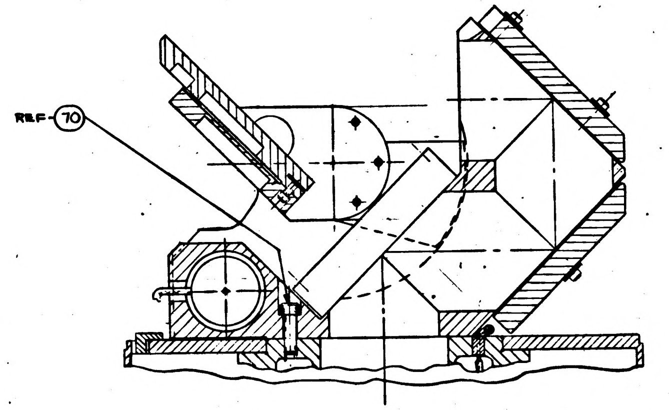
CODE IDENT NO. | SIZE E | NASA NUMBER 2011890
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 3 OF 5

2011890

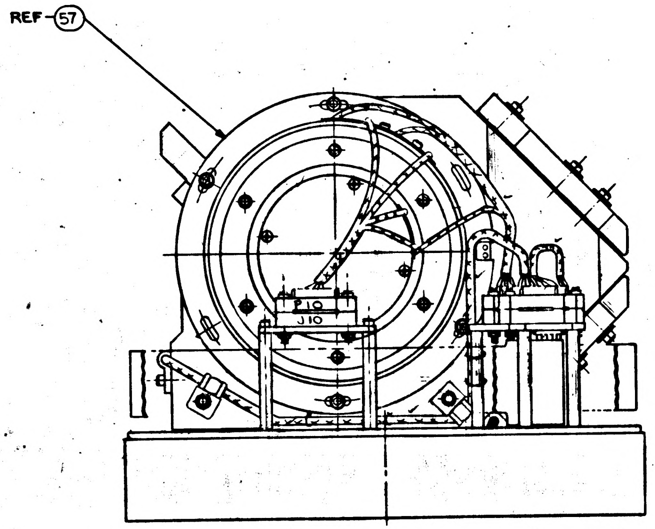
2011890

REVISIONS			12217	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL





PARTIAL SECTION **L-L**



PARTIAL VIEW **K-K**

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910700
DRAWN [illegible] DATE [illegible]
CHECKED [illegible] 8/27/64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

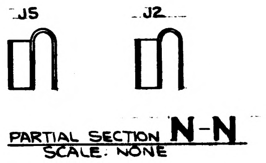
TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 4 OF 5

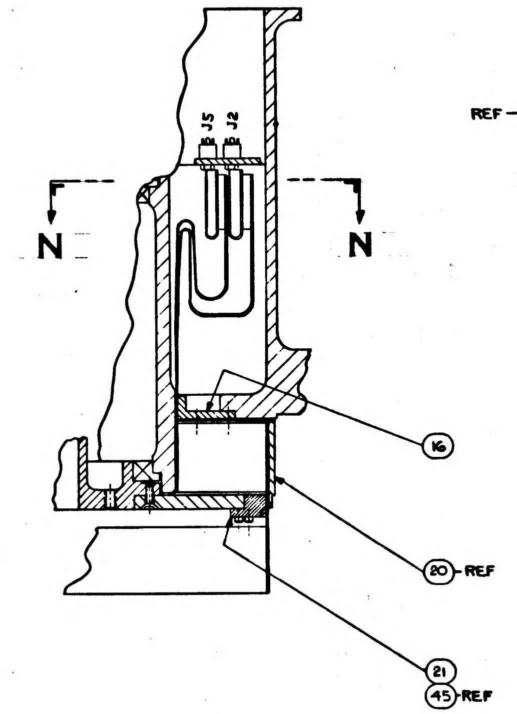
0681102

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

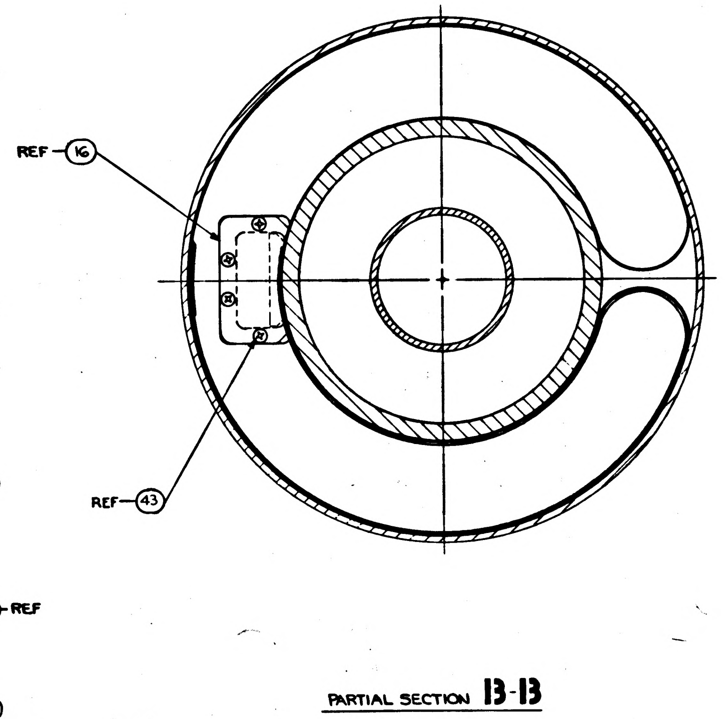
12217



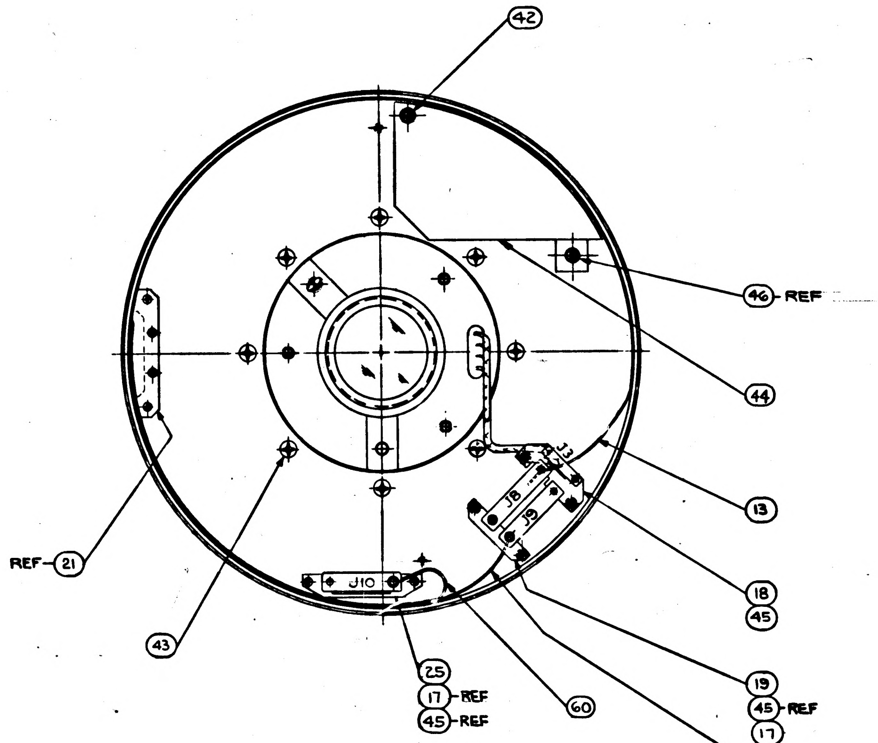
PARTIAL SECTION **N-N**
SCALE: NONE



PARTIAL SECTION **C-C**



PARTIAL SECTION **B-B**



PARTIAL VIEW **A-A**
(WITH SEXTANT INDEX HD ASSY REMOVED)

SEE SHEET 3 FOR ITEMS 56 THRU 86									
55	1		2012164	26386910060		GROMMET			
54									
53									
52	4	NAS	1352C08LL12	74455157029		SCREW, CAP, SOC. HD, SELF LOCKING			
51	3	NAS	1352C08LL8	74455157027					
50	2	NAS	1352C08LL6	74455157026					
49	4	NAS	1352C06LL4	74455157018					
48	8	NAS	1352C04LL8	74455157015					
47	14	NAS	1352C04LL6	74455157014					
46	15	NAS	1352C04LL4	74455157013					
45	16	NAS	1352C02LL4	74455157006		SCREW, CAP, SOC. HD, SELF LOCKING			
44	1		2007008			POWER SUPPLY (TRACKER & PHOTOMETER)			
43	12	NAS	1189C04P6L	74455155010		SCREW, SELF LOCKING, 100° FLAT HEAD			
42	1		1010628-19			SCREW, FLAT HD SELF LOCKING SOC. HEX			
41	2	AN	960-C8	74468051004		WASHER, FLAT, REGULAR			
						SEE SHEET 1 FOR ITEMS 1 THRU 40			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011000	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910690
DRAWN DATE 4-13-64
CHECKED
APPROVAL
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
OPTICAL UNIT SUBASSEMBLY
STAGE II

CODE IDENT NO.
SIZE E
NASA NUMBER 2011890
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 2 OF 5

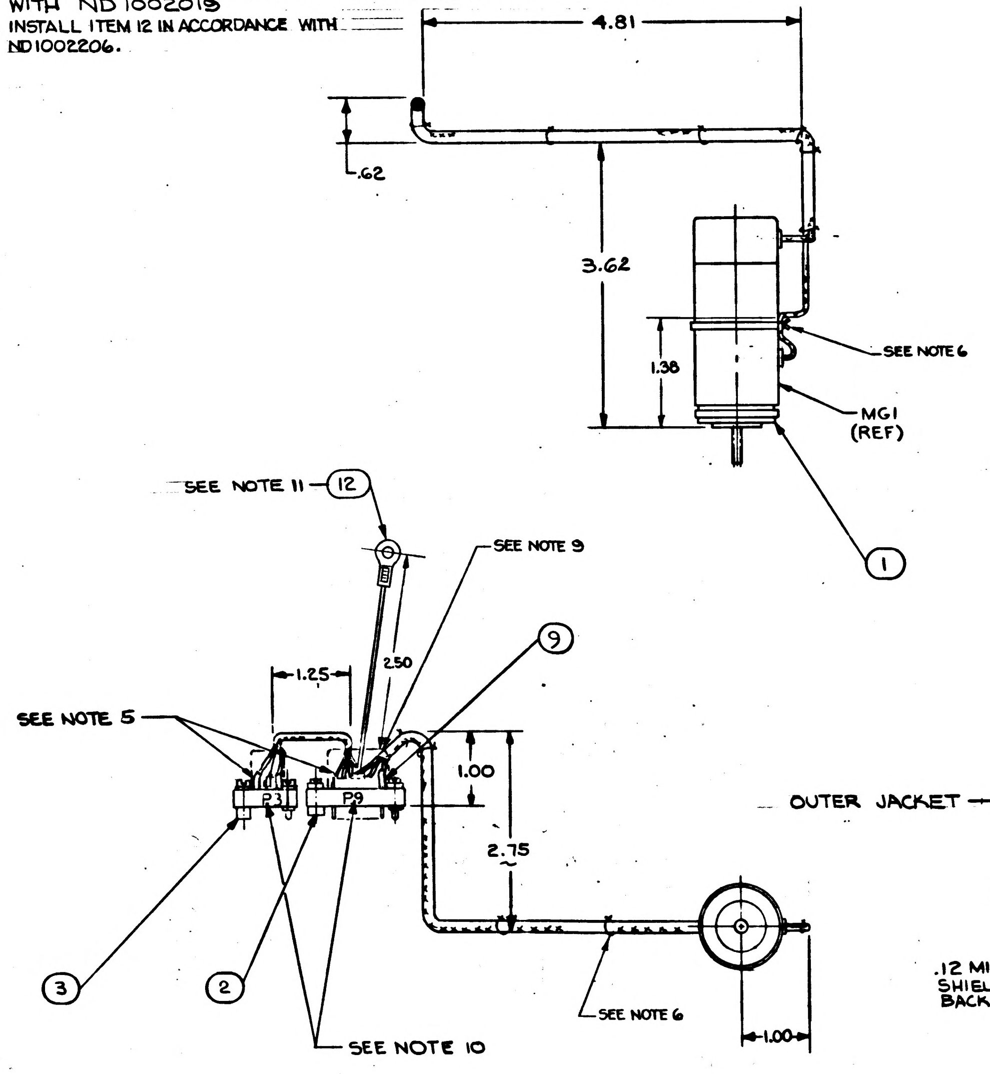
2011890

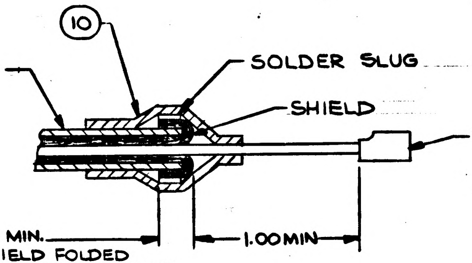
A	2011892

REVISIONS TDRR 2119

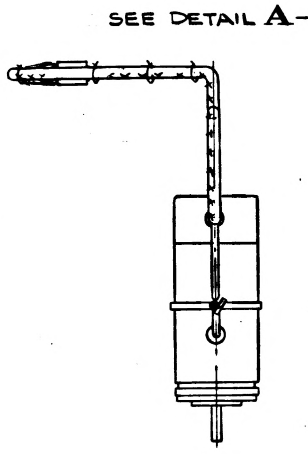
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17277	18 May 65	WR

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)





DETAIL "A" (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)



WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
12	1	*	MS25036-48	—+—		TERMINAL, LUG, CRIMP STYLE, COPPER			
11	1	*	1010789-006	—+—		WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
10	1	*	1010402-2			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060	—+—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15	—+—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17	—+—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11	—+—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13	—+—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4									
3	1	*	1011757	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123	—+—		CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1	—+—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN DATE 4-17-64
CHECKED J.E. SULLIVAN
APPROVAL 6/15/64
APPROVAL 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SERVO MOTOR & CONNECTOR, ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

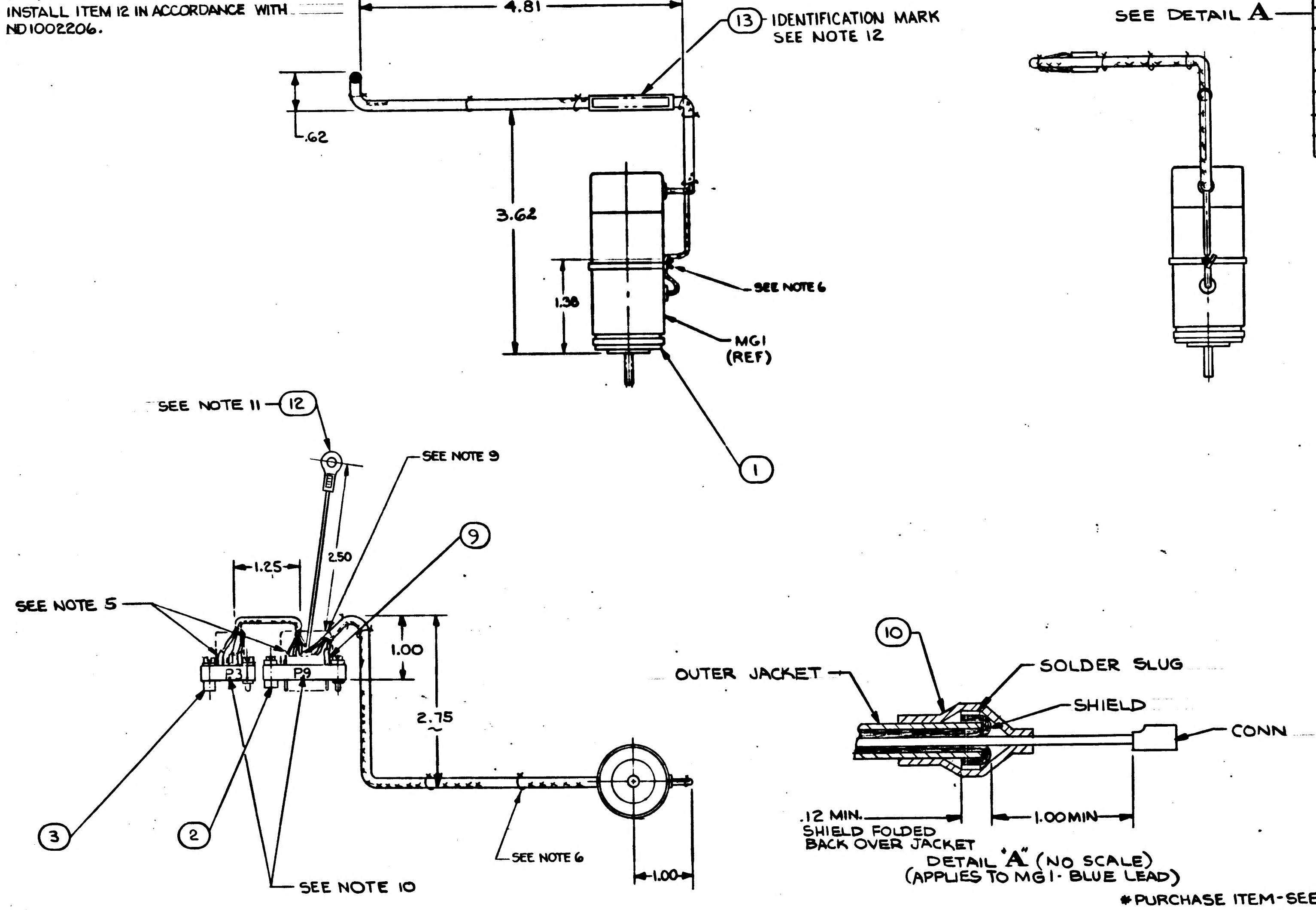
B 2011892

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 2119				
A		REVISED PER TDRR NO 17277	18 May 65	WR
B		REVISED PER TDRR NO. 18181	4/27/65	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. SHRINK ITEM 13 & IDENTIFY ASSY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1	*	1010490-290	—		INSULATION, SLEEVING, ELECT, HEAT SHRINKABLE			
12	1	*	MS25036-48	—		TERMINAL, LUG, CRIMP STYLE, COPPER			
11	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
10	1	*	1010402-2			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4									
3	1	*	1011757	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123	—		CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN J. Schulley DATE 4-11-64
CHECKED J.E. SULLIVAN
APPROVAL G. Rushman 6/15/64
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SERVO MOTOR & CONNECTOR,
ASSY OF

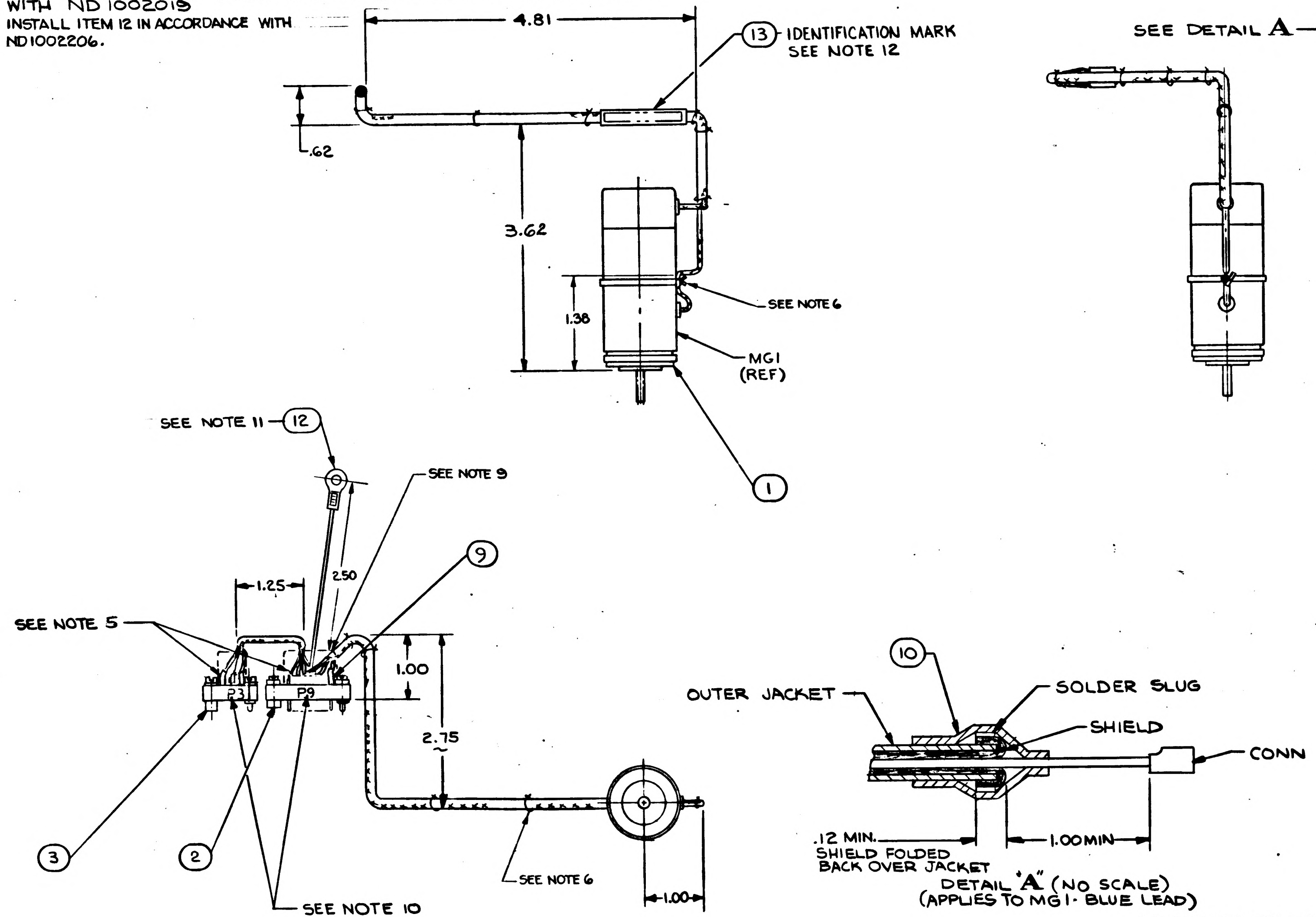
CODE IDENT NO. 80230 SIZE D NASA NUMBER 2011892
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011892 B

2011892 C

REVISIONS		TDRR 12119		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17277	18 May 65	WK
B		REVISED PER TDRR NO. 18181	4/27/65	WK
C		REVISED PER TDRR 19039	5/18/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. SHRINK ITEM 13 & IDENTIFY ASSY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.



DETAIL "A" (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1	*	1010490-290	—		INSULATION, SLEEVING, ELECT, HEAT SHRINKABLE			
12	1	*	MS25036-48	—		TERMINAL, LUG, CRIMP STYLE, COPPER			
11	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
10	1	*	1010402-1			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17	—		WIRE. ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4									
3	1	*	1011757	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123	—		CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011706	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.06 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN J. Schilley DATE 4-11-64
CHECKED J. E. SULLIVAN
APPROVAL G. Rushman 6/15/64
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL W Kaffer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SERVO MOTOR & CONNECTOR, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

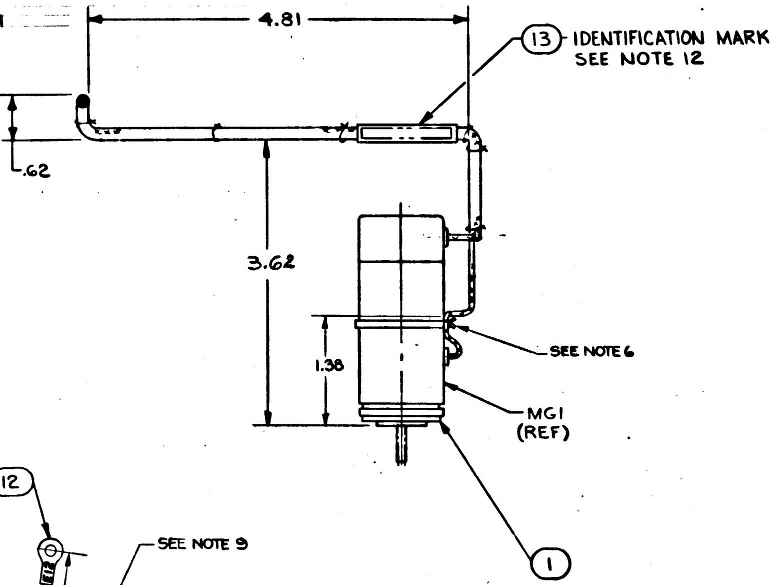
2011892 C

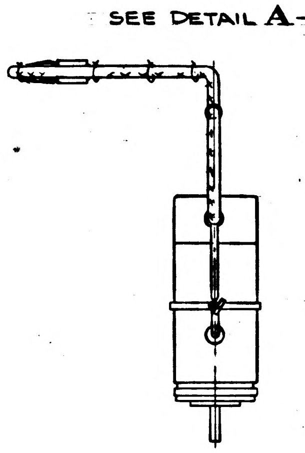
D 2011892

NOTES:

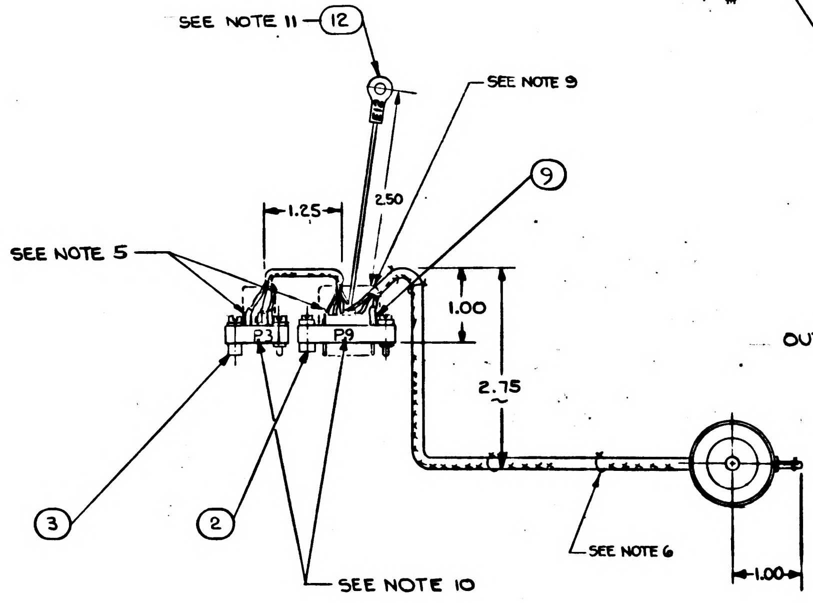
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. SHRINK ITEM 13 & IDENTIFY ASSY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.

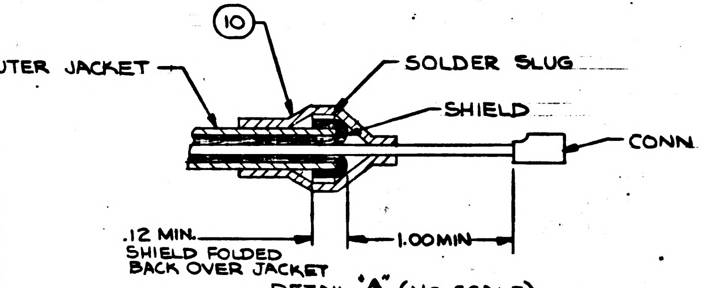
REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17277	18 [illegible] 65	WK
B		REVISED PER TDRR NO. 18181	4/27/65	WK
C		REVISED PER TDRR 19039	5/18/65	WK
D		REVISED PER TDRR 24641	12/14/65	WK





WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	





DETAIL 'A' (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1	*	1010490-290			INSULATION, SLEEVING, ELECT, HEAT SHRINKABLE			
12	1	*	MS25036-43			TERMINAL, LUG, CRIMP STYLE, COPPER			
11	1	*	1010789-006			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
10	1	*	1010402-1			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060			INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15			WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17			WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11			WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13			WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4									
3	1	*	1011757-000	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123			CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1			SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN J. Schiller DATE 4-17-64
CHECKED J. E. SULLIVAN
APPROVAL G. Rushman 6/15/64
APPROVAL E. Monroe 8/25/64
NASA APPROVAL
MIT APPROVAL W. Kuffer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SERVO MOTOR & CONNECTOR,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011892 D

MASTER

NOTES:
1 INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2 F... RING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3 TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4 SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5 SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6 LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7 PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. SHRINK ITEM 13 & IDENTIFY ASSY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.

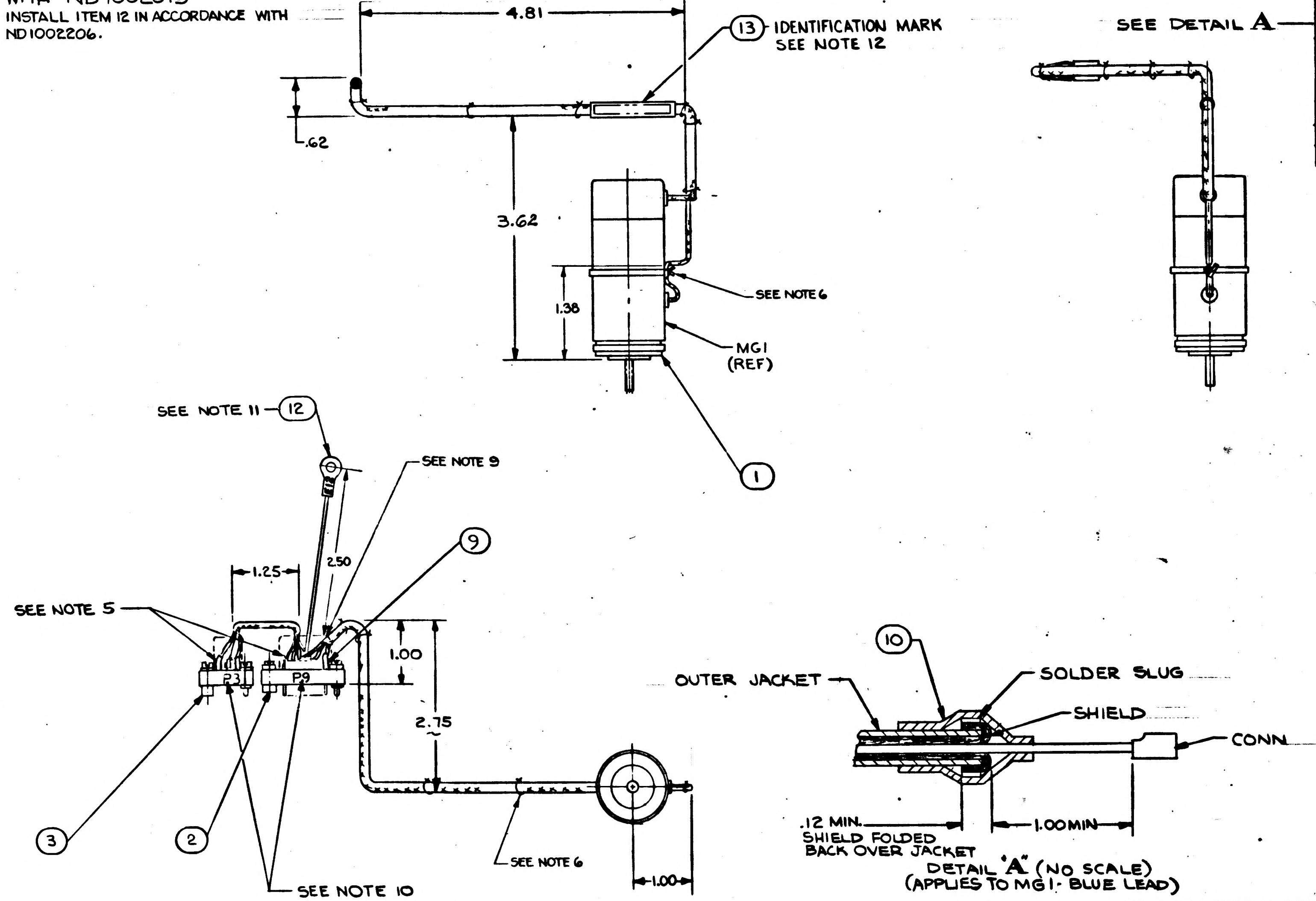
E	2011892

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17277		wk
B		REVISED PER TDRR NO. 18181	4/27/65	wk
C		REVISED PER TDRR 19039		wk
D		REVISED PER TDRR 24691	12/14/65	wk
E		REVISED PER TDRR 25244		wk

REVISIONS TDRR 12119

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
13	1	*	1010490-290	—		INSULATION, SLEEVING, ELECT, HEAT SHRINKABLE			
12	1	*	MS25036-43	—		TERMINAL, LUG, CRIMP STYLE, COPPER			
11	1	*	1010789-006	—		WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
10	1	*	1010402-1			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4									
3	1	*	1011757-000	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123	—		CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN J. Schulley DATE 4-17-64
CHECKED J.E. SULLIVAN
APPROVAL G. Rushman 6/15/64
APPROVAL E. Moraga 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

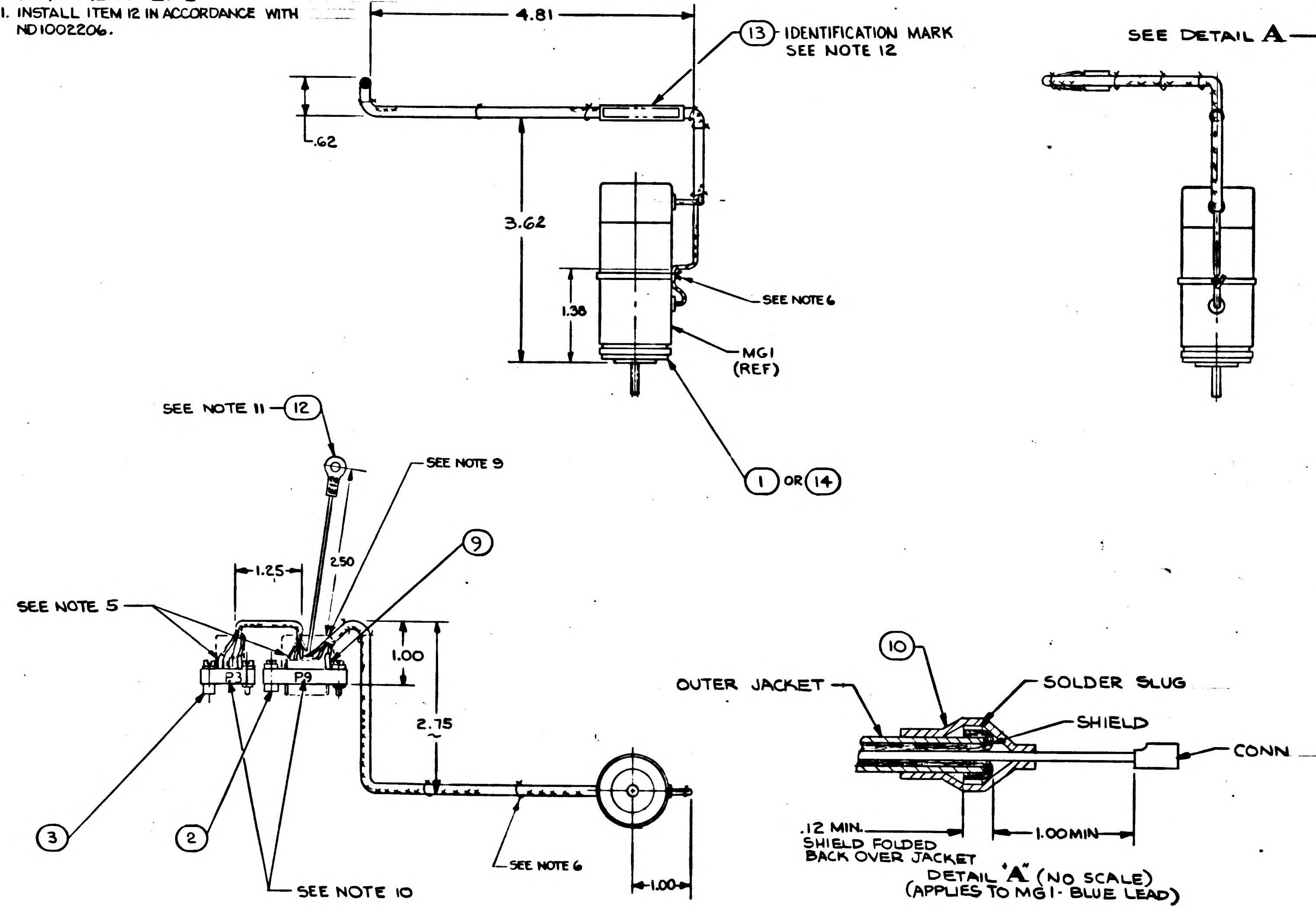
TITLE
SERVO MOTOR & CONNECTOR, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

F | 2011892

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032. THEN TIE TO ITEM 1.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019
11. INSTALL ITEM 12 IN ACCORDANCE WITH ND1002206.
12. SHRINK ITEM 13 & IDENTIFY ASSY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.



DETAIL "A" (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17277	18 [illegible] 65	WR
B		REVISED PER TDRR NO. 18181	4/27/65	WK
C		REVISED PER TDRR 19039	5/18/65	WK
D		REVISED PER TDRR 24641	12/14/65	WK
E		REVISED PER TDRR 25244	1/18/66	WK
F		REVISED PER TDRR 32823	1/27/67	

WIRING LEGEND

COND. NO.	COLOR	ITEM NO	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	
E14	YELLOW	11	P9-Z	E12	

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	14		*	1012156-4	—"—		SERVO MOTOR-TACHOMETER GENERATOR (MG-1)			
1	1	13		*	1010490-290	—"—		INSULATION, SLEEVING, ELECT, HEAT SHRINKABLE			
1	1	12		*	MS25036-43	—"—		TERMINAL, LUG, CRIMP STYLE, COPPER			
1	1	11		*	1010789-006	—"—		WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2½")			
1	1	10		*	1010402-1			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
17	17	9		*	1010490-060	—"—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
1	1	8		*	1010416-15	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
1	1	7		*	1010416-17	—"—		WIRE. ELECTRICAL, STRANDED, INSULATED 2" LG			
1	1	6		*	1010416-11	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
1	1	5		*	1010416-13	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
		4									
1	1	3		*	1011757-000	6850-2018301		CONNECTOR, ELECTRICAL (P3)			
1	1	2		*	1000123	—"—		CONNECTOR, ELECTRICAL (P9)			
0	1	1		*	1012156-1	—"—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-1)			

QTY REQD

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011706	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN [illegible] DATE 4-11-64
CHECKED J. E. SULLIVAN
APPROVAL [illegible] 6/15/64
APPROVAL E. [illegible] 8/15/64
NASA APPROVAL
MIT APPROVAL [illegible] 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SERVO MOTOR & CONNECTOR, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011892 F

MASTER

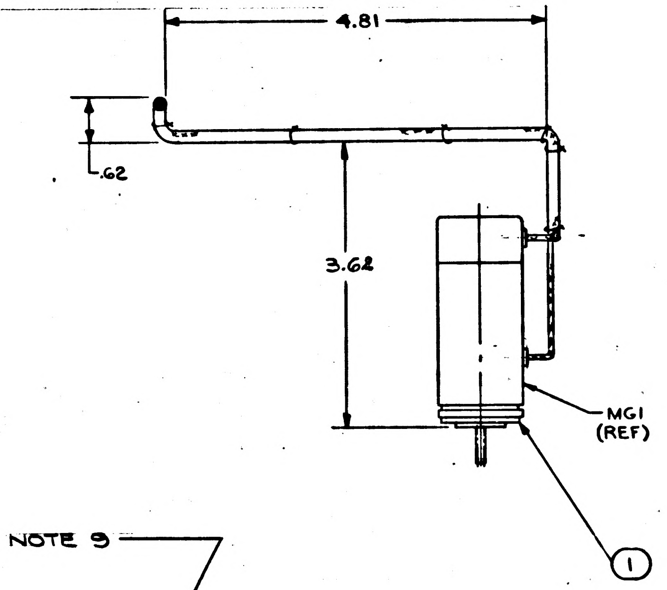
2011892

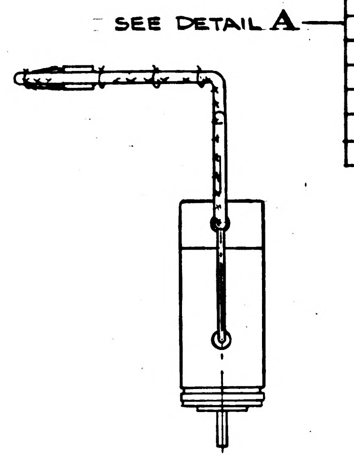
REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

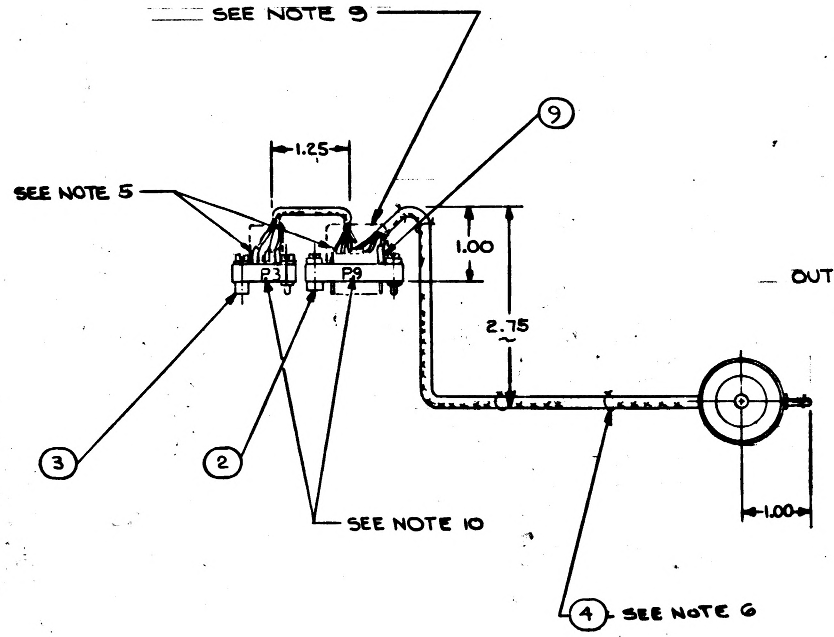
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012351
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158
6. LACE CONDUCTORS, USING ITEM 4 IN ACCORDANCE WITH ND1002032
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 9 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002009, METHOD C
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12±.02 HIGH IN ACCORDANCE WITH ND 1002019

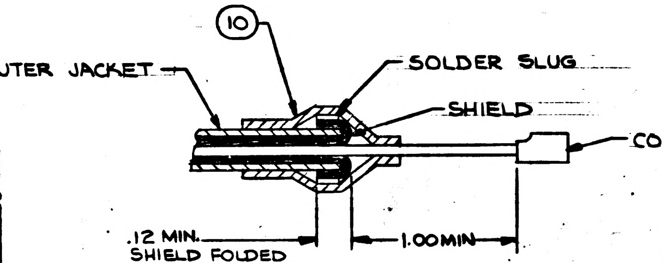
11. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)





WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 6
E1	YELLOW		MG1-YELLOW	P9-H	8
E2	WHITE		MG1-WHITE	P9-D	
E3	RED		MG1-RED	P9-L	8
E4	RED-BLACK		MG1-RED-BLACK	P9-A	
E5	BLACK		MG1-BLACK	P9-P	
E6	ORANGE		MG1-ORANGE	P9-T	8
E7	GRAY		MG1-GRAY	P9-W	
E8	BLUE		MG1-BLUE	P9-Y	8
E9	BROWN		MG1-BROWN	P9-b	
E10	YELLOW	8	P3-D	P9-C	8
E11	BLUE	7	P3-C	P9-F	
E12	BLACK	6	P3-B	P9-K	8
E13	RED	5	P3-A	P9-N	





DETAIL "A" (NO SCALE)
(APPLIES TO MG1- BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	1	*	1010402-2			SLEEVE SOLDER ELECT COND INSULATION HEAT SHRINKABLE			
9	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
8	1	*	1010416-15	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
7	1	*	1010416-17	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
6	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG.			
5	1	*	1010416-13	—		WIRE, ELECTRICAL, STRANDED, INSULATED 2" LG			
4	AR	*	1011753			TAPE, LACING AND TYING			
3	1	*	1011757	68502018301		CONNECTOR, ELECTRICAL (P3)			
2	1	*	1000123	—		CONNECTOR, ELECTRICAL (P9)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR (MG-			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011706	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.06	±

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910880
DRAWN DATE 4-17-64
CHECKED T.E. SULLIVAN
APPROVAL 6/15/64
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CODE IDENT NO.
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NASA NUMBER 2011892
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

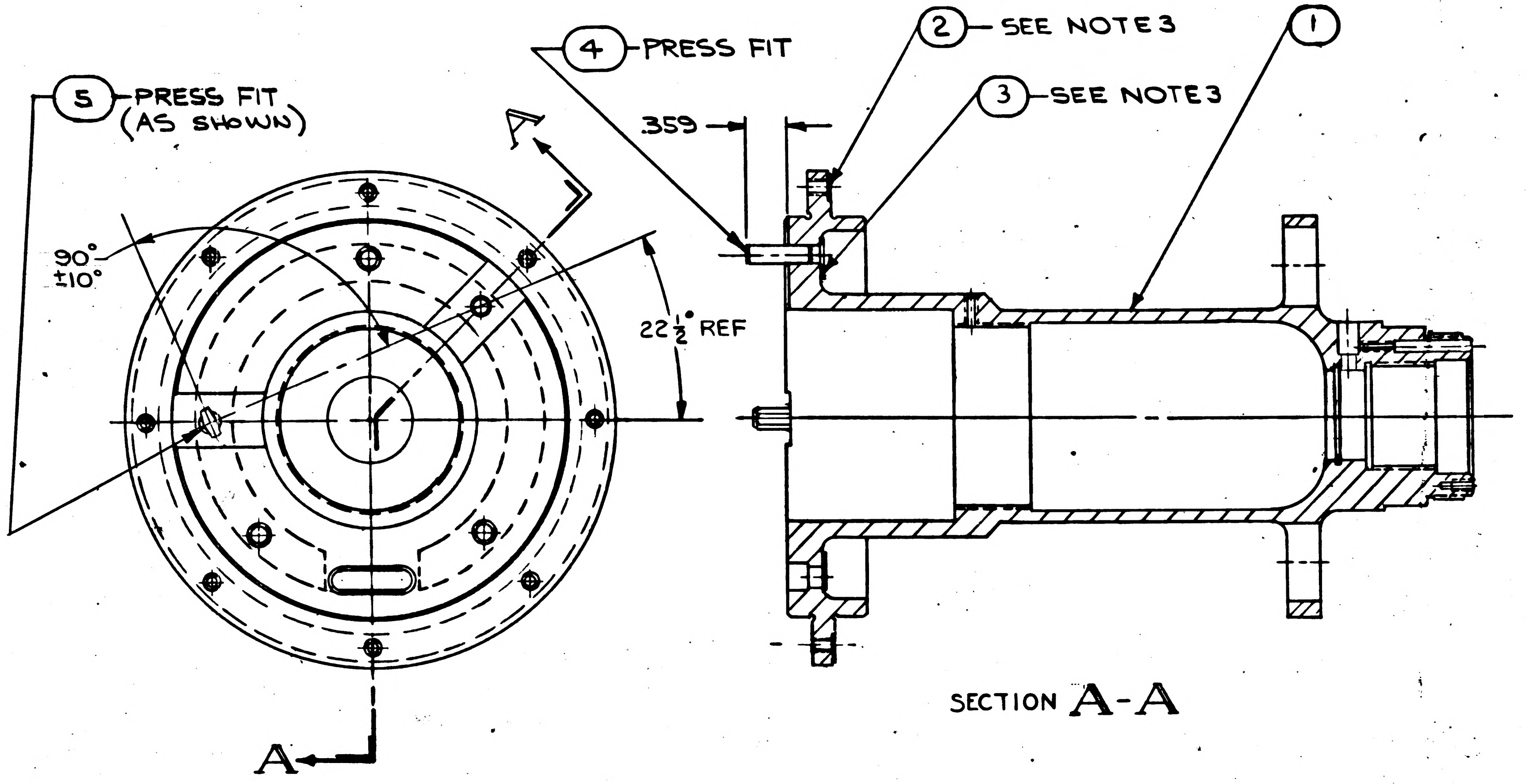
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A	2011893

REVISIONS TDRR 1149				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15355	5/6/65	UK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
3. SECURE IN PLACE AS SHOWN USING EPOXY BONDMASTER M688 PER ND 1002004. OR EQUIVALENT. (PAR 3.1.1, "ROUGHEN THE SURFACES TO BE BONDED WITH NO.180 EMERY CLOTH OR SANDPAPER" TO BE SUBSTITUTED WITH "VAPOR DEGREASING")



SECTION A-A

5	1	*	1011769	74444028001		PIN, DIAMOND			
4	1		MS16555-641			PIN-DOWEL, STEEL			
3	1		2011895	56386910130		PLATE, COVER			
2	1		2011894	56386910140		PLATE, COVER			
1	1		2011293	57386910200		TUBE, TELESCOPE, SEXTANT			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011797	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910280

DRAWN F. Schuller DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/22/64
APPROVAL E. Thorup 8/6/64
NASA APPROVAL 8/12/64
MIT APPROVAL 8/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE
ASSY OF

CODE IDENT NO. | SIZE C | NASA NUMBER 2011893
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET | OF

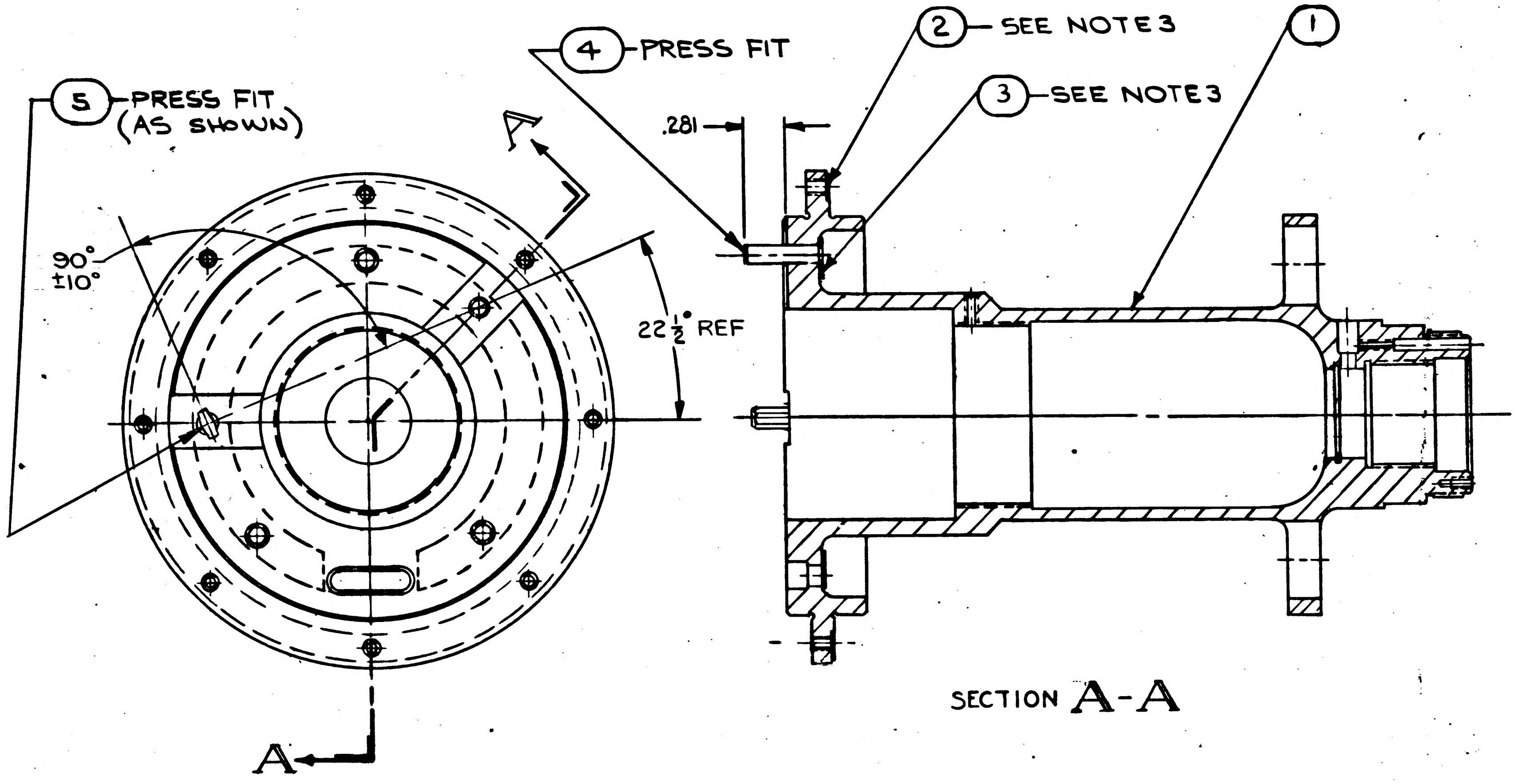
E-154

B 2011893

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
3. SECURE IN PLACE AS SHOWN IN ACCORDANCE WITH ND1002004, TYPE I, EXCEPT PARAGRAPH 3.2.1 MAY BE OMITTED.

REVISIONS TDRR 11491

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15355	5/6/65	UK
B		REVISED PER TDRR 19040	5/18/65	WK



SECTION A-A

2011893 B

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1	*	1011769	74444028001		PIN, DIAMOND			
4	1		MS16555-640			PIN-DOWEL, STEEL			
3	1		2011895	56386910130		PLATE, COVER			
2	1		2011894	56386910140		PLATE, COVER			
1	1		2011293	57386910200		TUBE, TELESCOPE, SEXTANT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011797	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910280

DRAWN DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/22/64
APPROVAL E. Thorup 8/6/64
NASA APPROVAL 8/14/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

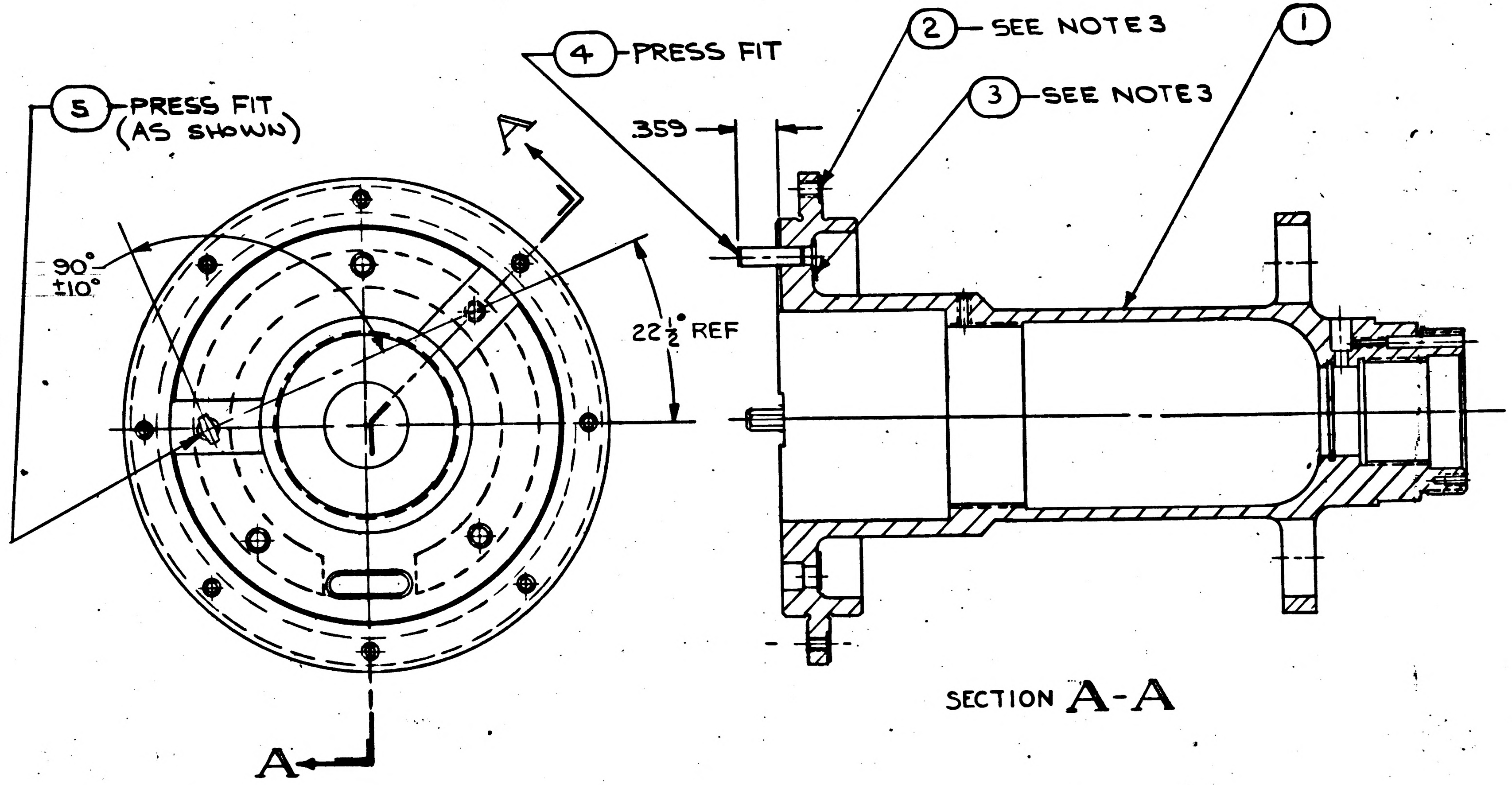
TITLE
TELESCOPE TUBE
ASSY OF

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011893
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF

2011893

REVISIONS TDRR 11491				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING)
3. SECURE IN PLACE AS SHOWN USING EPOXY BONDMASTER M688 PER ND 1002004. OR EQUIVALENT. (PAR 3.1.1, "ROUGHEN THE SURFACES TO BE BONDED WITH NO-180 EMERY CLOTH OR SANDPAPER" TO BE SUBSTITUTED WITH "VAPOR DEGREASING")



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1	*	1011769	74444028001		PIN, DIAMOND			
4	1		MS16555-641			PIN-DOWEL, STEEL			
3	1		2011895	56386910130		PLATE, COVER			
2	1		.2011894	56386910140		PLATE, COVER			
1	1		2011293	57386910200		TUBE, TELESCOPE, SEXTANT			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM:- SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011797	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910280

DRAWN DATE 4-2-64
CHECKED 5/14/64
APPROVAL 7/22/64
APPROVAL 8/6/64
NASA APPROVAL 8/12/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TELESCOPE TUBE
ASSY OF

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011893

SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET | OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011896 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
A		REVISED PER TDRR 17902		

NOTES:

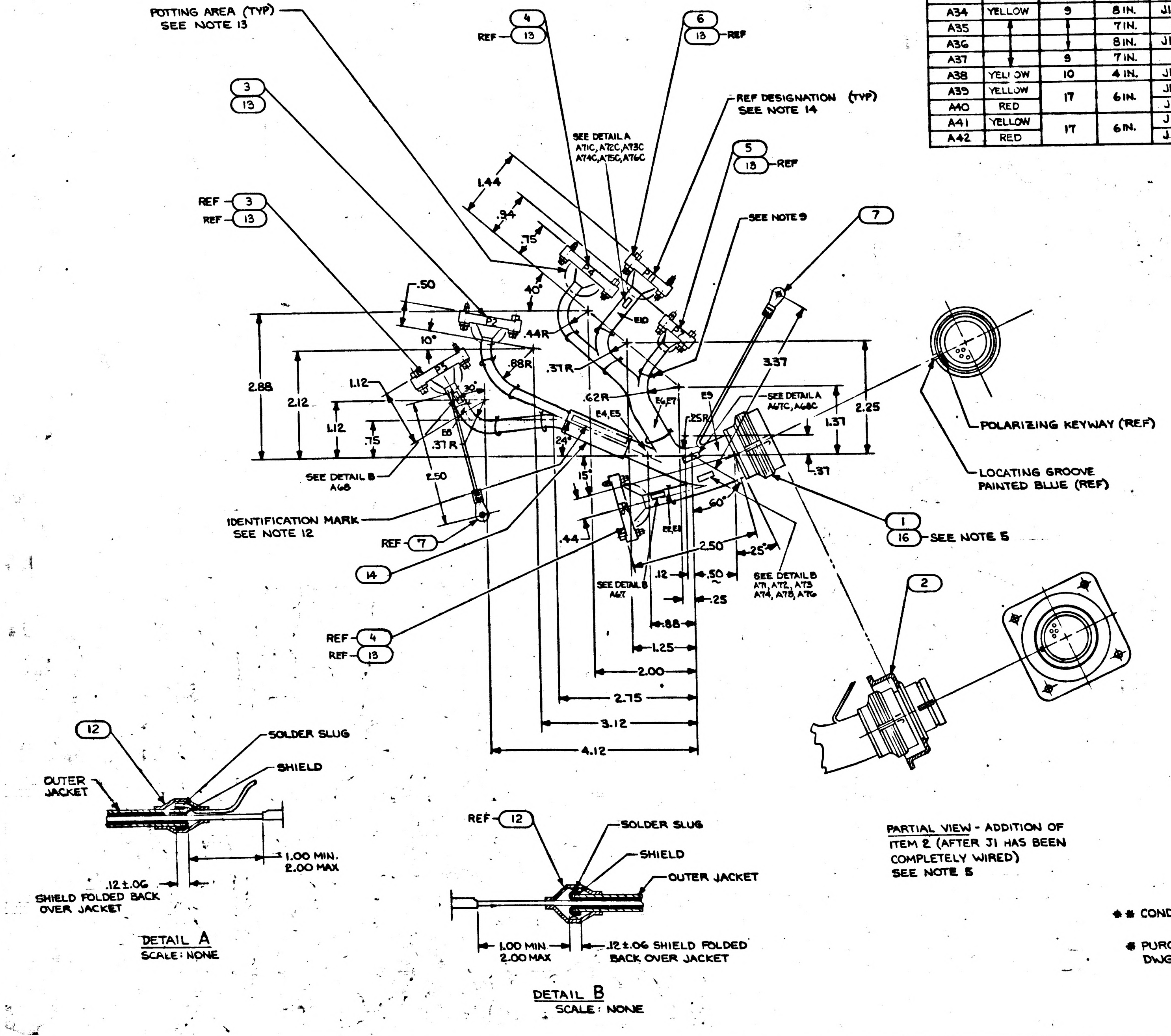
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391.
3.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
5. INSTALL CRIMP TYPE SOCKETS ITEM 16, IN ACCORDANCE WITH ND1002206.
6.
7. APPLY ITEMS 13, 14, & 15 TO LEADS.
8. SOLDER CONDUCTORS PER ND1002071.
9. LACE CONDUCTORS PER ND1002032.
10. PERFORM CONTINUITY CHECK.
11. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
12. SHRINK ITEM 14 AND IDENTIFY ASSEMBLY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.
13. POT PER ND1002240, METHOD A OR B.
    A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
14. MARK REFERENCE DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
15. TERMINATE SHIELDED WIRES AS SHOWN IN DETAILS A AND B.
16. ☐ SYMBOL ON HARNESS INDICATES APPROX. LOCATION OF SOLDER SLEEVE.
17. E-POINTS TO BE SPLICES, USING ITEM 15, PER ND1002032. APPROXIMATE LOCATION SHOWN ON HARNESS (EXCEPT E1 & E11).

WIRING LEGEND

COND. NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A1	YELLOW	17	7 IN.	J1 – 68		P11-B	8
A2	RED			J1 – 69		P11-J	
A3	YELLOW	↕	8 IN.	J1 – 58		P4-D	8
A4	RED			J1 – 59		P4-H	
A5	YELLOW		↕	J1 – 90		P4-Z	8
A6	RED			J1 – 91		P4-c	
A7	YELLOW			J1 – 86		P4-b	8
A8	RED			J1 – 87		P4-e	
A9	YELLOW		8 IN.	J1 – 56		P4-V	8
A10	RED			J1 – 57		P4-Y	
A11	YELLOW		8½ IN.	J1 – 62		P2-A	8
A12	RED			J1 – 63		P2-D	
A13	YELLOW		↕	J1 – 66		P2-H	8
A14	RED			J1 – 67		P2-L	
A15	YELLOW			J1 – 38		P2-W	8
A16	RED			J1 – 39		P2-Z	
A17	YELLOW			J1 – 40		P2-Y	8
A18	RED			J1 – 41		P2-b	
A19	YELLOW	17	8½ IN.	J1 – 70		P2-C	8
A20	RED			J1 – 71		P2-F	
A21	YELLOW	9	4 IN.	J1 – 76	E2	P6-A	8
A22	↕	↕	8 IN.	E2		P5-D	8
A23			4 IN.	J1 – 77	E3	P6-D	
A24	YELLOW	9	8 IN.	E3		P5-H	
A25	YELLOW	18	8½ IN.	J1 – 5		P5-L	8
A26	RED			J1 – 16		P5-A	
A27	GREEN			J1 – 33		P5-P	
A28	YELLOW	9	8½ IN.	J1 – 84	E4	P5-T	8
A29	↕	↕	4 IN.	E4		P6-H	8
A30			8½ IN.	J1 – 85	E5	P5-W	
A31	YELLOW	9	4 IN.	E5		P6-L	
A32	YELLOW	17	8½ IN.	J1 – 27		P5-C	8
A33	RED			J1 – 30		P5-F	
A34	YELLOW	9	8 IN.	J1 – 32	E6	P4-L	8
A35	↕	↕	7 IN.	E6		P5-K	8
A36			8 IN.	J1 – 55	E7	P4-P	
A37		9	7 IN.	E7		P5-N	
A38	YELLOW	10	4 IN.	J1 – 1		E1	
A39	YELLOW	17	6 IN.	J1 – 78		P7-A	8
A40	RED			J1 – 79		P7-D	
A41	YELLOW	17	6 IN.	J1 – 82		P7-C	8
A42	RED			J1 – 83		P7-F	

WIRING LEGEND

COND NO.**	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A43	YELLOW	17	6 IN.	J1 – 51		P7-H	8
A44	RED			J1 – 52		P7-L	
A45	YELLOW	↕	↕	J1 – 53		P7-K	8
A46	RED			J1 – 54		P7-M	
A47	YELLOW	17	6 IN.	J1 – 43		P7-B	8
A48	RED			J1 – 44		P7-E	
A49	YELLOW	18	4 IN.	J1 – 8		P6-B	8
A50	RED			J1 – 19		P6-C	
A51	GREEN			J1 – 36		P6-F	
A52	YELLOW	17	↕	J1 – 47		P6-K	8
A53	RED			J1 – 48		P6-N	
A54	YELLOW	↕		J1 – 49		P6-P	8
A55	RED			J1 – 50		P6-T	
A56	YELLOW			J1 – 45		P6-R	8
A57	RED			J1 – 46		P6-U	
A58	YELLOW	17		J1 – 25		P6-S	8
A59	RED			J1 – 26		P6-V	
A60	YELLOW	18		J1 – 12		P6-W	8
A61	RED			J1 – 13		P6-X	
A62	GREEN			J1 – 14		P6-Y	
A63	YELLOW	17		J1 – 2		P6-c	8
A64	RED			J1 – 3		P6-f	
A65	YELLOW	17		J1 – 6		P6-e	8
A66	RED			J1 – 7		P6-h	
A67	YELLOW	11	4 IN.				8
A67A	RED			J1 – 23		P6-J	
A67B	YELLOW			J1 – 24		P6-M	
A67C	YELLOW	9	2 IN.	A67-SHIELD		A68-SHIELD	
A68	YELLOW	11	8½ IN.				8
A68A	RED			J1 – 34		P5-Y	
A68B	YELLOW			J1 – 35		P5-b	
A68C	↕	9	2 IN.	A68-SHIELD		E9	
A69		9	8½ IN.	J1 – 37	E8, E9	P5-S	
A70		9	2 IN.	E8		P5-V	
A71	YELLOW	11	7 IN.				8
A71A	RED			J1 – 17		P11-A	
A71B	YELLOW			J1 – 18		P11-C	
A71C	YELLOW	9	2 IN.	A71-SHIELD		A72-SHIELD	
A72	YELLOW	11	7 IN.				8
A72A	RED			J1 – 64		P11-F	
A72B	YELLOW			J1 – 65		P11-D	
A72C	YELLOW	9	2 IN.	A72-SHIELD		A73-SHIELD	
A73	YELLOW	11	7 IN.				8
A73A	RED			J1 – 10		P11-H	
A73B	YELLOW			J1 – 11		P11-K	
A73C	YELLOW	9	2 IN.	A73-SHIELD		A74-SHIELD	
A74	YELLOW	11	7 IN.				8
A74A	RED			J1 – 72		P11-N	
A74B	YELLOW			J1 – 73		P11-L	
A74C	YELLOW	9	2 IN.	A74-SHIELD		A75-SHIELD	
A75	YELLOW	11	7 IN.				8
A75A	RED			J1 – 88		P11-V	
A75B	YELLOW			J1 – 89		P11-T	
A75C	YELLOW	9	2 IN.	A75-SHIELD		A76-SHIELD	
A76	YELLOW	11	7 IN.				8
A76A	RED			J1 – 80		P11-W	
A76B	YELLOW			J1 – 81		P11-X	
A76C	↕	9	2 IN.	A76-SHIELD		E10	
A77		9	7 IN.	J1 – 9	E10	P11-U	
A78	YELLOW	10	3 IN.	P5-Z		E11	


POTTING AREA (TYP)
SEE NOTE 13
REF 4 13
6 13 REF
3 13
REF DESIGNATION (TYP)
SEE NOTE 14
SEE DETAIL A
A71C, A72C, A73C
A74C, A75C, A76C
5 13 REF
REF 3
REF 13
SEE NOTE 9
7
1.44
.94
.75
40°
.50
10°
P2
P3
P4
P7
.44R
.88R
.37R
E10
3.37
2.88
2.12
1.12
1.12
.75
30°
E8
.37R
.62R
E4, E5
E6, E7
E9
.25R
SEE DETAIL A
A67C, A68C
1.37
2.25
.37
24°
15°
60°
SEE DETAIL B
A68
2.50
IDENTIFICATION MARK
SEE NOTE 12
REF 7
14
.44
E2, E3
2.50
.25°
SEE DETAIL B
A67
.12
.50
.25
SEE DETAIL B
A71, A72, A73
A74, A75, A76
.88
1.25
2.00
2.75
3.12
4.12
REF 4
REF 13
POLARIZING KEYWAY (REF)
LOCATING GROOVE
PAINTED BLUE (REF)
1 16 SEE NOTE 5
2
12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN.
2.00 MAX
.12 ± .06
SHIELD FOLDED BACK OVER JACKET
REF 12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN
2.00 MAX
.12 ± .06 SHIELD FOLDED BACK OVER JACKET

PARTIAL VIEW - ADDITION OF ITEM 2 (AFTER J1 HAS BEEN COMPLETELY WIRED)
SEE NOTE 5

DETAIL A
SCALE: NONE

DETAIL B
SCALE: NONE

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2')			
17	1	*	1010789-003			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (20')			
16	78	*	1010770-2			CONTACT, CRIMP TYPE #22 (SOCKET)			
15	9	*	1010490-114			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
14	1	*	1010490-278			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
13	84	*	1010490-058			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
12	16	*	1010402-2			SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK.			
11	1	*	1010789-012			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (5')			
10	1	*	1010789-006			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (1')			
9	1	*	1010789-001			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (10')			
8			— // —			— // —			
7	2		MS25036-48			TERMINAL, LUG, CRIMP STYLE, COPPER (E1)(E11)			
6	1	*	1011758	68502018201		CONNECTOR, ELECTRICAL (P11)			
5	1	*	1012147-2	68502022102		CONNECTOR, ELECTRICAL (P7)			
4	2	*	1000116			CONNECTOR, ELECTRICAL, RECEPTACLE (P4 & P6)			
3	2	*	1000121			CONNECTOR, ELECTRICAL, RECEPTACLE (P2 & P5)			
2	1		2011799	85386910750		PLATE & CONNECTOR, ASSY OF			
1	1	*	1010771-001			CONNECTOR, PLUG, ELECTRICAL			

NEXT ASSY	USED ON
2011890	2011000
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910050
DRAWN J. Schiller DATE 8-5-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL [illegible] 8/27/64
APPROVAL [illegible] 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011896
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B 2011896

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391.
3.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
5. INSTALL CRIMP TYPE SOCKETS ITEM 16, IN ACCORDANCE WITH ND1002206.
6.
7. APPLY ITEMS 13, 14, & 15 TO LEADS.
8. SOLDER CONDUCTORS PER ND1002071.
9. LACE CONDUCTORS PER ND1002032.
10. PERFORM CONTINUITY CHECK.
11. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
12. SHRINK ITEM 14 AND IDENTIFY ASSEMBLY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.
13. POT PER ND1002240, METHOD A OR B.
    A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
14. MARK REFERENCE DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
15. TERMINATE SHIELDED WIRES AS SHOWN IN DETAILS A AND B.
16. ☐ SYMBOL ON HARNESS INDICATES APPROX. LOCATION OF SOLDER SLEEVE.
17. E-POINTS TO BE SPLICES, USING ITEM 15, PER ND1002032. APPROXIMATE LOCATION SHOWN ON HARNESS (EXCEPT E1 & E11).

REVISIONS

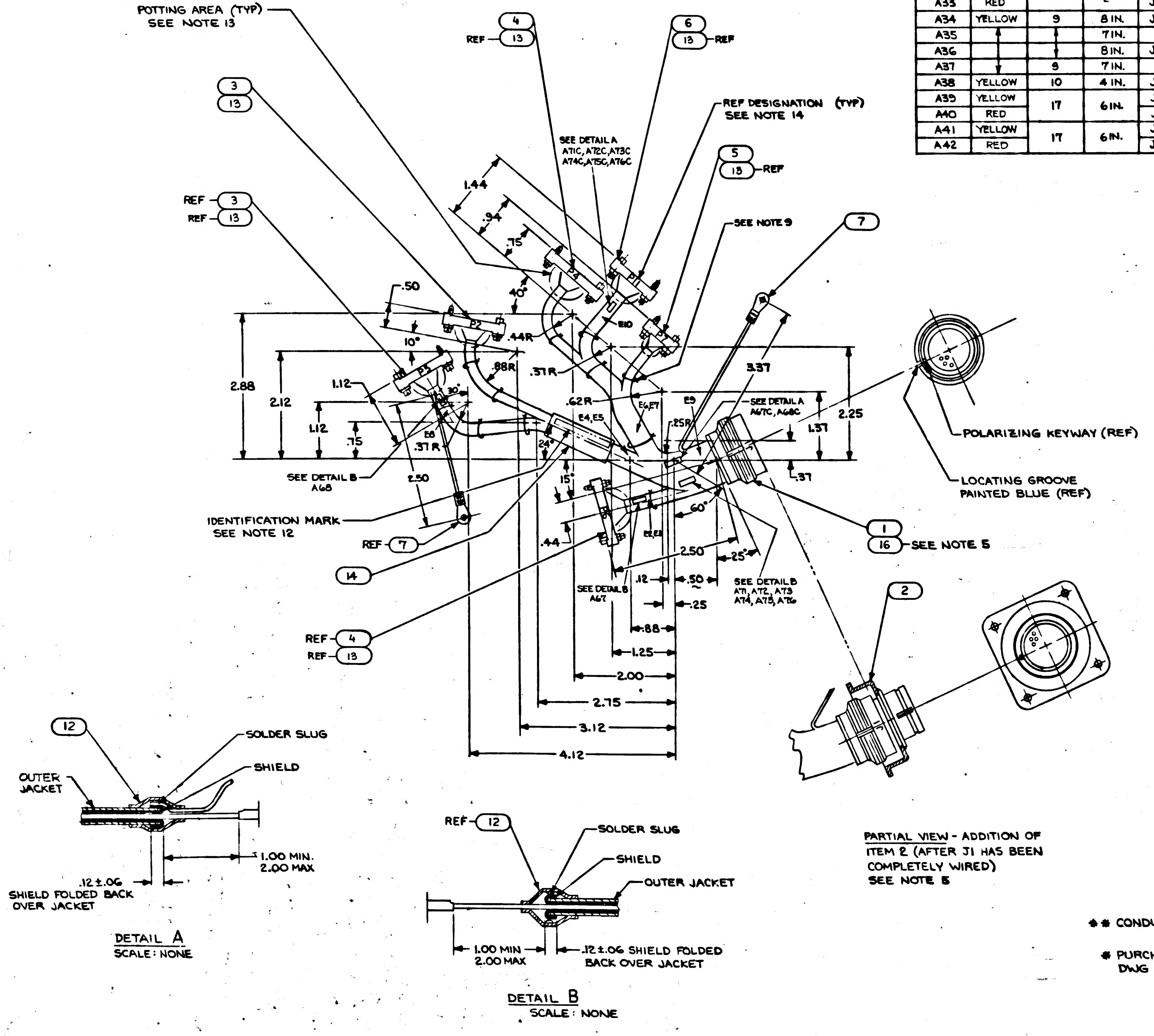
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 17902	[illegible]	[illegible]
B		REVISED PER TDRR 20032	[illegible]	[illegible]

WIRING LEGEND

COND. NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A1	YELLOW	17	7 IN.	J1-68		P11-W	8
A2	RED			J1-69		P11-X	
A3	YELLOW	↕	8 IN.	J1-58		P4-D	8
A4	RED			J1-59		P4-H	
A5	YELLOW		↕	J1-90		P4-Z	8
A6	RED			J1-91		P4-c	
A7	YELLOW			J1-86		P4-b	8
A8	RED			J1-87		P4-e	
A9	YELLOW		8 IN.	J1-56		P4-V	8
A10	RED			J1-57		P4-Y	
A11	YELLOW		8½ IN.	J1-62		P2-A	8
A12	RED			J1-63		P2-D	
A13	YELLOW		↕	J1-66		P2-H	8
A14	RED			J1-67		P2-L	
A15	YELLOW			J1-38		P2-W	8
A16	RED			J1-39		P2-Z	
A17	YELLOW			J1-40		P2-Y	8
A18	RED			J1-41		P2-b	
A19	YELLOW	17	8½ IN.	J1-70		P2-C	8
A20	RED			J1-71		P2-F	
A21	YELLOW	9	4 IN.	J1-76	E2	P6-A	8
A22	↕	↕	8 IN.	E2		P5-D	8
A23			4 IN.	J1-77	E3	P6-D	
A24	YELLOW	9	8 IN.	E3		P5-H	
A25	YELLOW	18	8½ IN.	J1-5		P5-L	8
A26	RED			J1-16		P5-A	
A27	GREEN			J1-33		P5-P	
A28	YELLOW	9	8½ IN.	J1-84	E4	P5-T	8
A29	↕	↕	4 IN.	E4		P6-H	8
A30			8½ IN.	J1-85	E5	P5-W	
A31	YELLOW	9	4 IN.	E5		P6-L	
A32	YELLOW	17	8½ IN.	J1-27		P5-C	8
A33	RED			J1-30		P5-F	
A34	YELLOW	9	8 IN.	J1-32	E6	P4-L	8
A35	↕	↕	7 IN.	E6		P5-K	8
A36			8 IN.	J1-55	E7	P4-P	
A37		9	7 IN.	E7		P5-N	
A38	YELLOW	10	4 IN.	J1-1		E1	
A39	YELLOW	17	6 IN.	J1-78		P7-A	8
A40	RED			J1-79		P7-D	
A41	YELLOW	17	6 IN.	J1-82		P7-C	8
A42	RED			J1-83		P7-F	

WIRING LEGEND

COND. NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A43	YELLOW	17	6 IN.	J1-51		P7-H	8
A44	RED			J1-52		P7-L	
A45	YELLOW	↕	↕	J1-53		P7-K	8
A46	RED			J1-54		P7-M	
A47	YELLOW	17	6 IN.	J1-43		P7-B	8
A48	RED			J1-44		P7-E	
A49	YELLOW	18	4 IN.	J1-8		P6-B	8
A50	RED			J1-19		P6-C	
A51	GREEN			J1-36		P6-F	
A52	YELLOW	17	↕	J1-47		P6-K	8
A53	RED			J1-48		P6-N	
A54	YELLOW	↕		J1-49		P6-P	8
A55	RED			J1-50		P6-T	
A56	YELLOW			J1-45		P6-R	8
A57	RED			J1-46		P6-U	
A58	YELLOW	17		J1-25		P6-S	8
A59	RED			J1-26		P6-V	
A60	YELLOW	18		J1-12		P6-W	8
A61	RED			J1-13		P6-X	
A62	GREEN			J1-14		P6-Y	
A63	YELLOW	17		J1-2		P6-c	8
A64	RED			J1-3		P6-f	
A65	YELLOW	17		J1-6		P6-e	8
A66	RED			J1-7		P6-h	
A67	YELLOW	11	4 IN.				8
A67A	RED			J1-23		P6-J	
A67B	YELLOW			J1-24		P6-M	
A67C	YELLOW	9	2 IN.	A67-SHIELD		A68-SHIELD	
A68	YELLOW	11	8½ IN.				8
A68A	RED			J1-34		P5-Y	
A68B	YELLOW			J1-35		P5-b	
A68C	↕	9	2 IN.	A68-SHIELD		E9	
A69		9	8½ IN.	J1-87	E8, E9	P5-S	
A70		9	2 IN.	E8		P5-V	
A71	YELLOW	11	7 IN.				8
A71A	RED			J1-17		P11-A	
A71B	YELLOW			J1-18		P11-C	
A71C	YELLOW	9	2 IN.	A71-SHIELD		A72-SHIELD	
A72	YELLOW	11	7 IN.				8
A72A	RED			J1-64		P11-F	
A72B	YELLOW			J1-65		P11-D	
A72C	YELLOW	9	2 IN.	A72-SHIELD		A73-SHIELD	
A73	YELLOW	11	7 IN.				8
A73A	RED			J1-10		P11-H	
A73B	YELLOW			J1-11		P11-K	
A73C	YELLOW	9	2 IN.	A73-SHIELD		A74-SHIELD	
A74	YELLOW	11	7 IN.				8
A74A	RED			J1-72		P11-N	
A74B	YELLOW			J1-73		P11-L	
A74C	YELLOW	9	2 IN.	A74-SHIELD		A75-SHIELD	
A75	YELLOW	11	7 IN.				8
A75A	RED			J1-88		P11-P	
A75B	YELLOW			J1-89		P11-S	
A75C	YELLOW	9	2 IN.	A75-SHIELD		A76-SHIELD	
A76	YELLOW	11	7 IN.				8
A76A	RED			J1-80		P11-V	
A76B	YELLOW			J1-81		P11-T	
A76C	↕	9	2 IN.	A76-SHIELD		E10	
A77		9	7 IN.	J1-9	E10	P11-U	
A78	YELLOW	10	3 IN.	P5-Z		E11	



POTTING AREA (TYP) SEE NOTE 13
REF
4
13
6
13
REF
3
13
REF DESIGNATION (TYP) SEE NOTE 14
SEE DETAIL A A71C, A72C, A73C, A74C, A75C, A76C
5
13
REF
REF
3
13
1.44
.94
.75
SEE NOTE 9
7
.50
40°
10°
.44R
.88R
.37R
E10
2.88
2.12
1.12
1.12
.75
.37R
E6
.62R
E4, E5
E6, E7
E9
.25R
3.37
SEE DETAIL A A67C, A68C
2.25
1.37
.37
24°
15°
60°
25°
SEE DETAIL B A68
2.50
IDENTIFICATION MARK SEE NOTE 12
REF
7
.44
2.50
14
SEE DETAIL B A67
.12
.50
.25
SEE DETAIL B A71, A72, A73, A74, A75, A76
1
16
SEE NOTE 5
POLARIZING KEYWAY (REF)
LOCATING GROOVE PAINTED BLUE (REF)
2
REF
4
13
.88
1.25
2.00
2.75
3.12
4.12
12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN. 2.00 MAX
.12 ± .06
SHIELD FOLDED BACK OVER JACKET
REF
12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ± .06 SHIELD FOLDED BACK OVER JACKET

PARTIAL VIEW - ADDITION OF ITEM 2 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 5

DETAIL A
SCALE: NONE

DETAIL B
SCALE: NONE

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2')			
17	1	*	1010789-003			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (20')			
16	78	*	1010770-2			CONTACT, CRIMP TYPE #22 (SOCKET)			
15	9	*	1010490-114			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
14	1	*	1010490-278			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
13	84	*	1010490-058			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
12	16	*	1010402-2			SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK.			
11	1	*	1010789-012			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (5')			
10	1	*	1010789-006			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED ([illegible])			
9	1	*	1010789-001			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (10')			
8			— // —			— // —			
7	2		MS25036-[illegible]8			TERMINAL, LUG, CRIMP STYLE, COPPER [illegible](E11)			
6	1	*	1011758	68502018201		CONNECTOR, ELECTRICAL (P11)			
5	1	*	1012147-2	68502022102		CONNECTOR, ELECTRICAL (P7)			
4	2	*	1000116			CONNECTOR, ELECTRICAL, RECEPTACLE (P4 & P6)			
3	2	*	1000121			CONNECTOR, ELECTRICAL, RECEPTACLE (P2 & P5)			
2	1		2011799	85386910750		PLATE & CONNECTOR, ASSY OF			
1	1	*	1010771-001			CONNECTOR, PLUG, ELECTRICAL			

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .12 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910050

DRAWN DATE 8-5-64
CHECKED T. SULLIVAN 8-2[illegible]-64
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011896
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011896 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 17902		
B		REVISED PER TDRR 20032		
C		REVISED PER TDRR 23558		

NOTES:

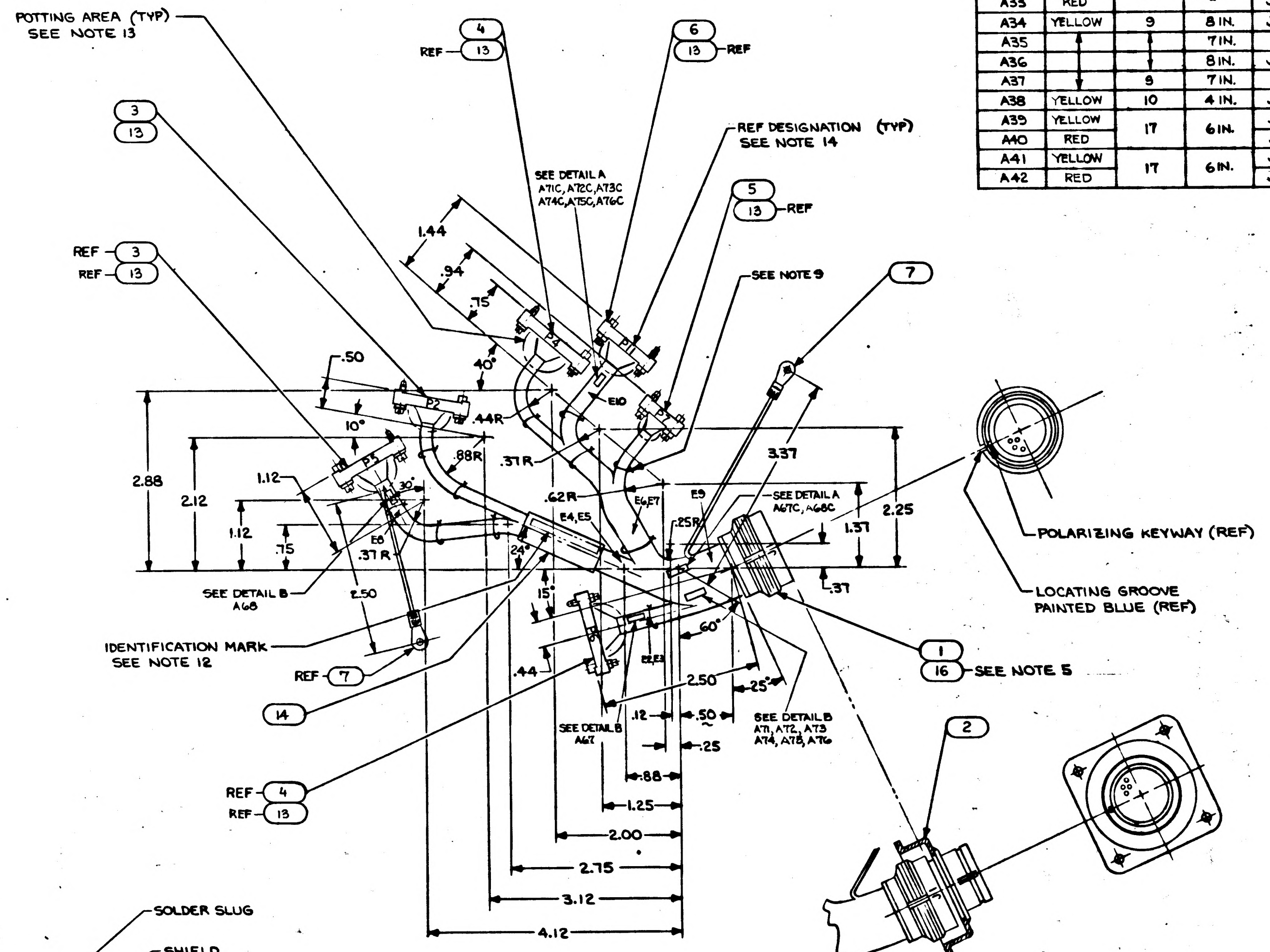
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391.
3.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
5. INSTALL CRIMP TYPE SOCKETS ITEM 16, IN ACCORDANCE WITH ND1002206.
6.
7. APPLY ITEMS 13, 14, & 15 TO LEADS.
8. SOLDER CONDUCTORS PER ND1002071.
9. LACE CONDUCTORS PER ND1002032.
10. PERFORM CONTINUITY CHECK.
11. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
12. SHRINK ITEM 14 AND IDENTIFY ASSEMBLY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.
13. POT PER ND1002240, METHOD A OR B.
    A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
14. MARK REFERENCE DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
15. TERMINATE SHIELDED WIRES AS SHOWN IN DETAILS A AND B.
16. ▭ SYMBOL ON HARNESS INDICATES APPROX. LOCATION OF SOLDER SLEEVE.
17. E-POINTS TO BE SPLICES, USING ITEM 15, PER ND1002032. APPROXIMATE LOCATION SHOWN ON HARNESS (EXCEPT E1 & E11).

WIRING LEGEND

COND. NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A1	YELLOW	17	7 IN.	J1 – 68		P11-W	8
A2	RED			J1 – 69		P11-X	
A3	YELLOW	↕	8 IN.	J1 – 58		P4-D	8
A4	RED			J1 – 59		P4-H	
A5	YELLOW		↕	J1 – 90		P4-Z	8
A6	RED			J1 – 91		P4-c	
A7	YELLOW			J1 – 86		P4-b	8
A8	RED			J1 – 87		P4-e	
A9	YELLOW		8 IN.	J1 – 56		P4-V	8
A10	RED			J1 – 57		P4-Y	
A11	YELLOW		8½ IN.	J1 – 62		P2-A	8
A12	RED			J1 – 63		P2-D	
A13	YELLOW		↕	J1 – 66		P2-H	8
A14	RED			J1 – 67		P2-L	
A15	YELLOW			J1 – 38		P2-W	8
A16	RED			J1 – 39		P2-Z	
A17	YELLOW			J1 – 40		P2-Y	8
A18	RED			J1 – 41		P2-b	
A19	YELLOW	17	8½ IN.	J1 – 70		P2-C	8
A20	RED			J1 – 71		P2-F	
A21	YELLOW	9	4 IN.	J1 – 76	E2	P6-A	8
A22	↕	↕	8 IN.	E2		P5-D	8
A23			4 IN.	J1 – 77	E3	P6-D	
A24	YELLOW	9	8 IN.	E3		P5-H	
A25	YELLOW	18	8½ IN.	J1 – 5		P5-L	8
A26	RED			J1 – 16		P5-A	
A27	GREEN			J1 – 33		P5-P	
A28	YELLOW	9	8½ IN.	J1 – 84	E4	P5-T	8
A29	↕	↕	4 IN.	E4		P6-H	8
A30			8½ IN.	J1 – 85	E5	P5-W	
A31	YELLOW	9	4 IN.	E5		P6-L	
A32	YELLOW	17	8½ IN.	J1 – 27		P5-C	8
A33	RED			J1 – 30		P5-F	
A34	YELLOW	9	8 IN.	J1 – 32	E6	P4-L	8
A35	↕	↕	7 IN.	E6		P5-K	8
A36			8 IN.	J1 – 55	E7	P4-P	
A37		9	7 IN.	E7		P5-N	
A38	YELLOW	10	4 IN.	J1 – 1		E1	
A39	YELLOW	17	6 IN.	J1 – 78		P7-A	8
A40	RED			J1 – 79		P7-D	
A41	YELLOW	17	6 IN.	J1 – 82		P7-C	8
A42	RED			J1 – 83		P7-F	

WIRING LEGEND

COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A43	YELLOW	17	6 IN.	J1 – 51		P7-H	8
A44	RED			J1 – 52		P7-L	
A45	YELLOW	↕	↕	J1 – 53		P7-K	8
A46	RED			J1 – 54		P7-M	
A47	YELLOW	17	6 IN.	J1 – 43		P7-B	8
A48	RED			J1 – 44		P7-E	
A49	YELLOW	18	4 IN.	J1 – 8		P6-B	8
A50	RED			J1 – 19		P6-C	
A51	GREEN			J1 – 36		P6-F	
A52	YELLOW	17	↕	J1 – 47		P6-K	8
A53	RED			J1 – 48		P6-N	
A54	YELLOW	↕		J1 – 49		P6-P	8
A55	RED			J1 – 50		P6-T	
A56	YELLOW			J1 – 45		P6-R	8
A57	RED			J1 – 46		P6-U	
A58	YELLOW	17		J1 – 25		P6-S	8
A59	RED			J1 – 26		P6-V	
A60	YELLOW	18		J1 – 12		P6-W	8
A61	RED			J1 – 13		P6-X	
A62	GREEN			J1 – 14		P6-Y	
A63	YELLOW	17		J1 – 2		P6-c	8
A64	RED			J1 – 3		P6-f	
A65	YELLOW	17		J1 – 6		P6-e	8
A66	RED			J1 – 7		P6-h	
A67	YELLOW	11	4 IN.				8
A67A	RED			J1 – 23		P6-J	
A67B	YELLOW			J1 – 24		P6-M	
A67C	YELLOW	9	2 IN.	A67-SHIELD		A68-SHIELD	
A68	YELLOW	11	8½ IN.				8
A68A	RED			J1 – 34		P5-Y	
A68B	YELLOW			J1 – 35		P5-b	
A68C	↕	9	2 IN.	A68-SHIELD		E9	
A69		9	8½ IN.	J1 – 37	E8, E9	P5-S	
A70		9	2 IN.	E8		P5-V	
A71	YELLOW	11	7 IN.				8
A71A	RED			J1 – 17		P11-A	
A71B	YELLOW			J1 – 18		P11-C	
A71C	YELLOW	9	2 IN.	A71-SHIELD		A72-SHIELD	
A72	YELLOW	11	7 IN.				8
A72A	RED			J1 – 64		P11-F	
A72B	YELLOW			J1 – 65		P11-D	
A72C	YELLOW	9	2 IN.	A72-SHIELD		A73-SHIELD	
A73	YELLOW	11	7 IN.				8
A73A	RED			J1 – 10		P11-H	
A73B	YELLOW			J1 – 11		P11-K	
A73C	YELLOW	9	2 IN.	A73-SHIELD		A74-SHIELD	
A74	YELLOW	11	7 IN.				8
A74A	RED			J1 – 72		P11-N	
A74B	YELLOW			J1 – 73		P11-L	
A74C	YELLOW	9	2 IN.	A74-SHIELD		A75-SHIELD	
A75	YELLOW	11	7 IN.				8
A75A	RED			J1 – 88		P11-P	
A75B	YELLOW			J1 – 89		P11-S	
A75C	YELLOW	9	2 IN.	A75-SHIELD		A76-SHIELD	
A76	YELLOW	11	7 IN.				8
A76A	RED			J1 – 80		P11-V	
A76B	YELLOW			J1 – 81		P11-T	
A76C	↕	9	2 IN.	A76-SHIELD		E10	
A77		9	7 IN.	J1 – 9	E10	P11-U	
A78	YELLOW	10	3 IN.	P5-Z		E11	


POTTING AREA (TYP)
SEE NOTE 13
4
REF 13
6
13 REF
3
13
REF DESIGNATION (TYP)
SEE NOTE 14
SEE DETAIL A
A71C, A72C, A73C
A74C, A75C, A76C
5
13 REF
REF 3
REF 13
1.44
.94
.75
SEE NOTE 9
7
.50
40°
P4
P11
P2
P7
P5
E10
.44R
10°
.88R
.37R
3.37
2.88
2.12
1.12
1.12
.75
30°
E8
.37 R
.62R
E4, E5
E6, E7
E9
.25R
SEE DETAIL A
A67C, A68C
1.37
2.25
.37
24°
15°
SEE DETAIL B
A68
2.50
IDENTIFICATION MARK
SEE NOTE 12
REF 7
14
REF 4
REF 13
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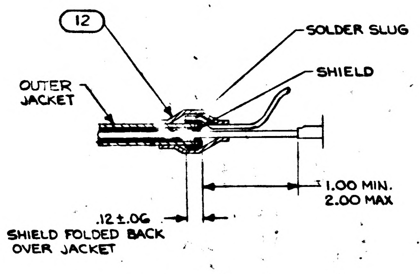
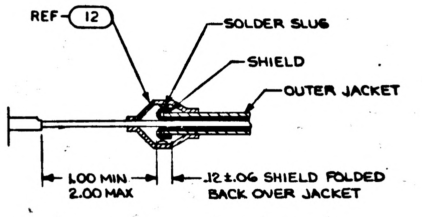
60°
E2, E3
2.50
25°
.12
.50
.25
SEE DETAIL B
A67
SEE DETAIL B
A71, A72, A73
A74, A75, A76
.88
1.25
2.00
2.75
3.12
4.12
1
16 SEE NOTE 5
POLARIZING KEYWAY (REF)
LOCATING GROOVE
PAINTED BLUE (REF)
2

PARTIAL VIEW - ADDITION OF ITEM 2 (AFTER J1 HAS BEEN COMPLETELY WIRED)
SEE NOTE 5


12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN.
2.00 MAX
.12 ± .06
SHIELD FOLDED BACK
OVER JACKET

DETAIL A
SCALE: NONE


REF 12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN
2.00 MAX
.12 ± .06 SHIELD FOLDED
BACK OVER JACKET

DETAIL B
SCALE: NONE

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2')			
17	1	*	1010789-003			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (20')			
16	78	*	1010770-2			CONTACT, CRIMP TYPE #22 (SOCKET)			
15	9	*	1010490-114			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
14	1	*	1010490-278			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
13	84	*	1010490-058			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
12	16	*	1010402-2			SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK.			
11	1	*	1010789-012			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (5')			
10	1	*	1010789-006			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (7')			
9	1	*	1010789-001			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (10')			
8			— // —			— // —			
7	2		MS25036-48			TERMINAL, LUG, CRIMP STYLE, COPPER (E1)(E11)			
6	1	*	1011758-1	68502018201		CONNECTOR, ELECTRICAL (P11)			
5	1	*	1012147-2	68502022102		CONNECTOR, ELECTRICAL (P7)			
4	2	*	1000116			CONNECTOR, ELECTRICAL, RECEPTACLE (P4 & P6)			
3	2	*	1000121			CONNECTOR, ELECTRICAL, RECEPTACLE (P2 & P5)			
2	1		2011799	85386910750		PLATE & CONNECTOR, ASSY OF			
1	1	*	1010771-001			CONNECTOR, PLUG, ELECTRICAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .12; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910050
DRAWN J. Schiller DATE 8-5-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL 8/27/64
APPROVAL 8/27/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011896
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011896 D

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 17902	[illegible]	WK
B		REVISED PER TDRR 20032	[illegible]	WK
C		REVISED PER TDRR 23558	[illegible]	WK
D		REVISED PER TDRR 25245	[illegible]	WK

REVISIONS 12-217

NOTES:

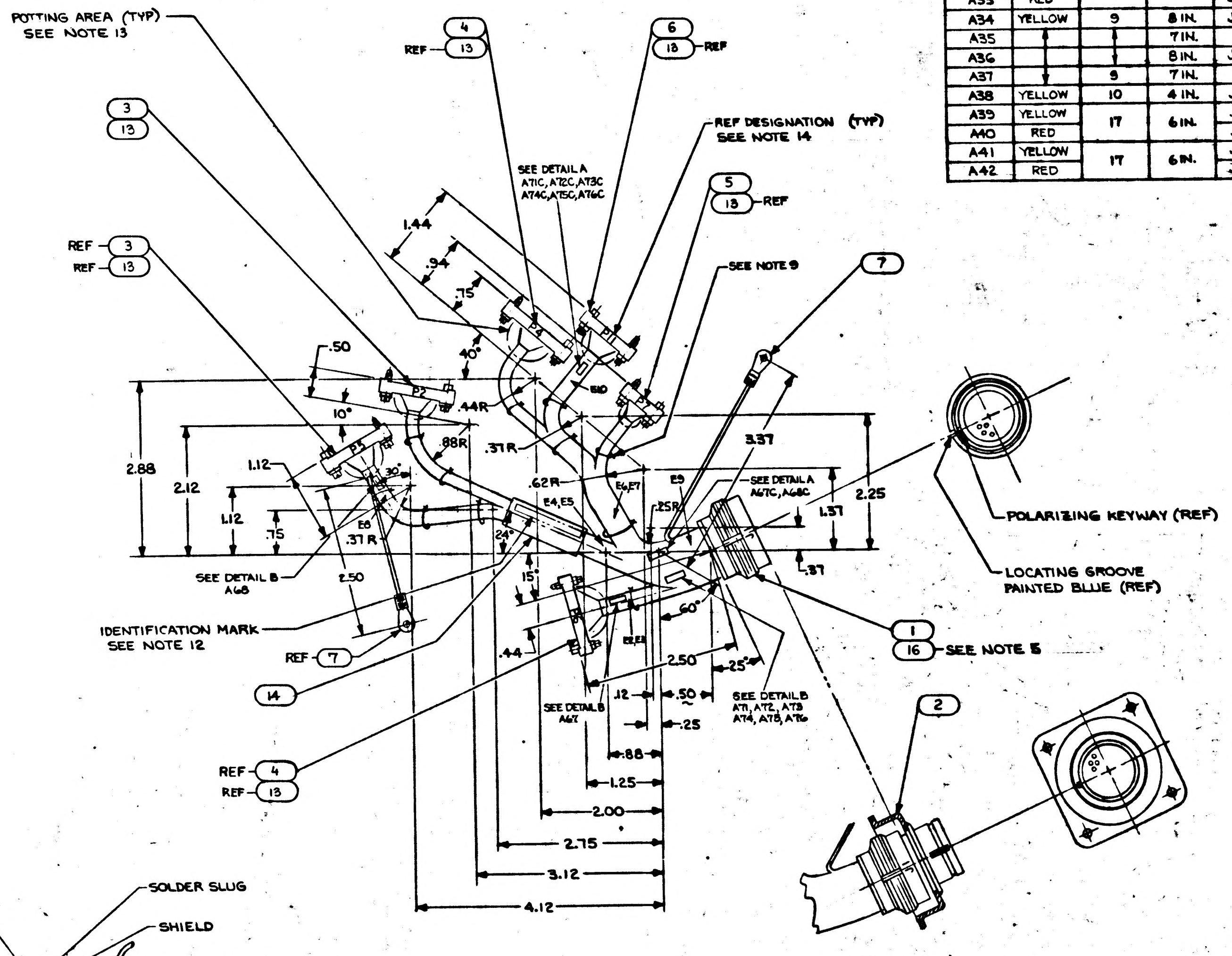
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
5. INSTALL CRIMP TYPE SOCKETS ITEM 16, IN ACCORDANCE WITH ND1002206.
6.
7. APPLY ITEMS 13, 14, & 15 TO LEADS.
8. SOLDER CONDUCTORS PER ND1002071.
9. LACE CONDUCTORS PER ND1002032.
10. PERFORM CONTINUITY CHECK.
11. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
12. SHRINK ITEM 14 AND IDENTIFY ASSEMBLY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.
13. POT PER ND1002240, METHOD A OR B.
    A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
14. MARK REFERENCE DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
15. TERMINATE SHIELDED WIRES AS SHOWN IN DETAILS A AND B.
16. ▭ SYMBOL ON HARNESS INDICATES APPROX. LOCATION OF SOLDER SLEEVE.
17. E-POINTS TO BE SPLICES, USING ITEM 15, PER ND1002032. APPROXIMATE LOCATION SHOWN ON HARNESS (EXCEPT E1 & E11).

WIRING LEGEND

COND. NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A1	YELLOW	17	7 IN.	J1 – 68		P11-W	8
A2	RED			J1 – 69		P11-X	
A3	YELLOW		8 IN.	J1 – 58		P4-D	8
A4	RED			J1 – 59		P4-H	
A5	YELLOW			J1 – 90		P4-Z	8
A6	RED			J1 – 91		P4-c	
A7	YELLOW			J1 – 86		P4-b	8
A8	RED			J1 – 87		P4-e	
A9	YELLOW		8 IN.	J1 – 56		P4-V	8
A10	RED			J1 – 57		P4-Y	
A11	YELLOW		8½ IN.	J1 – 62		P2-A	8
A12	RED			J1 – 63		P2-D	
A13	YELLOW			J1 – 66		P2-H	8
A14	RED			J1 – 67		P2-L	
A15	YELLOW			J1 – 38		P2-W	8
A16	RED			J1 – 39		P2-Z	
A17	YELLOW			J1 – 40		P2-Y	8
A18	RED			J1 – 41		P2-b	
A19	YELLOW	17	8½ IN.	J1 – 70		P2-C	8
A20	RED			J1 – 71		P2-F	
A21	YELLOW	9	4 IN.	J1 – 76	E2	P6-A	8
A22			8 IN.	E2		P5-D	8
A23			4 IN.	J1 – 77	E3	P6-D	
A24	YELLOW	9	8 IN.	E3		P5-H	
A25	YELLOW	18	8½ IN.	J1 – 5		P5-L	8
A26	RED			J1 – 16		P5-A	
A27	GREEN			J1 – 33		P5-P	
A28	YELLOW	9	8½ IN.	J1 – 84	E4	P5-T	8
A29			4 IN.	E4		P6-H	8
A30			8½ IN.	J1 – 85	E5	P5-W	
A31	YELLOW	9	4 IN.	E5		P6-L	
A32	YELLOW	17	8½ IN.	J1 – 27		P5-C	8
A33	RED			J1 – 30		P5-F	
A34	YELLOW	9	8 IN.	J1 – 32	E6	P4-L	8
A35			7 IN.	E6		P5-K	8
A36			8 IN.	J1 – 55	E7	P4-P	
A37		9	7 IN.	E7		P5-N	
A38	YELLOW	10	4 IN.	J1 – 1		E1	
A39	YELLOW	17	6 IN.	J1 – 78		P7-A	8
A40	RED			J1 – 79		P7-D	
A41	YELLOW	17	6 IN.	J1 – 82		P7-C	8
A42	RED			J1 – 83		P7-F	

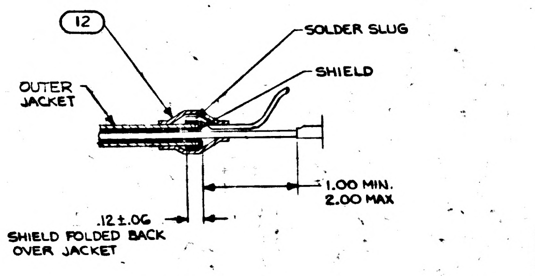
WIRING LEGEND

COND NO. **	COLOR	ITEM NO.	LENGTH (REF)	FROM	INTERIM PT.	TO	SEE NOTE 4
A43	YELLOW	17	6 IN.	J1 – 51		P7-H	8
A44	RED			J1 – 52		P7-L	
A45	YELLOW			J1 – 53		P7-K	8
A46	RED			J1 – 54		P7-M	
A47	YELLOW	17	6 IN.	J1 – 43		P7-B	8
A48	RED			J1 – 44		P7-E	
A49	YELLOW	18	4 IN.	J1 – 8		P6-B	8
A50	RED			J1 – 19		P6-C	
A51	GREEN			J1 – 36		P6-F	
A52	YELLOW	17		J1 – 47		P6-K	8
A53	RED			J1 – 48		P6-N	
A54	YELLOW			J1 – 49		P6-P	8
A55	RED			J1 – 50		P6-T	
A56	YELLOW			J1 – 45		P6-R	8
A57	RED			J1 – 46		P6-U	
A58	YELLOW	17		J1 – 25		P6-S	8
A59	RED			J1 – 26		P6-V	
A60	YELLOW	18		J1 – 12		P6-W	8
A61	RED			J1 – 13		P6-X	
A62	GREEN			J1 – 14		P6-Y	
A63	YELLOW	17		J1 – 2		P6-c	8
A64	RED			J1 – 3		P6-f	
A65	YELLOW	17		J1 – 6		P6-e	8
A66	RED			J1 – 7		P6-h	
A67	YELLOW	11	4 IN.				8
A67A	RED			J1 – 23		P6-J	
A67B	YELLOW			J1 – 24		P6-M	
A67C	YELLOW	9	2 IN.	A67-SHIELD		A68-SHIELD	
A68	YELLOW	11	8½ IN.				8
A68A	RED			J1 – 34		P5-Y	
A68B	YELLOW			J1 – 35		P5-b	
A68C		9	2 IN.	A68-SHIELD		E9	
A69		9	8½ IN.	J1 – 37	E8, E9	P5-S	
A70		9	2 IN.	E8		P5-V	
A71	YELLOW	11	7 IN.				8
A71A	RED			J1 – 17		P11-A	
A71B	YELLOW			J1 – 18		P11-C	
A71C	YELLOW	9	2 IN.	A71-SHIELD		A72-SHIELD	
A72	YELLOW	11	7 IN.				8
A72A	RED			J1 – 64		P11-F	
A72B	YELLOW			J1 – 65		P11-D	
A72C	YELLOW	9	2 IN.	A72-SHIELD		A73-SHIELD	
A73	YELLOW	11	7 IN.				8
A73A	RED			J1 – 10		P11-H	
A73B	YELLOW			J1 – 11		P11-K	
A73C	YELLOW	9	2 IN.	A73-SHIELD		A74-SHIELD	
A74	YELLOW	11	7 IN.				8
A74A	RED			J1 – 72		P11-N	
A74B	YELLOW			J1 – 73		P11-L	
A74C	YELLOW	9	2 IN.	A74-SHIELD		A75-SHIELD	
A75	YELLOW	11	7 IN.				8
A75A	RED			J1 – 88		P11-P	
A75B	YELLOW			J1 – 89		P11-S	
A75C	YELLOW	9	2 IN.	A75-SHIELD		A76-SHIELD	
A76	YELLOW	11	7 IN.				8
A76A	RED			J1 – 80		P11-V	
A76B	YELLOW			J1 – 81		P11-T	
A76C		9	2 IN.	A76-SHIELD		E10	
A77		9	7 IN.	J1 – 9	E10	P11-U	
A78	YELLOW	10	3 IN.	P5-Z		E11	



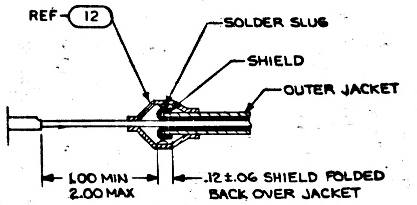
POTTING AREA (TYP) SEE NOTE 13
REF 4 13
6 13 REF
3 13
REF DESIGNATION (TYP) SEE NOTE 14
SEE DETAIL A A71C, A72C, A73C A74C, A75C, A76C
5 13 REF
1.44
.94
.75
REF 3
REF 13
SEE NOTE 9
7
P4
P11
P2
P5
P7
E10
.50
40°
10°
.44R
.88R
.37R
.62R
2.88
2.12
1.12
1.12
.75
30°
E8
.37 R
24°
E4, E5
E6, E7
E9
.25R
SEE DETAIL A A67C, A68C
3.37
1.37
2.25
.37
SEE DETAIL B A68
2.50
15°
60°
IDENTIFICATION MARK SEE NOTE 12
REF 7
14
.44
E2, E3
2.50
25°
SEE DETAIL B A67
.12
.50
.25
SEE DETAIL B A71, A72, A73 A74, A75, A76
.88
1.25
2.00
2.75
3.12
4.12
REF 4
REF 13
1 16 SEE NOTE 5
POLARIZING KEYWAY (REF)
LOCATING GROOVE PAINTED BLUE (REF)
2

PARTIAL VIEW - ADDITION OF ITEM 2 (AFTER J1 HAS BEEN COMPLETELY WIRED) SEE NOTE 5



12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN. 2.00 MAX
.12 ± .06
SHIELD FOLDED BACK OVER JACKET

DETAIL A
SCALE: NONE



REF 12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN 2.00 MAX
.12 ± .06 SHIELD FOLDED BACK OVER JACKET

DETAIL B
SCALE: NONE

** CONDUCTOR NUMBER FOR REFERENCE ONLY.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	1	*	1010789-004			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (2')			
17	1	*	1010789-003			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (20')			
16	78	*	1010770-2			CONTACT, CRIMP TYPE #22 (SOCKET)			
15	9	*	1010490-114			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
14	1	*	1010490-278			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
13	84	*	1010490-058			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
12	16	*	1010402-2			SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK.			
11	1	*	1010789-012			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (5')			
10	1	*	1010789-006			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED (7')			
9	1	*	1010789-001			WIRE, ELECT, EXTRUDED TFE INSUL, POLYIMIDE COATED ([illegible]')			
8			—//—			—//—			
7	2		MS25036-48			TERMINAL, LUG, CRIMP STYLE, COPPER (E1)(E11)			
6	1	*	1011758-1	68502018201		CONNECTOR, ELECTRICAL (P11)			
5	1	*	1012147-2	68502022102		CONNECTOR, ELECTRICAL (P7)			
4	2	*	1000116			CONNECTOR, ELECTRICAL, RECEPTACLE (P4 & P6)			
3	2	*	1000121			CONNECTOR, ELECTRICAL, RECEPTACLE (P2 & P5)			
2	1		2011799	85386910750		PLATE & CONNECTOR, ASSY OF			
1	1	*	1010771-001			CONNECTOR, PLUG, ELECTRICAL			

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910050

DRAWN [illegible] DATE 8-5-64
CHECKED T. Sullivan 8-27-64
APPROVAL [illegible] 8/27/64
APPROVAL E. [illegible] 2/3/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT BASE HARNESS
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011896
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011896 D

2011896

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

NOTES:

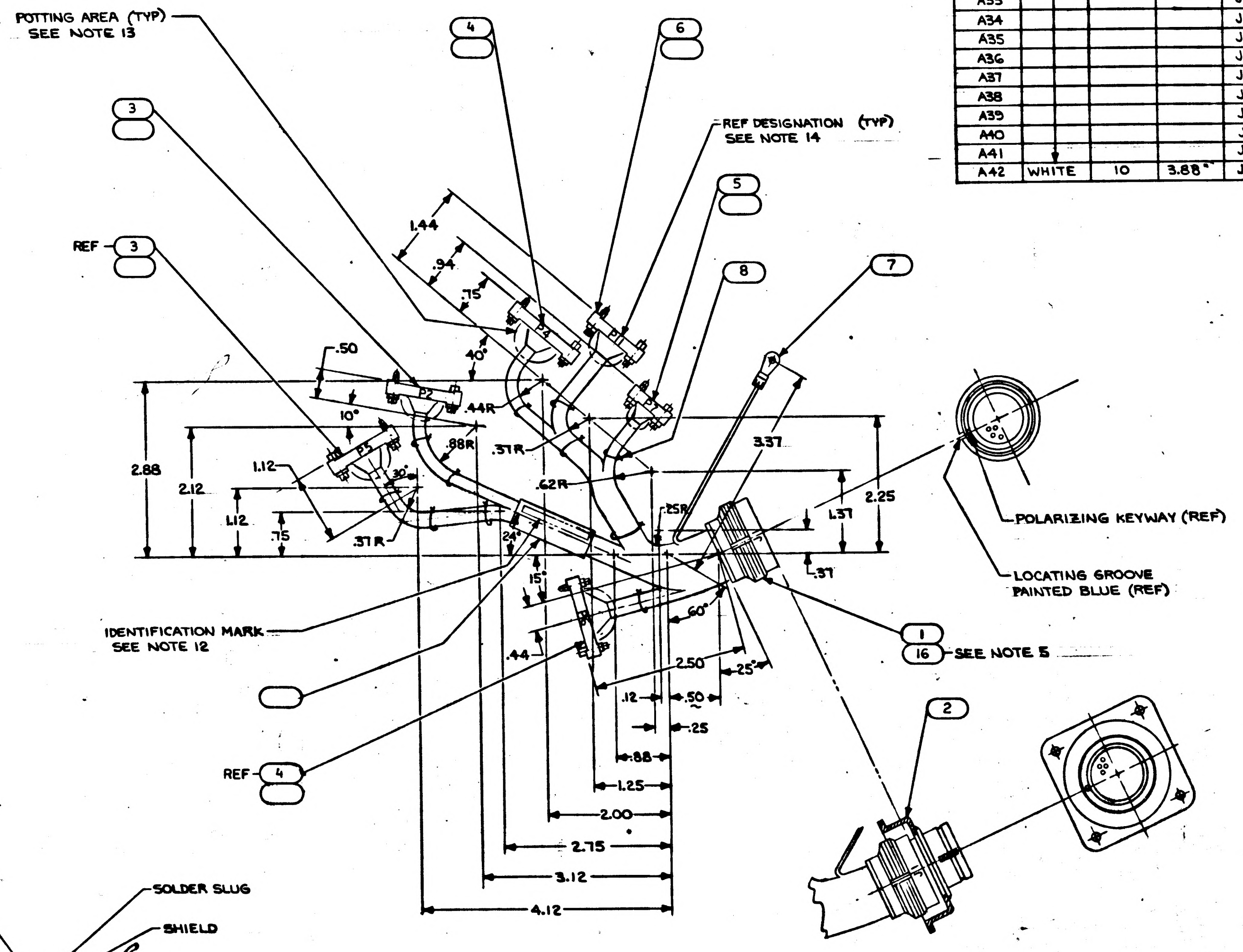
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012391.
3. CONDUCTOR NO. SHALL BE MARKED ON EACH WIRE PER ND1002019. SPACING OF CONDUCTOR IDENTIFICATION SHALL BE EVERY TWO (2) INCHES, MAXIMUM. SPIRALING OF THE MARKING IS ALLOWED.
4. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
5. INSTALL CRIMP TYPE SOCKETS ITEM 16, IN ACCORDANCE WITH ND1002206.
6. CONNECT CONDUCTORS — — — — — TO RESPECTIVE — — —
7. APPLY ITEMS 13, 14, & 15 TO LEADS.
8. SOLDER CONDUCTORS PER WIRING LEGEND, WITH SN60 WRAP2 PER QQ-S-571 PER MSFC-PROC-158.
9. LACE CONDUCTORS, USING ITEM 8, IN ACCORDANCE WITH ND1002032.
10. PERFORM CONTINUITY CHECK.
11. PLACE ITEMS 12 & 13 OVER CONTACTS AND LEADS AND SHRINK.
12. SHRINK ITEM 11 AND IDENTIFY ASSEMBLY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.
13. POT IN ACCORDANCE WITH ND1002009, METHOD C.
    - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
    - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
14. MARK REFERENCE DESIGNATIONS 1/8 INCH HIGH IN ACCORDANCE WITH ND1002019.
15. TERMINATE SHIELDED WIRES AS SHOWN IN DETAILS A AND B.
16. ☐ SYMBOL ON HARNESS INDICATES APPROX. LOCATION OF SOLDER SLEEVE.

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A1	WHITE			J1 – 68	P11 – B	8
A2	↑			J1 – 69	P11 – J	
A3				J1 – 58	P4 – D	8
A4				J1 – 59	P4 – H	
A5				J1 – 90	P4 – Z	8
A6				J1 – 91	P4 – c	
A7				J1 – 86	P4 – b	8
A8				J1 – 87	P4 – e	
A9				J1 – 56	P4 – V	8
A10				J1 – 57	P4 – Y	
A11				J1 – 62	P2 – A	8
A12				J1 – 63	P2 – D	
A13				J1 – 66	P2 – H	8
A14				J1 – 67	P2 – L	
A15				J1 – 38	P2 – W	8
A16				J1 – 39	P2 – Z	
A17				J1 – 40	P2 – Y	8
A18				J1 – 41	P2 – b	
A19				J1 – 70	P2 – C	8
A20				J1 – 71	P2 – F	
A21				J1 – 74	P2 – S	8
A22				J1 – 75	P2 – V	
A23				J1 – 76	P5 – D	8
A24				J1 – 77	P5 – H	
A25				J1 – 5	P5 – L	8
A26				J1 – 16	P5 – A	
A27				J1 – 33	P5 – P	
A28				J1 – 84	P5 – T	8
A29				J1 – 85	P5 – W	
A30				J1 – 27	P5 – C	8
A31				J1 – 30	P5 – F	
A32				J1 – 32	P5 – K	8
A33				J1 – 55	P5 – N	
A34				J1 – 78	P7 – A	8
A35				J1 – 79	P7 – D	
A36				J1 – 82	P7 – C	8
A37				J1 – 83	P7 – F	
A38				J1 – 51	P7 – H	8
A39				J1 – 52	P7 – L	
A40				J1 – 53	P7 – K	8
A41	↓			J1 – 54	P7 – M	
A42	WHITE	10	3.88"	J1 – 1	E1	

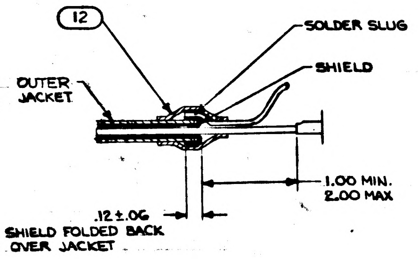
WIRING LEGEND

COND NO.	COLOR	ITEM NO.	LENGTH (REF)	FROM	TO	SEE NOTE 4
A43				J1 – 43	P7 – B	8
A44				J1 – 44	P7 – E	
A45				J1 – 8	P6 – B	8
A46				J1 – 19	P6 – C	
A47				J1 – 36	P6 – F	
A48				J1 – 47	P6 – K	8
A49				J1 – 48	P6 – N	
A50				J1 – 49	P6 – P	8
A51				J1 – 50	P6 – T	
A52				J1 – 45	P6 – R	8
A53				J1 – 46	P6 – U	
A54				J1 – 25	P6 – S	8
A55				J1 – 26	P6 – V	
A56				J1 – 12	P6 – W	8
A57				J1 – 13	P6 – X	
A58				J1 – 14	P6 – Y	
A59				J1 – 2	P6 – c	8
A60				J1 – 3	P6 – f	
A61				J1 – 6	P6 – e	8
A62				J1 – 7	P6 – h	



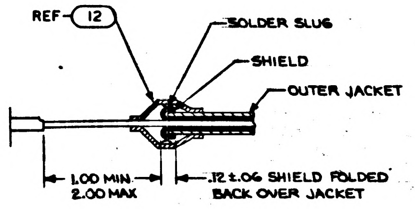
POTTING AREA (TYP)
SEE NOTE 13
REF DESIGNATION (TYP)
SEE NOTE 14
REF 3
3
4
6
5
8
7
P2
P5
P4
1.44
.94
.75
.50
40°
10°
.44R
.88R
.37R
.62R
.25R
2.88
2.12
1.12
1.12
.75
.37R
30°
24°
15°
.44
60°
2.50
25°
.12
.50
.25
.88
1.25
2.00
2.75
3.12
4.12
3.37
1.37
2.25
.37
IDENTIFICATION MARK
SEE NOTE 12
REF 4
1
16
SEE NOTE 5
2
POLARIZING KEYWAY (REF)
LOCATING GROOVE
PAINTED BLUE (REF)

PARTIAL VIEW - ADDITION OF ITEM 2 (AFTER J1 HAS BEEN COMPLETELY WIRED)
SEE NOTE 5



12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN.
2.00 MAX
.12 ± .06
SHIELD FOLDED BACK
OVER JACKET

DETAIL A
SCALE: NONE



REF 12
SOLDER SLUG
SHIELD
OUTER JACKET
1.00 MIN
2.00 MAX
.12 ± .06 SHIELD FOLDED
BACK OVER JACKET

DETAIL B
SCALE: NONE

*\# CONDUCTOR NUMBER FOR REFERENCE ONLY - WIRE SHALL NOT BE MARKED.

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

PENDING →

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
16	84	*	1010770-2			SOCKET, CRIMP TYPE #22			
15		*	1010490-			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
14		*	1010490-			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
13		*	1010490-			INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
12		*	1010402-2			SLEEVE, SOLDER, ELECT COND, INSUL, HEAT SHRINK.			
11	1	*	1010685-7			WIRE, IRRADIATED POLYOFIN, INSULATED ( )			
10	1	*	1010685-2			WIRE, IRRADIATED POLYOFIN, INSULATED (4")			
9	1	*	1010685-1			WIRE, IRRADIATED POLYOFIN, INSULATED ( )			
8	AR	*				TAPE, LACING & TYING			
7	1		MS25036-1			TERMINAL, LUG, CRIMP STYLE, COPPER (E1)			
6	1	*	1011758	68502018271		CONNECTOR, ELECTRICAL (P11)			
5	1	*	1012147-2	68502022102		CONNECTOR, ELECTRICAL (P7)			
4	2	*	1000116			CONNECTOR, ELECTRICAL, RECEPTACLE (P4 & P6)			
3	2	*	1000121			CONNECTOR, ELECTRICAL, RECEPTACLE (P2 & P5)			
2	1		2011799	85386910750		PLATE & CONNECTOR, ASSY OF			
1	1	*	1010772-5			CONNECTOR, ELECTRICAL (J1)			

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910050
DRAWN DATE 8-5-64
CHECKED T. SULLIVAN 8-27-64
APPROVAL
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

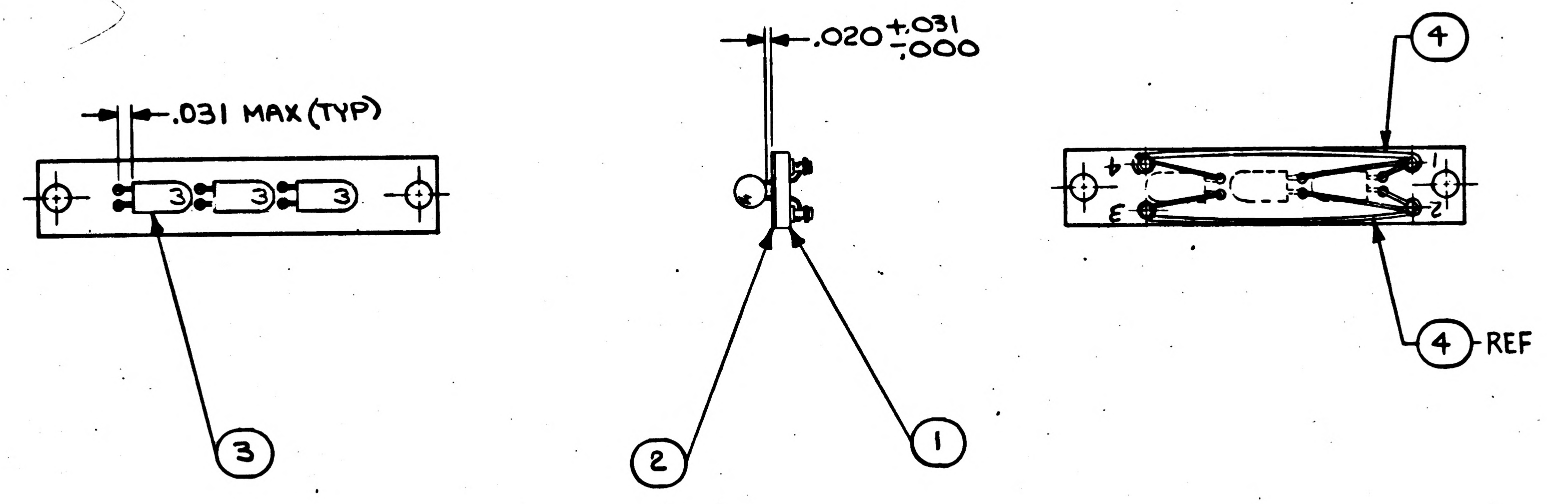
TITLE
SXT BASE HARNESS
ASSEMBLY

CODE IDENT NO.
SIZE E
NASA NUMBER 2011896
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

0061102

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. SOLDER PER MSFC-PROC-158.
3. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



2011900

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	AS REQD	✱	1010416-20			WIRE, ELECTRICAL, STRANDED, INSULATED			
3	3	✱	1010493			LAMP-MINIATURE			
2	1		2011833	25386910100		SHIM, INSULATING			
1	1		2011736	85386910610		TERMINAL BOARD, ASSY OF			

LIST OF PARTS AND MATERIALS

✱ PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011913	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ✱ DECIMALS ± ✱ ANGLES ± ✱
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
K-C PN 85386910600

DRAWN R.BRUNELLE DATE 4-13-64
CHECKED 4/28/64 JES
APPROVAL F. 7/27/64
APPROVAL E. 8/14/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP & TERMINAL BOARD, ASSEMBLY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011900
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16881	9 Nov 65	

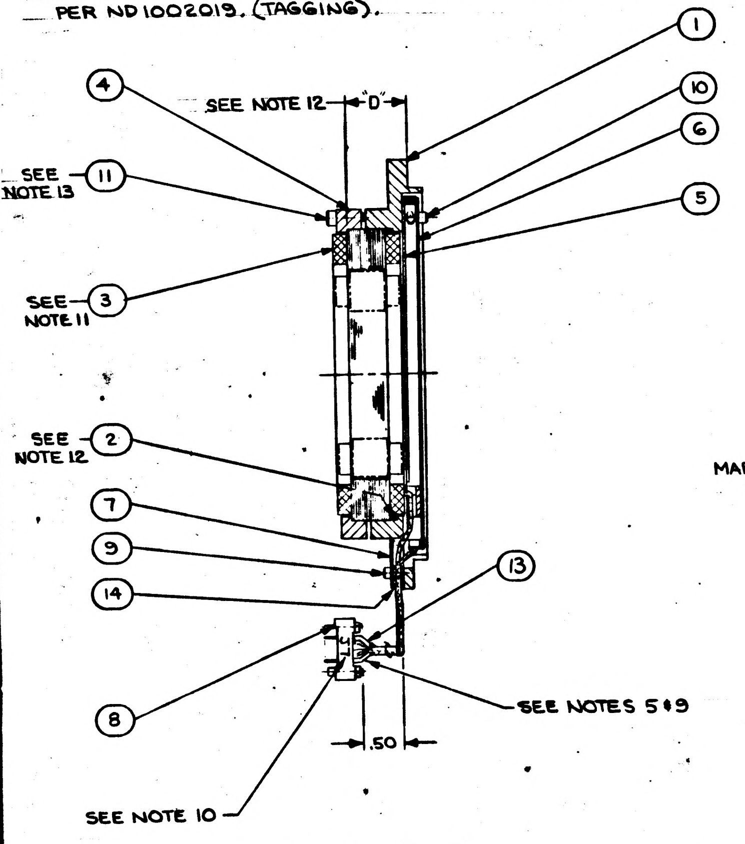
REVISIONS TDRR 2110

NOTES:

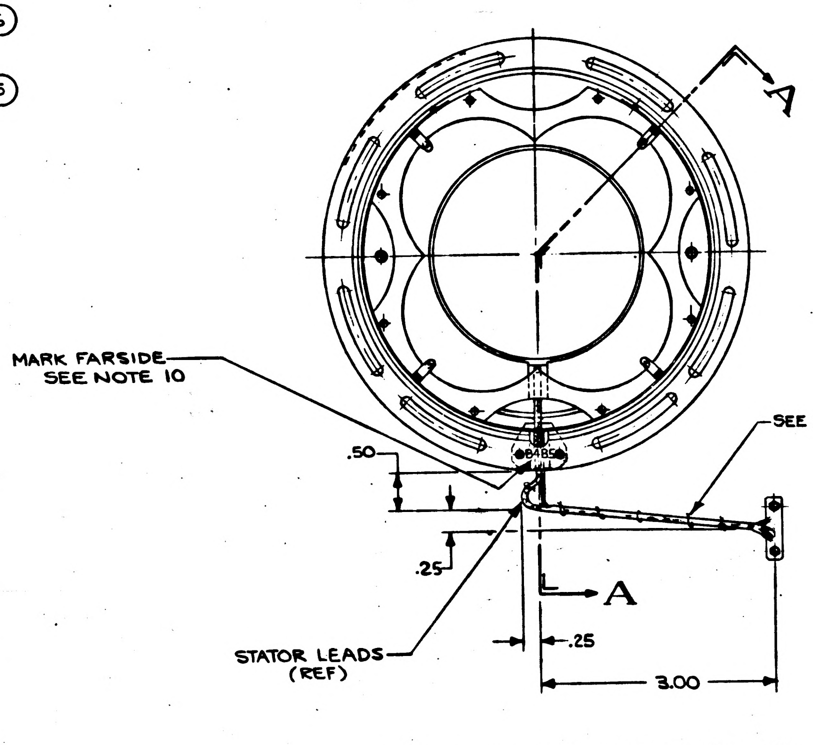
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC DWG. NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889 FOR CORRESPONDING RESOLVER ROTOR DIMENSION "D" TO BE EQUAL TO 0.014 ±.013 + "C".
13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019. (TAGGING).

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	



SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-3	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638-	5738691 0530 / 0540		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440
DRAWN F. Schiller DATE 4-7-64
CHECKED J. Sullivan 7-28-64
APPROVAL G. Rushmann 7-28-64
APPROVAL E. Morey 8/22/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP, ASSEMBLY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

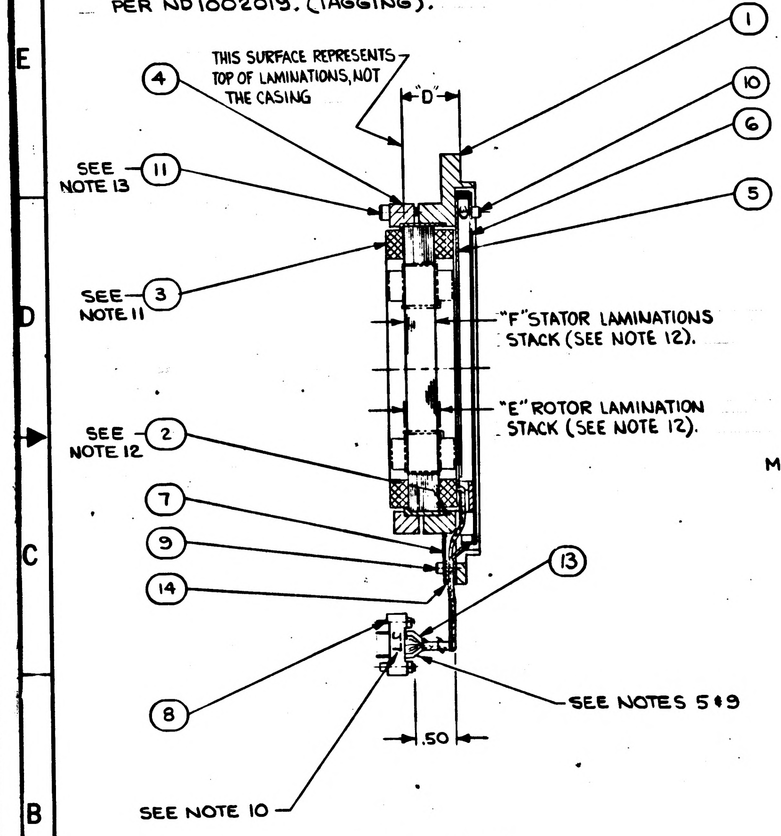
B 2011906

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16881	9 Mar 65	WH
B		REVISED PER TDRR NO. 21533	8/24/65	WH

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC DWG. NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889. DIMENSIONS "E" & "F" ESTABLISHED AT TIME OF INSPECTION OF 1012066 & DIMENSION "D" TO BE EQUAL TO $C-(\frac{E}{2}-\frac{F}{2})$ WITH TOLERANCE OF ±.010.
13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	



THIS SURFACE REPRESENTS TOP OF LAMINATIONS, NOT THE CASING
"D"
4
1
10
6
5
SEE NOTE 13
11
SEE NOTE 11
3
"F" STATOR LAMINATIONS STACK (SEE NOTE 12).
"E" ROTOR LAMINATION STACK (SEE NOTE 12).
SEE NOTE 12
2
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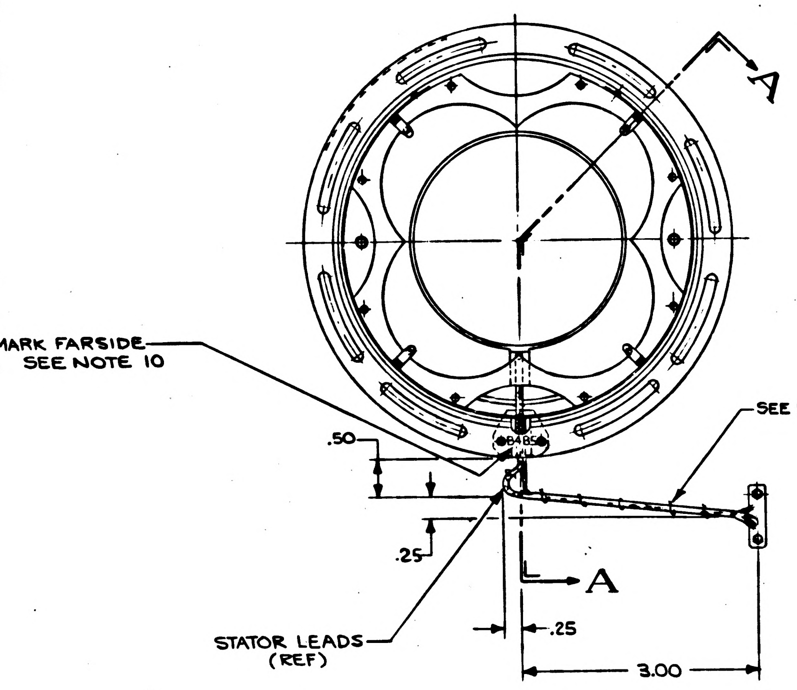
SEE NOTES 5 & 9
.50
SEE NOTE 10

SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-3	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16&1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638-	57386910530 0540		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440
DRAWN F. Schiller DATE 4-7-64
CHECKED J. SULLIVAN 7-28-64
APPROVAL G. Rushman 7-28-64
APPROVAL E. Morey 8/22/64
NASA APPROVAL
MIT APPROVAL W Kupfer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

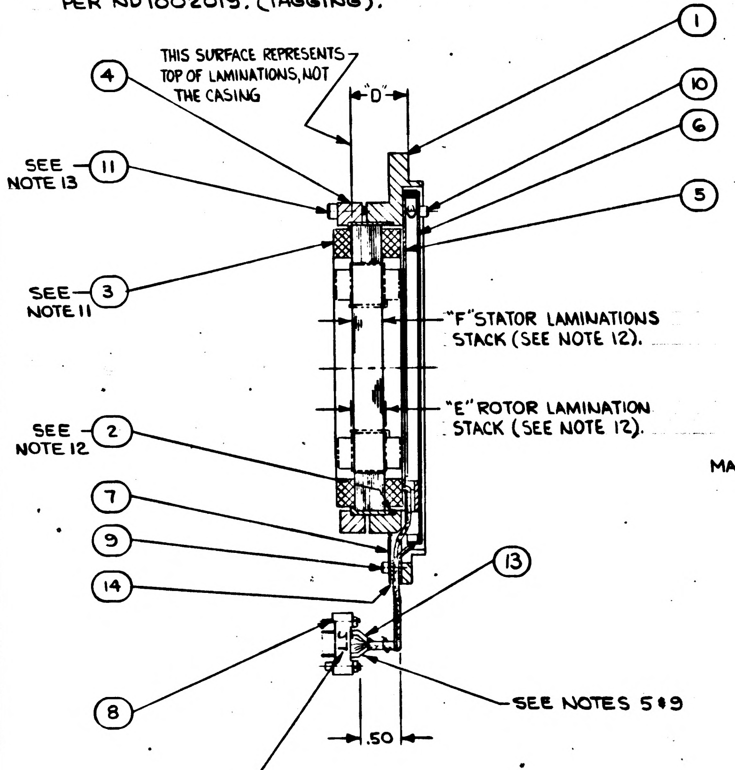
2011906 C

REVISIONS TDRR 2119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16881	4Nov65	WK
B		REVISED PER TDRR NO. 21533	8/24/65	WK
C		REVISED PER TDRR 24643	12/14/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC DWG. NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889. DIMENSIONS "E" & "F" ESTABLISHED AT TIME OF INSPECTION OF 1012066. DIMENSION "D" TO BE EQUAL TO $C-(\frac{E}{2}-\frac{F}{2})$ WITH TOLERANCE OF ±.010.
13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4.	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	


THIS SURFACE REPRESENTS TOP OF LAMINATIONS, NOT THE CASING
4
"D"
1
10
6
5
SEE NOTE 13 11
SEE NOTE 11 3
"F" STATOR LAMINATIONS STACK (SEE NOTE 12).
"E" ROTOR LAMINATION STACK (SEE NOTE 12).
SEE NOTE 12 2
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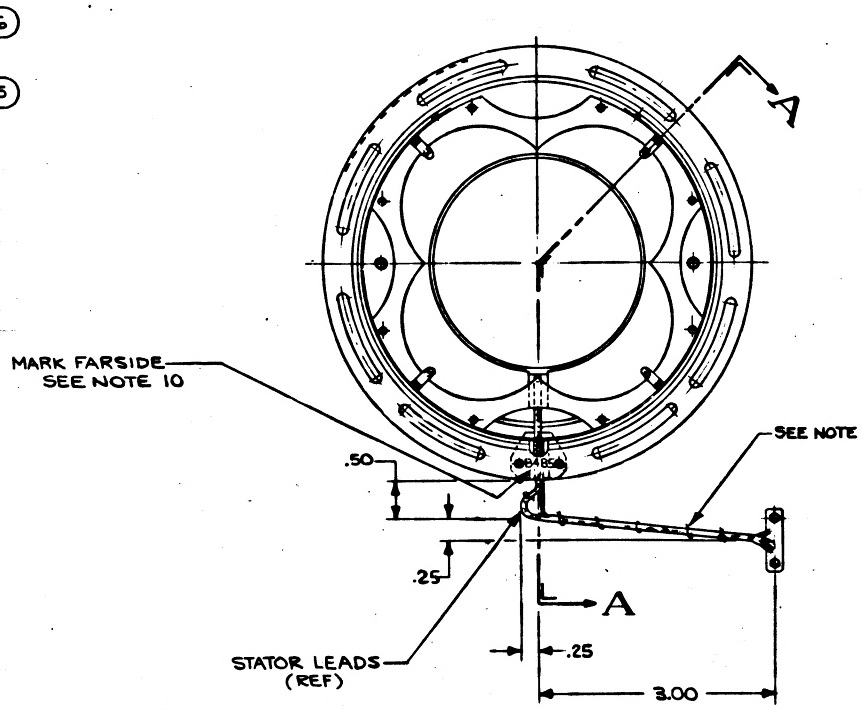
SEE NOTES 5 & 9
.50
SEE NOTE 10

SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

14	2		2012118	26386910070		GROMMET, HALF			
13	AR	✱	1010490-060	—"—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	✱	1012146-3	—"—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	✱	1012066	—"—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638-	5738691 0530 0540		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

✱ PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440
DRAWN DATE 4-7-64
CHECKED J. SULLIVAN 7-28-64
APPROVAL 7-28-64
APPROVAL E. Mong 8/22/64
NASA APPROVAL
MIT APPROVAL W Kupfer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
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13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

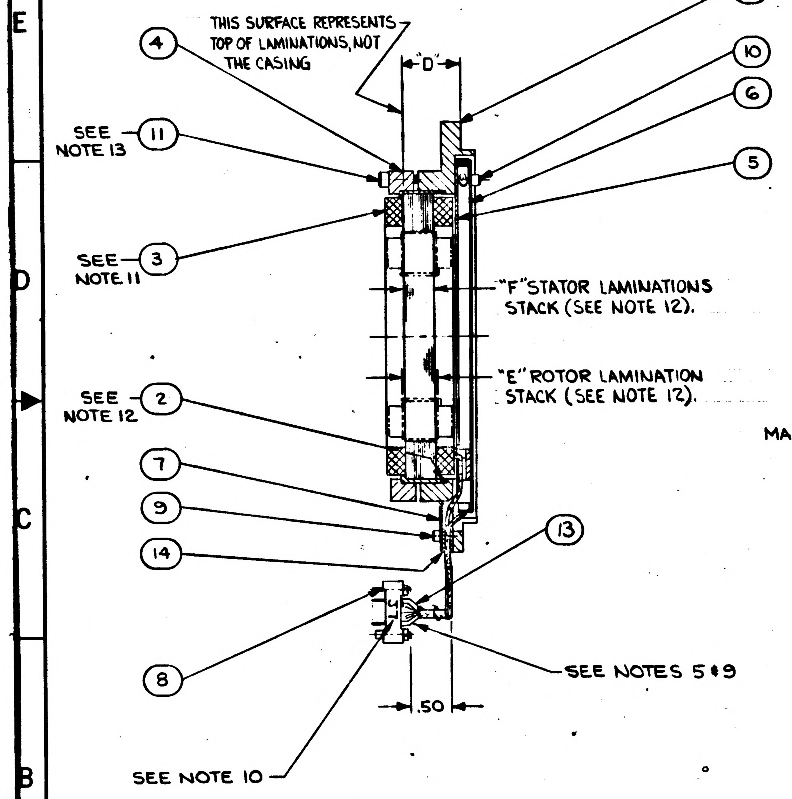
D 2011906

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	

REVISIONS TDRR 2110

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16881	9/Nov/65	WK
B		REVISED PER TDRR NO. 21533	8/24/65	WK
C		REVISED PER TDRR 24643	12/14/65	WK
D		REVISED PER TDRR 25246	1/18/66	WK



THIS SURFACE REPRESENTS TOP OF LAMINATIONS, NOT THE CASING
"D"
4
1
10
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SEE NOTE 13
11
SEE NOTE 11
3
"F" STATOR LAMINATIONS STACK (SEE NOTE 12).
"E" ROTOR LAMINATION STACK (SEE NOTE 12).
SEE NOTE 12
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SEE NOTES 5 & 9
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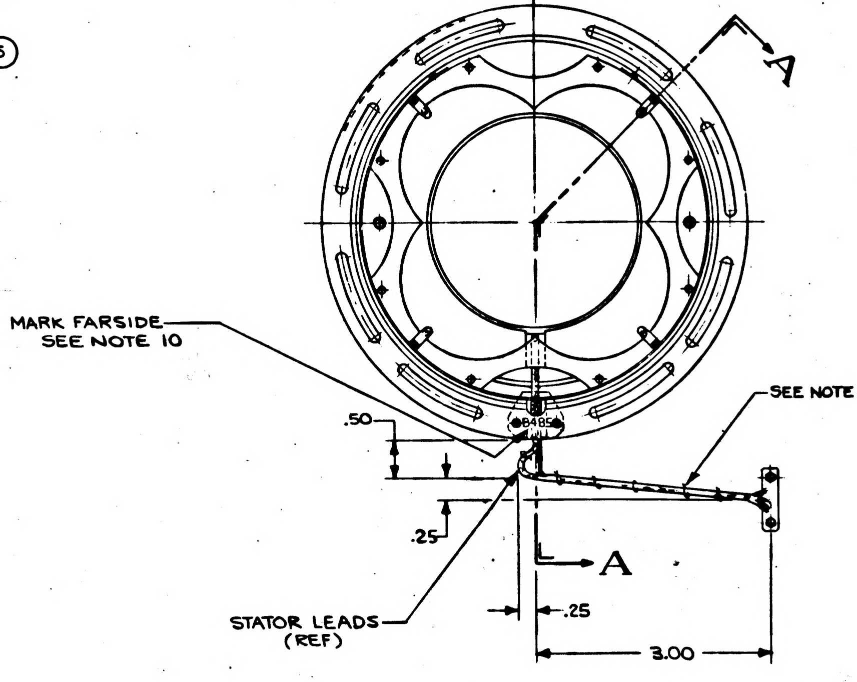
SEE NOTE 10

SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-3	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638-	57386910530 0540		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .06	± —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440
DRAWN F. Schilling DATE 4-7-64
CHECKED J. SULLIVAN 7-28-64
APPROVAL E. Ruhm 7-28-64
APPROVAL E. Moray 8/22/64
NASA APPROVAL
MIT APPROVAL W Kupfer 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:

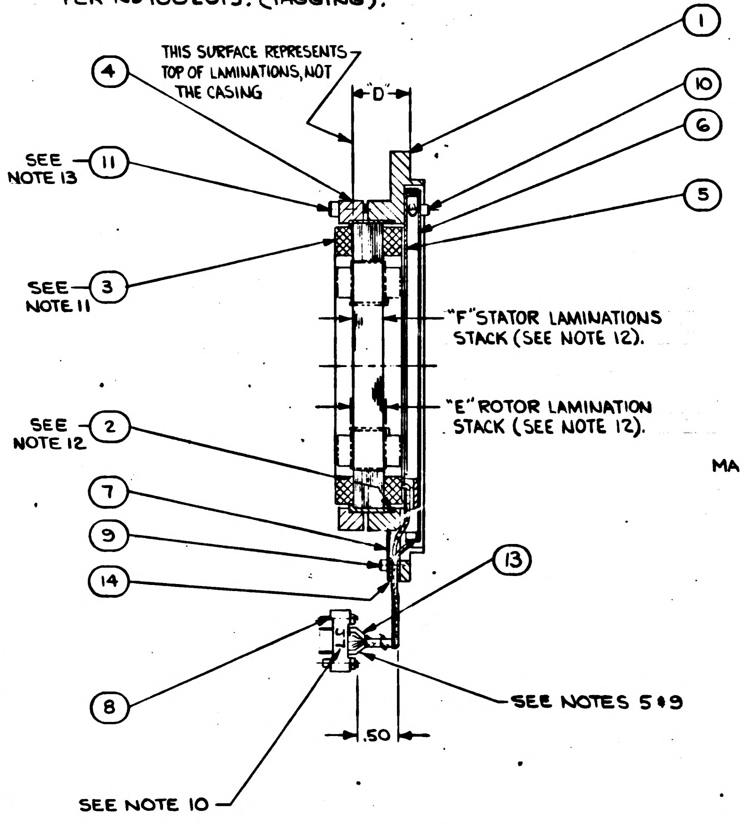
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER, ITEM 2, BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889. DIMENSIONS "E" & "F" ESTABLISHED AT TIME OF INSPECTION OF 1012066. DIMENSION "D" TO BE EQUAL TO $C-(\frac{E}{2}-\frac{F}{2})$ WITH TOLERANCE OF ±.010.
13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND

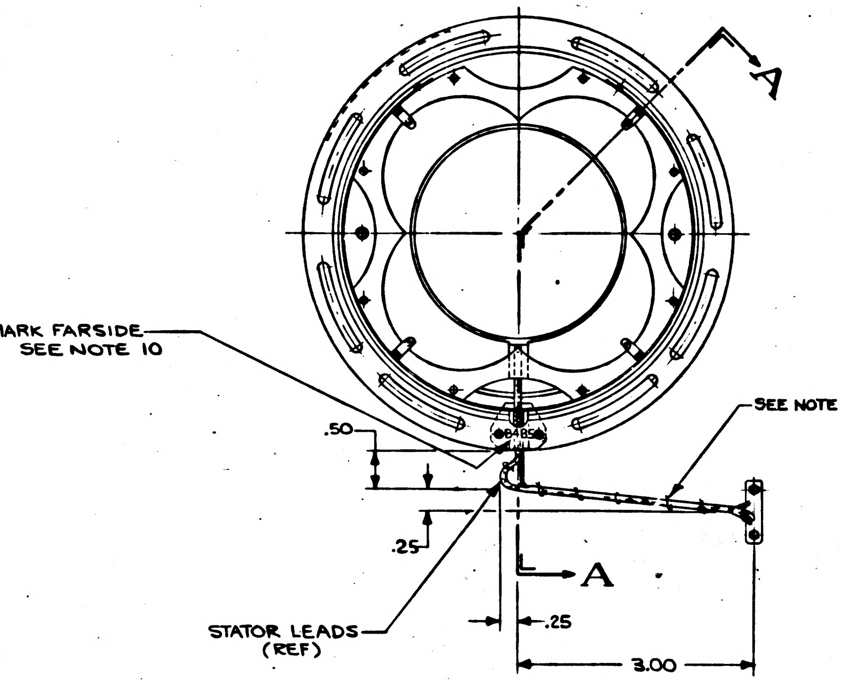
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	

REVISIONS TDRR 21[illegible]

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16881	9/[illegible]/65	WK
B		REVISED PER TDRR NO. 21533	8/24/65	WK
C		REVISED PER TDRR 24643	12/14/65	WK
D		REVISED PER TDRR 25246	1/18/66	WK
E		REVISED PER TDRR 26802	3/22/66	WK


THIS SURFACE REPRESENTS TOP OF LAMINATIONS, NOT THE CASING
"D"
4
1
10
6
5
SEE NOTE 13
11
SEE NOTE 11
3
"F" STATOR LAMINATIONS STACK (SEE NOTE 12).
"E" ROTOR LAMINATION STACK (SEE NOTE 12).
SEE NOTE 12
2
7
9
14
13
8
SEE NOTES 5 & 9
.50
SEE NOTE 10

SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

SEE NOTE 12

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-3	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638 THRU	5738691 1200 THRU 1220		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012736	
2012730	
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .06	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440

DRAWN DATE 4-7-64
CHECKED J. Sullivan 7-28-64
APPROVAL G. R[illegible] 7-28-64
APPROVAL E. M[illegible] 8/22/64
NASA APPROVAL
MIT APPROVAL W. K[illegible] 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

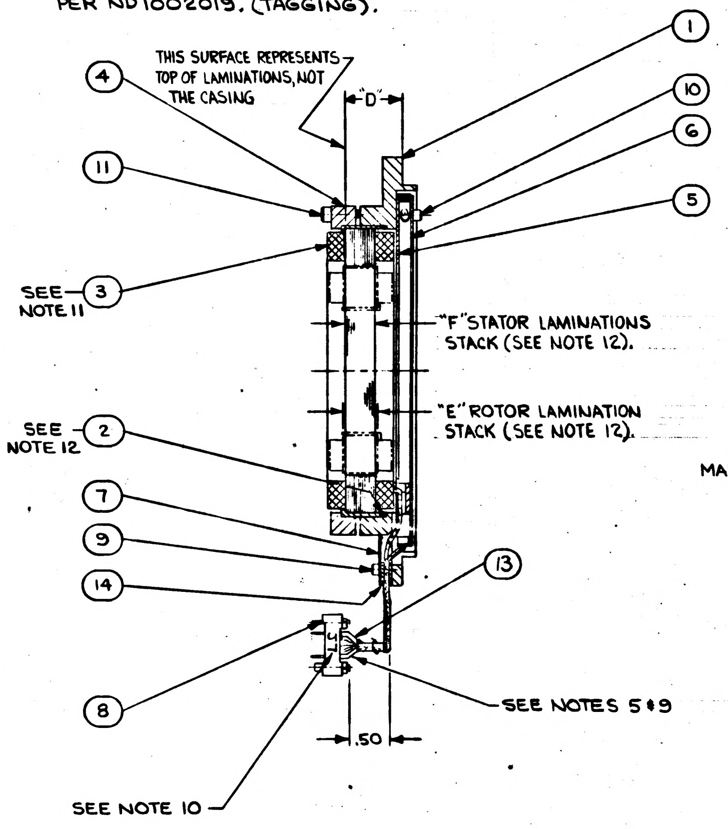
2011906 F

NOTES:

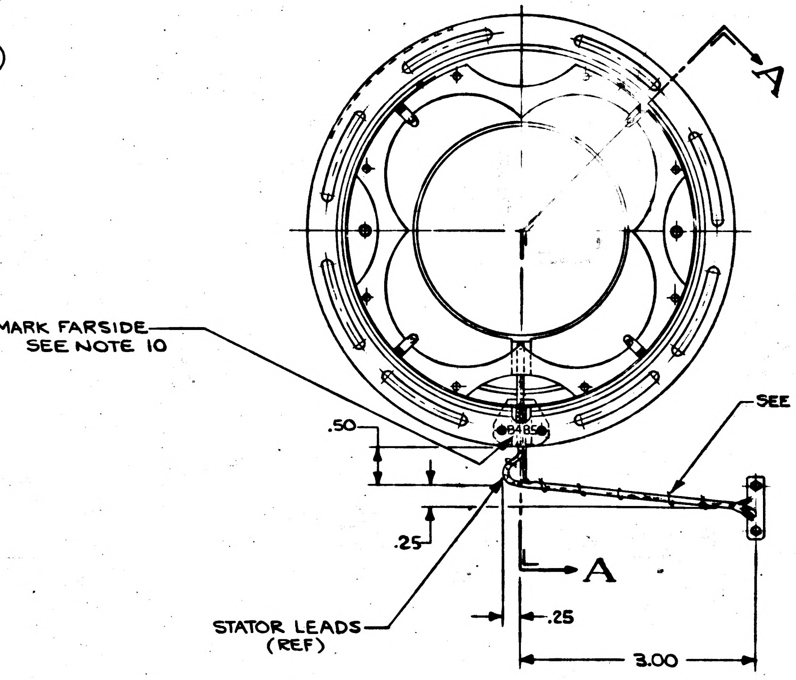
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD "A" OR "B"
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG NO. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER, ITEM 2, BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889. DIMENSIONS "E" & "F" ESTABLISHED AT TIME OF INSPECTION OF 1012066. DIMENSION "D" TO BE EQUAL TO $C-(\frac{E}{2}-\frac{F}{2})$ WITH TOLERANCE OF ±.010.
13. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	

REVISIONS TDRR 2119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16881	9/.../65	WK
B		REVISED PER TDRR NO. 21533	8/24/65	WK
Ⓜ C		REVISED PER TDRR 24643	12/14/65	WK
Ⓜ D		REVISED PER TDRR 25246	1/18/66	WK
Ⓜ E		REVISED PER TDRR 26802	3/22/66	WK
F		REVISED PER TDRR 27675	4/14/66	WK


THIS SURFACE REPRESENTS TOP OF LAMINATIONS, NOT THE CASING
"D"
4
1
10
6
5
11
SEE NOTE 11 3
"F" STATOR LAMINATIONS STACK (SEE NOTE 12).
"E" ROTOR LAMINATION STACK (SEE NOTE 12).
SEE NOTE 12 2
7
9
14
13
8
SEE NOTES 5 & 9
.50
SEE NOTE 10

SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12									
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-3	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
SEE NOTE 12 - 2	1		2011638 THRU	5738691 1200 THRU 1220		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012736	
2012730	
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ±.06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440
DRAWN DATE 4-7-64
CHECKED J. SULLIVAN 7-28-64
APPROVAL 7-28-64
APPROVAL 8/22/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP, ASSEMBLY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011906
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

2011906

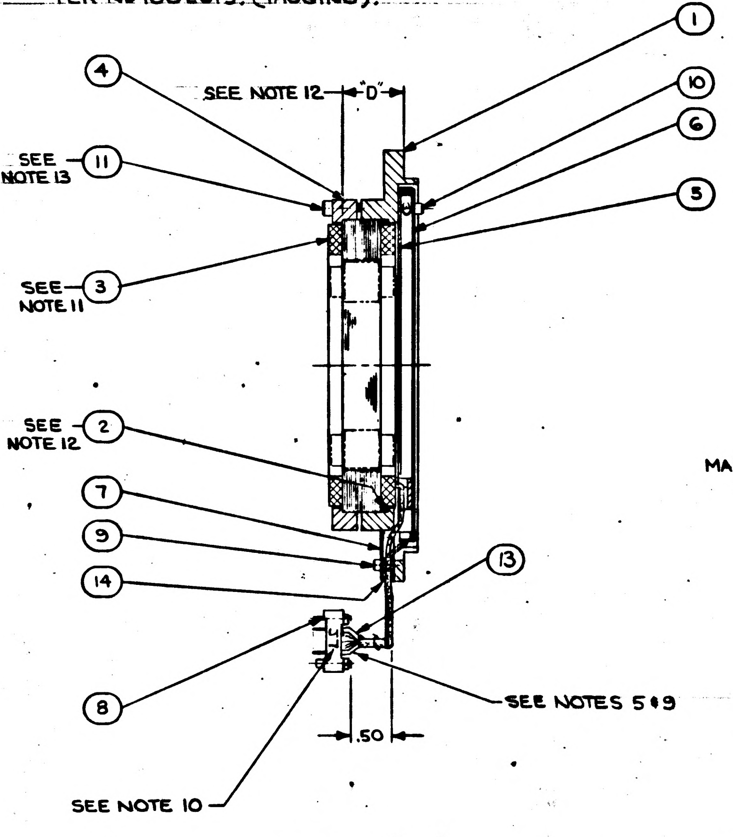
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

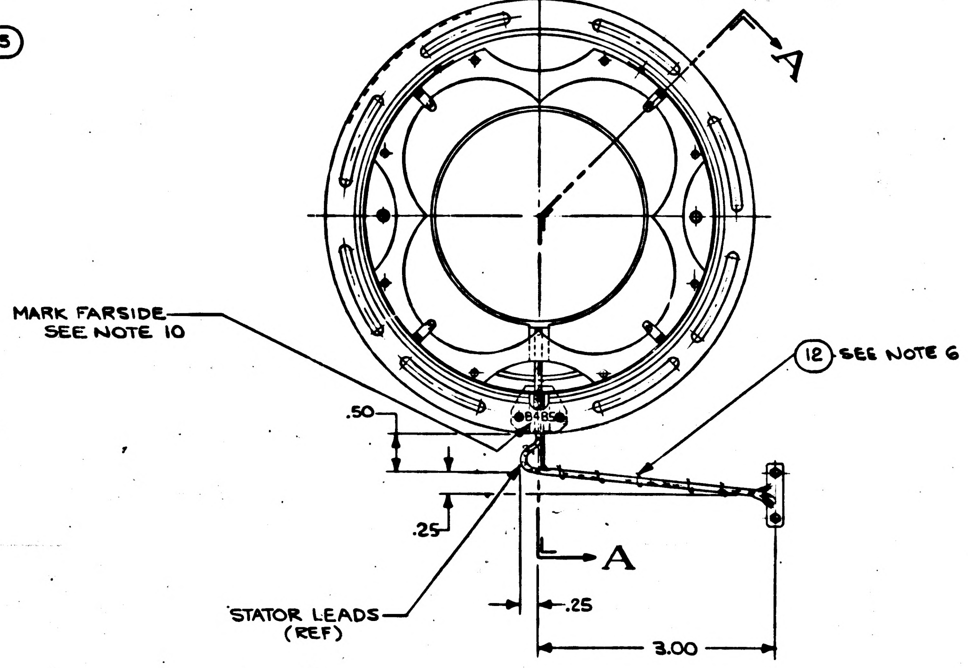
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC DWG. NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032.
4. APPLY ITEM 13 TO LEADS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS USING ITEM 12, IN ACCORDANCE WITH ND1002032.
7. PERFORM CONTINUITY CHECK.
8. PLACE ITEM 13 OVER CONTACTS AND LEADS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002009, METHOD C.
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 1/8 INCH.
10. MARK REF. DESIGNATIONS 3/32 INCH HIGH IN ACCORDANCE WITH ND 1002019.
11. ITEM NO. 3 (RESOLVER) ROTOR AND STATOR TO BE KEPT AS A MATCHED PAIR. REFER TO DWG No. 2011797 FOR ROTOR ASSEMBLY.
12. SELECT SPACER BY REFERENCE TO DIMENSION "C" FROM ASSEMBLY 2011889 FOR CORRESPONDING RESOLVER ROTOR DIMENSION "D" TO BE EQUAL TO 0.014 ±.013 + "C".
13. SCREW TORQUE REQUIREMENTS FOR ITEM 11 TO BE 4.5 IN. LBS ±10%.
14. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BLU-WHT		B4-S4	J7-A	8
C2	YEL-WHT		B4-S2	J7-D	
C3	RED-WHT		B4-S1	J7-C	8
C4	BLK-WHT		B4-S3	J7-F	
C5	BLUE		B5-S4	J7-H	8
C6	YELLOW		B5-S2	J7-L	
C7	RED		B5-S1	J7-K	8
C8	BLACK		B5-S3	J7-M	
C9	GREEN		GREEN	J7-B	8
C10	WHITE		WHITE	J7-E	



SECTION A-A



VIEW WITH LAMP COVER PLATE (ITEM 6) REMOVED

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
14	2		2012118	26386910070		GROMMET, HALF			
13	AR	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
12	AR	*	1011753	60035142001		TAPE, LACING & TYING			
11	6	NAS	1352C04LL10	74455157016		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
10	8	NAS	1352C02LL6	74455157007		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
9	2	NAS	1352C02LL4	74455157006		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
8	1	*	1012146-1	—		CONNECTOR, ELECTRICAL (J7)			
7	1		2011343	56386910230		PLATE, STRAP			
6	1		2011335	56386910220		PLATE, COVER, LAMP			
5	1		2011563	85386910420		LAMP & PLATE, ASSY OF			
4	1		2011327	57386910550		RETAINER, STATOR			
3	1	*	1012066	—		RESOLVER, 16:1 SPEED TRANSMITTER (STATOR) B4, B5			
2	1		2011638-	573869105̲3̲0̲ 0540		SPACER, STATOR			
1	1		2011325	57386910520		HOUSING, STATOR			

LIST OF PARTS AND MATERIALS

MASTER

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .06	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910440

DRAWN F. Schiller DATE 4-7-64
CHECKED J. Sullivan 7-28-64
APPROVAL G. Ruhm 7-31-64
APPROVAL E. Moore 8/22/64
NASA APPROVAL
MIT APPROVAL W Kupfer 25 Aug 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, STATOR & LAMP, ASSEMBLY OF

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011906

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-100

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

2011913 A

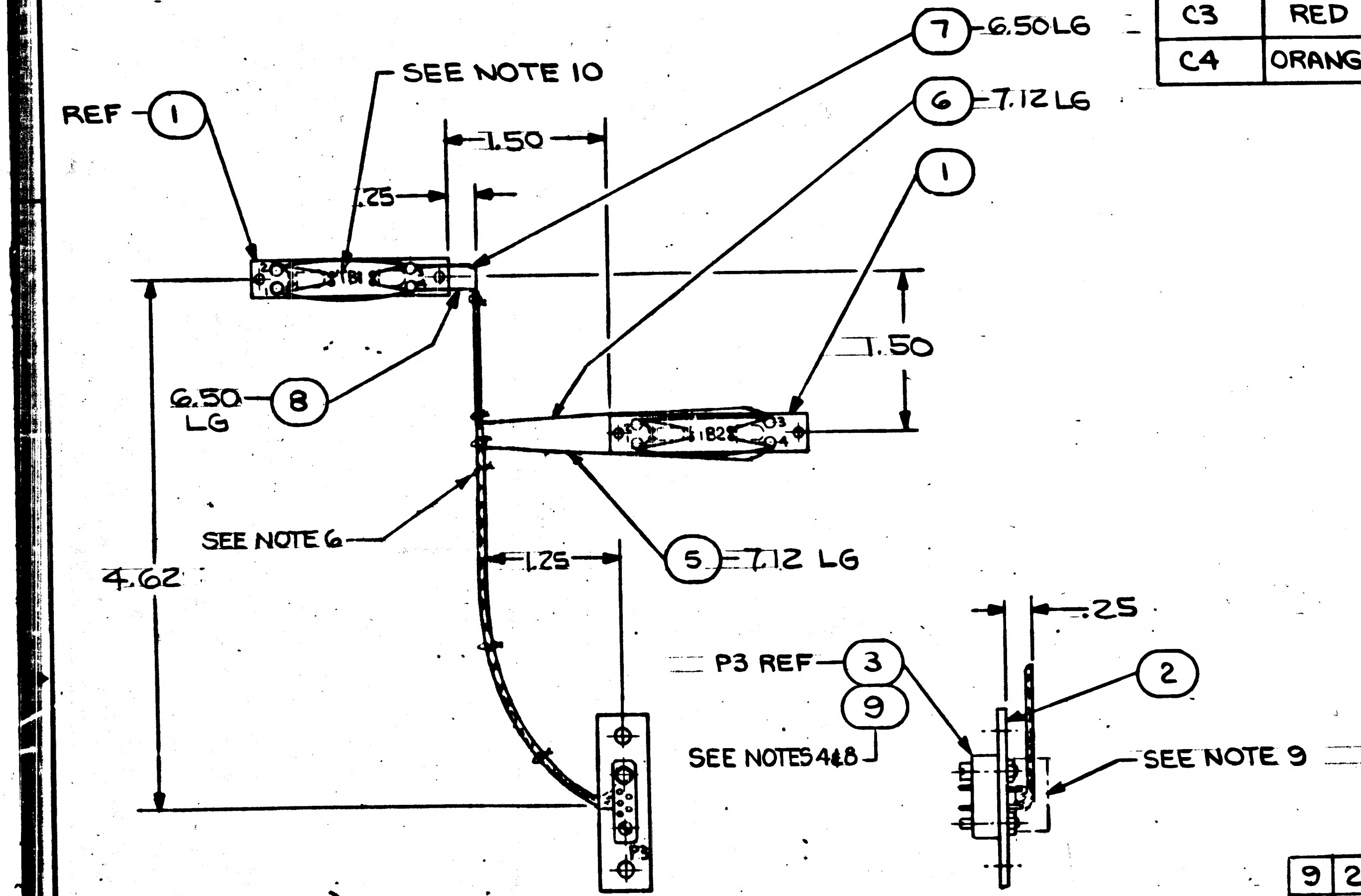
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17093		Wl.

REVISIONS 10952

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032

WIRING LEGEND

COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BROWN	7	P3-C	TB1-3	8
C2	BLACK	8	P3-D	TB1-4	
C3	RED	6	P3-C	TB2-3	8
C4	ORANGE	5	P3-D	TB2-4	



MASTER

NOTES (CONTINUED)
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 9 OVER SOLDERED JOINTS & SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   a. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   b. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.02 HIGH IN ACCORDANCE WITH ND1002019.
11. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MFRS. SYMBOL PER ND 1002019. (TAGGING).

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2	*	1010490-054	—"—		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
8	1	*	1010416-11	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
7	1	*	1010416-12	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	1	*	1010416-13	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	1	*	1010416-14	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
4									
3	1	*	1011647	68502017501		CONNECTOR, ELECTRICAL (5 PINS)			
2	1		2011331	52386910600		PLATE, CONNECTOR MTG			
1	2		2011900	85386910600		LAMP & TERMINAL BOARD, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .12	± ½

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910590

DRAWN R. BRUNELLE DATE 4-14-64
CHECKED 4/30/64 F.S.
APPROVAL F. Ruschmann 7/8/64
APPROVAL E. Dhorup 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP & HARNESS,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011913
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

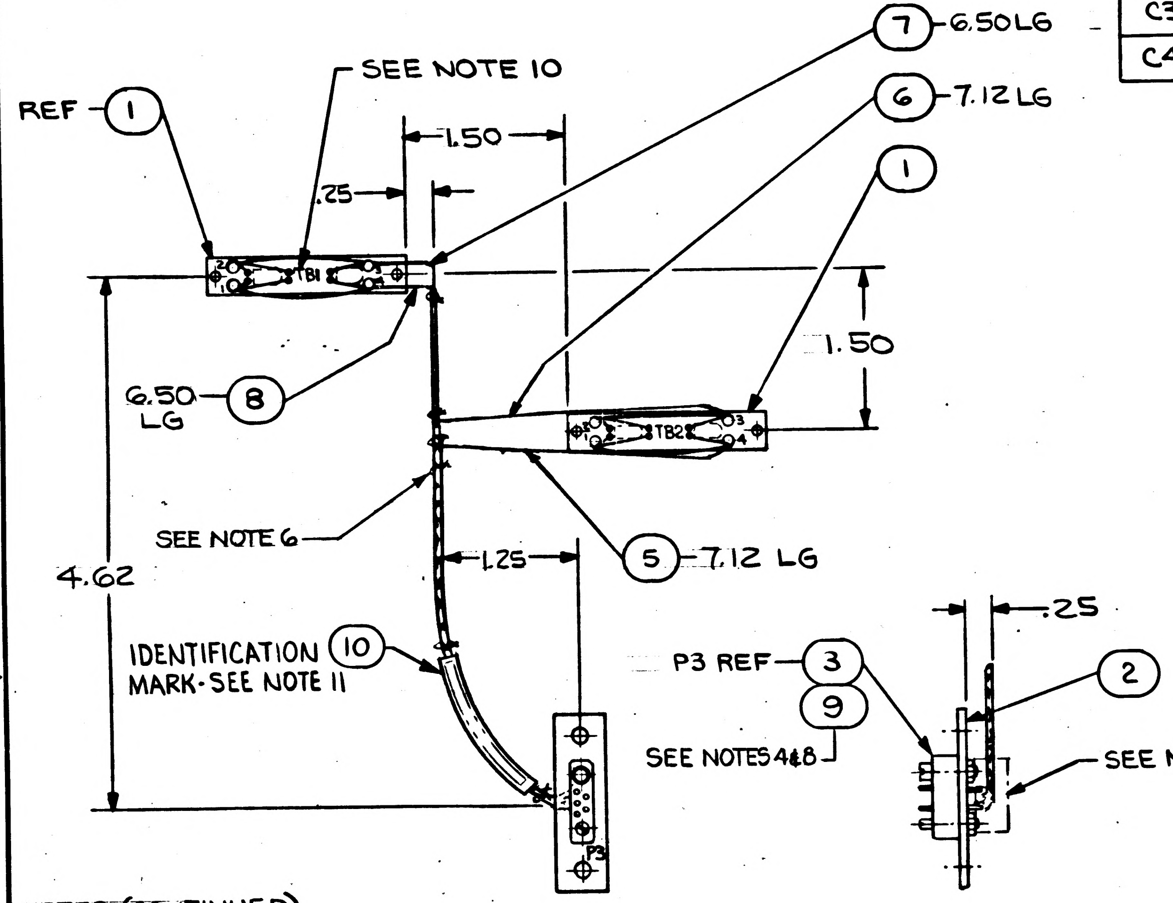
E-154

2011913 B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032

WIRING LEGEND					
COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BROWN	7	P3-C	TB1-3	8
C2	BLACK	8	P3-D	TB1-4	
C3	RED	6	P3-C	TB2-3	8
C4	ORANGE	5	P3-D	TB2-4	

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17093	5Jan65	WK
B		REVISED PER TDRR NO. 18182	4/27/65	WK



NOTES (CONTINUED)
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 9 OVER SOLDERED JOINTS & SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   - a. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - b. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.02 HIGH IN ACCORDANCE WITH ND1002019.
11. SHRINK ITEM ⑩ AND IDENTIFY ASSY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	1	*	1010490-292	— " —		INSULATION - SLEEVING, ELECT, HEAT SHRINKABLE			
9	2	*	1010490-054	— " —		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
8	1	*	1010416-11	— " —		WIRE, ELECTRICAL, STRANDED, INSULATED			
7	1	*	1010416-12	— " —		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	1	*	1010416-13	— " —		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	1	*	1010416-14	— " —		WIRE, ELECTRICAL, STRANDED, INSULATED			
4									
3	1	*	1011647	68502017501		CONNECTOR, ELECTRICAL (5 PINS)			
2	1		2011331	52386910600		PLATE, CONNECTOR MTG			
1	2		2011900	85386910600		LAMP & TERMINAL BOARD, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .12	± ½

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910590

DRAWN R. BRUNELLE DATE 4-14-64
CHECKED [illegible] 4/30/64 FS
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL [illegible] 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP & HARNESS, ASSY OF

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011913
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011913 B

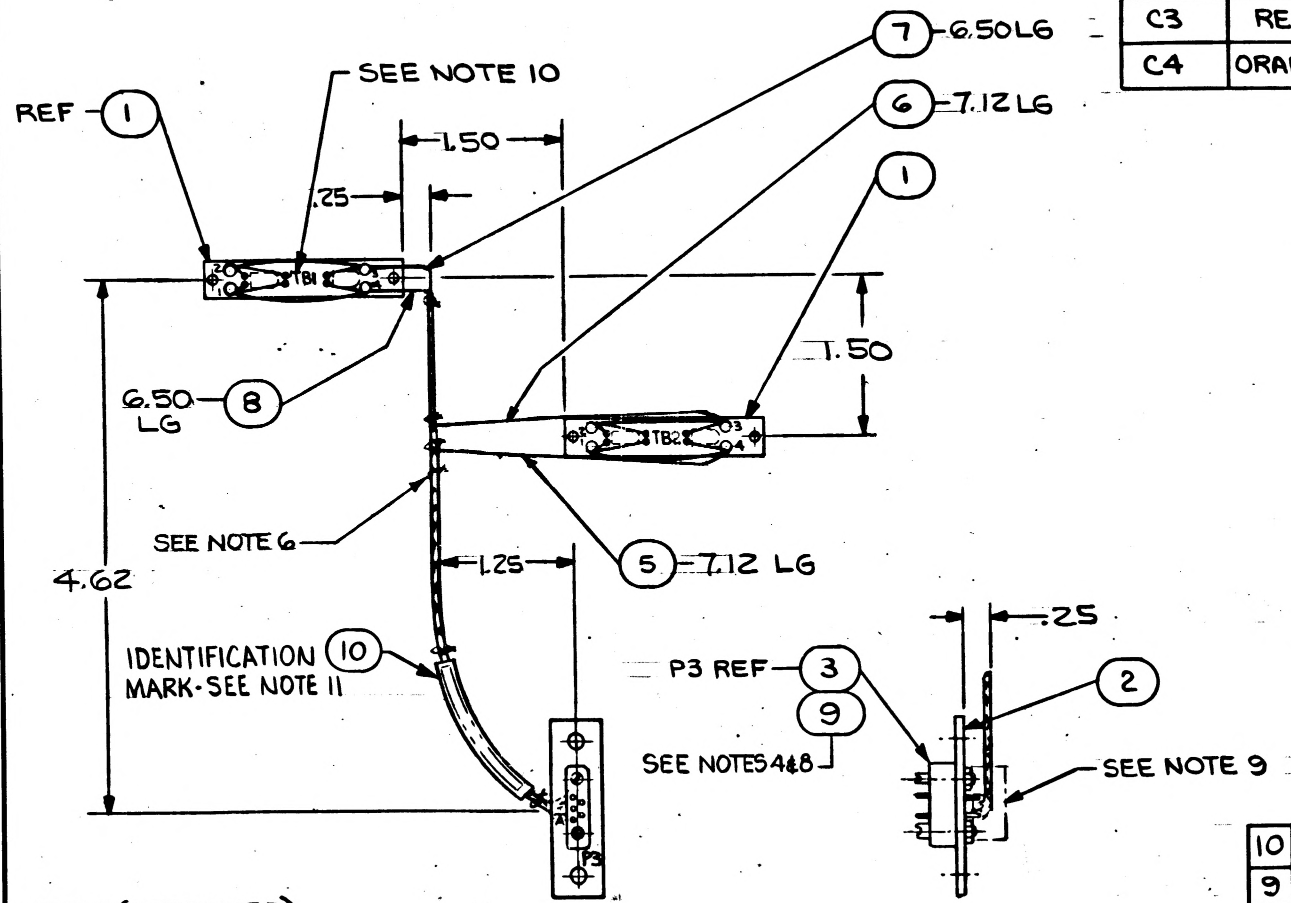
2011913 C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND 1002032

WIRING LEGEND					
COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BROWN	7	P3-C	TB1-3	8
C2	BLACK	8	P3-D	TB1-4	
C3	RED	6	P3-C	TB2-3	8
C4	ORANGE	5	P3-D	TB2-4	

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17093	5/[illegible]/65	WK
B		REVISED PER TDRR NO. 18182	4/27/65	WK
C		REVISED PER TDRR 22639	9/28/65	WK



NOTES (CONTINUED)

7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 9 OVER SOLDERED JOINTS & SHRINK.
9. POT IN ACCORDANCE WITH ND1002240, METHOD 'A' OR 'B'
   - a. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - b. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.02 HIGH IN ACCORDANCE WITH ND1002019.
11. SHRINK ITEM ⑩ AND IDENTIFY ASSY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	1	*	1010490-292	—"—		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
9	2	*	1010490-054	—"—		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
8	1	*	1010416-11	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
7	1	*	1010416-12	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	1	*	1010416-13	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	1	*	1010416-14	—"—		WIRE, ELECTRICAL, STRANDED, INSULATED			
4									
3	1	*	1011647	68502017501		CONNECTOR, ELECTRICAL (5 PINS)			
2	1		2011331	52386910600		PLATE, CONNECTOR MTG			
1	2		2011900	85386910600		LAMP & TERMINAL BOARD, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .12	± ½

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910590

DRAWN R. BRUNELLE DATE 4-14-64
CHECKED [illegible] 4/30/64
APPROVAL F. Ruschmann 7/8/64
APPROVAL [illegible] 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL [illegible] 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP & HARNESS,
ASSY OF

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2011913
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

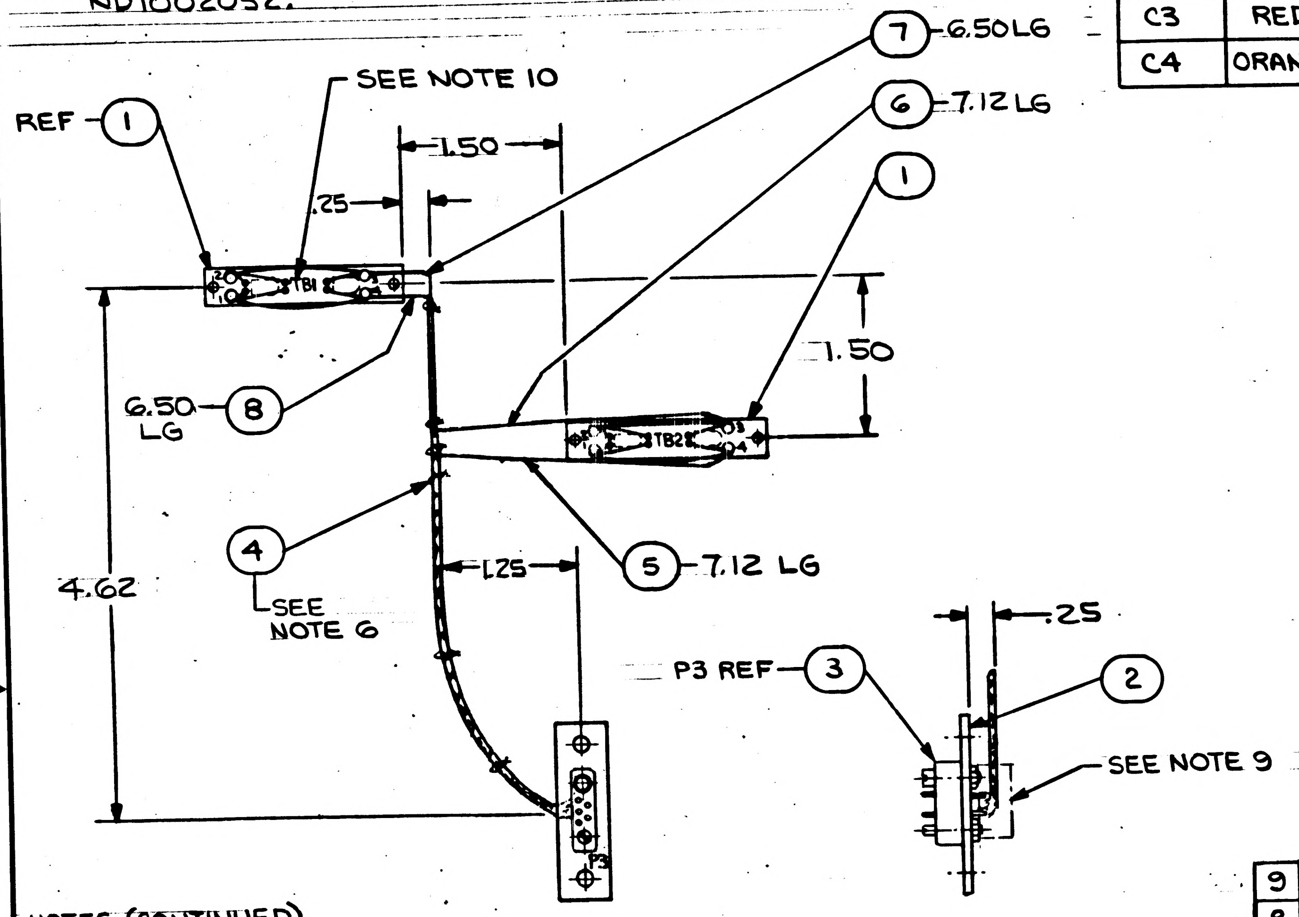
E-154

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2012390.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 9 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRP2, PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 4, IN ACCORDANE WITH ND1002032.

WIRING LEGEND

COND NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
C1	BROWN	7	P3-C	TB1-3	8
C2	BLACK	8	P3-D	TB1-4	
C3	RED	6	P3-C	TB2-3	8
C4	ORANGE	5	P3-D	TB2-4	



NOTES (CONTINUED)
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 9 OVER SOLDERED JOINTS & SHRINK.
9. POT IN ACCORDANCE WITH ND1002009, METHOD C.
   - a. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - b. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.02 HIGH IN ACCORDANCE WITH ND1002019.
11. IDENTIFY USING NASA DWG NO, REVISION LETTER AND MFRS. SYMBOL PER ND 1002019. (TAGGING)

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
9	2	*	1010490-054	—//—		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
8	1	*	1010416-11	—//—		WIRE, ELECTRICAL, STRANDED, INSULATED			
7	1	*	1010416-12	—//—		WIRE, ELECTRICAL, STRANDED, INSULATED			
6	1	*	1010416-13	—//—		WIRE, ELECTRICAL, STRANDED, INSULATED			
5	1	*	1010416-14	—//—		WIRE, ELECTRICAL, STRANDED, INSULATED			
4	AR	*	1011753	—//—		TAPE, LACING & TYING			
3	1	*	1011647	68502017501		CONNECTOR, ELECTRICAL (5 PINS)			
2	1		2011331	52386910600		PLATE, CONNECTOR MTG			
1	2		2011900	85386910600		LAMP & TERMINAL BOARD, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011784	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .12	± ½

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910590

DRAWN R. BRUNELLE DATE 4-14-64
CHECKED [illegible] 4/30/64
APPROVAL F. Ruschmann 7/8/64
APPROVAL E. Dhorup 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL [illegible] 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LAMP & HARNESS,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011913
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

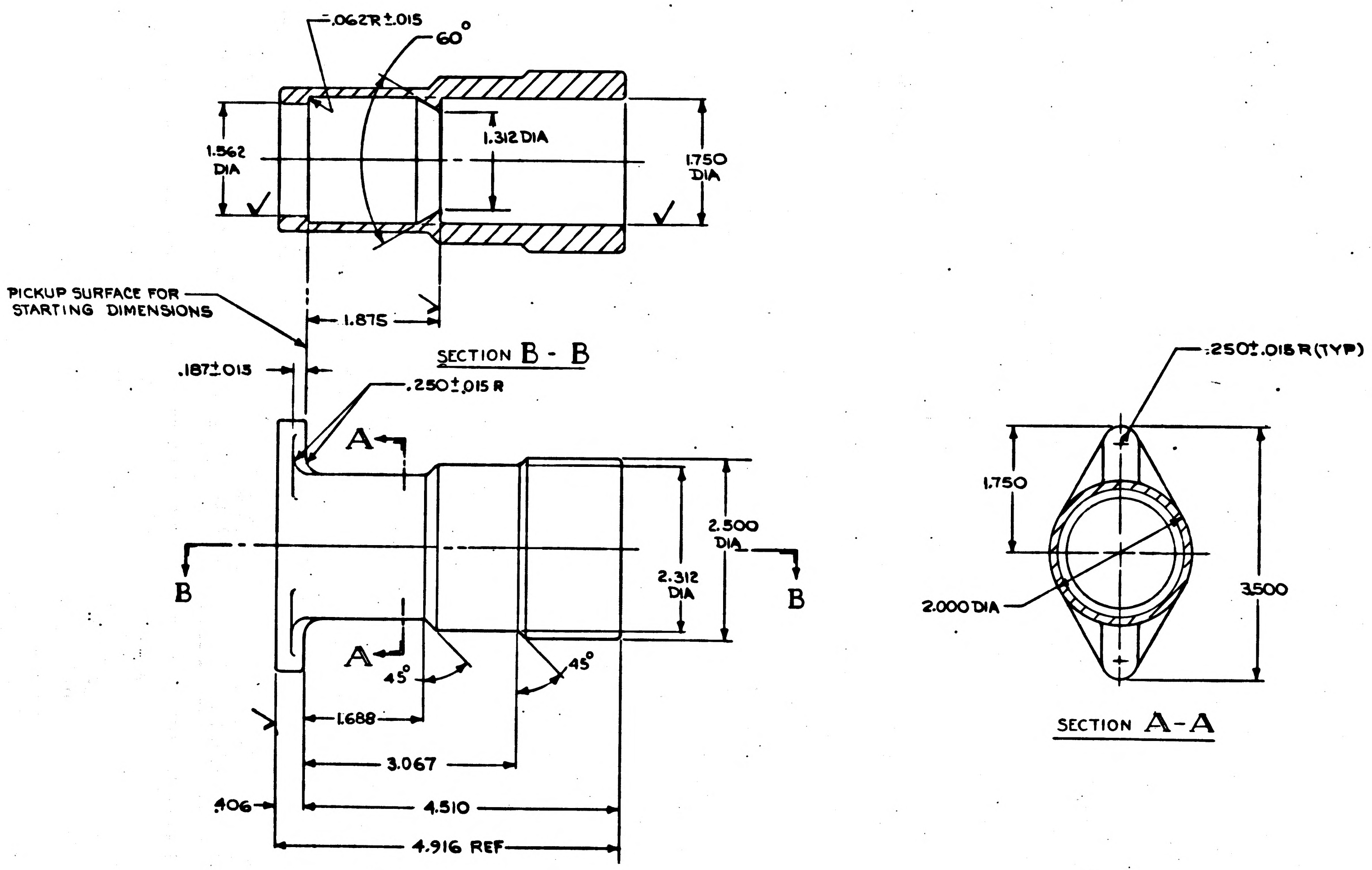
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. MATERIAL: INVESTMENT CASTING ALUMINUM ALLOY. FED. SPEC MIL-C-11866(Ord) ALLOY COMPOSITION NO.2 (356 COMM. DESIGNATION) TEMPER T6.
3. CORNER RADII AND FILLETS .031 R MAX, UNLESS OTHERWISE SPECIFIED.
4. SURFACES MARKED ✓ WILL BE MACHINED. DIMENSIONS INCLUDE ALLOWANCE FOR MACHINING.
5. CASTING TOLERANCE ±.005 INCH/INCH. FOR DIMENSIONS LESS THAN ONE INCH – ±.005.
6. SURFACES NOT MACHINED, TO HAVE A CAST FINISH OF 125 RMS (MAX.).

2011914

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS Tear 10230



.062R±.015
60°
1.562 DIA
1.312 DIA
1.750 DIA
PICKUP SURFACE FOR STARTING DIMENSIONS
1.875
SECTION B - B
.187±.015
.250±.015 R
A
A
B
B
2.500 DIA
2.312 DIA
45°
45°
1.688
3.067
.406
4.510
4.916 REF
.250±.015R (TYP)
1.750
2.000 DIA
3.500
SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011561	
2011915	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 2
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 21386910020
DRAWN DATE 4-10-64
CHECKED 6/1/64
APPROVAL 6/3/64
APPROVAL E. Morup 6/12/64
NASA APPROVAL
MIT APPROVAL 6/10/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, EYEPIECE, SCT
(CASTING)

CODE IDENT NO.
SIZE D
NASA NUMBER 2011914
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011914

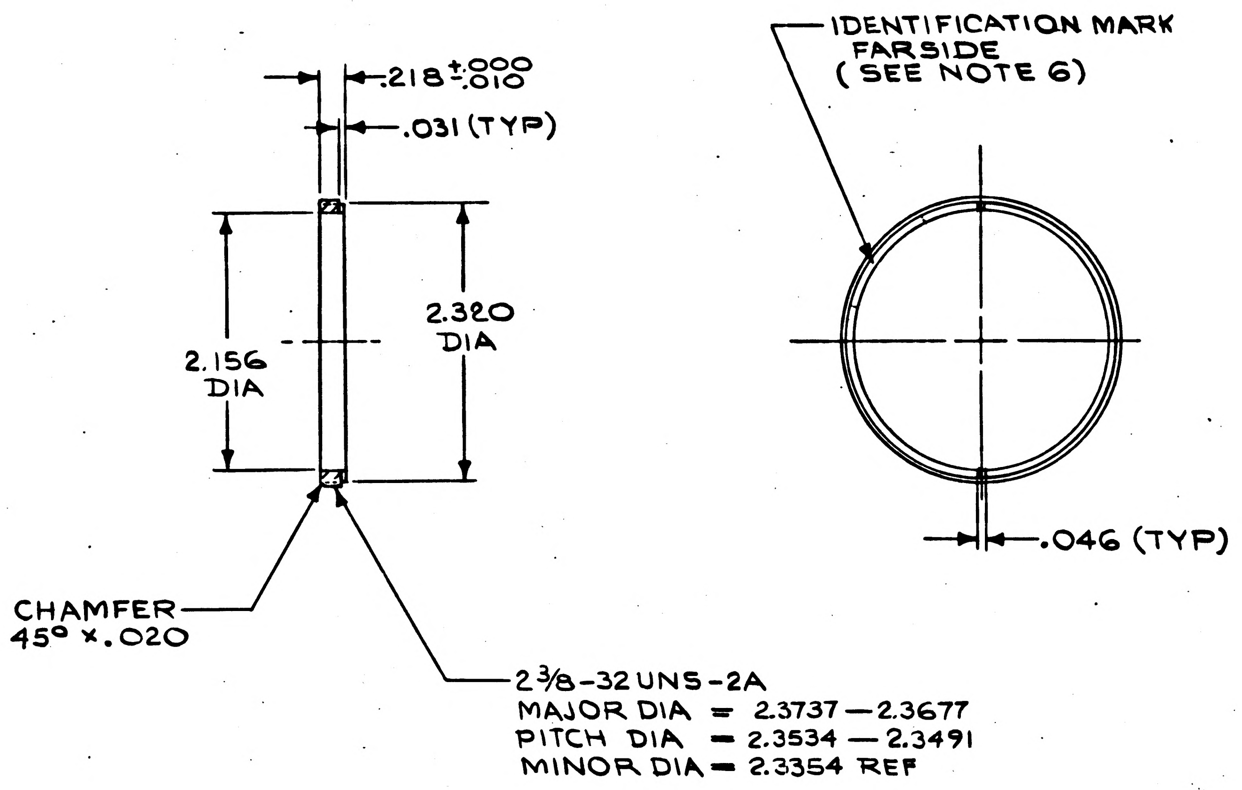
MASTER

2011916

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TORR 09890

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



.218 +.000 -.010
.031 (TYP)
2.320 DIA
2.156 DIA
CHAMFER 45° x .020
2 3/8-32 UNS-2A
MAJOR DIA = 2.3737—2.3677
PITCH DIA = 2.3534—2.3491
MINOR DIA = 2.3354 REF
IDENTIFICATION MARK FARSIDE (SEE NOTE 6)
.046 (TYP)

2011916

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011788	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY TUBING 2½ O.D. × .250 WALL FED. SPEC WW-T-789 TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910820

DRAWN DATE 4-10-64
CHECKED 5/27/64
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011916

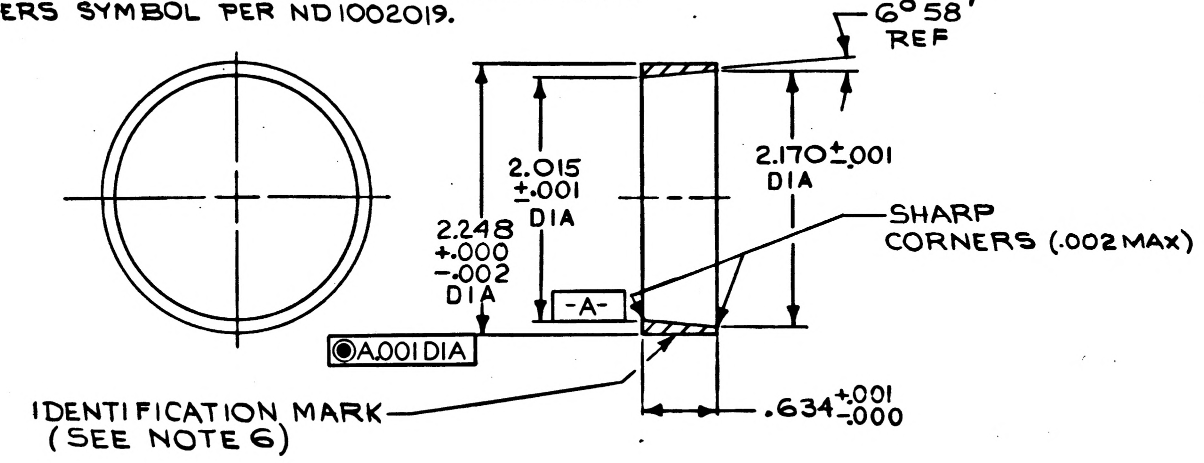
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011917

REVISIONS TDRR 09890			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG. IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625, TYPE II BLACK (KPS 1005A.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011788	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± —

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY TUBING, 2½ O.D. x .250 WALL FED. SPEC WW-T-789 TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910820

DRAWN F Schiller DATE 4-10-64
CHECKED 5/27/64
APPROVAL Ruhlmann 5-29-64
APPROVAL E. Thorup 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER, LENS

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2011917
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

MASTER

K+E E-153

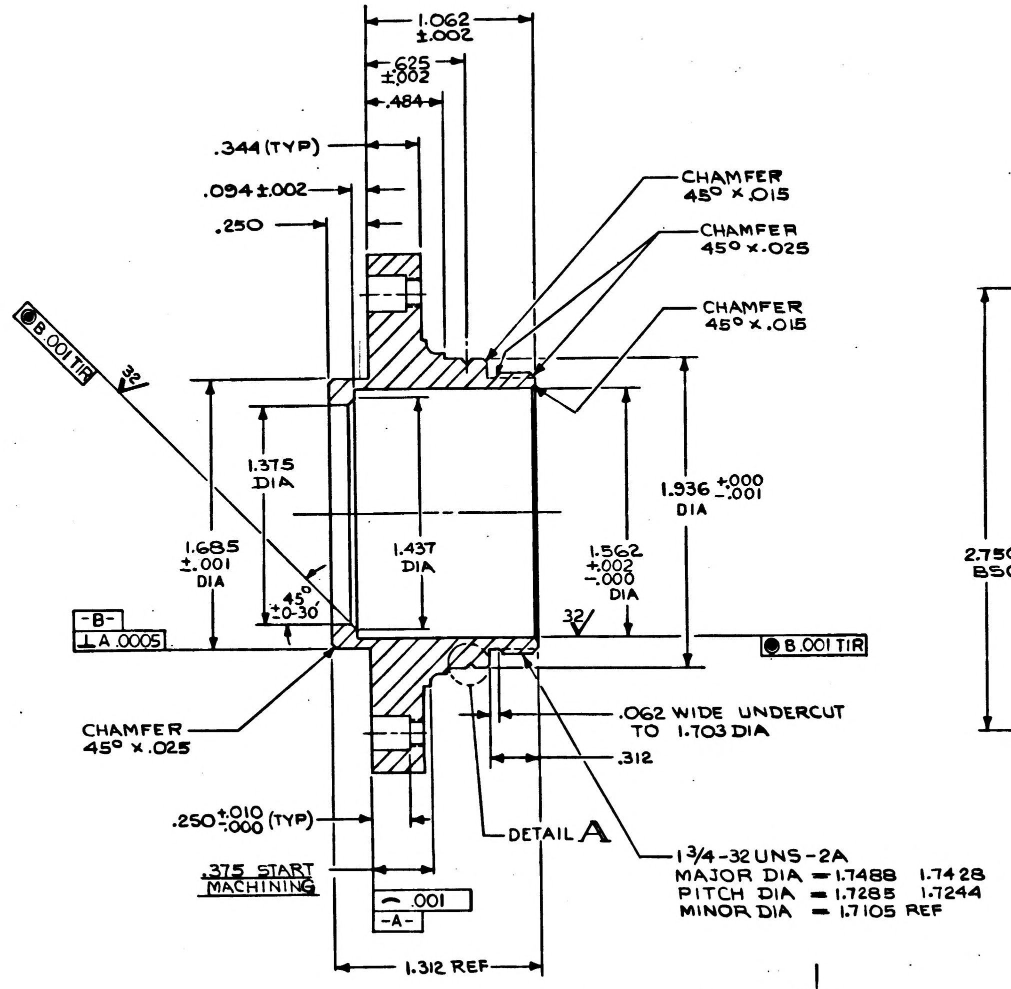
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011926

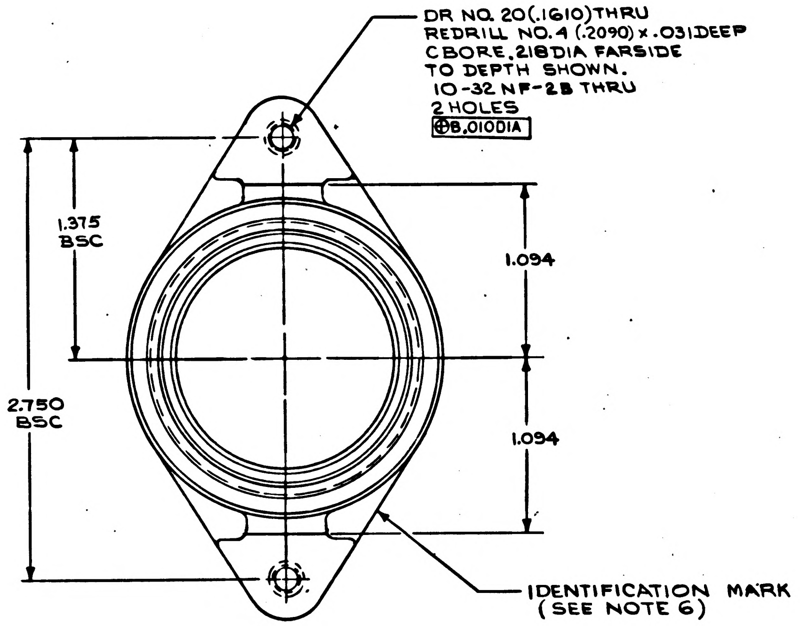
REVISIONS TDRM 07E90

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

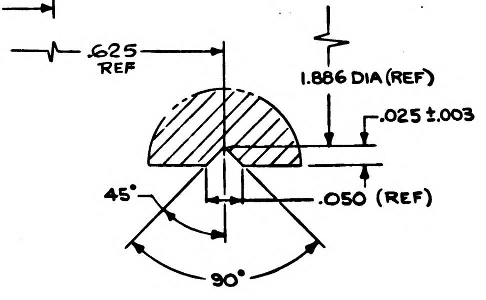
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ON ALL MACHINED SURFACES
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201).
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



1.062 ±.002
.625 ±.002
.484
.344 (TYP)
.094 ±.002
.250
CHAMFER 45° × .015
CHAMFER 45° × .025
CHAMFER 45° × .015
B .001 TIR
32
1.375 DIA
1.685 ±.001 DIA
45° ±0-30
1.437 DIA
1.936 +.000 -.001 DIA
1.562 +.002 -.000 DIA
-B-
⊥ A .0005
32
B .001 TIR
CHAMFER 45° × .025
.062 WIDE UNDERCUT TO 1.703 DIA
.312
.250 +.010 -.000 (TYP)
DETAIL A
.375 START MACHINING
⌒ .001
-A-
1.312 REF
1 3/4-32 UNS-2A
MAJOR DIA = 1.7488 1.7428
PITCH DIA = 1.7285 1.7244
MINOR DIA = 1.7105 REF

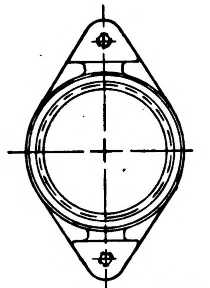


DR NO. 20 (.1610) THRU
REDRILL NO. 4 (.2090) × .031 DEEP
CBORE, .218 DIA FARSIDE
TO DEPTH SHOWN.
10-32 NF-2B THRU
2 HOLES
⊕ B .010 DIA
1.375 BSC
2.750 BSC
1.094
1.094
IDENTIFICATION MARK (SEE NOTE 6)



.625 REF
1.886 DIA (REF)
.025 ±.003
45°
.050 (REF)
90°

DETAIL A
SCALE 10/1



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011787	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011925

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910060

DRAWN E-DRAPALA DATE 4-13-64
CHECKED 5/20/64
APPROVAL 5/28/65
APPROVAL E. Thomas 6/2/64
NASA APPROVAL 6/1/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, LONG EYE RELIEF
EYEPIECE (SEXTANT)

CODE IDENT NO. SIZE D NASA NUMBER 2011926

SCALE 2/1 & 10/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

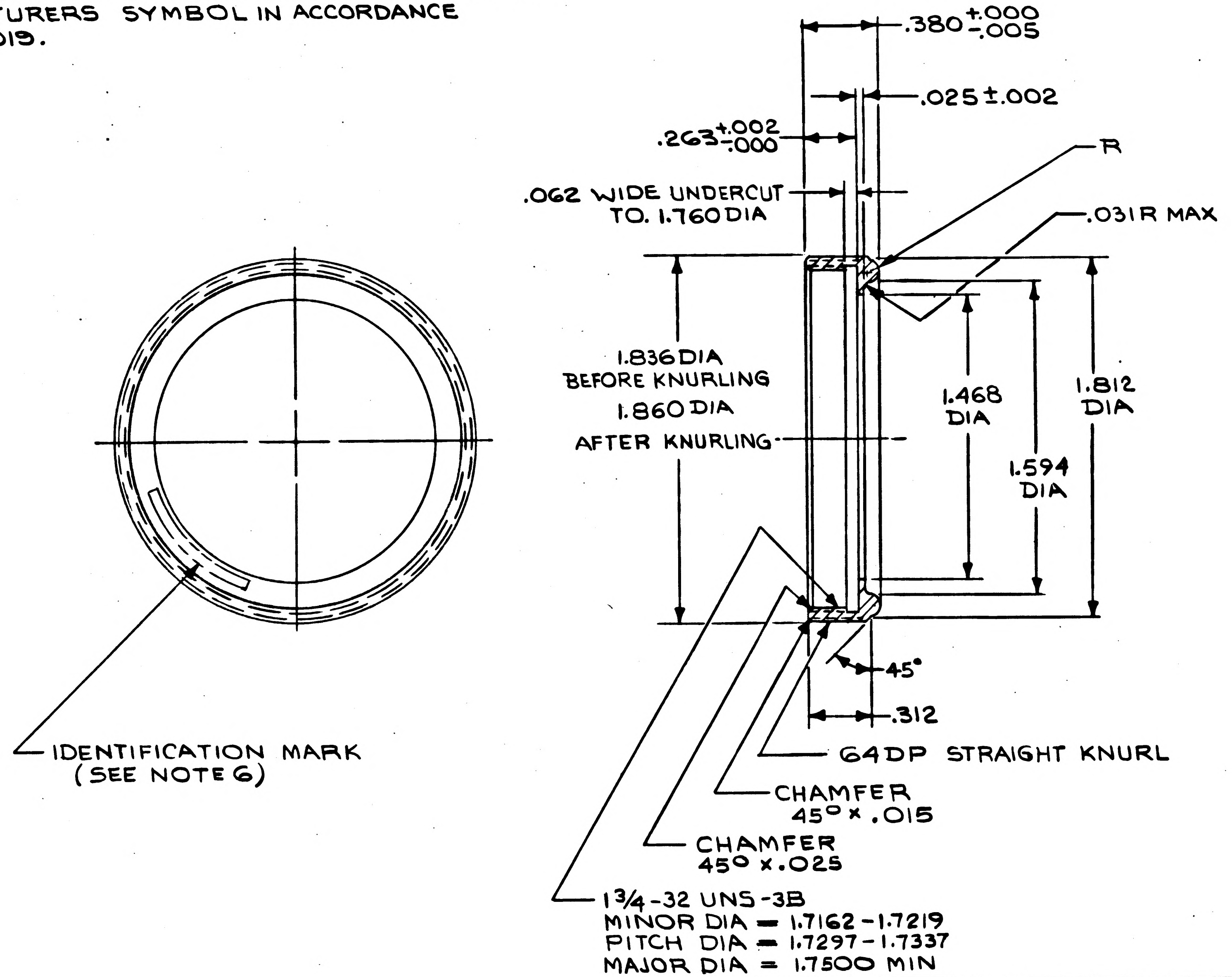
2011926

INCHES
PHOTOGRAPHIC SCALE ONLY

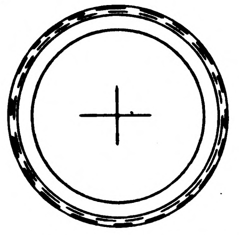
2011927

REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED: $\overset{63}{\surd}$ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625. TYPE II BLACK (KPS-1005A.201).
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.



.380 +.000 −.005
.025 ±.002
.263 +.002 −.000
R
.031R MAX
.062 WIDE UNDERCUT TO. 1.760 DIA
1.836 DIA BEFORE KNURLING
1.860 DIA AFTER KNURLING
1.468 DIA
1.812 DIA
1.594 DIA
45°
.312
64DP STRAIGHT KNURL
CHAMFER 45° x .015
CHAMFER 45° x .025
1 3/4-32 UNS-3B
MINOR DIA = 1.7162-1.7219
PITCH DIA = 1.7297-1.7337
MAJOR DIA = 1.7500 MIN
IDENTIFICATION MARK (SEE NOTE 6)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011787	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-268 TEMPER T4
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910920
DRAWN E. DRAPALA DATE 4-14-6
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011927
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011927

MASTER

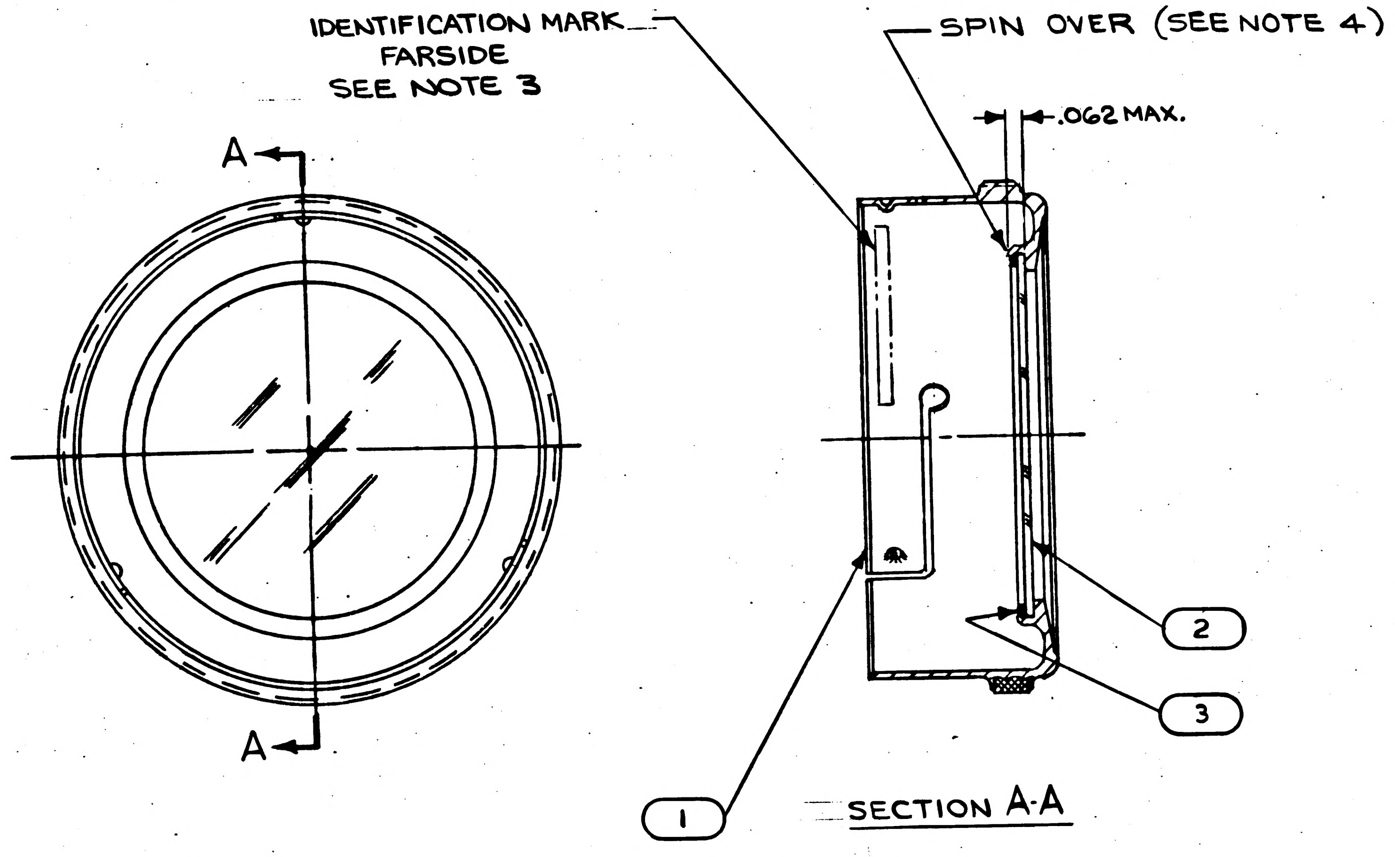
INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

2011931

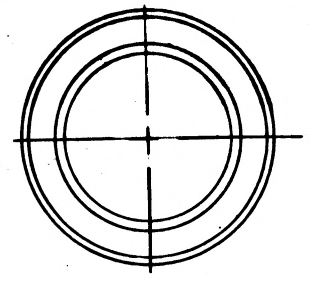
REVISIONS TDRR 11491

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
4. RE-FINISH IF NECESSARY. (BLACKEN PER MIL-C-13924, CLASS 3, REF).



SECTION A-A



ACTUAL SIZE

*-PURCHASE ITEM: SEE SOURCE CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		2011956	57386910900	–	SPACER . FILTER			
2	1	*	1011923	25386900080		POLARIZATION FILTER			
1	1		2011957	57386910910	–	RETAINER , FILTER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011787	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ___	± ___	± ___

DO NOT SCALE THIS DRAWING

MATERIAL ___

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910710

DRAWN E.DRAPALA DATE 4-13-64
CHECKED 5/6/64
APPROVAL 7/27/64
APPROVAL E. Dhorup 8/7/64
NASA APPROVAL 8/14/64
MIT APPROVAL 8/12/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER AND FILTER,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011931
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011931

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 2011933

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 16909	2/26/65	WE

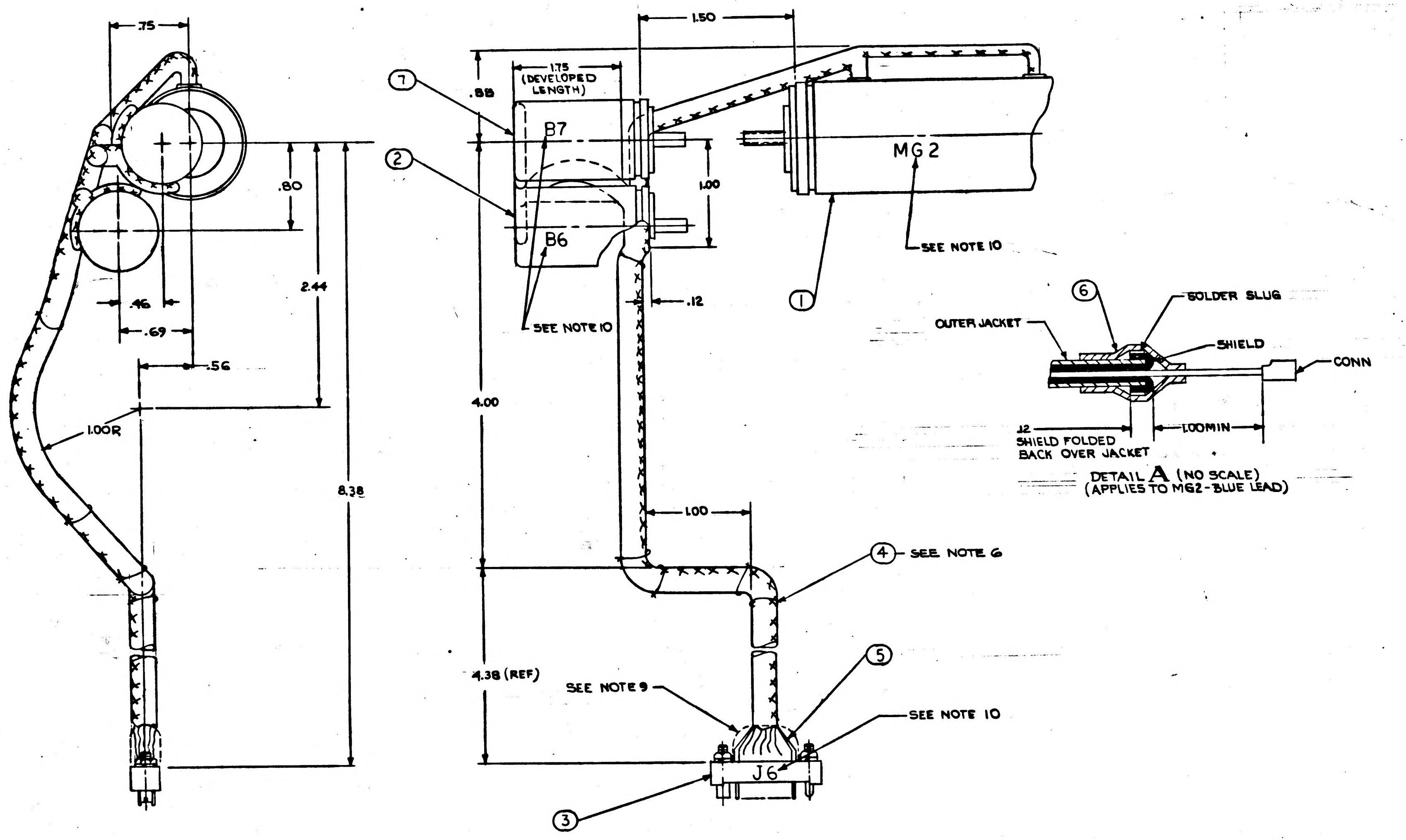
REVISIONS 12217

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC. NASA DRAWING NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, WITH SN60 WRP2 PER QQ-S-571 PER MSFC-PROC-158
6. LACE CONDUCTORS USING ITEM 4 IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002009, METHOD C
   a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12 ± .02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	

SEE DETAIL A



DETAIL A (NO SCALE)
(APPLIES TO MG2-BLUE LEAD)

REPLACED WITH CHANGES
BY REV "B"

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010428	—		RESOLVER, RECEIVER, ½ SPEED (B7)			
6	1	*	1010402-2	—		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
5	24	*	1010490-060	—		INSULATION-SLEEVING: ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	—		TAPE, LACING & TYING			
3	1	*	1000117	—		CONNECTOR, ELECTRICAL (J6)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B6)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910020
DRAWN E. DRAPALA DATE [illegible]
CHECKED T. SULLIVAN 7-23-64
APPROVAL [illegible] 7/ 1/64
APPROVAL [illegible] 7-28-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT SHAFT DRIVE HARNESS
ASSY OF

CODE IDENT NO.
SIZE E
NASA NUMBER 2011933
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

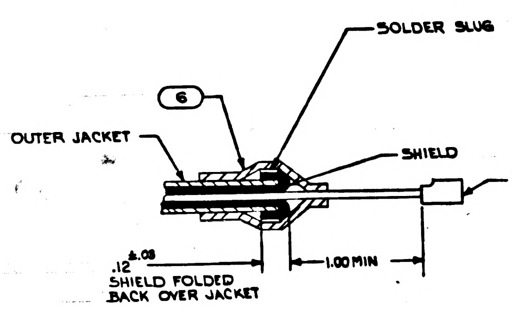
MASTER

E-109

2011933 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER TDRR 6904	2/4/65	K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC NASA DRAWING NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, PER ND1002071.
6. LACE CONDUCTORS PER ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT PER ND1002240, METHOD 'A' OR 'B'
   a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)

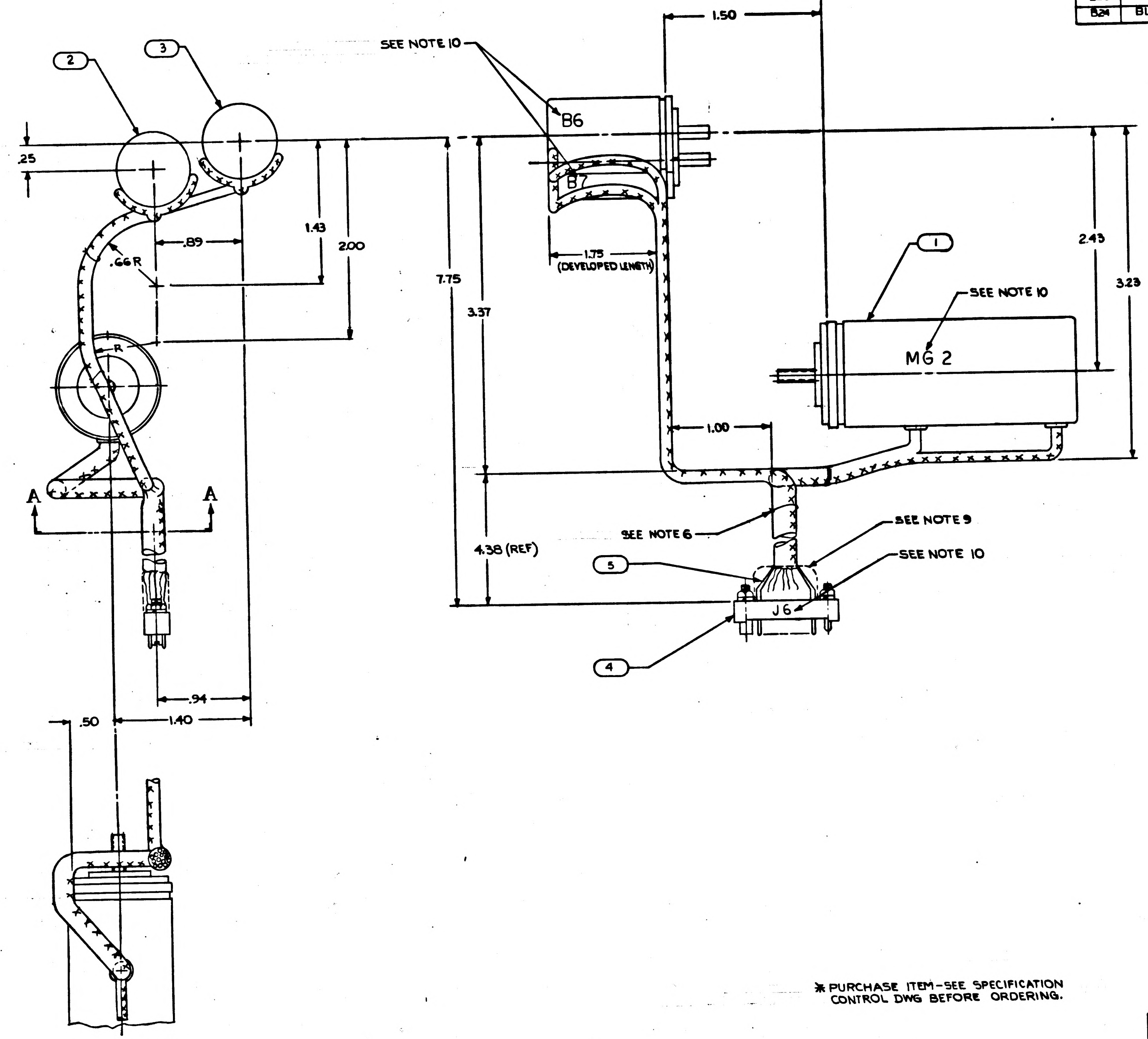


DETAIL A (NO SCALE)
(APPLIES TO MG2-BLUE LEAD)

SEE DETAIL A

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	



REPLACES REV A WITH CHANGES

✱ PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	✱	1010402-2	—		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
5	24	✱	1010490-060	—		INSULATION-SLEEVING: ELECTRICAL, HEAT SHRINKABLE			
4	1	✱	1000117-001	—		CONNECTOR, ELECTRICAL (J6)			
3	1	✱	1012157	—		RESOLVER, RECEIVER ONE SPEED (B6)			
2	1	✱	1010428			RESOLVER, TRANSMITTER ½ SPEED (B7)			
1	1	✱	1012156-1			SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
201705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910020
DRAWN E. DRAPALA DATE 11-12-64
CHECKED P. A. Leone 1-26-65
APPROVAL 1-26-65
APPROVAL
NASA APPROVAL W. J. Rhine 2-26-65
MIT APPROVAL 24 FEB 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

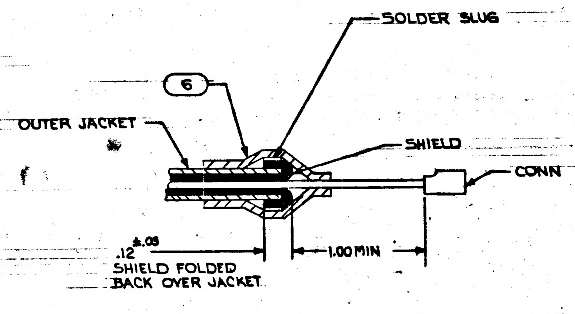
TITLE
SXT SHAFT DRIVE HARNESS.
ASSY OF

CODE IDENT NO.
SIZE E
NASA NUMBER 2011933
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011933 C

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS				
B		REVISED PER TDRR 16504	2/26/65	WK
C		REVISED PER TDRR 18177	[illegible]	WK

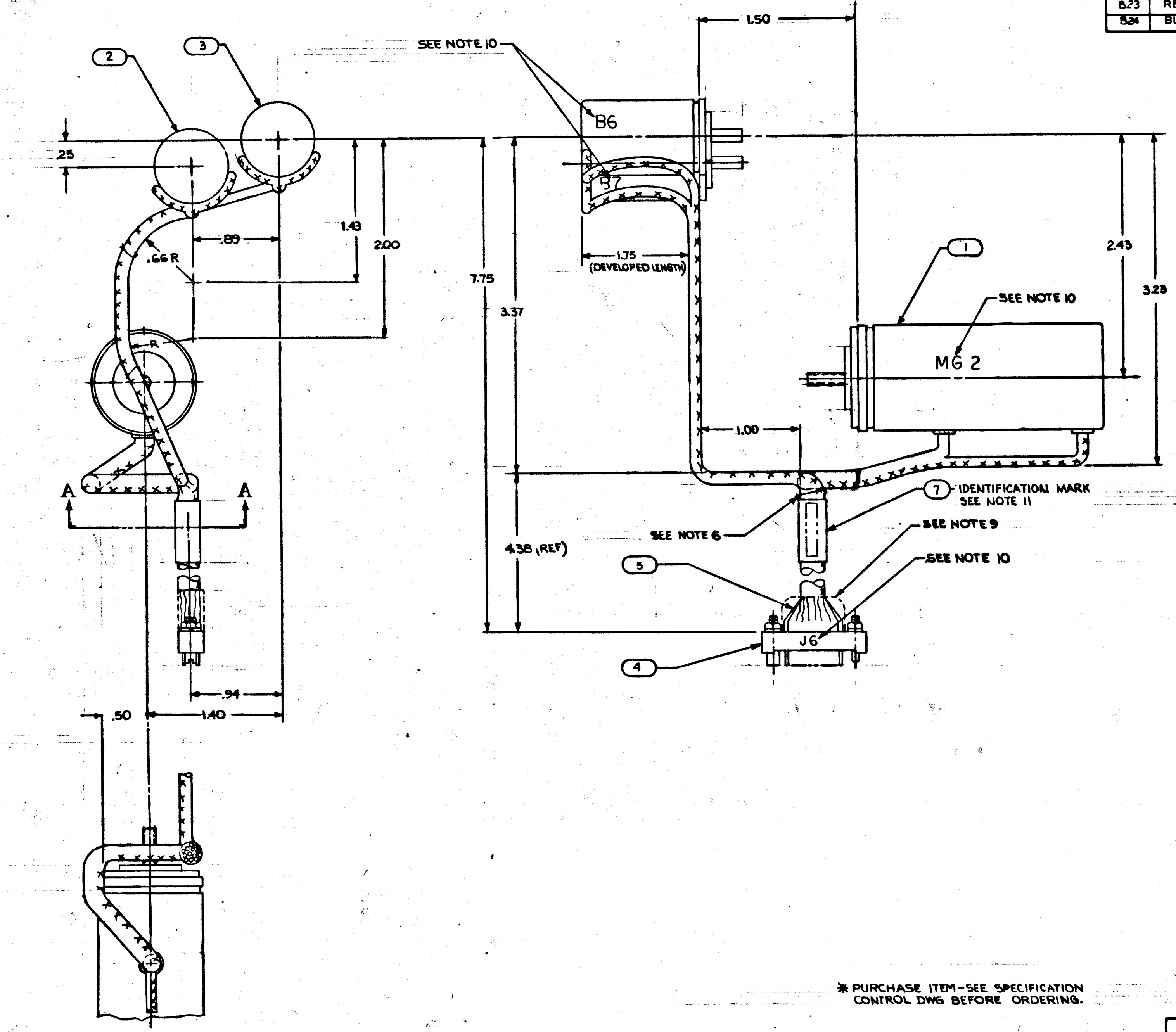
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC NASA DRAWING NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, PER ND1002071.
6. LACE CONDUCTORS PER ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT PER ND1002240, METHOD 'A' OR 'B'
   a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12 ± .02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. SHRINK ITEM 7 AND IDENTIFY ASSY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



DETAIL A (NO SCALE)
(APPLIES TO MG2-BLUE LEAD)

SEE DETAIL A

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
WIRING LEGEND					
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	



PARTIAL VIEW A-A

REPLACES REV A WITH CHANGES

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010490-284	——		INSULATION, SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
6	1	*	1010402-1	——		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
5	24	*	1010490-060	——		INSULATION-SLEEVING: ELECTRICAL, HEAT SHRINKABLE			
4	1	*	1000117-001	——		CONNECTOR, ELECTRICAL (J6)			
3	1	*	1012157	——		RESOLVER, RECEIVER ONE SPEED (B6)			
2	1	*	1010428			RESOLVER, TRANSMITTER ½ SPEED (B7)			
1	1	*	1012156-1			SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910020
DRAWN [illegible] DATE 11-12-64
CHECKED P. G. [illegible] 1-26-65
APPROVAL [illegible] 1-26-65
APPROVAL
NASA APPROVAL W. J. [illegible] 2-26-65
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT SHAFT DRIVE HARNESS, ASSY OF

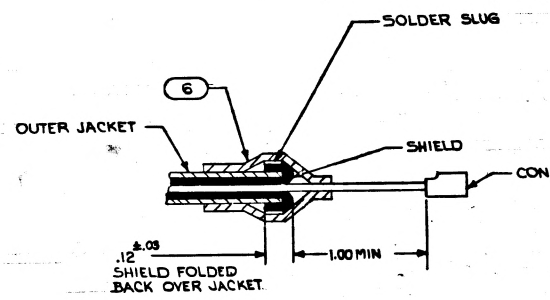
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011933
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

D 2011933

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, PER ND1002071.
6. LACE CONDUCTORS PER ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT PER ND1002240, METHOD 'A' OR 'B'
 a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
 b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11 SHRINK ITEM 7 AND IDENTIFY ASSY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.

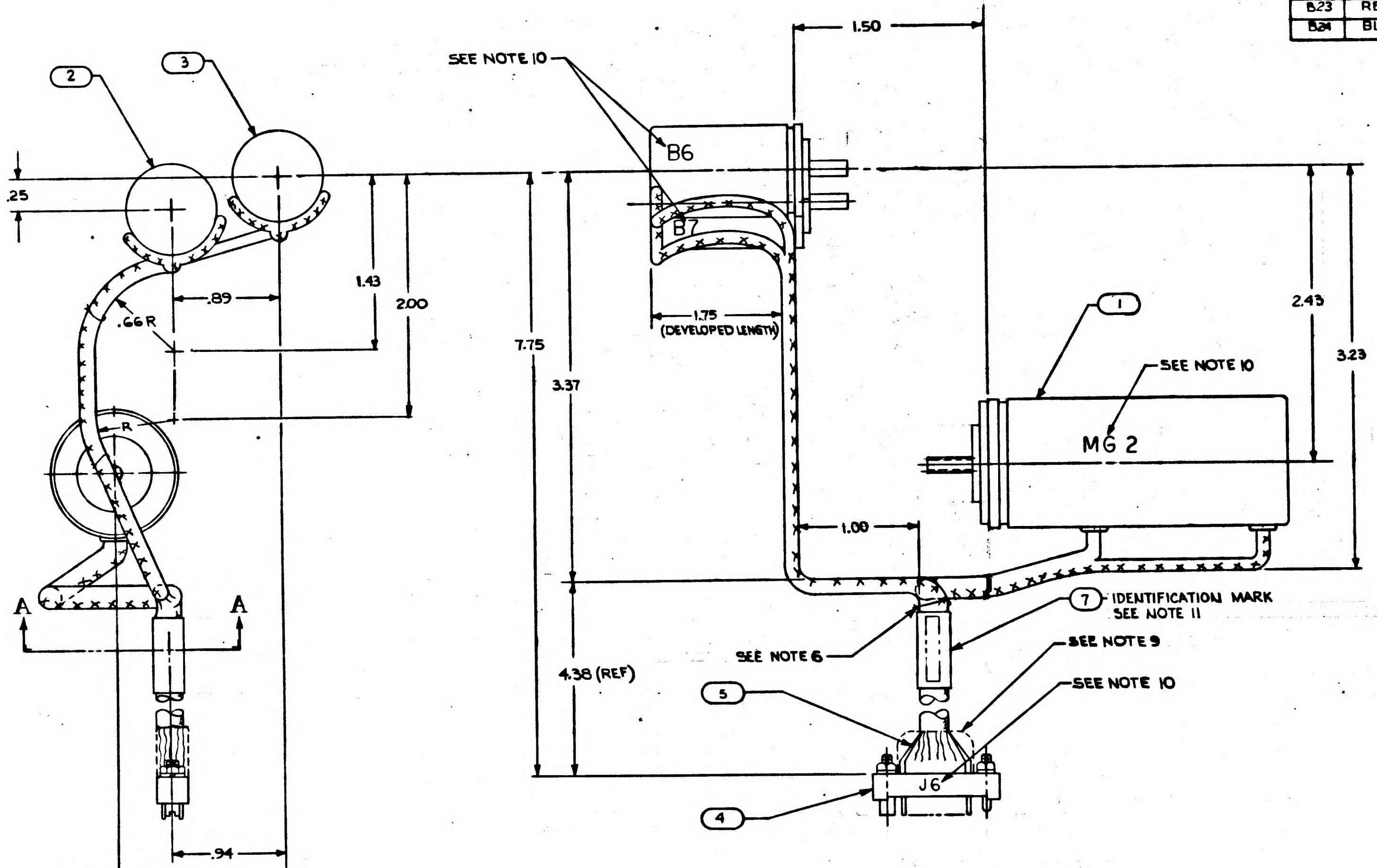
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER TDRR 16509	2/26/65	WK
C		REVISED PER TDRR 18177	4/2/65	WK
D		REVISED PER TDRR 25247	6/8/66	WK

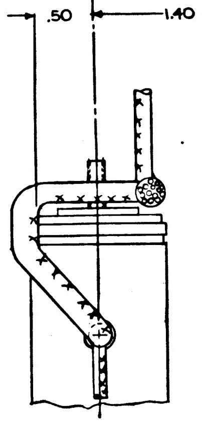


DETAIL **A** (NO SCALE)
(APPLIES TO MG2-BLUE LEAD)

SEE DETAIL **A**

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	





PARTIAL VIEW A-A

REPLACES REV A WITH CHANGES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010430-284	—		INSULATION, SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
6	1	*	1010402-1	—		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
5	24	*	1010490-060	—		INSULATION-SLEEVING: ELECTRICAL, HEAT SHRINKABLE			
4	1	*	1000117-001	—		CONNECTOR, ELECTRICAL (J6)			
3	1	*	1012157	—		RESOLVER, RECEIVER ONE SPEED (B6)			
2	1	*	1010428			RESOLVER, TRANSMITTER ½ SPEED (B7)			
1	1	*	1012156-1			SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± .12 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910020
DRAWN E. DRAPALA DATE 11-12-64
CHECKED P. A. Leone 1-26-65
APPROVAL
APPROVAL
NASA APPROVAL W. J. Rhine 2-26-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
SXT SHAFT DRIVE HARNESS. ASSY OF
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011933
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

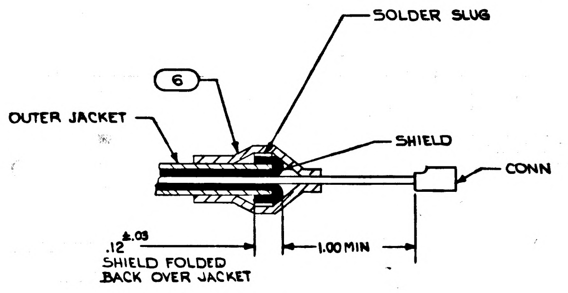
MASTER

2011933 E

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. FOR WIRING SCHEMATIC REFER TO TABLE I (SCHEMATIC REF) ON 2011000.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, PER ND1002071.
6. LACE CONDUCTORS PER ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT PER ND1002240, METHOD 'A' OR 'B'
   a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. SHRINK ITEM 7 AND IDENTIFY ASSY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
B		REVISED PER TDRR 16509	2/26/65	WK
C		REVISED PER TDRR 18177	4/26/65	WK
D		REVISED PER TDRR 25247	1/18/66	WK
E		REVISED PER TDRR 32830	1-27-67	

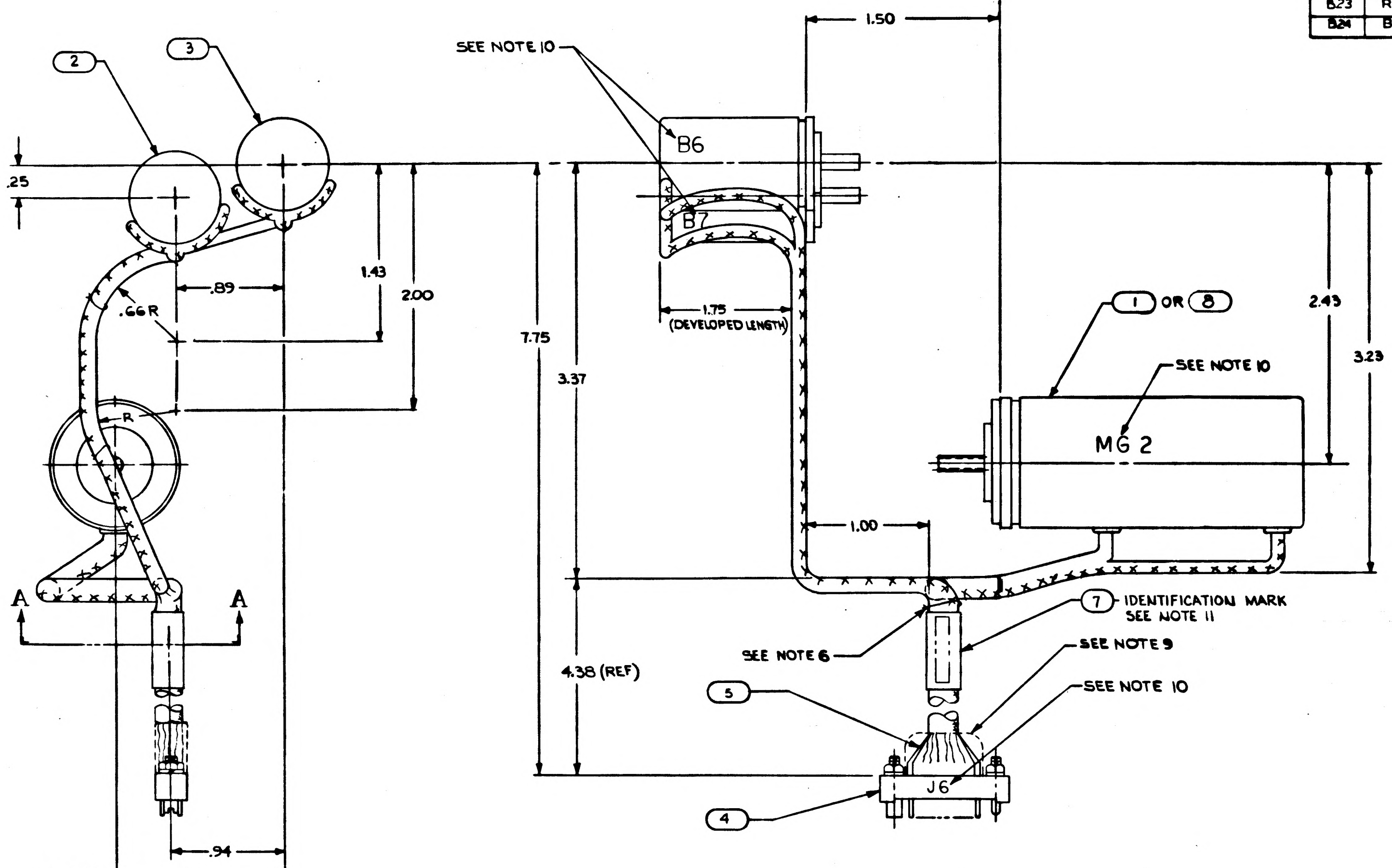


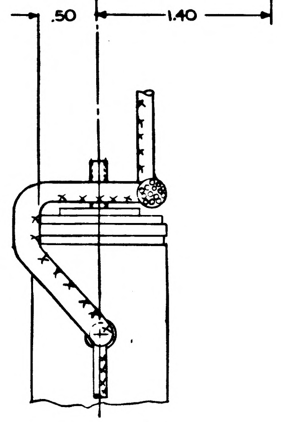
DETAIL A (NO SCALE)
(APPLIES TO MG2-BLUE LEAD)

SEE DETAIL A

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	





PARTIAL VIEW A-A

REPLACES REV A WITH CHANGES

LIST OF PARTS AND MATERIALS

QTY REQD 011	QTY REQD 000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	8		*	1012156-4			SERVOMOTOR-TACHOMETER, GEN			
1	1	7	1	*	1010490-284	—		INSULATION, SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
1	1	6	1	*	1010402-1	—		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
24	24	5	24	*	1010490-060	—		INSULATION-SLEEVING: ELECTRICAL, HEAT SHRINKABLE			
1	1	4	1	*	1000117-001	—		CONNECTOR, ELECTRICAL (J6)			
		3	1	*	1012157	—		RESOLVER, RECEIVER ONE SPEED (B6)			
1	1	2	1	*	1010428			RESOLVER, TRANSMITTER ½ SPEED (B7)			
0	1	1	1	*	1012156-1			SERVO MOTOR-TACHOMETER, GENERATOR			

* PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910020
DRAWN E. DRAPALA DATE 11-12-64
CHECKED P. G. Leone 1-26-65
APPROVAL 1-26-65
APPROVAL
NASA APPROVAL W. J. Rhine 2-26-65
MIT APPROVAL 26 Feb 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT SHAFT DRIVE HARNESS.
ASSY OF

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2011933
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011933 E

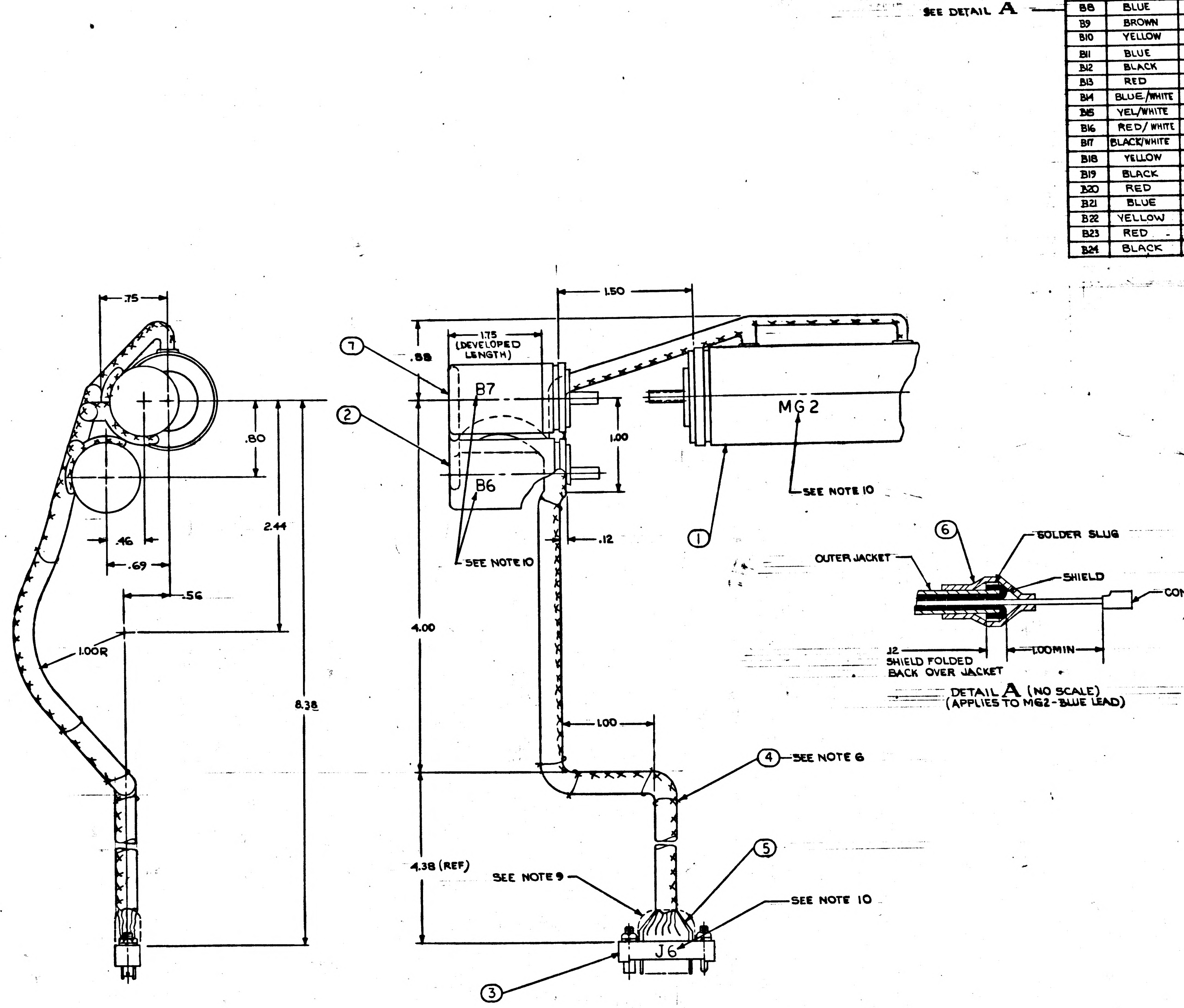
2011933

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC. NASA DRAWING NO. 2012391.
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS PER WIRING LEGEND, WITH Sn60WRP2. PER QQ-S-571. PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 4. IN ACCORDANCE WITH ND1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND1002009. METHOD C.
   a) POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   b) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REF. DESIGNATIONS .12 ± .02 INCH HIGH IN ACCORDANCE WITH ND1002019.
11. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	WHITE		MG2-WHITE	J6-A	8
B2	YELLOW		MG2-YELLOW	J6-D	
B3	RED		MG2-RED	J6-B	8
B4	RED/BLACK		MG2-RED/BLACK	J6-C	
B5	BLACK		MG2-BLACK	J6-F	
B6	ORANGE		MG2-ORANGE	J6-H	8
B7	GRAY		MG2-GRAY	J6-L	
B8	BLUE		MG2-BLUE	J6-J	8
B9	BROWN		MG2-BROWN	J6-M	
B10	YELLOW		B6-P2	J6-K	8
B11	BLUE		B6-P4	J6-N	
B12	BLACK		B6-P3	J6-P	8
B13	RED		B6-P1	J6-T	
B14	BLUE/WHITE		B6-S4	J6-R	8
B15	YEL/WHITE		B6-S2	J6-U	
B16	RED/WHITE		B6-S1	J6-S	8
B17	BLACK/WHITE		B6-S3	J6-V	
B18	YELLOW		B7-P2	J6-W	8
B19	BLACK		B7-P3	J6-X	
B20	RED		B7-P1	J6-Y	
B21	BLUE		B7-S4	J6-c	8
B22	YELLOW		B7-S2	J6-f	
B23	RED		B7-S1	J6-e	8
B24	BLACK		B7-S3	J6-h	



SEE DETAIL A
.75
1.75 (DEVELOPED LENGTH)
1.50
.88
⑦
②
B7
B6
MG2
.80
1.00
2.44
.46
.69
.56
.12
SEE NOTE 10
SEE NOTE 10
SEE NOTE 10
①
1.00R
4.00
8.38
1.00
④ SEE NOTE 6
⑤
4.38 (REF)
SEE NOTE 9
J6
③
⑥
SOLDER SLUG
OUTER JACKET
SHIELD
CONN
.12 SHIELD FOLDED BACK OVER JACKET
1.00 MIN
DETAIL A (NO SCALE) (APPLIES TO MG2-BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010428	—		RESOLVER, RECEIVER, ½ SPEED (B7)			
6	1	*	1010402-2	—		SLEEVE SOLDER ELECT. COND INSUL., HEAT SHRINKABLE			
5	24	*	1010490-060	—		INSULATION-SLEEVING; ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	—		TAPE, LACING AND TYING			
3	1	*	1000117	—		CONNECTOR, ELECTRICAL (J6)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B6)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

*PURCHASE ITEM-SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK
KIC PN 80386910020
DRAWN [illegible] DATE [illegible]
CHECKED T. SULLIVAN 7-23-64
APPROVAL [illegible] 7/23/64
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SXT SHAFT DRIVE HARNESS
ASSY OF

CODE IDENT NO. | SIZE E | NASA NUMBER 2011933
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

2011934 A

NOTES:

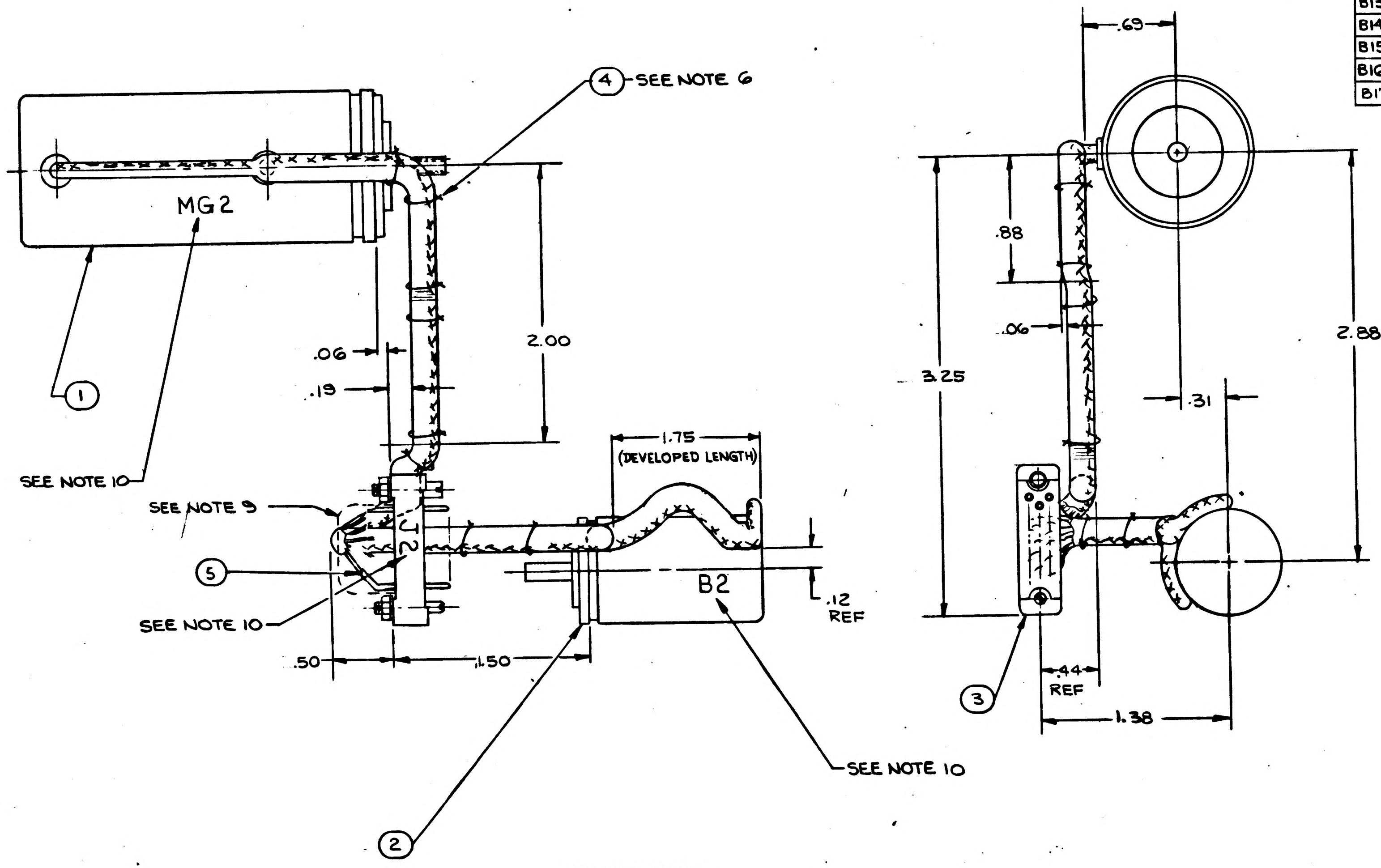
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND, WITH Sn 60WRP2 PER QQ-S-571, PER MSFC-PROC-158
6. LACE CONNECTORS, USING ITEM 4 IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002009, METHOD C.
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH
10. MARK REFERENCE DESIGNATIONS .12 ± .02 INCH HIGH IN ACCORDANCE WITH ND 1002019
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

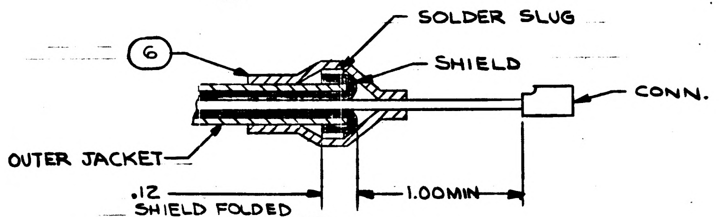
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 14295	11/13/64	WK

TDRR 12119

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	YELLOW		MG2-YELLOW	J2-B	8
B2	WHITE		MG2-WHITE	J2-A	
B3	RED		MG2-RED	J2-C	8
B4	RED-BLACK		MG2-RED-BLK	J2-D	
B5	BLACK		MG2-BLACK	J2-E	
B6	ORANGE		MG2-ORANGE	J2-F	8
B7	GRAY		MG2-GRAY	J2-H	
B8	BLUE		MG2-BLUE	J2-J	8
B9	BROWN		MG2-BROWN	J2-K	
B10	RED-WHITE		B2-S1	J2-P	8
B11	BLACK-WHITE		B2-S3	J2-M	
B12	YELLOW-WHITE		B2-S2	J2-N	8
B13	BLUE-WHITE		B2-S4	J2-L	
B14	BLACK		B2-P3	J2-R	8
B15	RED		B2-P1	J2-S	
B16	YELLOW		B2-P2	J2-T	8
B17	BLUE		B2-P4	J2-U	





DETAIL "A" (NO SCALE)
(APPLIES TO MG2 BLUE LEAD)

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	*	1010402-2	—		SLEEVE, SOLDER, ELECTRICAL CONDUCTOR INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	—		TAPE, LACING & TYING			
3	1	*	1011740-1	68502016801		CONNECTOR, ELECTRICAL (J2)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B2)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910010
DRAWN E. DRAPALA DATE 4-6-64
CHECKED T. SULLIVAN 7-29-64
APPROVAL G. Rudman 7-29-64
APPROVAL E. Moray 8/25/64
NASA APPROVAL
MIT APPROVAL W Kyp 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT SHAFT DRIVE HARNESS, ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011934
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011934 B

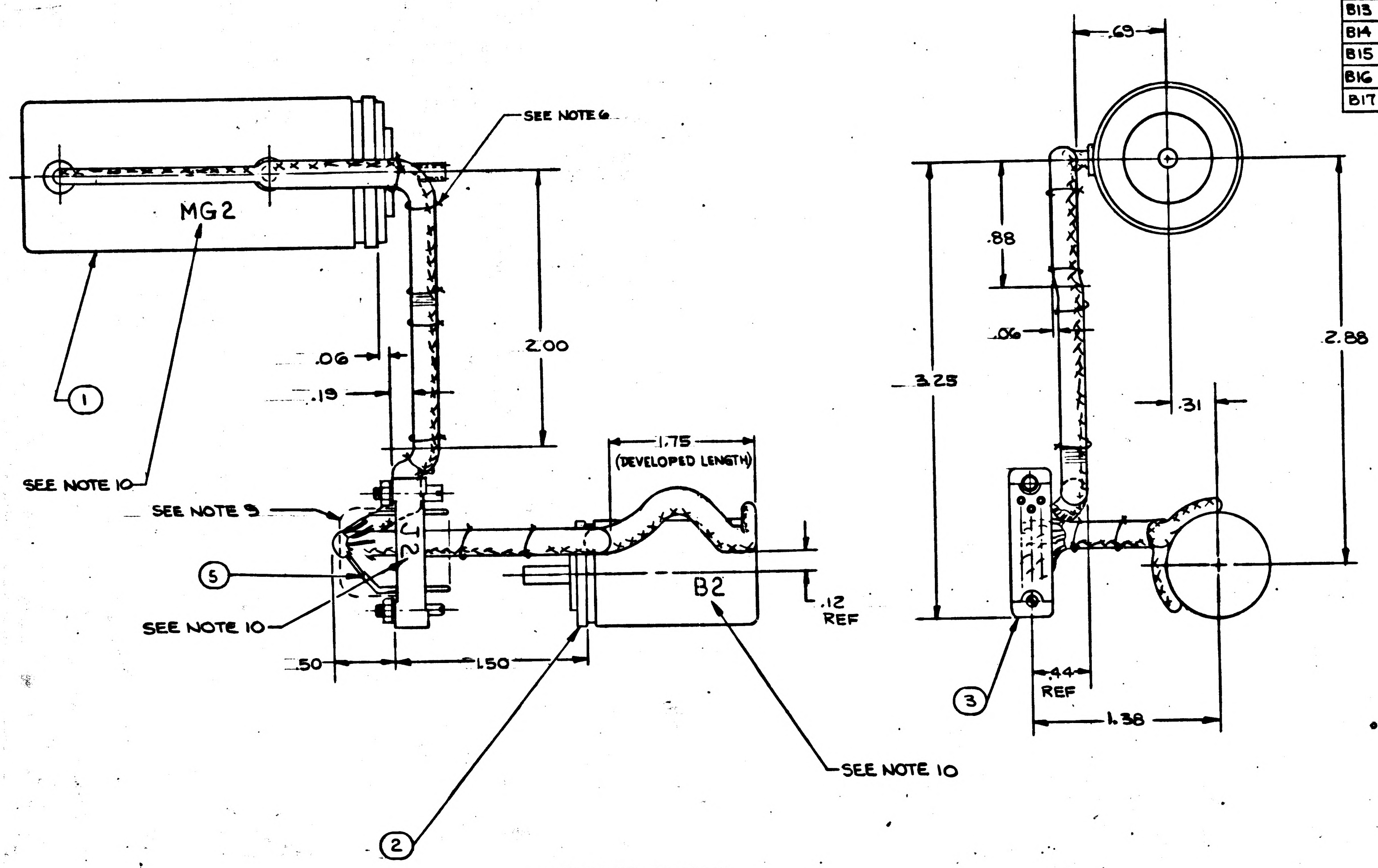
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032.
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH
10. MARK REFERENCE DESIGNATIONS ~~.12 ± .02 INCH HIGH~~ IN ACCORDANCE WITH ND 1002019
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)

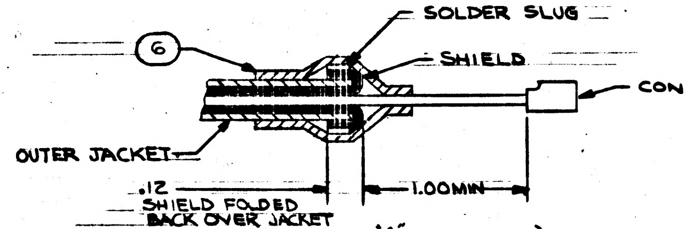
REVISIONS			TDRR 12119	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 14295	11/19/64	WK
B		REVISED PER TDRR 16882	9/14/65	WL

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	YELLOW		M62-YELLOW	J2-B	8
B2	WHITE		M62-WHITE	J2-A	
B3	RED		M62-RED	J2-C	8
B4	RED-BLACK		MG2-RED-BLK	J2-D	
B5	BLACK		M62-BLACK	J2-E	
B6	ORANGE		M62-ORANGE	J2-F	8
B7	GRAY		M62-GRAY	J2-H	
B8	BLUE		M62-BLUE	J2-J	8
B9	BROWN		M62-BROWN	J2-K	
B10	RED-WHITE		B2-S1	J2-P	8
B11	BLACK-WHITE		B2-S3	J2-M	
B12	YELLOW-WHITE		B2-S2	J2-N	8
B13	BLUE-WHITE		B2-S4	J2-L	
B14	BLACK		B2-P3	J2-R	8
B15	RED		B2-P1	J2-S	
B16	YELLOW		B2-P2	J2-T	8
B17	BLUE		B2-P4	J2-U	

SEE DETAIL "A"





DETAIL "A" (NO SCALE)
(APPLIES TO MG2 BLUE LEAD)

MASTER

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	*	1010402-2	—		SLEEVE, SOLDER, ELECTRICAL CONDUCTOR INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4									
3	1	*	1011740-3	—		CONNECTOR, ELECTRICAL (J2)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B2)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± .06 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910010
DRAWN E. DRAPALA DATE 4-6-64
CHECKED T. SULLIVAN 7-29-64
APPROVAL E. Rudman 7-29-64
APPROVAL E. Murray 8/25/64
NASA APPROVAL
MIT APPROVAL 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT SHAFT DRIVE HARNESS,
ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011934
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011934 C

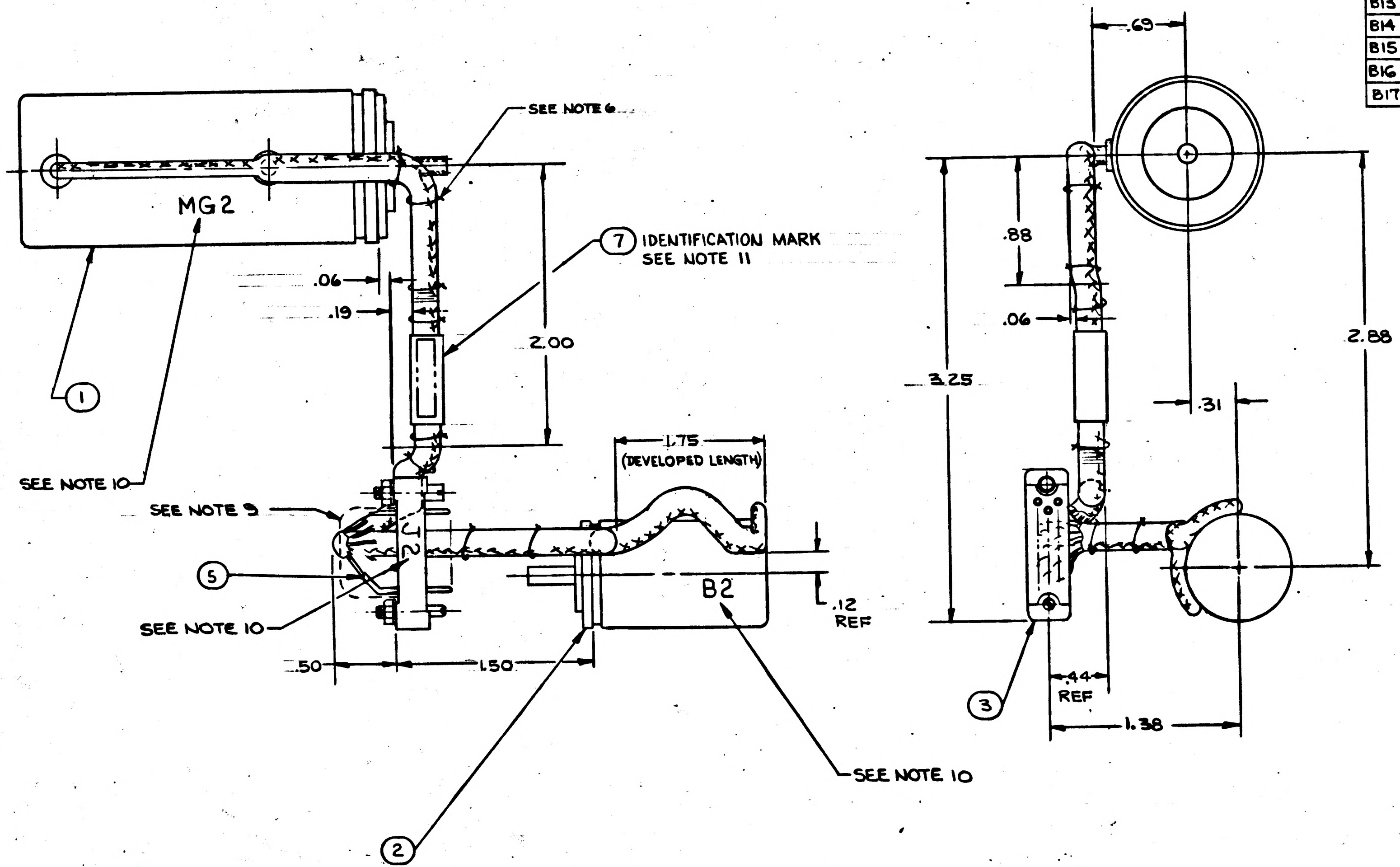
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032.

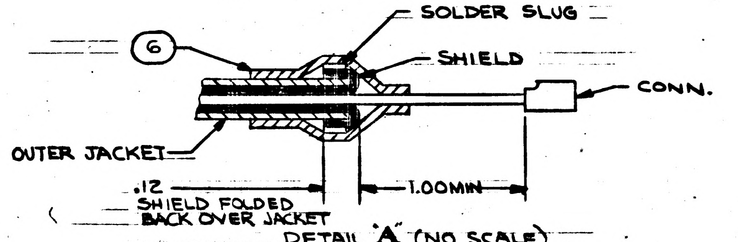
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH
10. MARK REFERENCE DESIGNATIONS ~~.12 ± .02 INCH HIGH~~ IN ACCORDANCE WITH ND 1002019
11. SHRINK ITEM 7 & IDENTIFY ASSY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

REVISIONS		TDRR 12119		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 14295	11/13/64	WK
B		REVISED PER TDRR 16882	9/ /65	WK
C		REVISED PER TDRR 18179	4/24/65	WK

SEE DETAIL "A"

WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	YELLOW		MG2-YELLOW	J2-B	8
B2	WHITE		MG2-WHITE	J2-A	
B3	RED		MG2-RED	J2-C	8
B4	RED-BLACK		MG2-RED-BLK	J2-D	
B5	BLACK		MG2-BLACK	J2-E	
B6	ORANGE		MG2-ORANGE	J2-F	8
B7	GRAY		MG2-GRAY	J2-H	
B8	BLUE		MG2-BLUE	J2-J	8
B9	BROWN		MG2-BROWN	J2-K	
B10	RED-WHITE		B2-S1	J2-P	8
B11	BLACK-WHITE		B2-S3	J2-M	
B12	YELLOW-WHITE		B2-S2	J2-N	8
B13	BLUE-WHITE		B2-S4	J2-L	
B14	BLACK		B2-P3	J2-R	8
B15	RED		B2-P1	J2-S	
B16	YELLOW		B2-P2	J2-T	8
B17	BLUE		B2-P4	J2-U	





DETAIL "A" (NO SCALE)
(APPLIES TO MG2 BLUE LEAD)

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010490-290	—		INSULATION-SLEEVING, ELECT, T SHRINKABLE			
6	1	*	1010402-1	—		SLEEVE, SOLDER, ELECTRICAL CTOR INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4									
3	1	*	1011740-3	—		CONNECTOR, ELECTRICAL (J2)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B2)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910010
DRAWN E. DRAPALA DATE 4-6-64
CHECKER T. SULLIVAN 7-28-64
APPROVAL G. Rushman 7-29-64
APPROVAL E. Morug 8/25/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
SCT SHAFT DRIVE HARNESS, ASSY OF
CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011934
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011934 C

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND IN ACCORDANCE WITH ND1002071.
6. LACE CONDUCTORS IN ACCORDANCE WITH ND1002032.

7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND 1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH
10. MARK REFERENCE DESIGNATIONS .12±.02 INCH HIGH IN ACCORDANCE WITH ND 1002019
11. SHRINK ITEM 7 & IDENTIFY ASSY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019.

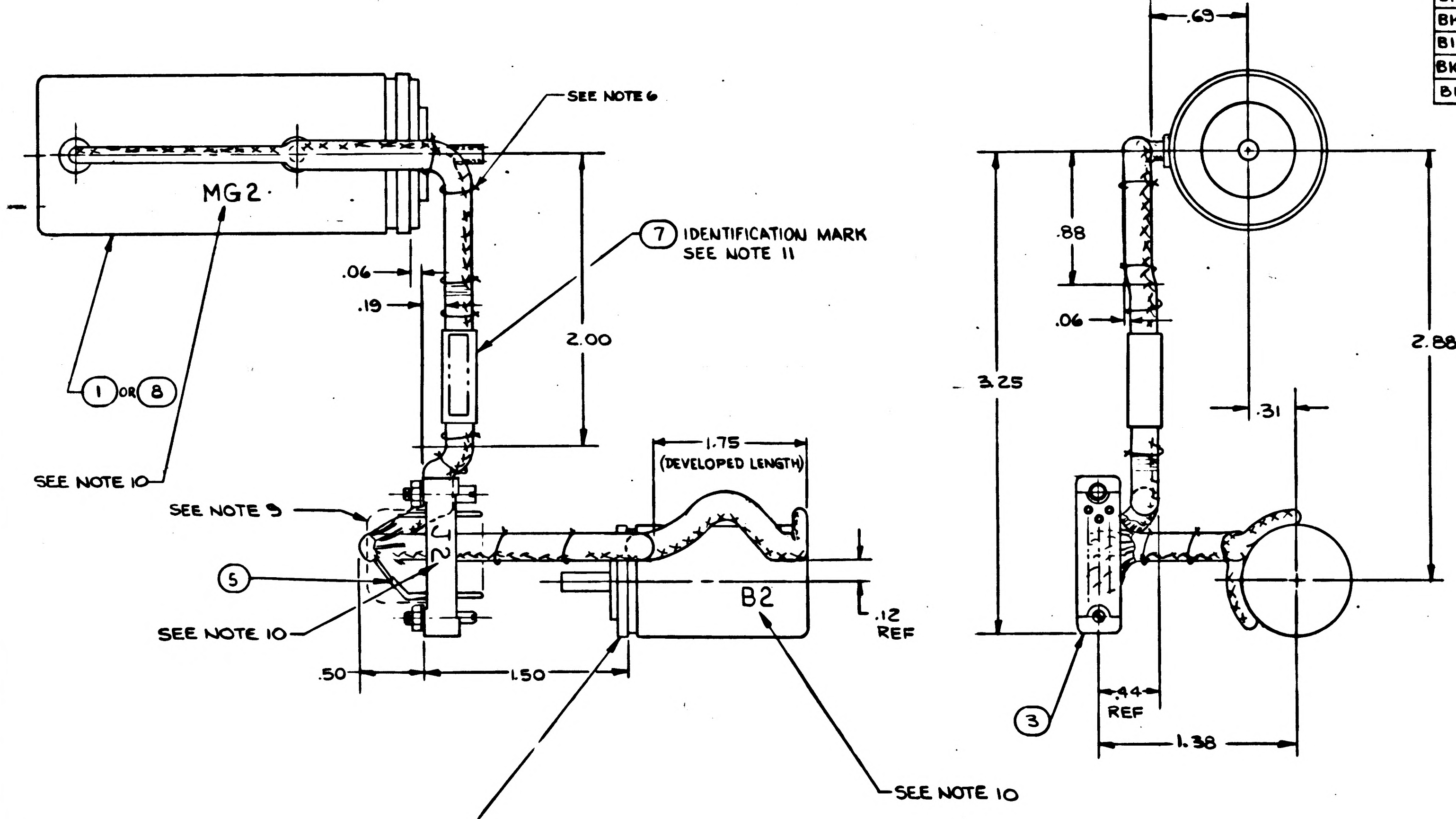
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 14295	11/13/64	wK
B		REVISED PER TDRR 16882	9/ /65	wK
C		REVISED PER TDRR 18179	11/2/65	WK
D		REVISED PER TDRR 32828	1/27/67	

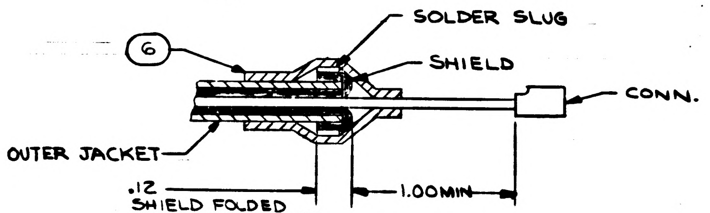
TDRR 12119

SEE DETAIL "A"

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
B1	YELLOW		M62-YELLOW	J2-B	8
B2	WHITE		M62-WHITE	J2-A	
B3	RED		M62-RED	J2-C	8
B4	RED-BLACK		MG2-RED-BLK	J2-D	
B5	BLACK		M62-BLACK	J2-E	
B6	ORANGE		M62-ORANGE	J2-F	8
B7	GRAY		M62-GRAY	J2-H	
B8	BLUE		M62-BLUE	J2-J	8
B9	BROWN		M62-BROWN	J2-K	
B10	RED-WHITE		B2-S1	J2-P	8
B11	BLACK-WHITE		B2-S3	J2-M	
B12	YELLOW-WHITE		B2-S2	J2-N	8
B13	BLUE-WHITE		B2-S4	J2-L	
B14	BLACK		B2-P3	J2-R	8
B15	RED		B2-P1	J2-S	
B16	YELLOW		B2-P2	J2-T	8
B17	BLUE		B2-P4	J2-U	





DETAIL "A" (NO SCALE)
(APPLIES TO MG2 BLUE LEAD)

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	8		*	1012156-4	—		SERVO MOTOR-TACHOMETER, GENERATOR			
1	1	7		*	1010490-290	—		INSULATION-SLEEVING, ELECT, HEAT SHRINKABLE			
1	1	6		*	1010402-1	—		SLEEVE, SOLDER, ELECTRICAL CONDUCTOR INSUL. HEAT SHRINKABLE			
17	17	5		*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
		4									
1	1	3		*	1011740-3	—		CONNECTOR, ELECTRICAL (J2)			
1	1	2		*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B2)			
0	1	1		*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

QTY REQD
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011703	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ± .06; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910010
DRAWN E. DRAPALA DATE 4-6-64
CHECKER T. SULLIVAN 7-29-64
APPROVAL E. Rahm 7-29-64
APPROVAL E. Thomas 8/25/64
NASA APPROVAL
MIT APPROVAL W. Kopp 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT SHAFT DRIVE HARNESS,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011934
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2011934

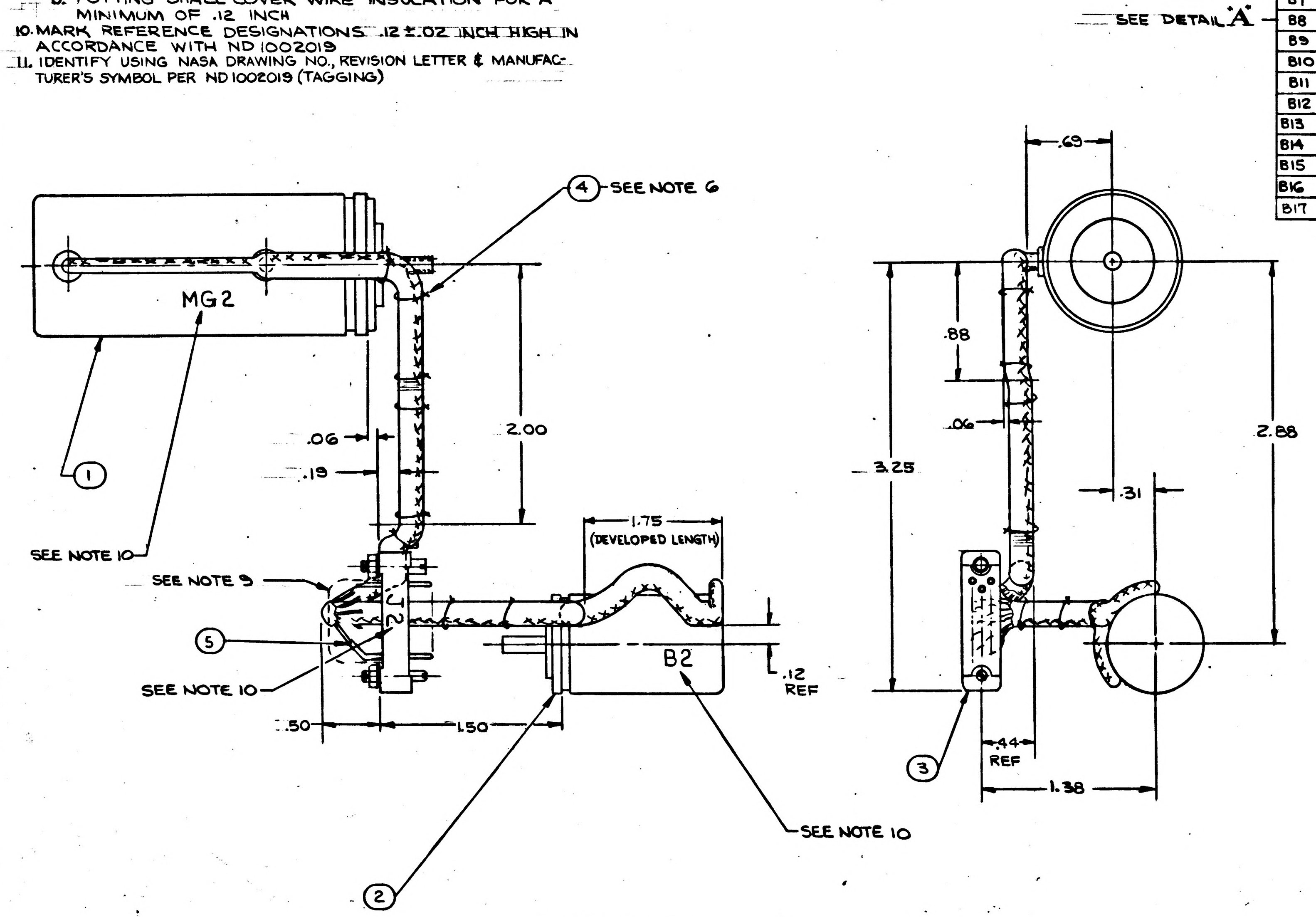
NOTES:

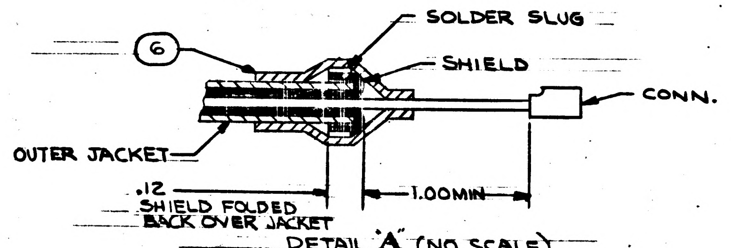
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND 1002032
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS
5. SOLDER CONDUCTORS PER WIRING LEGEND, WITH Sn60WRP2 PER QQ-S-571, PER MSFC-PROC-158
6. LACE CONNECTORS, USING ITEM 4 IN ACCORDANCE WITH ND 1002032
7. PERFORM CONTINUITY CHECK
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK
9. POT IN ACCORDANCE WITH ND 1002003, METHOD C.
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH
10. MARK REFERENCE DESIGNATIONS ~~.12 ±.02 INCH HIGH~~ IN ACCORDANCE WITH ND 1002019
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTES
B1	YELLOW		MG2-YELLOW	J2-B	8
B2	WHITE		MG2-WHITE	J2-A	
B3	RED		MG2-RED	J2-C	8
B4	RED-BLACK		MG2-RED-BLK	J2-D	
B5	BLACK		MG2-BLACK	J2-E	
B6	ORANGE		MG2-ORANGE	J2-F	8
B7	GRAY		MG2-GRAY	J2-H	
B8	BLUE		MG2-BLUE	J2-J	8
B9	BROWN		MG2-BROWN	J2-K	
B10	RED-WHITE		B2-S1	J2-P	8
B11	BLACK-WHITE		B2-S3	J2-M	
B12	YELLOW-WHITE		B2-S2	J2-N	8
B13	BLUE-WHITE		B2-S4	J2-L	
B14	BLACK		B2-P3	J2-R	8
B15	RED		B2-P1	J2-S	
B16	YELLOW		B2-P2	J2-T	8
B17	BLUE		B2-P4	J2-U	





DETAIL "A" (NO SCALE)
(APPLIES TO MG2 BLUE LEAD)

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	*	1010402-2	—		SLEEVE, SOLDER, ELECTRICAL CONDUCTOR, INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	—		TAPE, LACING & TYING			
3	1	*	1011740	68502016801		CONNECTOR, ELECTRICAL (J2)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B2)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

2011703	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .06 ; ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 803869:0010

DRAWN E. DRAPALA DATE 4-6-64
CHECKED T. SULLIVAN 7-28-64
APPROVAL G. Roshm 7-29-64
APPROVAL E. Morey 8/25/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT SHAFT DRIVE HARNESS,
ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011934
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

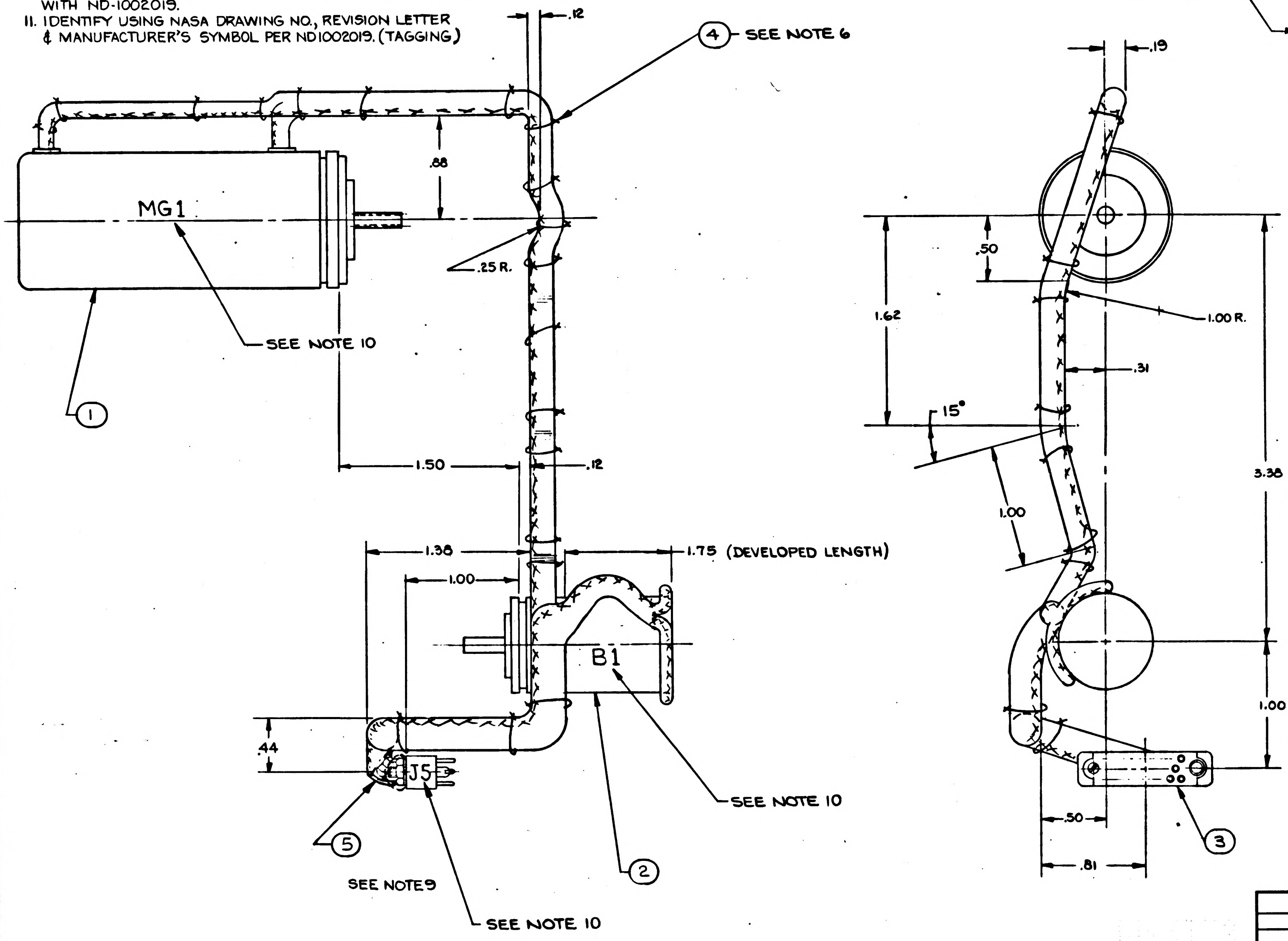
2011935 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14296	11/13/64	

REVISIONS TDRR 12119

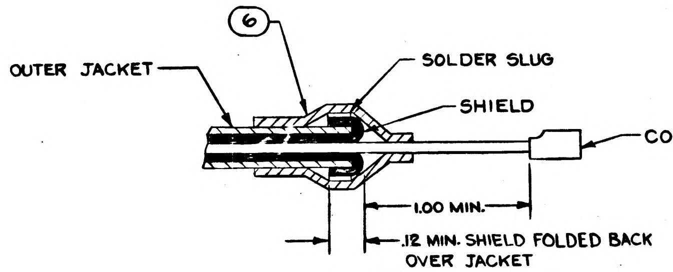
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 4, IN ACCORDANCE WITH ND-1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND-1002009, METHOD C.
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.020 INCH HIGH IN ACCORDANCE WITH ND-1002019.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)



WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
E1	YELLOW		MG1-YELLOW	J5-B	8
E2	WHITE		MG1-WHITE	J5-A	
E3	RED		MG1-RED	J5-C	8
E4	RED/BLACK		MG1-RED/BLK	J5-D	
E5	BLACK		MG1-BLACK	J5-E	
E6	ORANGE		MG1-ORANGE	J5-F	8
E7	GRAY		MG1-GRAY	J5-H	
E8	BLUE		MG1-BLUE	J5-J	8
E9	BROWN		MG1-BROWN	J5-K	
E10	RED-WHITE		B1-S1	J5-P	8
E11	BLACK-WHITE		B1-S3	J5-M	
E12	YELLOW-WHITE		B1-S2	J5-N	8
E13	BLUE-WHITE		B1-S4	J5-L	
E14	BLACK		B1-P3	J5-R	8
E15	RED		B1-P1	J5-S	
E16	YELLOW		B1-P2	J5-T	8
E17	BLUE		B1-P4	J5-U	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	*	1010402-2			SLEEVE SOLDER ELECT. COND. INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	—		TAPE, LACING & TYING			
3	1	*	1011740-1	68502016801		CONNECTOR, ELECTRICAL (J5)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B1)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .12 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910030
DRAWN E. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 7-31-64
APPROVAL E. Rusch
APPROVAL E. Maroney 8/25/64
NASA APPROVAL
MIT APPROVAL W Kyff 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT TRUNNION DRIVE HARNESS, ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011935
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

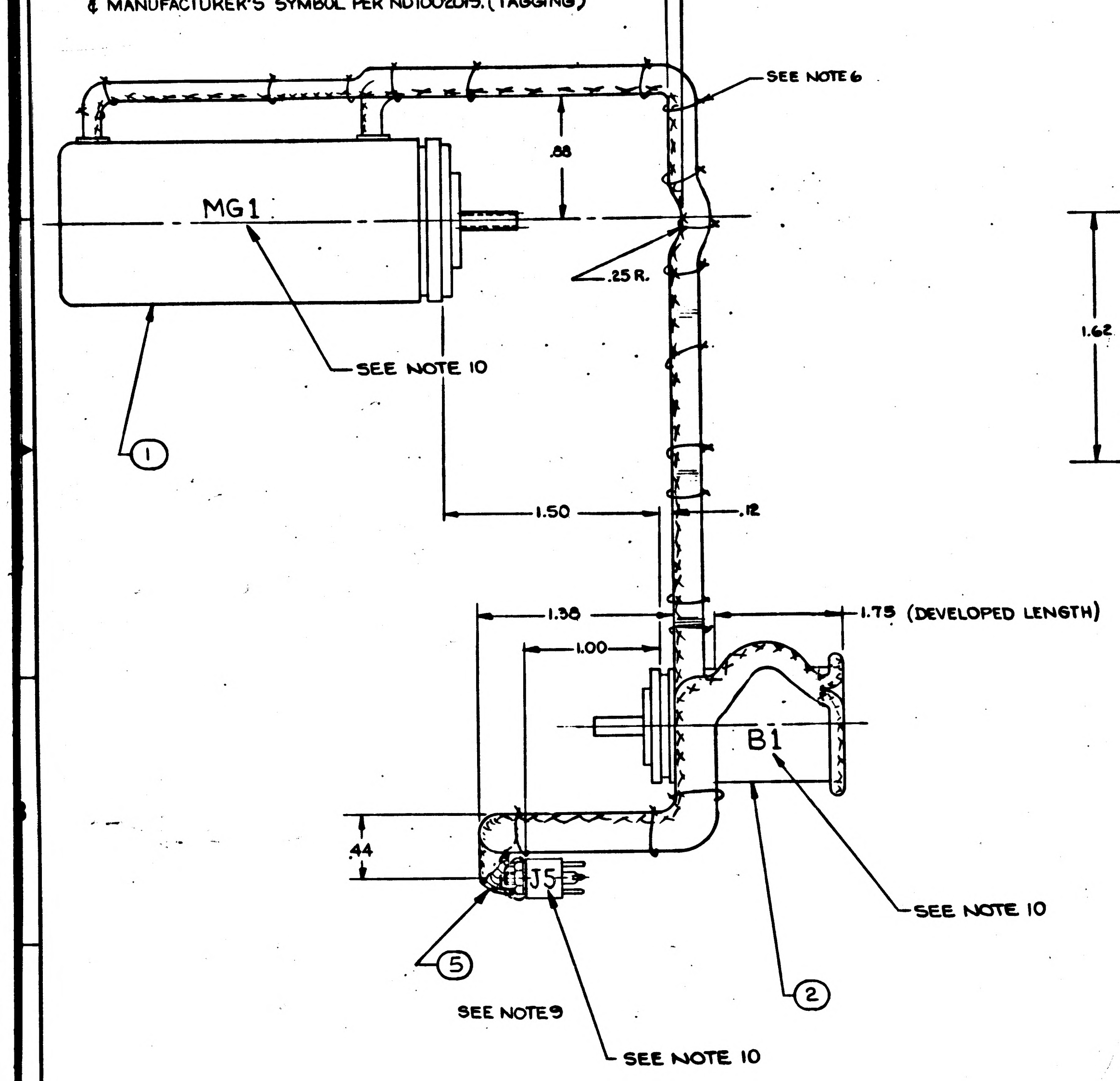
2011935 | B

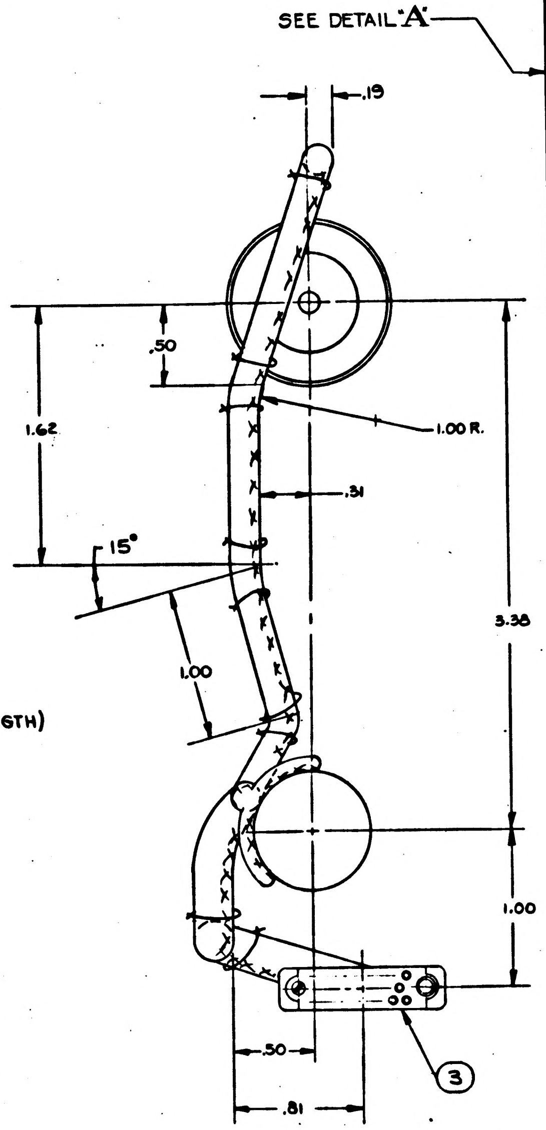
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND-1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.020 INCH HIGH IN ACCORDANCE WITH ND-1002019.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)

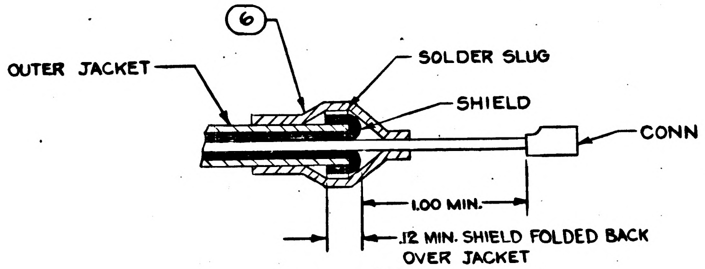
REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14296	4/13/64	WK
B		REVISED PER TDRR NO. 16883	9 Mar 65	WK

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
E1	YELLOW		MG1-YELLOW	J5-B	8
E2	WHITE		MG1-WHITE	J5-A	
E3	RED		MG1-RED	J5-C	8
E4	RED/BLACK		MG1-RED/BLK	J5-D	
E5	BLACK		MG1-BLACK	J5-E	
E6	ORANGE		MG1-ORANGE	J5-F	8
E7	GRAY		MG1-GRAY	J5-H	
E8	BLUE		MG1-BLUE	J5-J	8
E9	BROWN		MG1-BROWN	J5-K	
E10	RED-WHITE		B1-S1	J5-P	8
E11	BLACK-WHITE		B1-S3	J5-M	
E12	YELLOW-WHITE		B1-S2	J5-N	8
E13	BLUE-WHITE		B1-S4	J5-L	
E14	BLACK		B1-P3	J5-R	8
E15	RED		B1-P1	J5-S	
E16	YELLOW		B1-P2	J5-T	8
E17	BLUE		B1-P4	J5-U	







DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

6	1	*	1010402-2			SLEEVE SOLDER ELECT. COND. INSUL. HEAT SHRINKABLE			
5	17	*	1010450-060	———		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4									
3	1	*	1011740-3	———		CONNECTOR, ELECTRICAL (J5)			
2	1	*	1012157	———		RESOLVER, RECEIVER, ONE SPEED (B1)			
1	1	*	1012156-1	———		SERVO MOTOR-TACHOMETER, GENERATOR			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .12	± 5°

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910030
DRAWN B. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 7-31-64
APPROVAL E. Russelmann
APPROVAL E. Thorup 8/25/64
NASA APPROVAL
MIT APPROVAL W. Kupfer 25 Aug 64

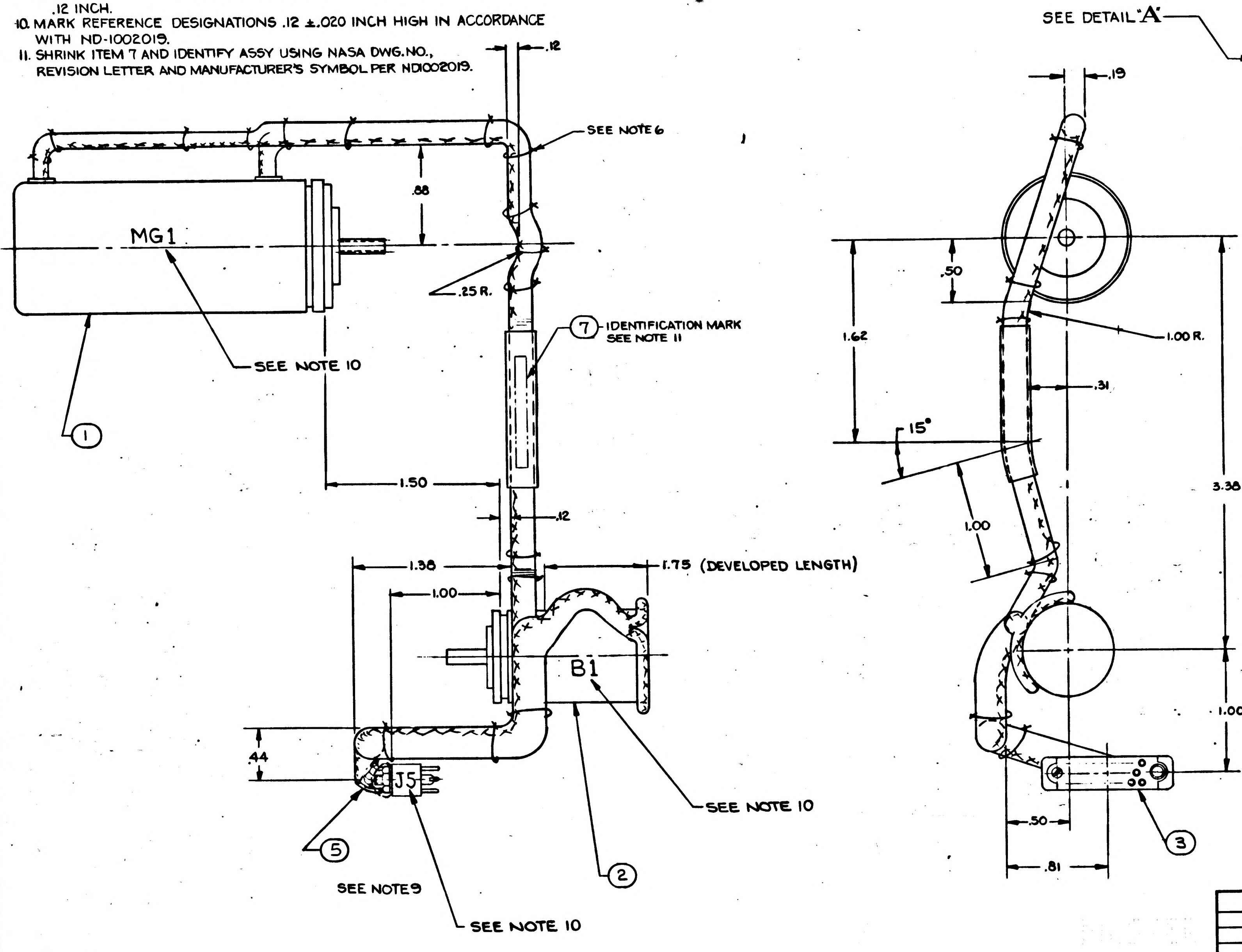
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT TRUNNION DRIVE HARNESS,
ASSY OF

CODE IDENT NO.
SIZE D
NASA NUMBER 2011935
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.

7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND-1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.020 INCH HIGH IN ACCORDANCE WITH ND-1002019.
11. SHRINK ITEM 7 AND IDENTIFY ASSY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.



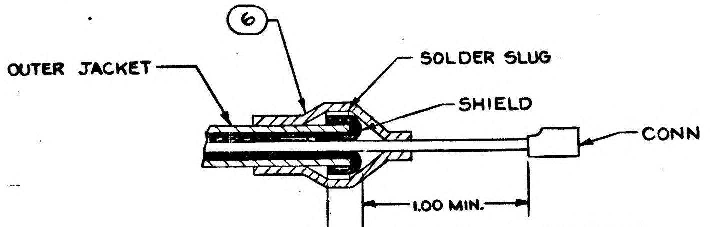
2011935 C

REVISIONS TDRR 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14296	4/13/64	WH
B		REVISED PER TDRR NO. 16883	9 Mar 65	WK
C		REVISED PER TDRR 18567	8/27/65	WK

WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
E1	YELLOW		MG1-YELLOW	J5-B	8
E2	WHITE		MG1-WHITE	J5-A	
E3	RED		MG1-RED	J5-C	8 8
E4	RED/BLACK		MG1-RED/BLK	J5-D	
E5	BLACK		MG1-BLACK	J5-E	
E6	ORANGE		MG1-ORANGE	J5-F	8
E7	GRAY		MG1-GRAY	J5-H	
E8	BLUE		MG1-BLUE	J5-J	8
E9	BROWN		MG1-BROWN	J5-K	
E10	RED-WHITE		B1-S1	J5-P	8
E11	BLACK-WHITE		B1-S3	J5-M	
E12	YELLOW-WHITE		B1-S2	J5-N	8
E13	BLUE-WHITE		B1-S4	J5-L	
E14	BLACK		B1-P3	J5-R	8
E15	RED		B1-P1	J5-S	
E16	YELLOW		B1-P2	J5-T	8
E17	BLUE		B1-P4	J5-U	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	1	*	1010490-290	—		INSULATION, SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
6	1	*	1010402-1			SLEEVE SOLDER ELECT. COND. INSUL. HEAT SHRINKABLE			
5	17	*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4									
3	1	*	1011740-3	—		CONNECTOR, ELECTRICAL (J5)			
2	1	*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B1)			
1	1	*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCE: FRACTIONS ± — ; DECIMALS ± .12 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910030
DRAWN E. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 7-31-64
APPROVAL E. Russelman
APPROVAL E. Morey 8/25/64
NASA APPROVAL
MIT APPROVAL W. Kyff 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

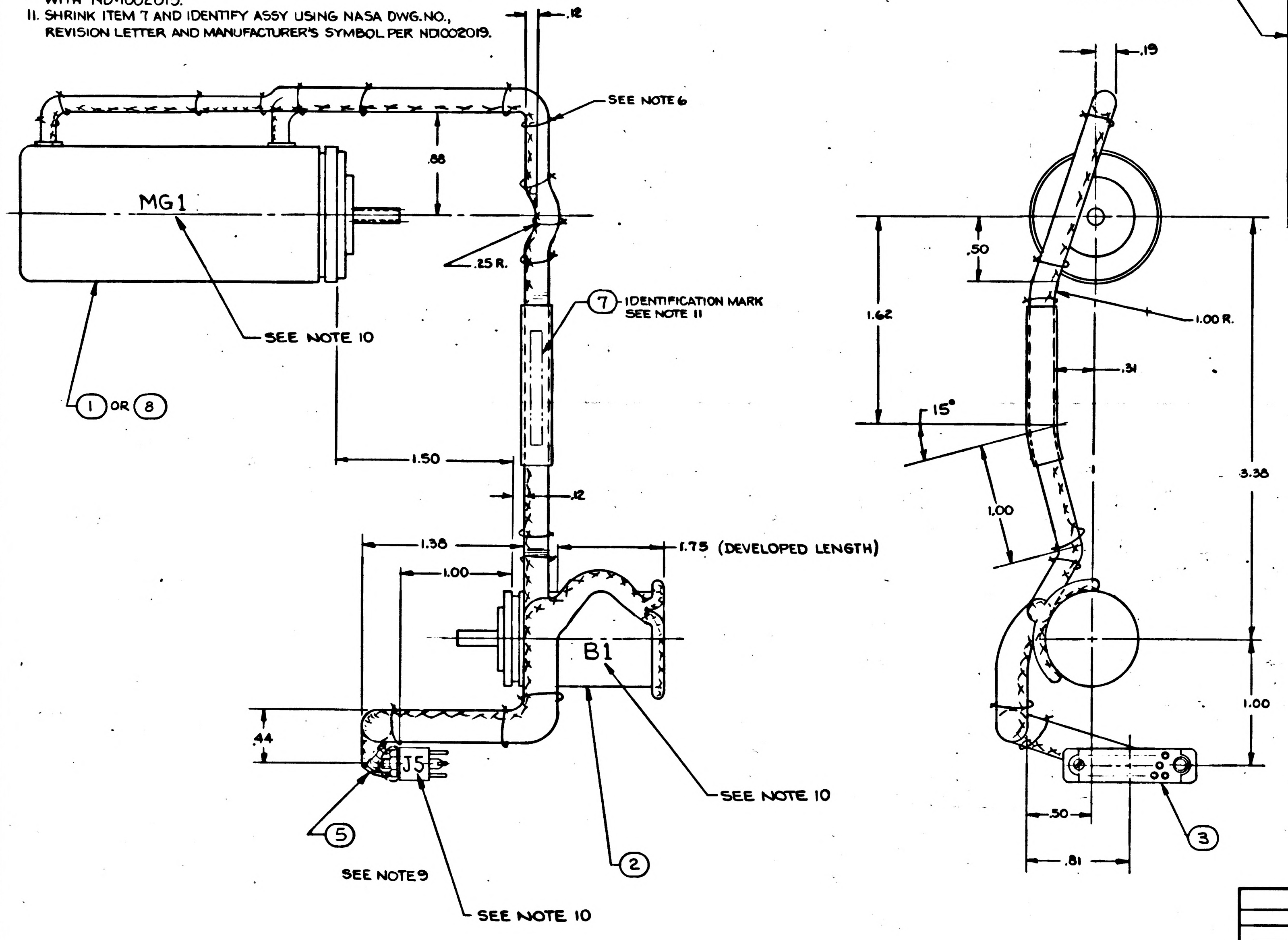
TITLE
SCT TRUNNION DRIVE HARNESS, ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011935
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND 1002071.
6. LACE CONDUCTORS, IN ACCORDANCE WITH ND 1002032.

7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND-1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.020 INCH HIGH IN ACCORDANCE WITH ND-1002019.
11. SHRINK ITEM 7 AND IDENTIFY ASSY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.



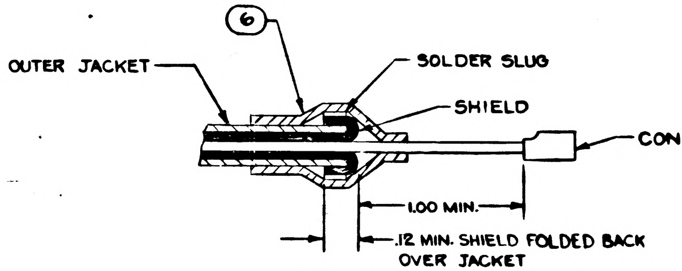
WIRING LEGEND

COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
E1	YELLOW		MG1-YELLOW	J5-B	8
E2	WHITE		MG1-WHITE	J5-A	
E3	RED		MG1-RED	J5-C	8
E4	RED/BLACK		MG1-RED/BLK	J5-D	
E5	BLACK		MG1-BLACK	J5-E	
E6	ORANGE		MG1-ORANGE	J5-F	8
E7	GRAY		MG1-GRAY	J5-H	
E8	BLUE		MG1-BLUE	J5-J	8
E9	BROWN		MG1-BROWN	J5-K	
E10	RED-WHITE		B1-S1	J5-P	8
E11	BLACK-WHITE		B1-S3	J5-M	
E12	YELLOW-WHITE		B1-S2	J5-N	8
E13	BLUE-WHITE		B1-S4	J5-L	
E14	BLACK		B1-P3	J5-R	8
E15	RED		B1-P1	J5-S	
E16	YELLOW		B1-P2	J5-T	8
E17	BLUE		B1-P4	J5-U	

REVISIONS

TDRE 12119

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 14296	4/13/64	WK
B		REVISED PER TDRR NO. 16883	5 Mar 65	WK
C		REVISED PER TDRR 18567	4/27/65	WK
D		REVISED PER TDRR 32826	/27/67	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

2011935 D

LIST OF PARTS AND MATERIALS

011	000	ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
1	0	8		*	1012156-4	—		SERVO MOTOR-TACHOMETER, GENERATOR			
1	1	7		*	1010490-290	—		INSULATION, SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
1	1	6		*	1010402-1			SLEEVE SOLDER ELECT COND. INSUL HEAT SHRINKABLE			
17	17	5		*	1010490-060	—		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
		4									
1	1	3		*	1011740-3	—		CONNECTOR, ELECTRICAL (J5)			
1	1	2		*	1012157	—		RESOLVER, RECEIVER, ONE SPEED (B1)			
0	1	1		*	1012156-1	—		SERVO MOTOR-TACHOMETER, GENERATOR			

QTY REQD

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± .12 ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910030
DRAWN E. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 7-31-64
APPROVAL
APPROVAL E. Thorup 8/25/64
NASA APPROVAL
MIT APPROVAL W Kupfer 28 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT TRUNNION DRIVE HARNESS,
ASSY OF

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2011935
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

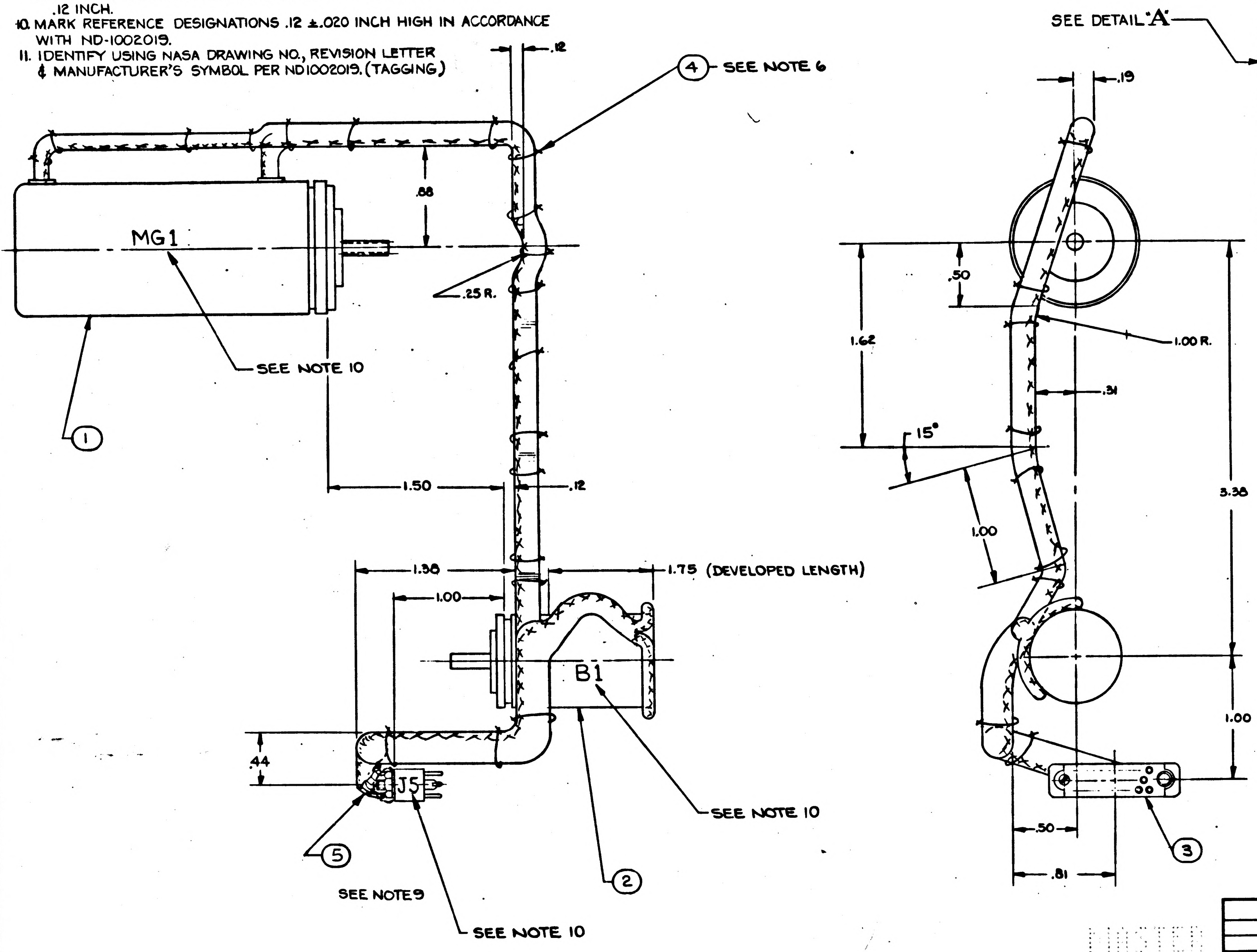
* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

2011935

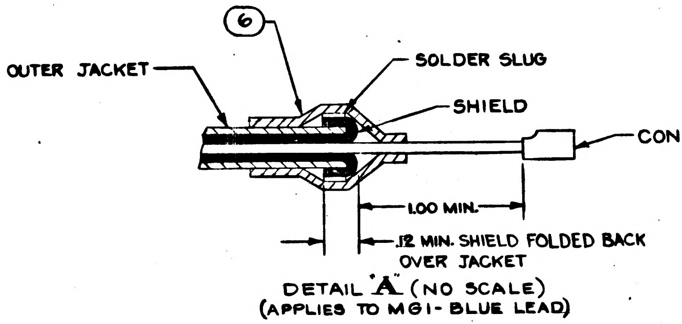
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

REVISIONS TD2E .L.9

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DRAWING NO. 2012390
3. TWIST CONDUCTORS IN ACCORDANCE WITH ND-1002032.
4. SLIDE ITEM 5 OVER WIRES BEYOND STRIPPED ENDS.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. LACE CONDUCTORS, USING ITEM 4, IN ACCORDANCE WITH ND-1002032.
7. PERFORM CONTINUITY CHECK.
8. SLIDE ITEM 5 OVER SOLDERED JOINTS AND SHRINK.
9. POT IN ACCORDANCE WITH ND-1002009, METHOD C.
   - A. POTTING SHALL NOT INTERFERE WITH POLARITY SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .12 INCH.
10. MARK REFERENCE DESIGNATIONS .12 ±.020 INCH HIGH IN ACCORDANCE WITH ND-1002019.
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019. (TAGGING)



WIRING LEGEND					
COND. NO.	COLOR	ITEM NO.	FROM	TO	SEE NOTE 3
E1	YELLOW		MG1-YELLOW	J5-B	8
E2	WHITE		MG1-WHITE	J5-A	
E3	RED		MG1-RED	J5-C	8 8
E4	RED/BLACK		MG1-RED/BLK	J5-D	
E5	BLACK		MG1-BLACK	J5-E	
E6	ORANGE		MG1-ORANGE	J5-F	8
E7	GRAY		MG1-GRAY	J5-H	
E8	BLUE		MG1-BLUE	J5-J	8
E9	BROWN		MG1-BROWN	J5-K	
E10	RED-WHITE		B1-S1	J5-P	8
E11	BLACK-WHITE		B1-S3	J5-M	
E12	YELLOW-WHITE		B1-S2	J5-N	8
E13	BLUE-WHITE		B1-S4	J5-L	
E14	BLACK		B1-P3	J5-R	8
E15	RED		B1-P1	J5-S	
E16	YELLOW		B1-P2	J5-T	8
E17	BLUE		B1-P4	J5-U	



DETAIL "A" (NO SCALE)
(APPLIES TO MG1-BLUE LEAD)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	1	*	1010402-2			SLEEVE SOLDER ELECT. COND. INSUL. HEAT SHRINKABLE			
5	17	*	1010450-060	——		INSULATION-SLEEVING, ELECTRICAL, HEAT SHRINKABLE			
4	AR	*	1011753	——		TAPE, LACING & TYING			
3	1	*	1011740	6850201680l		CONNECTOR, ELECTRICAL (J5)			
2	1	*	1012157	——		RESOLVER, RECEIVER, ONE SPEED (B1)			
1	1	*	1012156-1	——		SERVO MOTOR-TACHOMETER, GENERATOR			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

NEXT ASSY	USED ON
2011702	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ± .12 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 80386910030
DRAWN B. DRAPALA DATE 4-10-64
CHECKED J. SULLIVAN 7-31-64
APPROVAL E. Russ
APPROVAL E. Phorys 8/25/64
NASA APPROVAL
MIT APPROVAL W. Kyff 25 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT TRUNNION DRIVE HARNESS,
ASSY OF

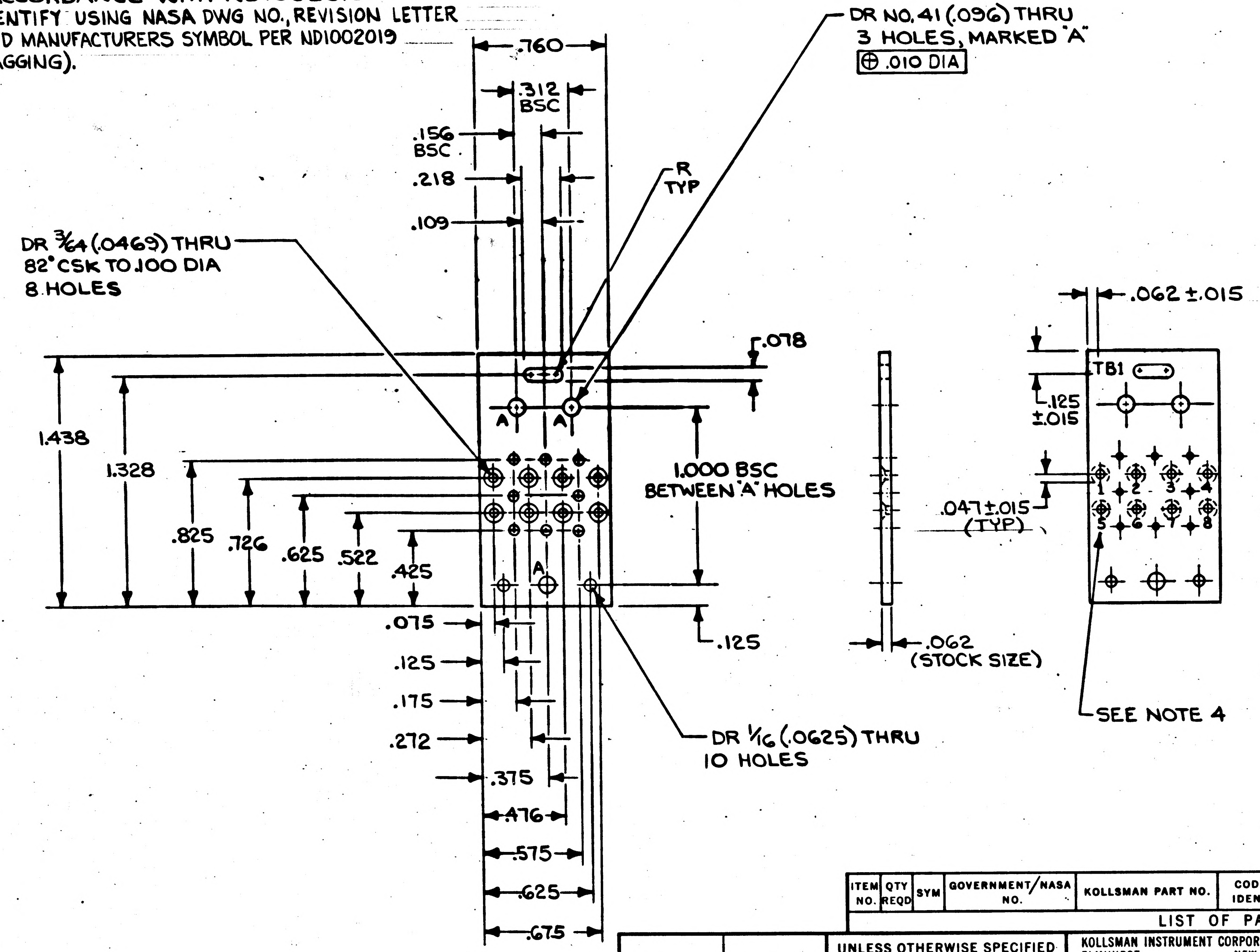
CODE IDENT NO. | SIZE D | NASA NUMBER 2011935
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

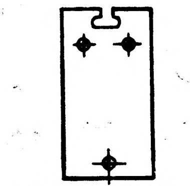
2011936 A

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12840	27Aug64	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. MATERIAL:
   PLASTIC SHEET, LAMINATED THERMOSETTING GLASS FIBER BASE, EPOXY RESIN HIGH TEMPERATURE TYPE IN COMPLETE CONFORMANCE WITH THE LATEST ISSUE OF MIL-P-18177, TYPE GEB.
4. MARK CHARACTERS AT LOCATIONS SHOWN IN ACCORDANCE WITH ND1002019.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).


DR NO. 41 (.096) THRU
3 HOLES, MARKED "A"
⊕ .010 DIA
.760
.312 BSC
.156 BSC
.218
.109
R TYP
DR 3/64 (.0469) THRU
82° CSK TO .100 DIA
8 HOLES
.078
1.438
1.328
.825
.726
.625
.522
.425
A
A
A
1.000 BSC BETWEEN "A" HOLES
.125
.075
.125
.175
.272
.375
.476
.575
.625
.675
DR 1/16 (.0625) THRU
10 HOLES
.062 (STOCK SIZE)
.062 ±.015
TB1
.125 ±.015
.047 ±.015 (TYP)
1
2
3
4
5
6
7
8
SEE NOTE 4



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011938	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.010	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 25386910130

DRAWN J. Schuller DATE 4-15-64
CHECKED 5/27/64
APPROVAL 5/28/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BOARD, TERMINAL

CODE IDENT NO.
SIZE C
NASA NUMBER 2011936
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011936 A

K+E
E-134

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

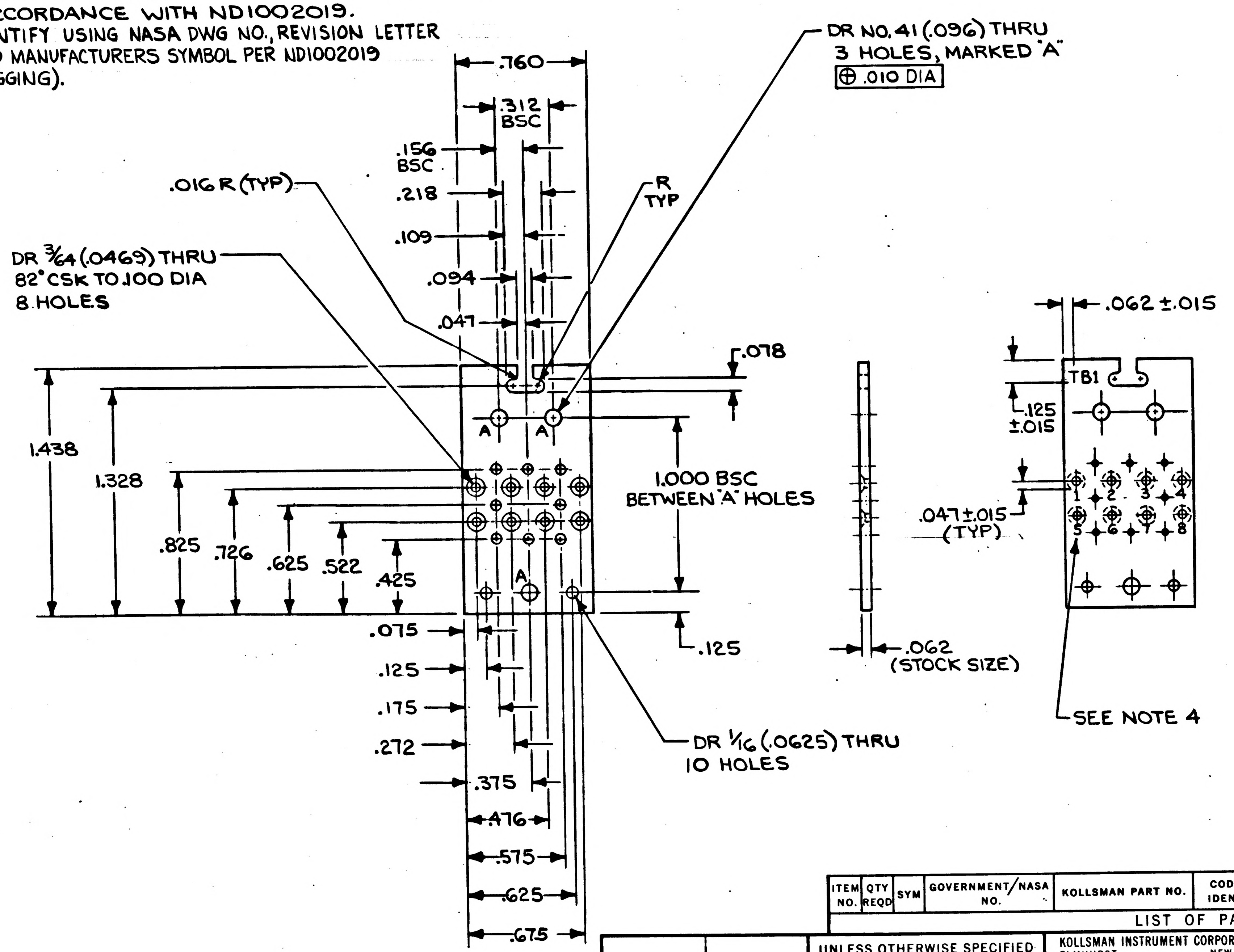
2011936

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

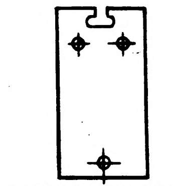
REVISIONS TDRR 09890

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. MATERIAL:
   PLASTIC SHEET, LAMINATED THERMOSETTING GLASS FIBER BASE, EPOXY RESIN HIGH TEMPERATURE TYPE IN COMPLETE CONFORMANCE WITH THE LATEST ISSUE OF MIL-P-18177, TYPE GEB.
4. MARK CHARACTERS AT LOCATIONS SHOWN IN ACCORDANCE WITH ND1002019.
5. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



.760
.312 BSC
.156 BSC
.218
.109
.094
.047
.016 R (TYP)
R TYP
DR 3/64 (.0469) THRU 82° CSK TO .100 DIA 8 HOLES
DR NO. 41 (.096) THRU 3 HOLES, MARKED "A"
⊕ .010 DIA
.078
1.438
1.328
.825
.726
.625
.522
.425
A
1.000 BSC BETWEEN "A" HOLES
.125
.075
.125
.175
.272
.375
.476
.575
.625
.675
DR 1/16 (.0625) THRU 10 HOLES
.062 (STOCK SIZE)
.062 ±.015
.125 ±.015
TB1
.047±.015 (TYP)
1 2 3 4
5 6 7 8
SEE NOTE 4



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011938	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.010	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 25386910130

DRAWN J. Schuller DATE 4-15-64
CHECKED 5/27/64
APPROVAL 5/28/64
APPROVAL E. Thomp 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BOARD, TERMINAL

CODE IDENT NO. | SIZE C | NASA NUMBER 2011936
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

MASTER

E-154

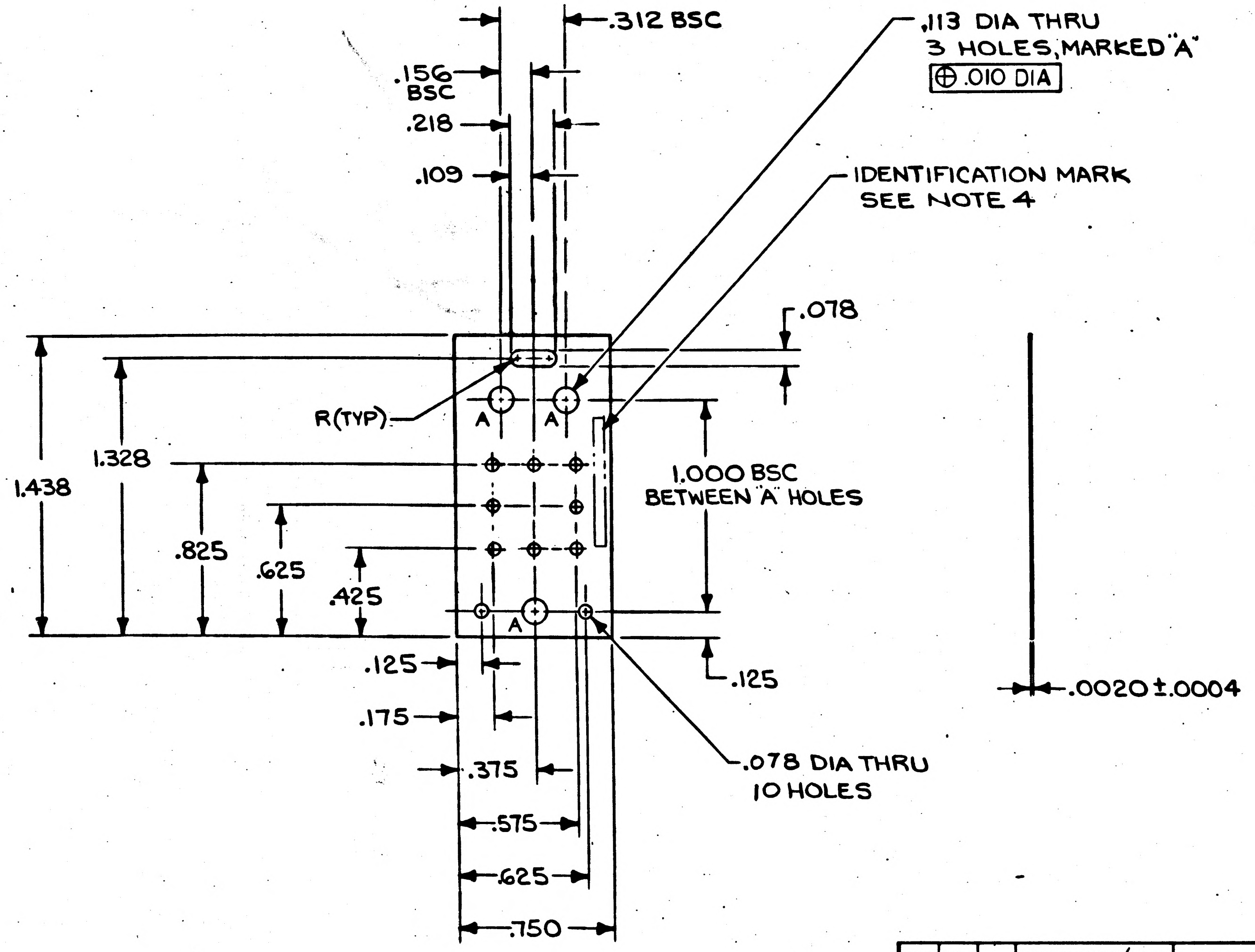
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

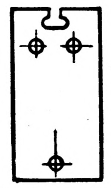
2011937 A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. MATERIAL: INSULATION, ELECTRICAL, (MYLAR) SYNTHETIC-RESIN COMPOSITION, NONRIGID PER MIL-I-631 TYPE G, FILM TAPE, CLASS I.
4. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

REVISIONS TDRR 04890

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12841	23/ /64	W.H.


.312 BSC
.156 BSC
.218
.109
.113 DIA THRU
3 HOLES, MARKED "A"
⊕ .010 DIA
IDENTIFICATION MARK
SEE NOTE 4
.078
R (TYP)
A
A
A
1.438
1.328
.825
.625
.425
1.000 BSC
BETWEEN "A" HOLES
.125
.125
.175
.375
.575
.625
.750
.078 DIA THRU
10 HOLES
.0020 ± .0004


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011945	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 25386910120

DRAWN F. Schuller DATE 4-15-64
CHECKED 4/27/64
APPROVAL
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSULATION, ELECTRICAL

CODE IDENT NO.
SIZE C
NASA NUMBER 2011937
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

2011937 A

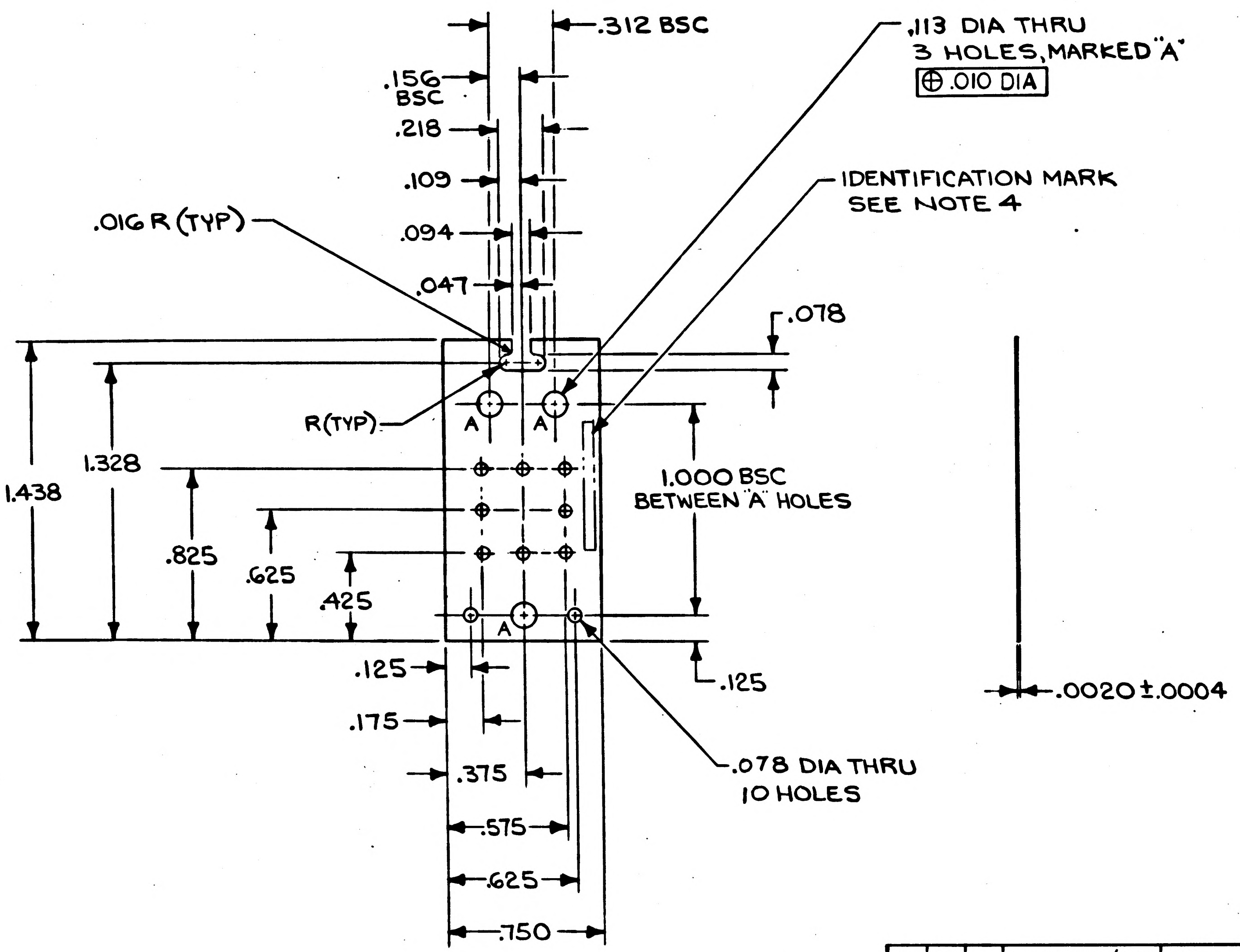
INCHES
0 1 2
PHOTOGRAPHIC SCALE

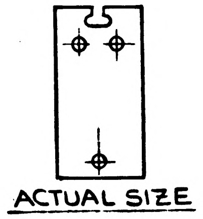
2011937

REVISIONS TDRR 04890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. MATERIAL: INSULATION, ELECTRICAL, (MYLAR) SYNTHETIC-RESIN COMPOSITION, NONRIGID PER MIL-I-631 TYPE G, FILM TAPE, CLASS I.
4. IDENTIFY USING NASA DWG NO. REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.


.312 BSC
.156 BSC
.218
.109
.094
.047
.016 R (TYP)
R (TYP)
.113 DIA THRU
3 HOLES, MARKED "A"
⊕ .010 DIA
IDENTIFICATION MARK
SEE NOTE 4
.078
A
A
A
1.438
1.328
.825
.625
.425
1.000 BSC
BETWEEN "A" HOLES
.125
.125
.175
.375
.575
.625
.750
.078 DIA THRU
10 HOLES
.0020 ± .0004


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011945	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 25386910120

DRAWN J. Schuller DATE 4-15-64
CHECKED 4/27/64
APPROVAL 5/4/64
APPROVAL 6/1/64

NASA APPROVAL 1/3/14
MIT APPROVAL 6/8/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
INSULATION, ELECTRICAL

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011937

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

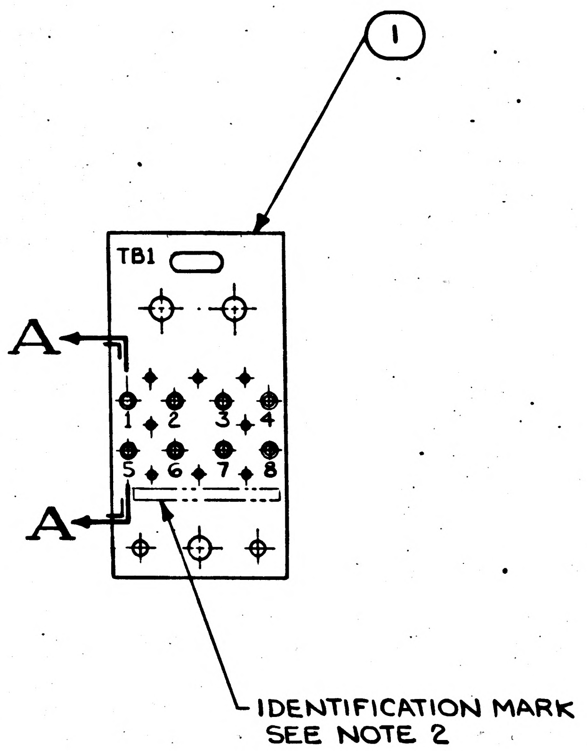
2011937

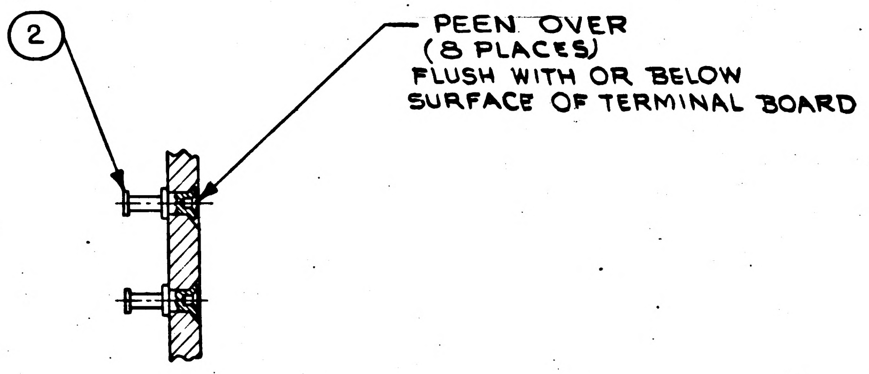
2011938	A

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12842	23 [illegible]	WK

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.





PARTIAL SECTION A-A
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	8		MS17121-2	-"-		TERMINAL, STUD, SINGLE TURRET			
1	1		2011936	25386910130		BOARD, TERMINAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011945	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910800
DRAWN J. Schiller DATE 4-15-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. [illegible] 7/13/64
NASA APPROVAL W. J. [illegible] 7-14-64
MIT APPROVAL W. [illegible] 14 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TERMINAL BOARD,
ASSEMBLY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011938
SCALE 2/1 & 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011938A

MASTER

E-154

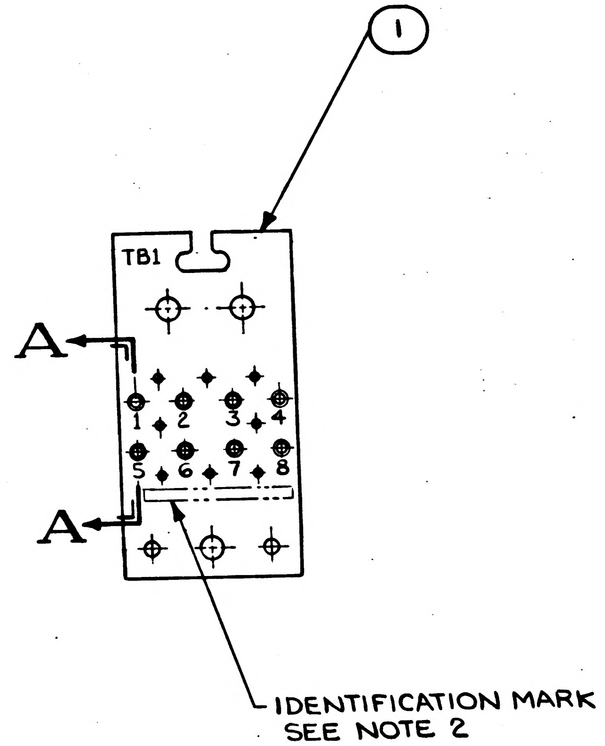
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

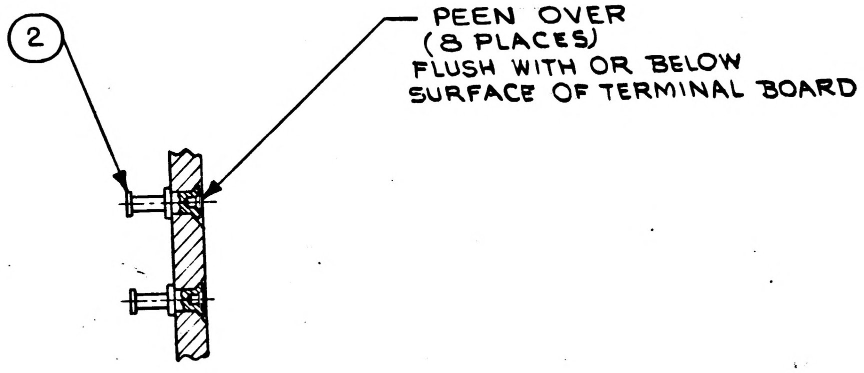
2011938

SYM	ZONE	REVISIONS 10952 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.





PARTIAL SECTION A-A
SCALE 4/1

2011938

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	8		MS17121-2	—		TERMINAL, STUD, SINGLE TURRET			
1	1		2011936	25386910130		BOARD, TERMINAL			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011945	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±	~	~	~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910800

DRAWN Schiller DATE 4-15-64
CHECKED C. LEINZ (CRE) 7/13/64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Thoney 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
TERMINAL BOARD,
ASSEMBLY OF

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011938

SCALE 2/1 & 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-154

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011941

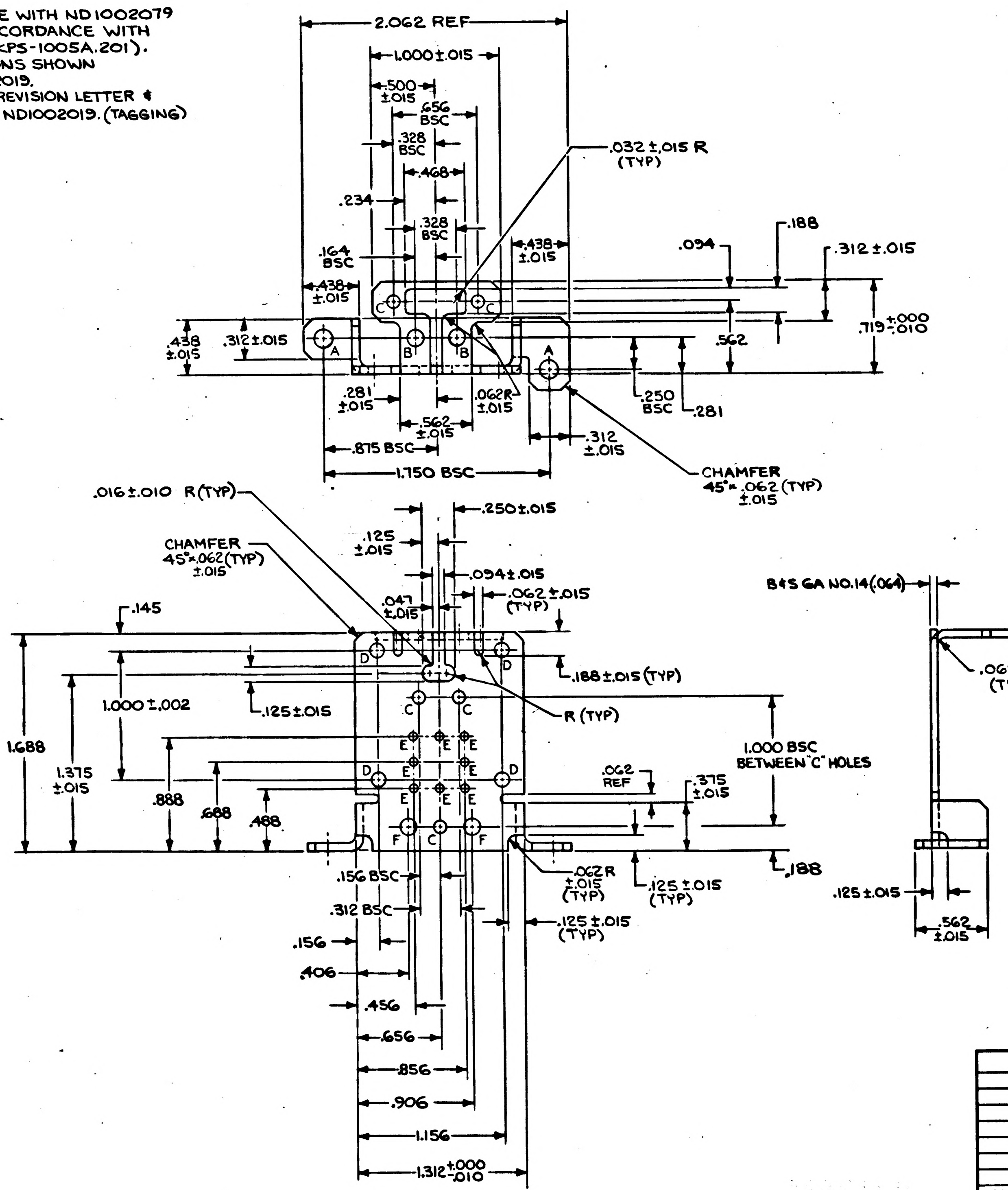
REVISIONS TDRR 09890

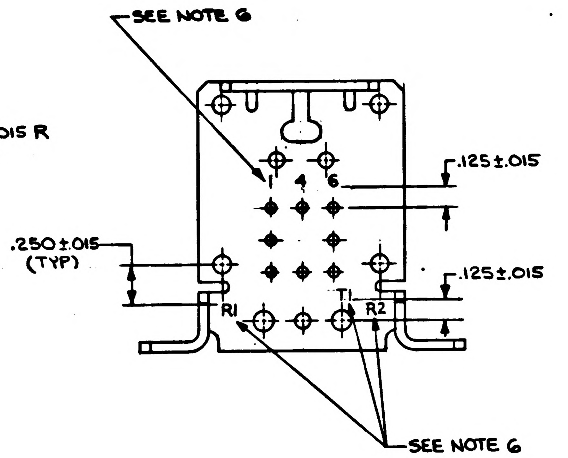
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

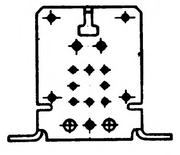
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED: $\sqrt{}^{63}$ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625, TYPE II BLACK (KPS-1005A.201).
6. MARK CHARACTERS AT LOCATIONS SHOWN IN ACCORDANCE WITH ND1002019.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)

HOLE DATA			
HOLE	DESCRIPTION	QTY.	TRUE POSITIONING
A	DR NO. 29(.136) THRU	2	⊕ .010 DIA
B	.125 ±.001 DIA THRU	2	⊕ .004 DIA
C	DR NO. 41(.096) THRU	5	⊕ .004 DIA
D	.109 ±.001 DIA THRU	4	—◆—
E	DR 3/32(.0937) THRU	8	—+—
F	DR 1/8(.125) THRU	2	—+—


2.062 REF
1.000±.015
.500 ±.015
.656 BSC
.328 BSC
.468
.234
.328 BSC
.164 BSC
.438 ±.015
.438 ±.015
.032±.015 R (TYP)
.094
.188
.312±.015
.719 +.000 -.010
.438 ±.015
.312±.015
.562
A
B
B
C
C
A
.281 ±.015
.062R ±.015
.562 ±.015
.250 BSC
.281
.312 ±.015
.875 BSC
1.750 BSC
CHAMFER 45°×.062 (TYP) ±.015
.016±.010 R(TYP)
.250±.015
.125 ±.015
CHAMFER 45°×.062(TYP) ±.015
.094±.015
.062±.015 (TYP)
.047 ±.015
.145
.188±.015 (TYP)
1.000±.002
.125±.015
R (TYP)
1.000 BSC BETWEEN "C" HOLES
1.688
1.375 ±.015
.888
.688
.488
.062 REF
.375 ±.015
D
D
C
C
E
E
E
E
D
D
F
C
F
.188
.156 BSC
.312 BSC
.062R ±.015 (TYP)
.125±.015 (TYP)
.125±.015 (TYP)
.156
.406
.456
.656
.856
.906
1.156
1.312 +.000 -.010
B&S GA NO.14(.064)
.062±.015 R (TYP)
.125±.015
.562 ±.015


SEE NOTE 6
1
4
6
.125±.015
.250±.015 (TYP)
.125±.015
T1
R1
R2
SEE NOTE 6



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011942	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED. SPEC QQ-A-318
TEMPER H34

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 59386910030

DRAWN DATE 4-15-64
CHECKED 5/28/64
APPROVAL 5/
APPROVAL 6/3/64
NASA APPROVAL 6/4/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BRACKET,
COMPONENT MOUNTING

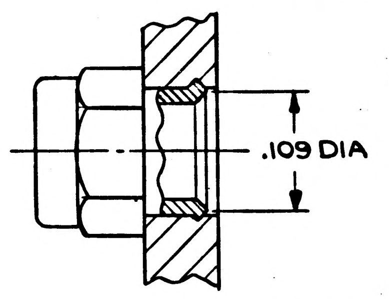
CODE IDENT NO.
SIZE D
NASA NUMBER 2011941
SCALE 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

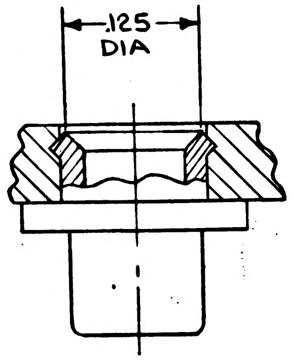
2011942

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

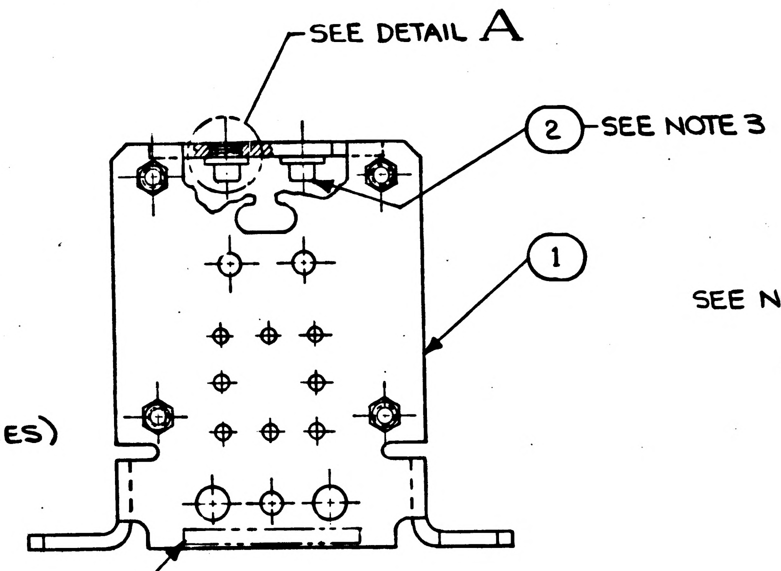
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019.
3. PRESS ITEMS 2 & 3 INTO ITEM 1, AND SWAGE TO DIMENSION SHOWN IN DETAILS A & B.



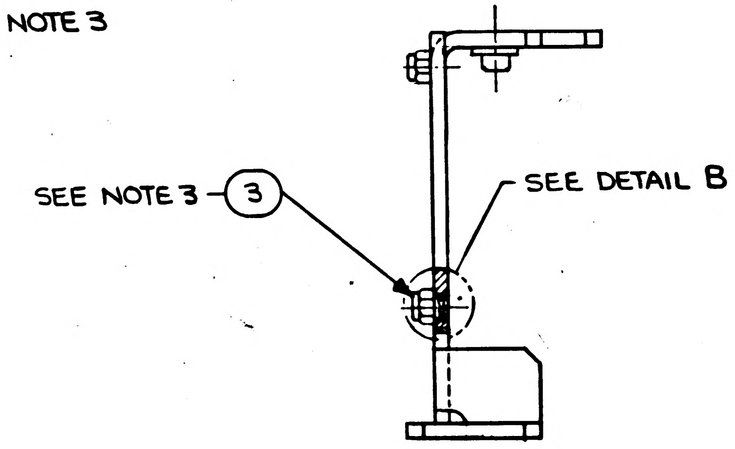
DETAIL "B" (TYP 4 PLACES)
SCALE 10/1



DETAIL A (TYP 2 PLACES)
SCALE 10/1



IDENTIFICATION MARK
SEE NOTE 2



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	4	*	1011766-3	—〃—		NUT, CLINCH, SELF LOCKING			
2	2	*	1000076-5	—〃—		NUT, CLINCH, FLUSH MOUNTED			
1	1		2011941	59386910030		BRACKET, COMPONENT MOUNTING			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING.

APPLICATION	
NEXT ASSY	USED ON
2011945	2011000

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .010	± ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910790

DRAWN J. Schulles DATE 4-15-64
CHECKED C. LENZ (CRT) 7/13/64
APPROVAL F. Ruschmann 7/13/64 QEC
APPROVAL E. Mhoup 7/13/64
NASA APPROVAL W. J. Rhyne 7-14-64
MIT APPROVAL 14 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BRACKET & NUT,
ASSEMBLY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2011942
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

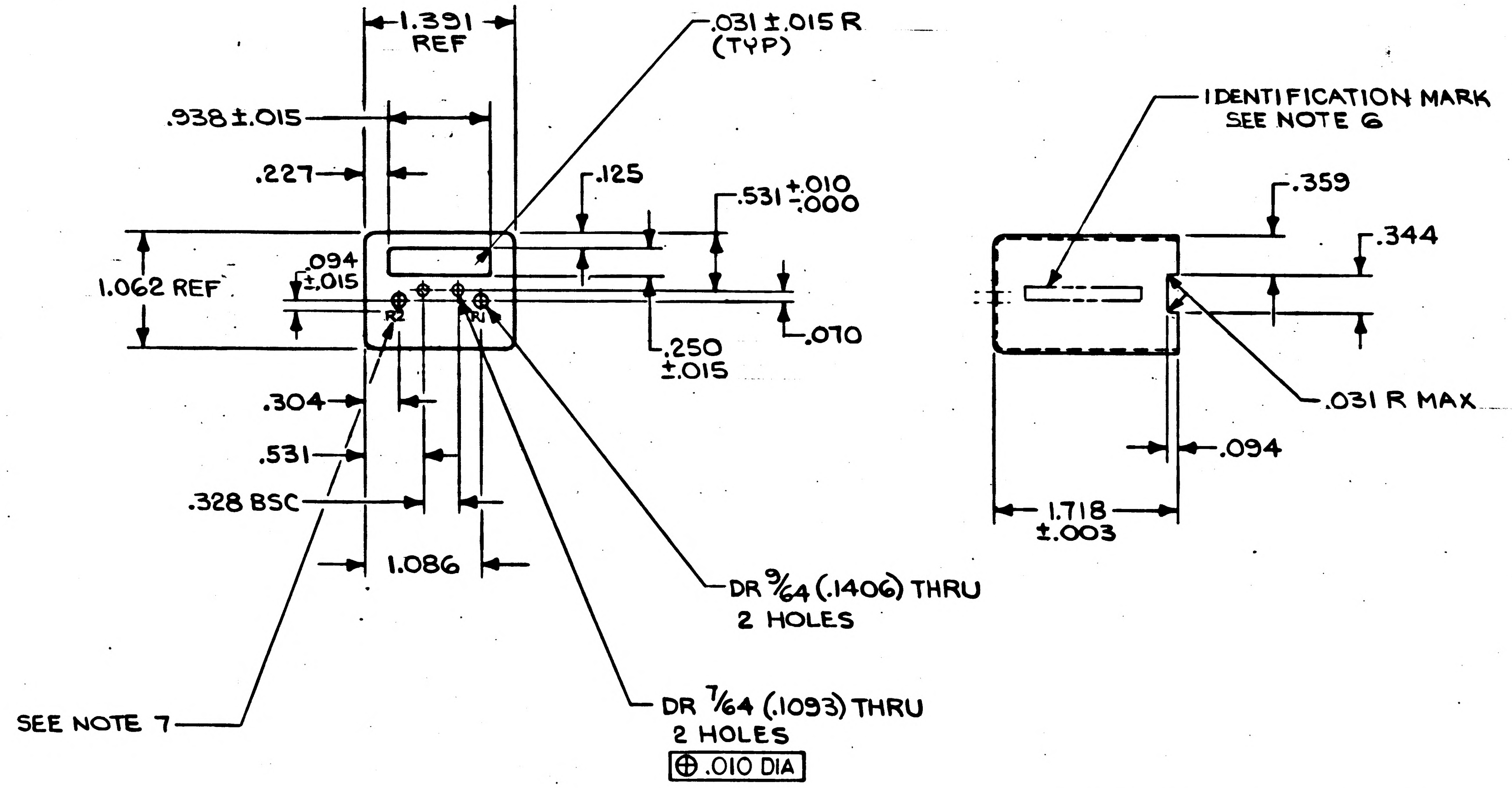
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011943

REVISIONS TDRR 05890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED, 63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625, TYPE II BLACK (KPS-1005A.201)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
7. MARK CHARACTERS AT LOCATIONS SHOWN IN ACCORDANCE WITH ND 1002019.


1.391 REF
.031 ± .015 R (TYP)
.938 ± .015
.227
.125
.531 +.010 -.000
1.062 REF
.094 ±.015
R2
R1
.250 ±.015
.070
.304
.531
.328 BSC
1.086
DR 9/64 (.1406) THRU 2 HOLES
DR 7/64 (.1093) THRU 2 HOLES
⊕ .010 DIA
SEE NOTE 7
IDENTIFICATION MARK SEE NOTE 6
.359
.344
.031 R MAX
.094
1.718 ±.003

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011946	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	± .005	± ~

DO NOT SCALE THIS DRAWING

MATERIAL 1010691-7

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 48386910050

DRAWN J. Scheller DATE 4-15-64
CHECKED Pickering 5/29/64
APPROVAL E. Renstrom 5/29/64
APPROVAL E. Thomas 6/1/64
NASA APPROVAL K Michael 6/5/64
MIT APPROVAL L Halpil 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE COVER, MODULE

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011943

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011943

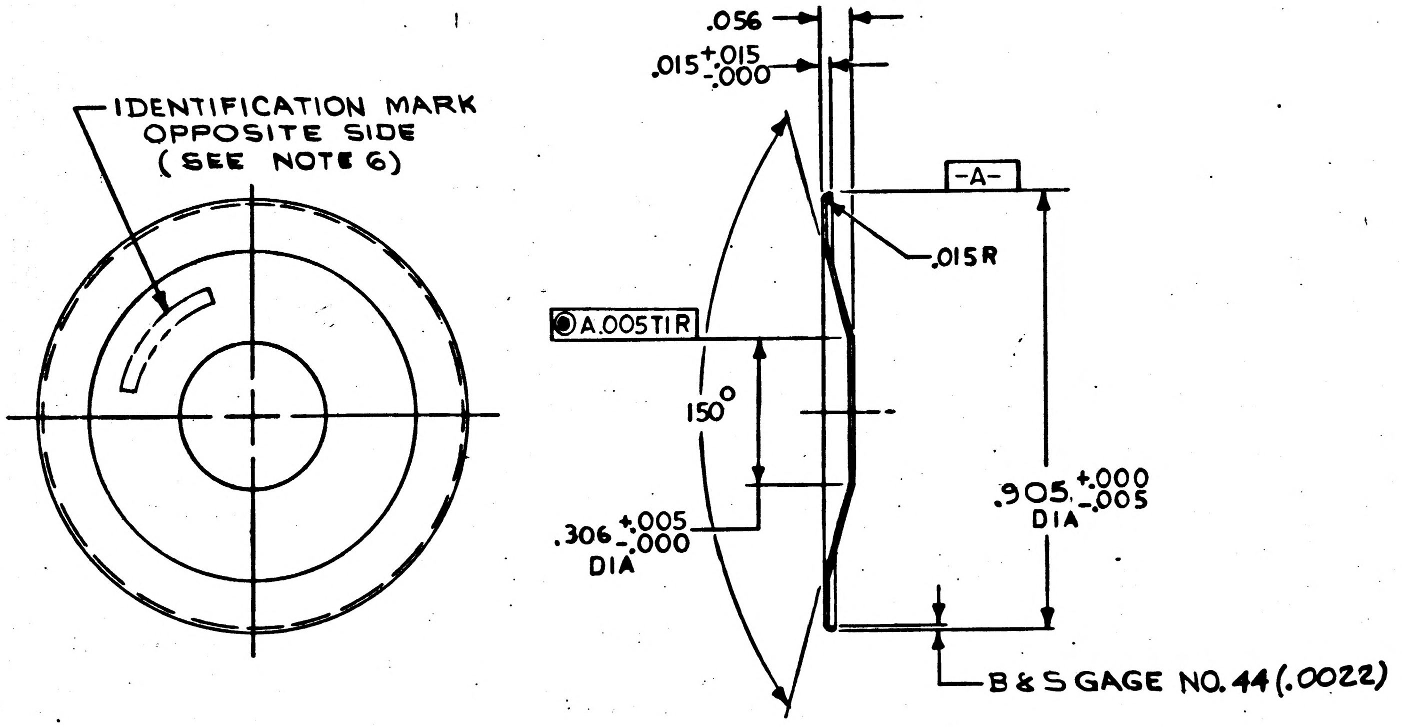
MASTER

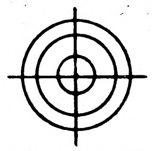
INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

2011944

REVISIONS TORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED: 63/√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACKEN IN ACCORDANCE WITH MIL-F-495B
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.




ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011704	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL PHOSPHOR-BRONZE
FED. SPEC QQ-P-330
COMP A, COND SPRING

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910180

DRAWN J Schiller DATE 4-3-64
CHECKED 5/13/64
APPROVAL G. Richman 6/15/64
APPROVAL E. Thomp 6/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WASHER, SPRING

CODE IDENT NO.
SIZE C
NASA NUMBER 2011944
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011944

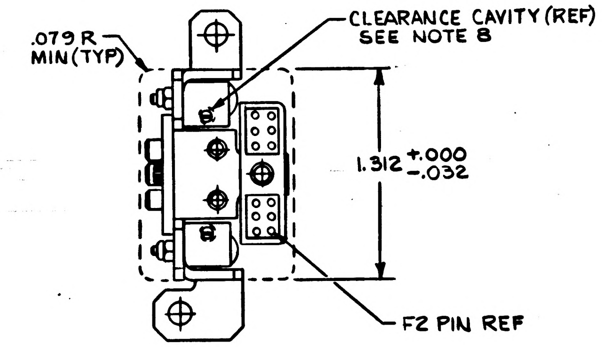
2011945 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17394	[illegible] 65	WK

REVISIONS 12217

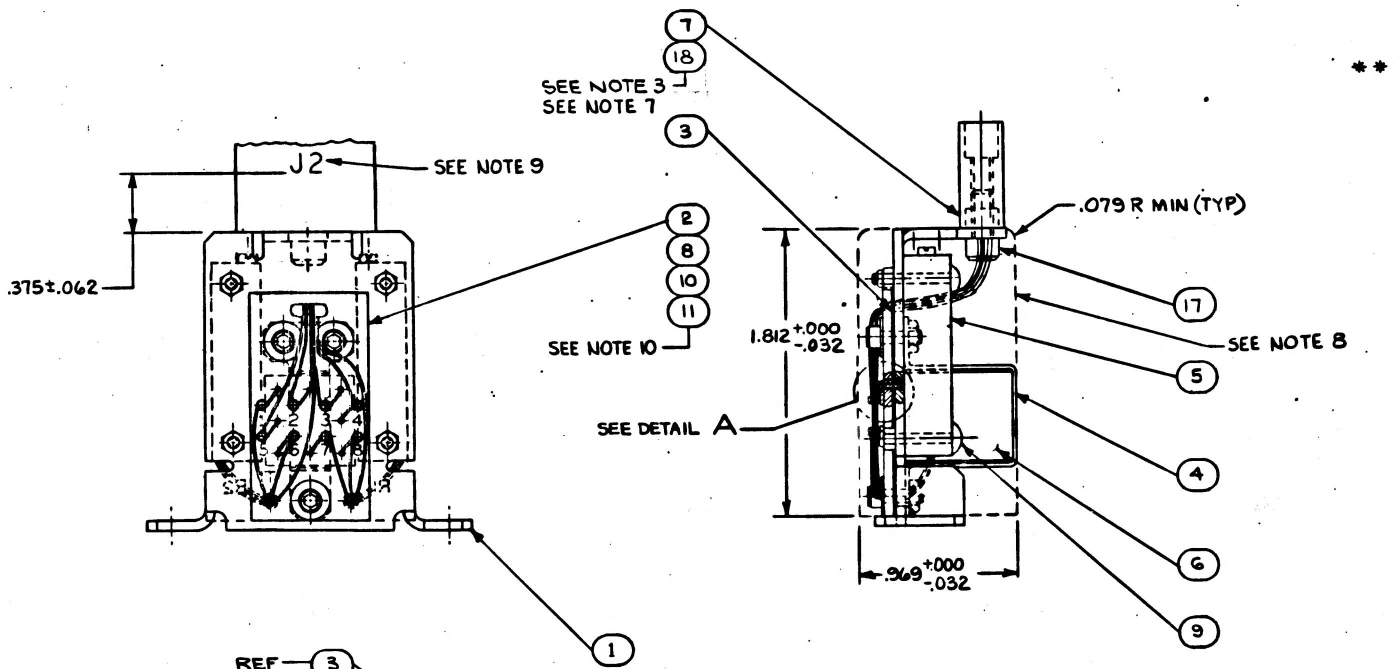
NOTES:

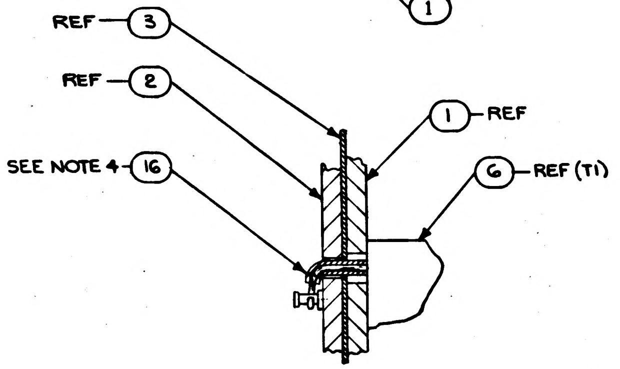
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2011949.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 18, IN ACCORDANCE WITH ND1002206.
4. PLACE ITEM 16 ON EIGHT (8) LEADS EMANATING FROM TRANSFORMER (ITEM 6) ONLY.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071.
6. PERFORM CONTINUITY CHECK.
7. POT REAR OF CONNECTOR IN ACCORDANCE WITH ND1002240, METHOD "A" OR "B"
   - A. POTTING SHALL NOT INTERFERE WITH MOUNTING SCREW OPERATION.
   - B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 3/16 INCH.
8. ENCAPSULATE MODULE PER ND1002036. CLEARANCE CAVITIES FOR TRIM RESISTORS MUST BE FREE OF ENCAPSULATION MATERIAL.
9. MARK REF DESIGNATION .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
10. VIBRATION PROOF ITEM 11 WITH LOCKING COMPOUND USING GRADE "E" OF MIL-S-22473 PER ND1002211.
11. IDENTIFY USING NASA DWG.NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).



WIRING LEGEND				
COND. NO.**	COLOR	ITEM NO.	FROM	TO
A1	RED	13	TB1-3	J2-E1
A2	BLACK	15	TB1-4	J2-E2
A3	BROWN	14	TB1-2	J2-F2
A4	ORANGE	12	TB1-5	J2-D2
A5	RED	—	R1-RED	J2-F1
A6	RED	—	R2-RED	J2-D1
A7	—	—	T1-1	TB1-3
A8	—	—	T1-2	TB1-4
A9	—	—	T1-3	TB1-8
A10	—	—	T1-4	TB1-2
A11	—	—	T1-5	TB1-7
A12	—	—	T1-6	TB1-1
A13	—	—	T1-7	TB1-5
A14	—	—	T1-8	TB1-6
A15	GREEN	—	R1-GREEN	TB1-8
A16	YELLOW	—	R1-YELLOW	TB1-7
A17	GREEN	—	R2-GREEN	TB1-1
A18	YELLOW	—	R2-YELLOW	TB1-6

** FOR REF ONLY





DETAIL A
SCALE 4/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	12	*	1010770-1	—		CONTACT, CRIMP TYPE, #22			
17	1		NAS1352C06LL4	74455157013		SCREW, CAP, HEX SOC HD, SELF LOCKING			
16	AR	*	1006776-22	—		INSULATION SLEEVING, ELECTRICAL			
15	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
14	1	*	1010416-12	—		↕			
13	1	*	1010416-13	—		↕			
12	1	*	1010416-14	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
11	3		MS35649-24	61501051002		NUT, PLAIN, HEXAGON			
10	3		NAS1352C02-6	—		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	4		AN520C1-8	—		SCREW, MACHINE, ROUND HEAD.			
8	3		MS15795-802	—		WASHER, FLAT			
7	1	*	1010808-001	—		RECEPTACLE, CONNECTOR, ELECTRICAL			
6	1	*	1010651	—		TRANSFORMER, SEXTANT RESOLVER ALIGNMENT			
5	2	*	1010373-17	—		RESISTOR, VARIABLE, TRIMMER			
4	1		2011939	59386910020		BRACKET, TRANSFORMER RETAINING			
3	1		2011937	25386910120		INSULATION, ELECTRICAL			
2	1		2011938	85386910800		TERMINAL BOARD, ASSY OF			
1	1		2011942	85386910790		BRACKET AND NUT, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011946	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910780

DRAWN [illegible] DATE 4-15-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL [illegible] 8/27/64
APPROVAL E. [illegible] 8/31/64
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RESOLVER TRIMMING MODULE,
ASSEMBLY OF

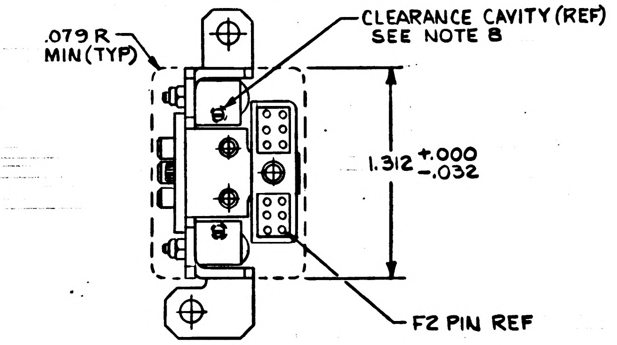
CODE IDENT NO.
SIZE D
NASA NUMBER 2011945
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2011945 A

MASTER

2011945 B

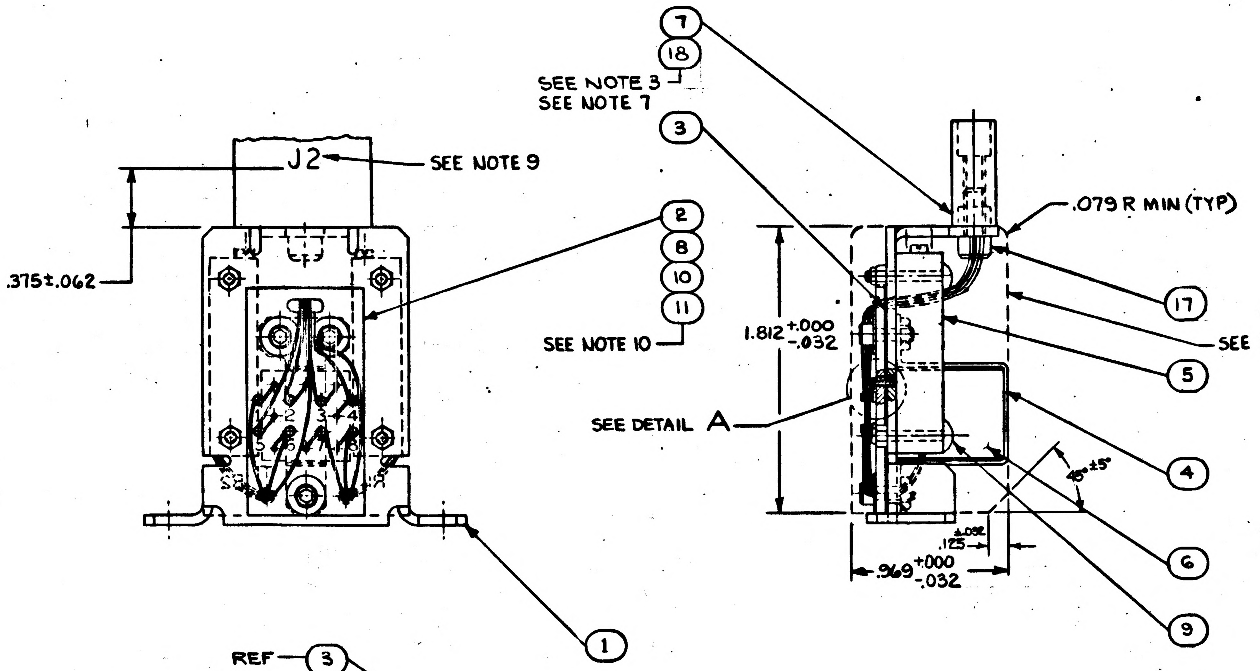
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2011949.
3. INSTALL CRIMP STYLE TERMINALS, ITEM 18, IN ACCORDANCE WITH ND1002206.
4. PLACE ITEM 16 ON EIGHT (8) LEADS EMANATING FROM TRANSFORMER (ITEM 6) ONLY.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, IN ACCORDANCE WITH ND1002071.
6. PERFORM CONTINUITY CHECK.
7. POT REAR OF CONNECTOR IN ACCORDANCE WITH ND1002240, METHOD "A" OR "B"
   A. POTTING SHALL NOT INTERFERE WITH MOUNTING SCREW OPERATION.
   B. POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF 3/16 INCH.
8. ENCAPSULATE MODULE PER ND1002036. CLEARANCE CAVITIES FOR TRIM RESISTORS MUST BE FREE OF ENCAPSULATION MATERIAL.
9. MARK REF DESIGNATION .125 ± .020 HIGH IN ACCORDANCE WITH ND1002019.
10. VIBRATION PROOF ITEM 11 WITH LOCKING COMPOUND USING GRADE "E" OF MIL-S-22473 PER ND1002211.
11. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING).

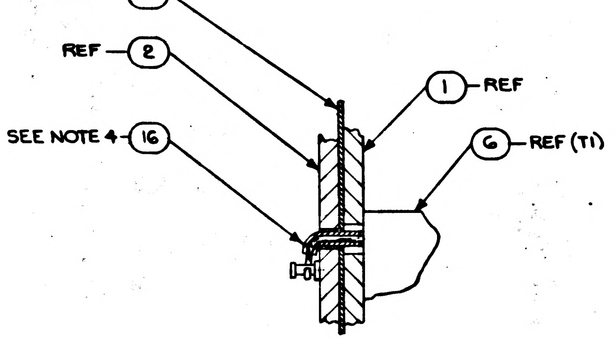


REVISIONS 12219				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO 17394	65	WK
B		REVISED PER TDRR 18014	4/1/65	WL

WIRING LEGEND				
COND. NO.**	COLOR	ITEM NO.	FROM	TO
A1	RED	13	TB1-3	J2-E1
A2	BLACK	15	TB1-4	J2-E2
A3	BROWN	14	TB1-2	J2-F2
A4	ORANGE	12	TB1-5	J2-D2
A5	RED	—	R1-RED	J2-F1
A6	RED	—	R2-RED	J2-D1
A7	—	—	T1-1	TB1-3
A8	—	—	T1-2	TB1-4
A9	—	—	T1-3	TB1-8
A10	—	—	T1-4	TB1-2
A11	—	—	T1-5	TB1-7
A12	—	—	T1-6	TB1-1
A13	—	—	T1-7	TB1-5
A14	—	—	T1-8	TB1-6
A15	GREEN	—	R1-GREEN	TB1-8
A16	YELLOW	—	R1-YELLOW	TB1-7
A17	GREEN	—	R2-GREEN	TB1-1
A18	YELLOW	—	R2-YELLOW	TB1-6

** FOR REF ONLY





DETAIL A
SCALE 4/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	12	*	1010770-1	—		CONTACT, CRIMP TYPE, #22			
17	1		NAS1352C06LL4	74455157013		SCREW, CAP, HEX SOC HD, SELF LOCKING			
16	AR	*	1006776-22	—		INSULATION SLEEVING, ELECTRICAL			
15	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
14	1	*	1010416-12	—		↕			
13	1	*	1010416-13	—		↕			
12	1	*	1010416-14	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
11	3		MS35649-24	61501051002		NUT, PLAIN, HEXAGON			
10	3		NAS1352C02-6	—		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	4		AN520C1-8	—		SCREW, MACHINE, ROUND HEAD.			
8	3		MS15795-802	—		WASHER, FLAT			
7	1	*	1010808-001	—		RECEPTACLE, CONNECTOR, ELECTRICAL			
6	1	*	1010651	—		TRANSFORMER, SEXTANT RESOLVER ALIGNMENT			
5	2	*	1010373-17	—		RESISTOR, VARIABLE, TRIMMER			
4	1		2011939	59386910020		BRACKET, TRANSFORMER RETAINING			
3	1		2011937	25386910120		INSULATION, ELECTRICAL			
2	1		2011938	85386910800		TERMINAL BOARD, ASSY OF			
1	1		2011942	85386910790		BRACKET AND NUT, ASSY OF			

LIST OF PARTS AND MATERIALS

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

NEXT ASSY	USED ON
2011946	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910780
DRAWN DATE 4-15-64
CHECKED T. SULLIVAN 8-27-64
APPROVAL 8/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RESOLVER TRIMMING MODULE,
ASSEMBLY OF

CODE IDENT NO. | SIZE D | NASA NUMBER 2011945
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011945

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

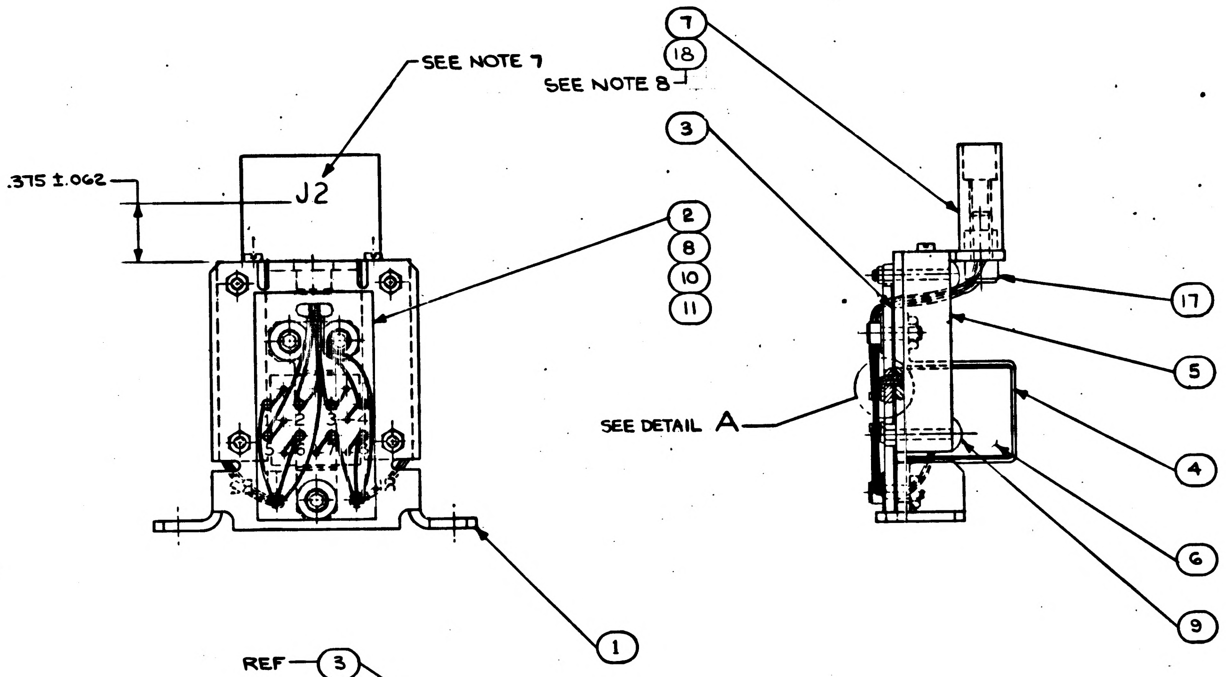
NOTES:

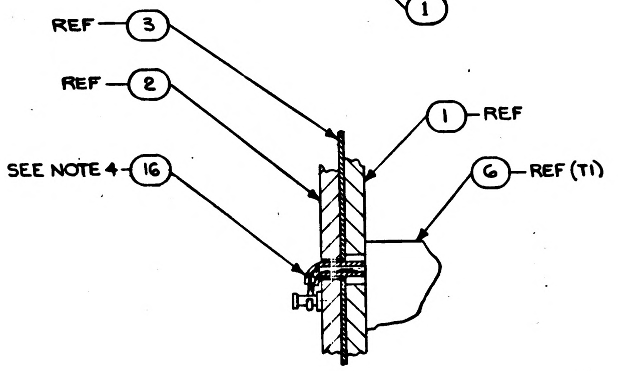
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. REFER TO WIRING SCHEMATIC, NASA DWG NO. 2011949.
3. SLIDE ITEM 17 OVER WIRES BEYOND STRIPPED ENDS.
4. PLACE ITEM 16 ON EIGHT (8) LEADS EMANATING FROM TRANSFORMER (ITEM 6) ONLY.
5. SOLDER CONDUCTORS, PER WIRING LEGEND, WITH Sn60WRAP2 PER QQ-S-571, PER MSFC-PROC-158.
6. PERFORM CONTINUITY CHECK.
7. MARK REF DESIGNATION .125±.020 HIGH IN ACCORDANCE WITH ND1002019.
8. INSTALL CRIMP STYLE TERMINALS, ITEM 18, IN ACCORDANCE WITH ND1002206.
9. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).

WIRING LEGEND

COND. NO.**	COLOR	ITEM NO.	FROM	TO
A1	RED	13	TB1-3	J2-C1
A2	BLACK	15	TB1-4	J2-D1
A3	BROWN	14	TB1-2	J2-B2
A4	ORANGE	12	TB1-5	J2-E2
A5	RED	—	R1-RED	J2-A1
A6	RED	—	R2-RED	J2-F1
A7	—	—	T1-1	TB1-3
A8	—	—	T1-2	TB1-4
A9	—	—	T1-3	TB1-8
A10	—	—	T1-4	TB1-2
A11	—	—	T1-5	TB1-7
A12	—	—	T1-6	TB1-1
A13	—	—	T1-7	TB1-5
A14	—	—	T1-8	TB1-6
A15	GREEN	—	R1-GREEN	TB1-8
A16	YELLOW	—	R1-YELLOW	TB1-7
A17	GREEN	—	R2-GREEN	TB1-1
A18	YELLOW	—	R2-YELLOW	TB1-6

** FOR REF ONLY





DETAIL A
SCALE 4/1

* PURCHASE ITEM - SEE SPECIFICATION CONTROL DRAWING BEFORE ORDERING.

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
18	6	*	1010810-1			CONTACT, CRIMP TYPE, #22			
17	1	*	1011625-39	74455151040		SCREW, CAP, HEX SOC HD, SELF LOCKING			
16	AR	*	1006776-22	—		INSULATION SLEEVING, ELECTRICAL			
15	1	*	1010416-11	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
14	1	*	1010416-12	—		↕			
13	1	*	1010416-13	—					
12	1	*	1010416-14	—		WIRE, ELECTRICAL, STRANDED, INSULATED			
11	3		MS35649-24	61501051002		NUT, PLAIN, HEXAGON			
10	3		NAS1352C02LL4	74455157006		SCREW, CAP, HEX SOC HD, SELF LOCKING			
9	4		AN520C1-8	—		SCREW, MACHINE, ROUND HEAD			
8	3		MS15795-302	—		WASHER, FLAT			
7	1	*	1010808-1	—		RECEPTACLE, CONNECTOR, ELECTRICAL			
6	1	*	1010651	—		TRANSFORMER, SEXTANT RESOLVER ALIGNMENT			
5	2	*	1010360-22	—		RESISTOR, VARIABLE, TRIMMER			
4	1		2011939	59386910020		BRACKET, TRANSFORMER RETAINING			
3	1		2011937	25386910120		INSULATION, ELECTRICAL			
2	1		2011938	85386910800		TERMINAL BOARD, ASSY OF			
1	1		2011942	85386910790		BRACKET AND NUT, ASSY OF			

2011946	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910780
DRAWN DATE 4-15-64
CHECKED J. SULLIVAN 8-27-64
APPROVAL 8/27/64
APPROVAL 8/31/64
NASA APPROVAL
MIT APPROVAL Sep 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RESOLVER TRIMMING MODULE, ASSEMBLY OF

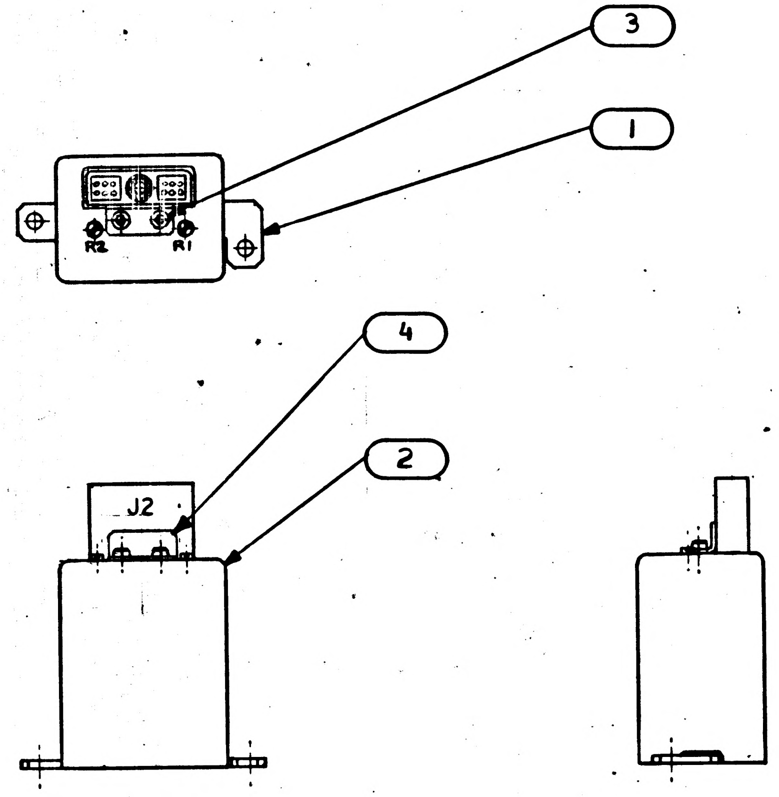
CODE IDENT NO. | SIZE D | NASA NUMBER 2011945
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2011946

SYM	ZONE	REVISIONS 11749 DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
4	1		2012377	59386910090		PLATE, ANGLE			
3	2		NAS1352C024	—		SCREW, CAP, HEX SOC HD, (PLAIN)			
2	1		2011943	48386910050		COVER, MODULE			
1	1		2011945	85386910780		RESOLVER TRIMMING MODULE, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ –	+ –	+ –

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910810

DRAWN DATE 7-31-64
CHECKED T. SULLIVAN 8-10-64
APPROVAL 8/12/64
APPROVAL E. Thoup 8/14/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RESOLVER TRIMMING MODULE
ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 2011946
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-184

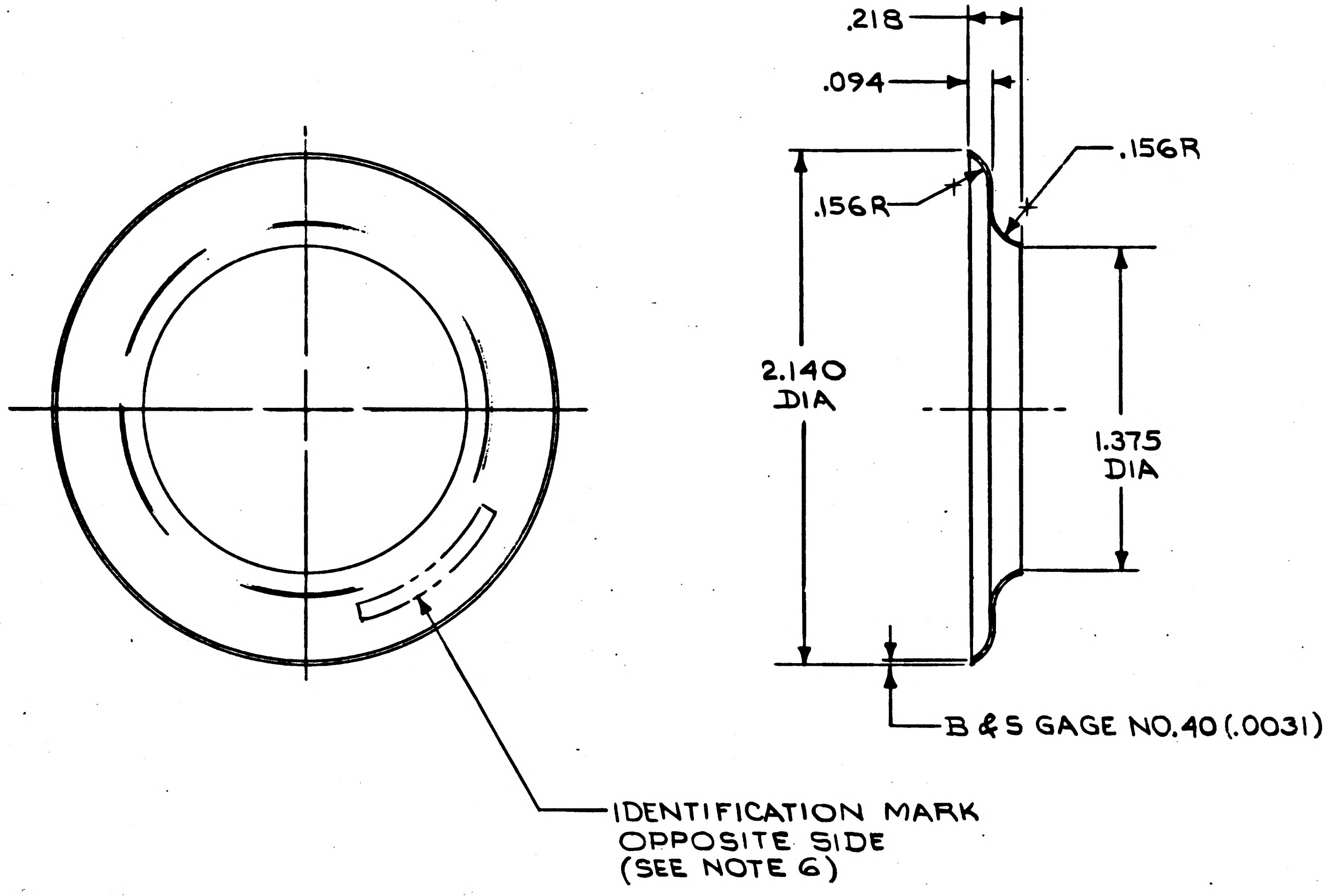
2011946

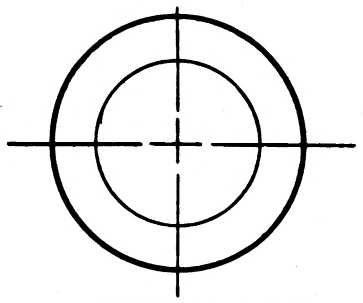
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011947

REVISIONS TORR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED: 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002078.
5. FINISH: BLACKENED IN ACCORDANCE WITH MIL-F-495B.
6. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
7. AFTER FORMING, HARDEN PER MIL-H-7199 TO ROCKWELL C33-40.


.218
.094
.156R
.156R
2.140 DIA
1.375 DIA
B & S GAGE NO. 40 (.0031)
IDENTIFICATION MARK OPPOSITE SIDE (SEE NOTE 6)



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011722	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM COPPER
FED. SPEC QQ-C-533, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910170

DRAWN R. BRUNELLE DATE 4-2-64
CHECKED 5/27/64
APPROVAL 5/23/64
APPROVAL 6/1/64
NASA APPROVAL 6/3/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
WASHER, SPRING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2011947

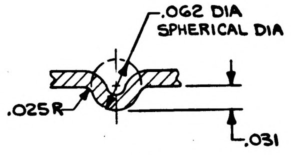
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011947

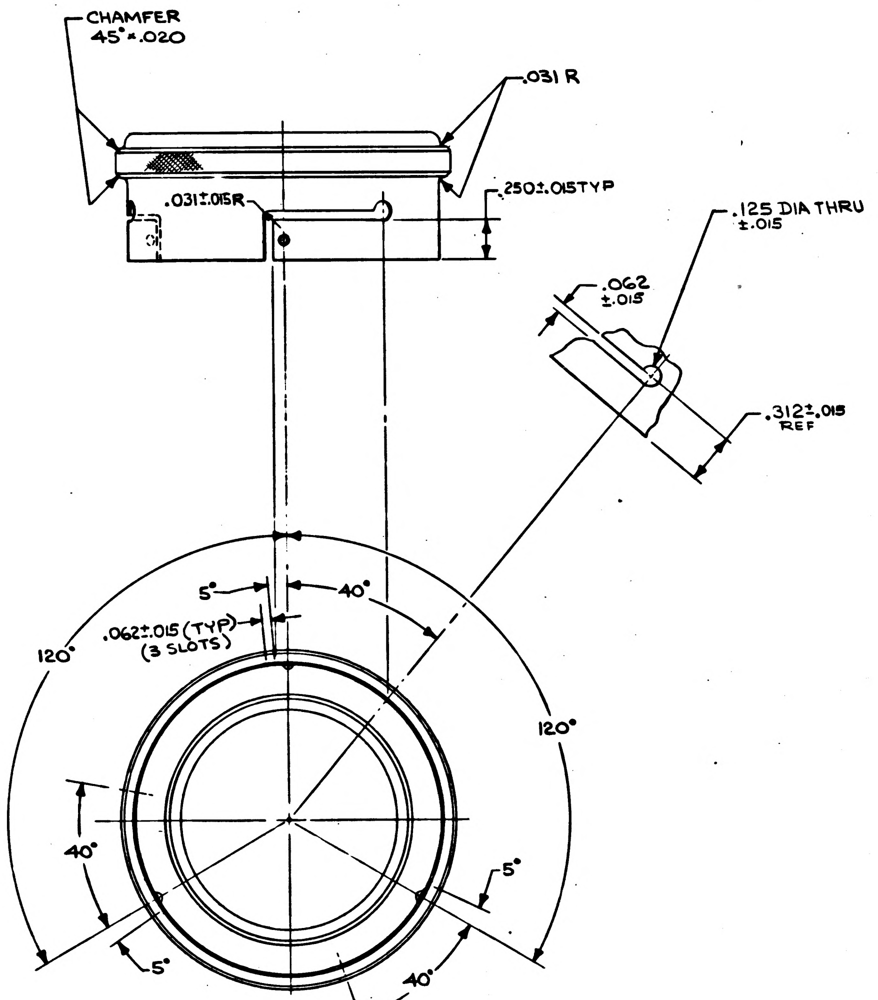
E-154

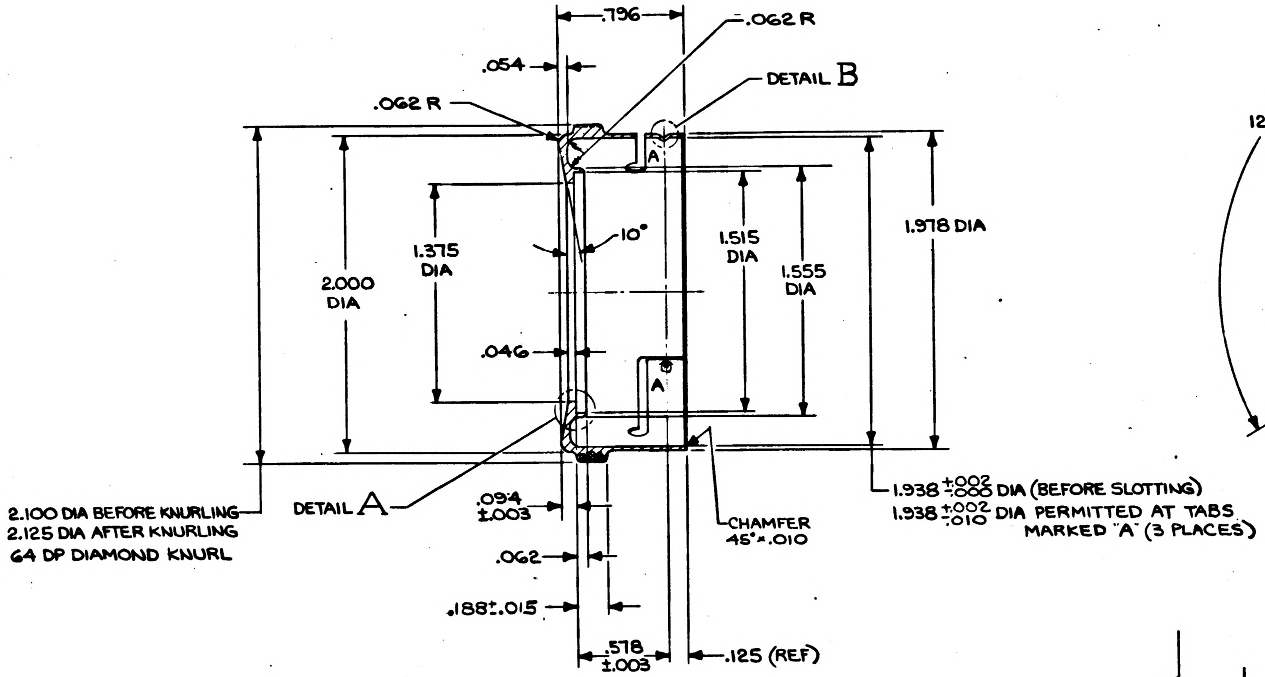
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

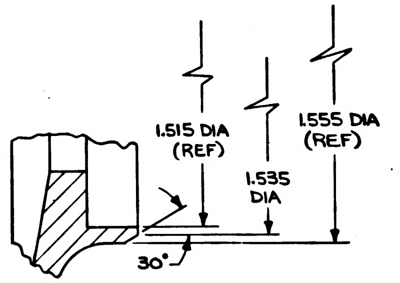
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3 (KPS-1005B.100).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.


.062 DIA
SPHERICAL DIA
.025 R
.031

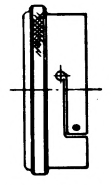
DETAIL B
TYP 3 PLACES
SCALE 10/1


CHAMFER 45° × .020
.031 R
.250±.015 TYP
.031±.015 R
.125 DIA THRU ±.015
.062 ±.015
.312±.015 REF
5°
40°
.062±.015 (TYP) (3 SLOTS)
120°
120°
40°
5°
5°
40°


.796
.054
.062 R
.062 R
DETAIL B
2.000 DIA
1.375 DIA
10°
1.515 DIA
1.555 DIA
1.978 DIA
.046
A
A
2.100 DIA BEFORE KNURLING
2.125 DIA AFTER KNURLING
64 DP DIAMOND KNURL
DETAIL A
.094 ±.003
.062
.188±.015
.578 ±.003
.125 (REF)
CHAMFER 45° × .010
1.938 +.002 −.000 DIA (BEFORE SLOTTING)
1.938 +.002 −.010 DIA PERMITTED AT TABS MARKED "A" (3 PLACES)


1.515 DIA (REF)
1.535 DIA
1.555 DIA (REF)
30°

DETAIL A
SCALE 10/1



ACTUAL SIZE

A	2011957

REVISIONS TDRR C9F90

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13798	10/26/64	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011931	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTING STEEL FED. SPEC QQ-S-763 CLASS 303, COND. A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910910

DRAWN E. DRAPALA DATE 4-13-64
CHECKED 5/20/64
APPROVAL 5/28/64
APPROVAL E. Thomas 6/2/64
NASA APPROVAL 6/1/64
MIT APPROVAL 6/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RETAINER, FILTER

CODE IDENT NO.
SIZE D
NASA NUMBER 2011957

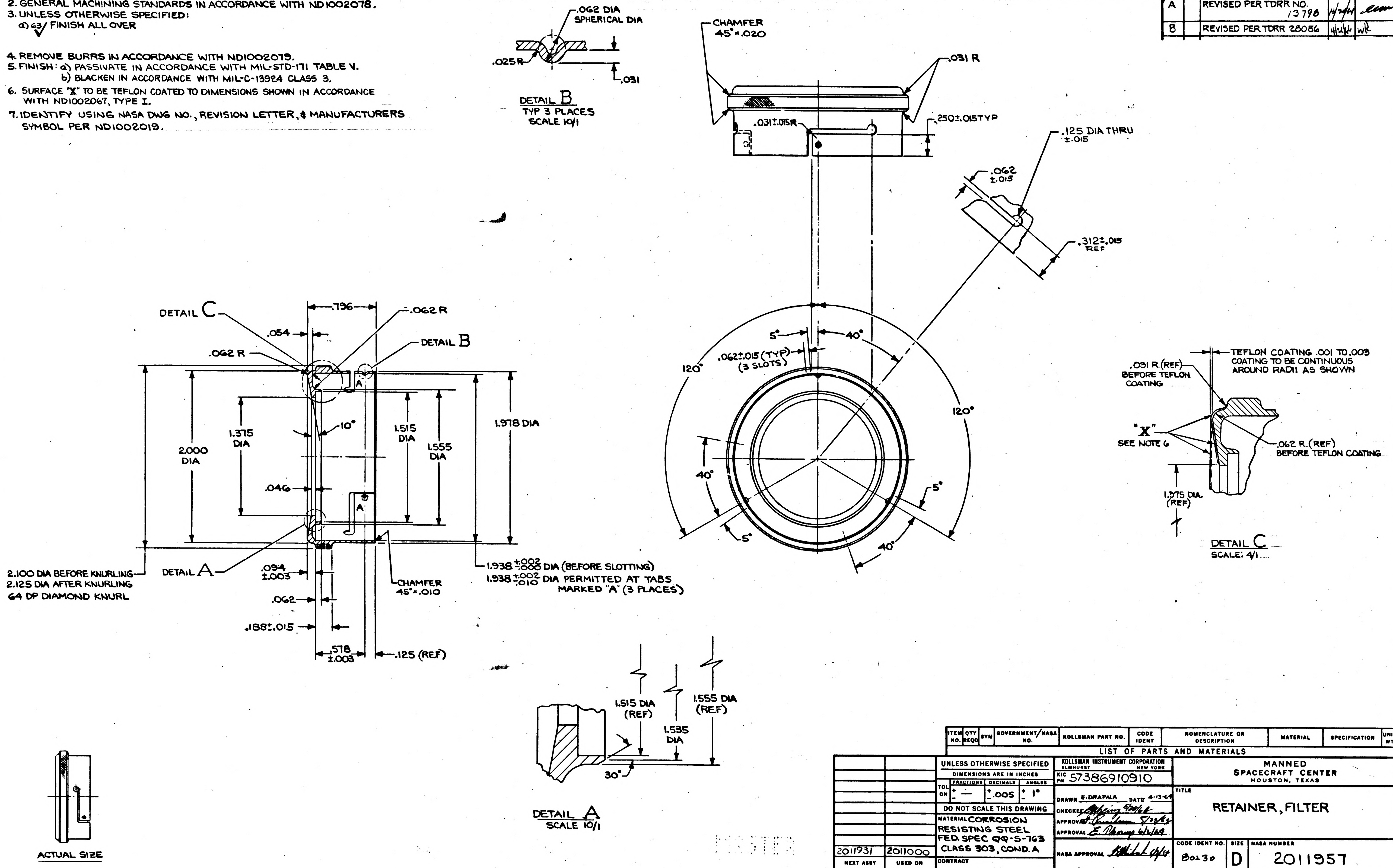
SCALE 2/1 & 10/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

B	2011957

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 13798	10/29/64	
B		REVISED PER TDRR 28086	4/21/66	WR

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V.
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3.
6. SURFACE "X" TO BE TEFLON COATED TO DIMENSIONS SHOWN IN ACCORDANCE WITH ND1002067, TYPE I.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.



.062 DIA SPHERICAL DIA
.025R
.031
DETAIL B
TYP 3 PLACES
SCALE 10/1
CHAMFER 45°×.020
.031 R
.031±.015R
.250±.015TYP
.125 DIA THRU ±.015
.062 ±.015
.312±.015 REF
DETAIL C
.796
.062 R
.054
DETAIL B
.062 R
10°
1.375 DIA
2.000 DIA
1.515 DIA
1.555 DIA
1.978 DIA
.046
A
2.100 DIA BEFORE KNURLING
2.125 DIA AFTER KNURLING
64 DP DIAMOND KNURL
DETAIL A
.094 ±.003
.062
.188±.015
.578 ±.003
.125 (REF)
CHAMFER 45°×.010
1.938 +.002 -.000 DIA (BEFORE SLOTTING)
1.938 +.002 -.010 DIA PERMITTED AT TABS MARKED "A" (3 PLACES)
5°
40°
120°
.062±.015 (TYP) (3 SLOTS)
120°
40°
5°
5°
40°
.031 R (REF) BEFORE TEFLON COATING
TEFLON COATING .001 TO .003 COATING TO BE CONTINUOUS AROUND RADII AS SHOWN
"X"
SEE NOTE 6
.062 R (REF) BEFORE TEFLON COATING
1.375 DIA (REF)
DETAIL C
SCALE: 4/1
1.515 DIA (REF)
1.555 DIA (REF)
1.535 DIA
30°
DETAIL A
SCALE 10/1
ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011931	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTING STEEL FED. SPEC QQ-S-763 CLASS 303, COND. A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910910

DRAWN E. DRAPALA DATE 4-13-64
CHECKED 5/20/64
APPROVAL 5/28/64
APPROVAL E. Thomas 6/2/64
NASA APPROVAL 6/5/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, FILTER

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2011957

SCALE 2/1 & 10/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2011957 B

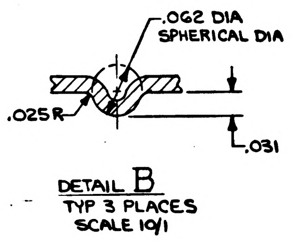
E-186

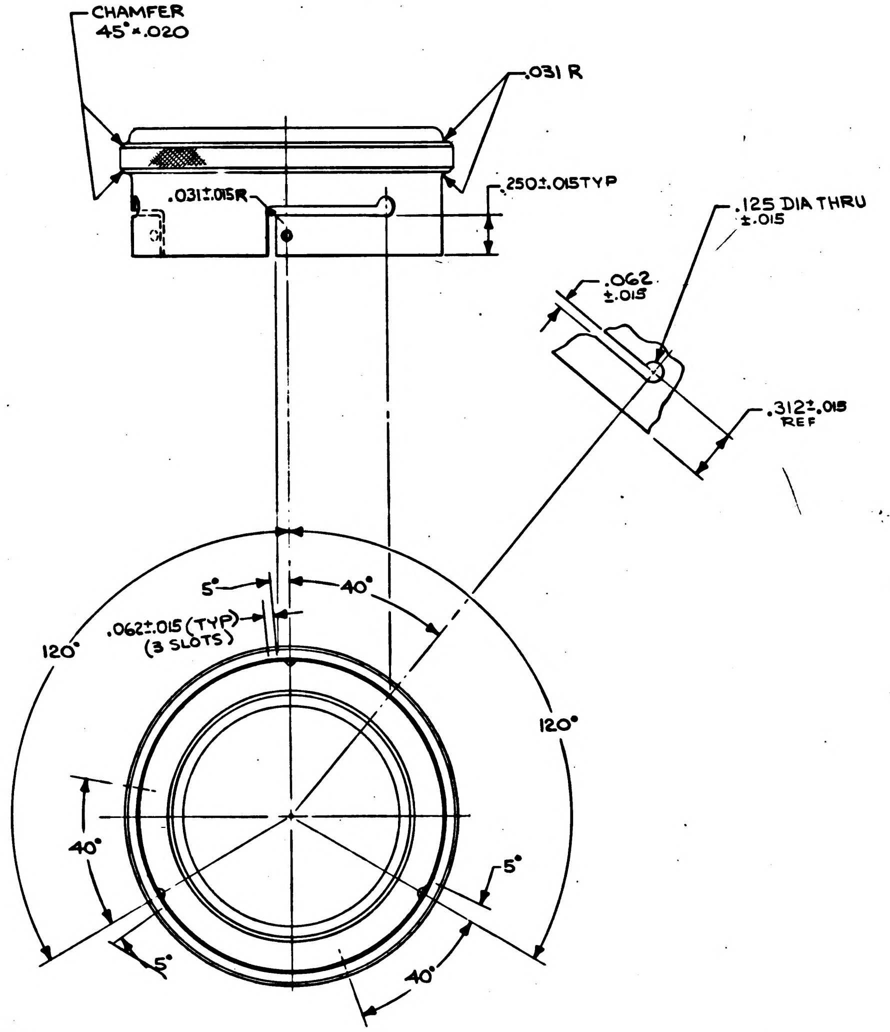
2011957

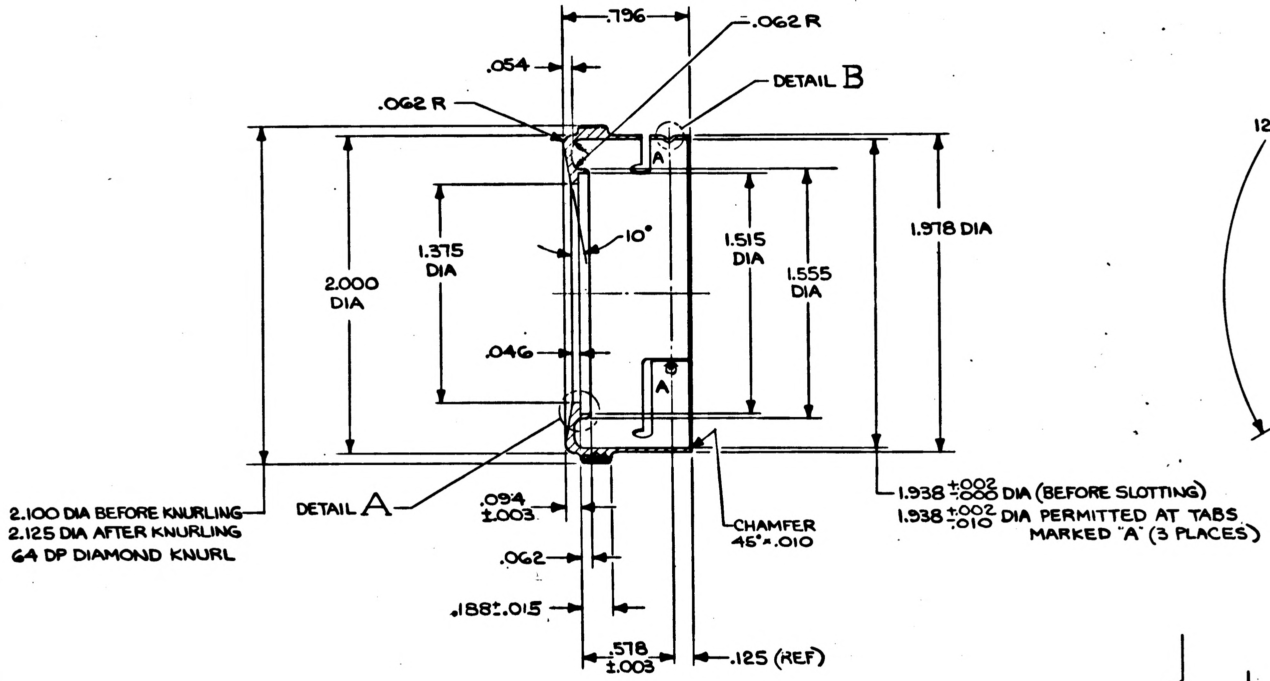
SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVAL

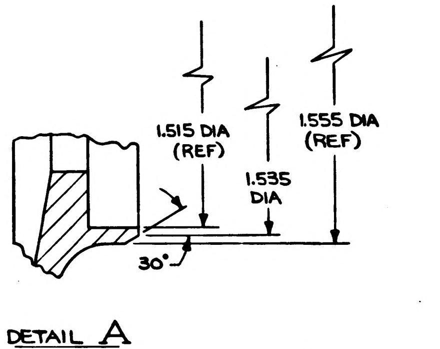
NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: a) PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200)
   b) BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3 (KPS-1005B.100).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER, & MANUFACTURERS SYMBOL PER ND1002019.

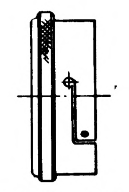

.062 DIA
SPHERICAL DIA
.025 R
.031
DETAIL B
TYP 3 PLACES
SCALE 10/1


CHAMFER
45° × .020
.031 R
.031±.015R
.250±.015 TYP
.125 DIA THRU
±.015
.062
±.015
.312±.015
REF
5°
40°
.062±.015 (TYP)
(3 SLOTS)
120°
120°
40°
5°
5°
40°


.796
.062 R
.054
.062 R
DETAIL B
2.000
DIA
1.375
DIA
10°
1.515
DIA
1.555
DIA
1.978 DIA
.046
A
A
DETAIL A
2.100 DIA BEFORE KNURLING
2.125 DIA AFTER KNURLING
64 DP DIAMOND KNURL
.094
±.003
.062
.188±.015
.578
±.003
.125 (REF)
CHAMFER
45° × .010
1.938 +.002 −.000 DIA (BEFORE SLOTTING)
1.938 +.002 −.010 DIA PERMITTED AT TABS MARKED "A" (3 PLACES)


1.515 DIA
(REF)
1.535
DIA
1.555 DIA
(REF)
30°

DETAIL A
SCALE 10/1



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011931	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 5°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTING STEEL FED. SPEC QQ-S-763 CLASS 303, COND. A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910910

DRAWN E. DRAPALA DATE 4-13-64
CHECKED 5/20/64
APPROVAL 5/22/64
APPROVAL E. 6/2/64
NASA APPROVAL
MIT APPROVAL 6/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETAINER, FILTER

CODE IDENT NO.
SIZE D
NASA NUMBER 2011957
SCALE 8/1 & 10/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

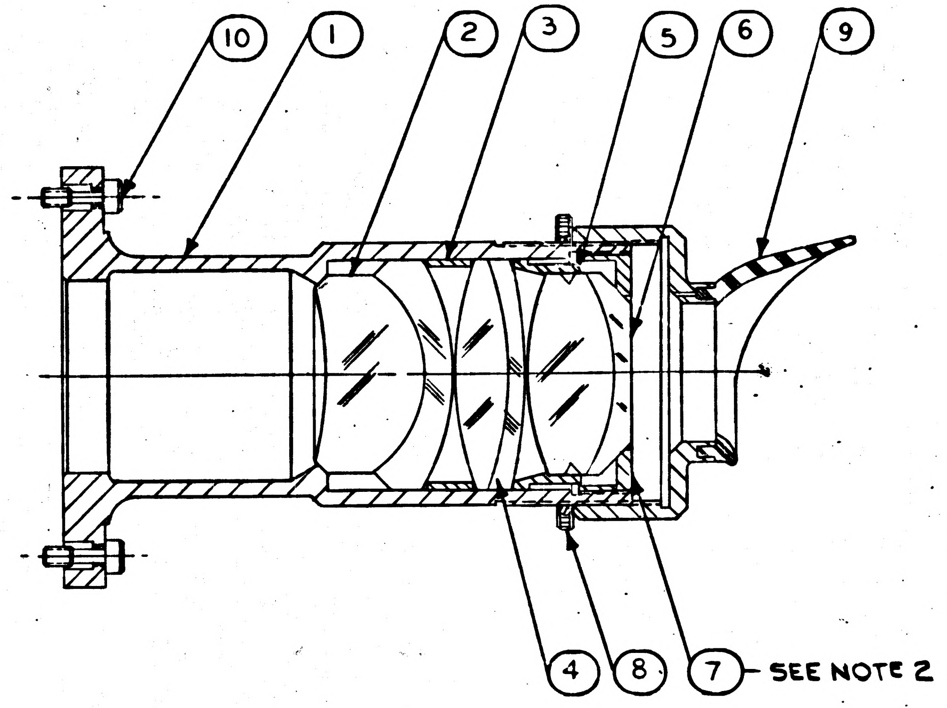
2011957

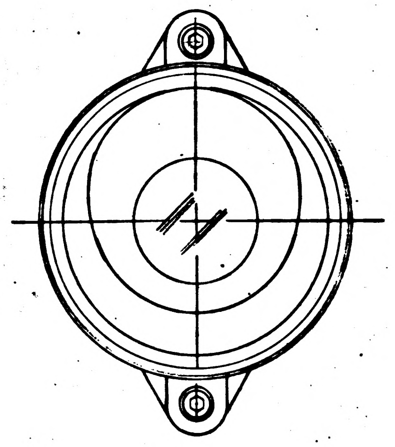
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011960

REVISIONS TORR 12655				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. APPLY TO 1/3 CIRC OF THE LAST THREAD TO ENTER THREADED HOLE, SEALING COMPOUND OF MIL-S-22473, GRADE HV, PER ND 1002211
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING).





2011960

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
10	2		2012490	48386910090		SCREW, CAPTIVE HEX SOCKET HEAD			
9	1		2011965	85386910550		SCT EYEGUARD ASSEMBLY			
8	1		2011962	57386910740		RING, LOCKING			
7	1		2011963	57386910730		RING, LOCKING			
6	1		2011967	76386910080		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
5	1		2011661	57386910270		SPACER, LENS			
4	1		2011708	76386910020		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
3	1		2011660	57386910260		SPACER LENS			
2	1		2011707	76386910010		LENS, ASSY OF (TELESCOPE OBJECTIVE)			
1	1		2011961	50386910030		HOUSING, EYEPIECE SCT			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011000	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	±	±	±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST, NEW YORK
KIC PN 85386910560

DRAWN J. Schiller DATE 4-10-64
CHECKED C. Leinz (CRF) 7-13-64
APPROVAL 9-10-64
APPROVAL E. Zhong 9/10/64
NASA APPROVAL
MIT APPROVAL 9/17/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SCT EYEPIECE, ASSEMBLY

CODE IDENT NO.
SIZE C
NASA NUMBER 2011960
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

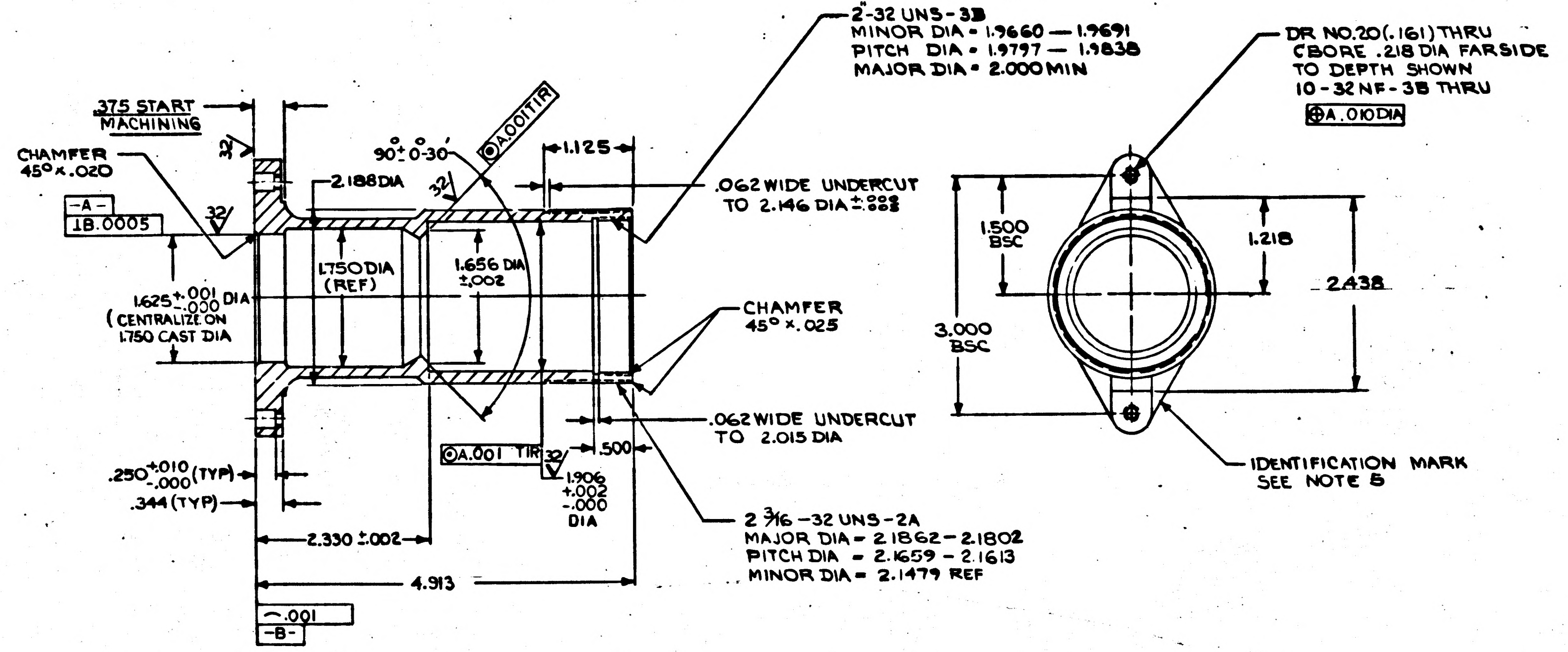
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

A 2011961

REVISIONS TDRR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR / 2676		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ON ALL MACHINED SURFACES
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
4. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201).
5. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.


.375 START MACHINING
CHAMFER 45° × .020
-A-
⊥B.0005
32
90° ± 0°-30′
⊚A.001TIR
2.188 DIA
1.125
.062 WIDE UNDERCUT TO 2.146 DIA +.008 -.008
2"-32 UNS-3B
MINOR DIA = 1.9660 — 1.9691
PITCH DIA = 1.9797 — 1.9838
MAJOR DIA = 2.000 MIN
1.750 DIA (REF)
1.656 DIA ±.002
1.625 +.001 -.000 DIA (CENTRALIZE ON 1.750 CAST DIA
CHAMFER 45° × .025
.062 WIDE UNDERCUT TO 2.015 DIA
⊚A.001 TIR
.500
1.906 +.002 -.000 DIA
.250 +.010 -.000 (TYP)
.344 (TYP)
2.330 ±.002
4.913
2 3/16 -32 UNS-2A
MAJOR DIA = 2.1862 - 2.1802
PITCH DIA = 2.1659 - 2.1613
MINOR DIA = 2.1479 REF
⌒.001
-B-
DR NO.20 (.161) THRU
CBORE .218 DIA FARSIDE
TO DEPTH SHOWN
10-32 NF-3B THRU
⊕A.010 DIA
1.500 BSC
3.000 BSC
1.218
2.438
IDENTIFICATION MARK SEE NOTE 5

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011960	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
2011914

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910030

DRAWN DATE 4-10-64
CHECKED
APPROVAL 4/15/64
APPROVAL 4/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, EYEPIECE SCT

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2011961

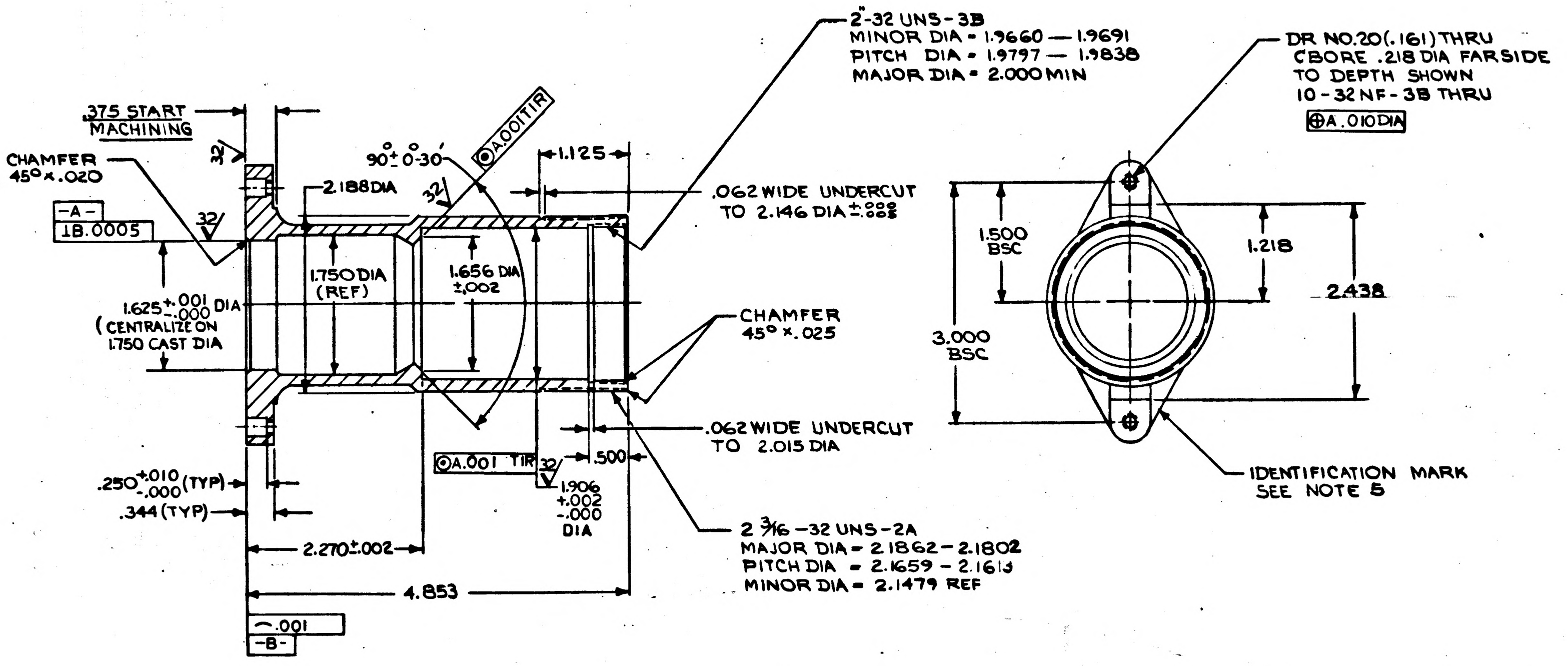
SCALE 1/1 WEIGHT CALC ACTUAL SHEET OF

2011961 A

2011961

REVISIONS T.ORR 10230				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ON ALL MACHINED SURFACES
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
   c. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
4. BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.201).
5. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.


.375 START MACHINING
32
CHAMFER 45° × .020
-A-
⊥B.0005
32
90° ± 0°30'
32
◎A.001TIR
2.188DIA
1.125
1.750 DIA (REF)
1.656 DIA ±.002
1.625 +.001 -.000 DIA (CENTRALIZE ON 1.750 CAST DIA
2"-32 UNS-3B
MINOR DIA = 1.9660 — 1.9691
PITCH DIA = 1.9797 — 1.9838
MAJOR DIA = 2.000 MIN
.062 WIDE UNDERCUT TO 2.146 DIA +.000 -.005
CHAMFER 45° × .025
.062 WIDE UNDERCUT TO 2.015 DIA
◎A.001 TIR
32
.500
1.906 +.002 -.000 DIA
.250 +.010 -.000 (TYP)
.344 (TYP)
2.270±.002
4.853
⌒.001
-B-
2 3/16-32 UNS-2A
MAJOR DIA = 2.1862 - 2.1802
PITCH DIA = 2.1659 - 2.1613
MINOR DIA = 2.1479 REF
DR NO.20(.161) THRU
CBORE .218 DIA FARSIDE
TO DEPTH SHOWN
10-32 NF-3B THRU
⊕A.010DIA
1.500 BSC
3.000 BSC
1.218
2.438
IDENTIFICATION MARK SEE NOTE 5

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011960	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2011914

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 50386910030

DRAWN DATE 4-10-64
CHECKED 4/10/64
APPROVAL 4/15/64
APPROVAL 4/15/64
NASA APPROVAL
MIT APPROVAL 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, EYEPIECE SCT

CODE IDENT NO.
SIZE D
NASA NUMBER 2011961
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET OF

MASTER

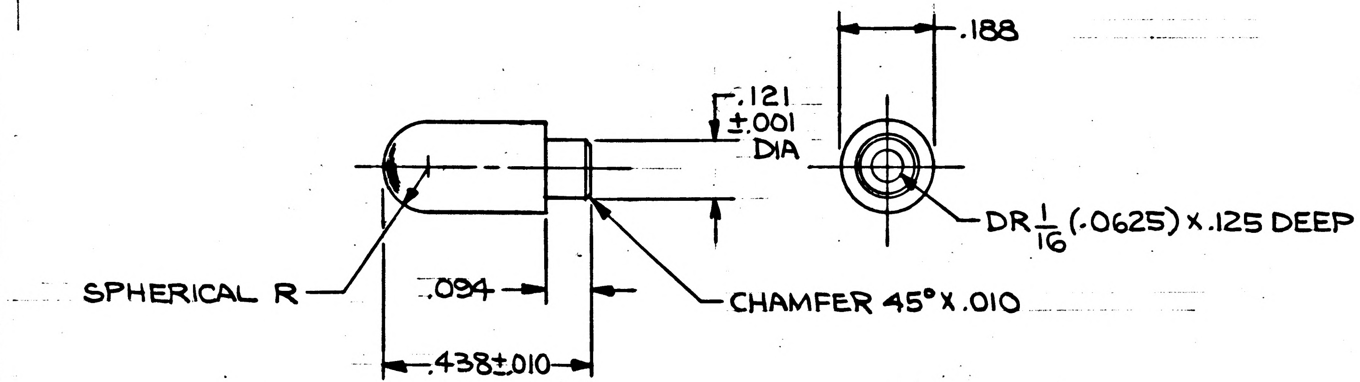
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2011961

2012006

REVISIONS 1221			
SYM	DESCRIPTION	DATE	APPROVAL

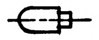
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. FINISH: ANODIZE PER MIL-A-8625, TYPE II CLASS 2 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER


ACTUAL SIZE

2012004	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/8
TEMPER T6
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911270
DRAWN R. BRUNELLE DATE 8-17-64
CHECKED T. SULLIVAN 8-24-64
APPROVAL [illegible] 8/27/64
APPROVAL E. Thrup 8/31/64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
STANDOFF
CODE IDENT NO.
SIZE B
NASA NUMBER 2012006
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-153

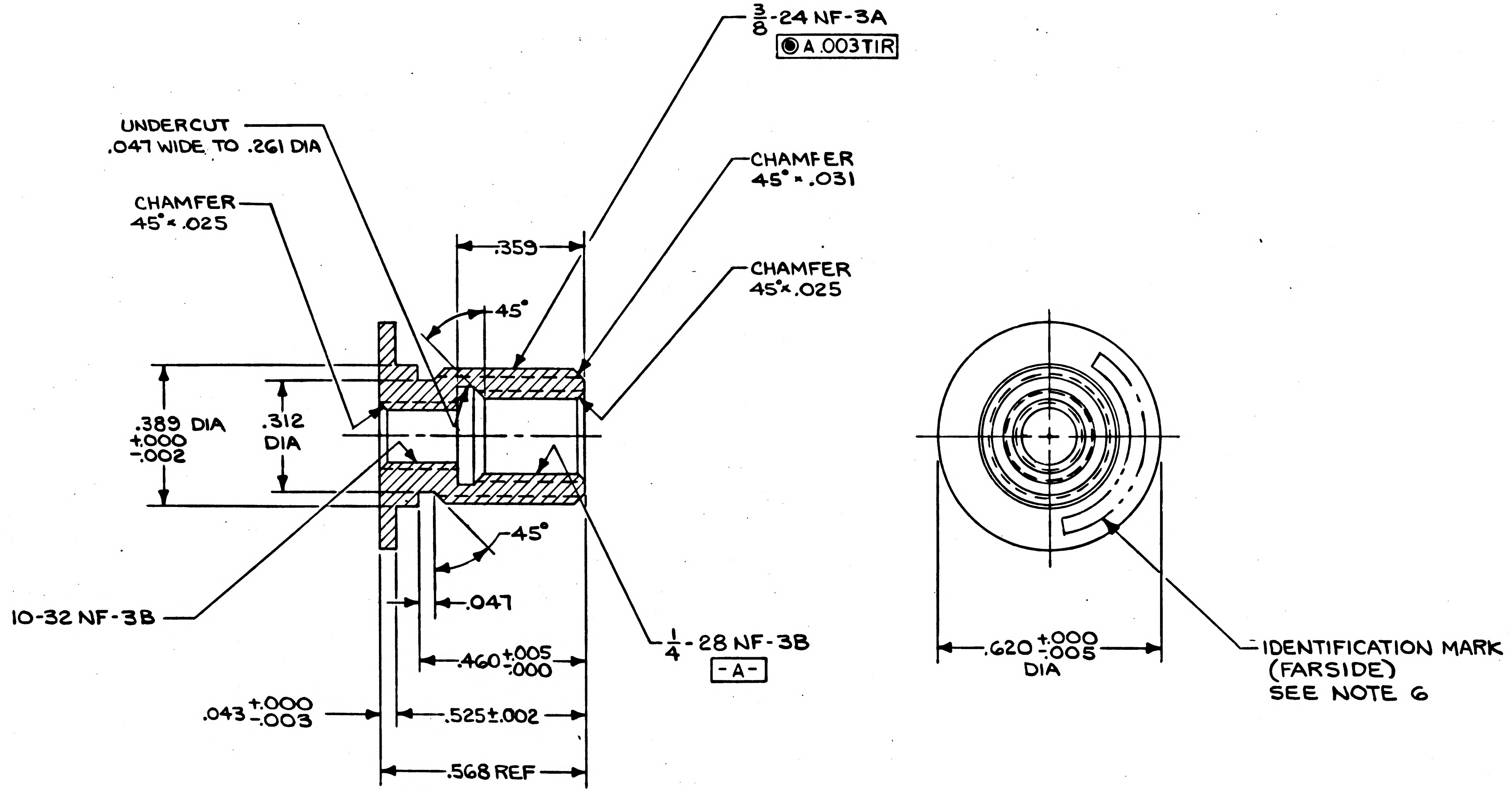
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012032

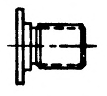
REVISIONS TDIR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



$\frac{3}{8}$-24 NF-3A
◎ A .003 TIR
UNDERCUT .047 WIDE TO .261 DIA
CHAMFER 45° × .031
CHAMFER 45° × .025
.359
45°
CHAMFER 45° × .025
.389 DIA +.000 −.002
.312 DIA
45°
10-32 NF-3B
.047
.460 +.005 −.000
$\frac{1}{4}$-28 NF-3B
-A-
.043 +.000 −.003
.525 ±.002
.568 REF
.620 +.000 −.005 DIA
IDENTIFICATION MARK (FARSIDE) SEE NOTE 6



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011586	
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 57386911140

DRAWN F. Saloon DATE 5/26/64
CHECKED Alfeiny 5/28/64
APPROVAL F. Ruclum 5/29/64
APPROVAL E. Thorup 6/1/64
NASA APPROVAL K Mi[illegible] 6/3/64
MIT APPROVAL L Blagel 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
ADAPTER, THREADED,
GAS INJECTION

CODE IDENT NO. | SIZE C | NASA NUMBER 2012032

SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

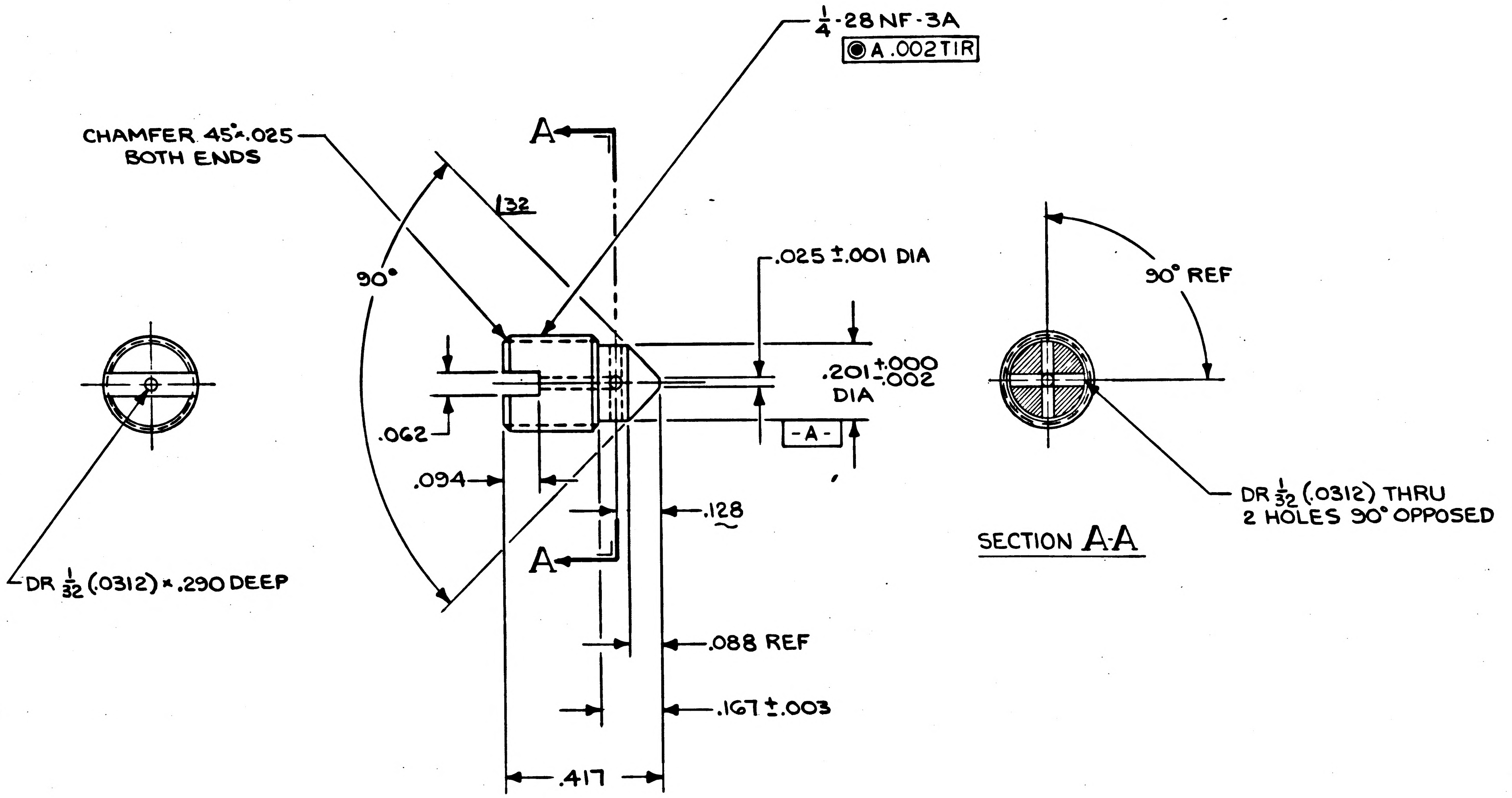
2012032

2012033

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO.54.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



1/4-28 NF-3A
◎ A .002 TIR
CHAMFER 45° × .025 BOTH ENDS
A
A
1/32
90°
.025 ± .001 DIA
.201 +.000 -.002 DIA
-A-
.062
.094
.128
.088 REF
.167 ± .003
.417
DR 1/32 (.0312) × .290 DEEP
90° REF
DR 1/32 (.0312) THRU
2 HOLES 90° OPPOSED
SECTION A-A

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011586	
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911150

DRAWN J. Schiller DATE 5/25/64
CHECKED M. Spiry 5/28/64
APPROVAL R. Rublum 5/29/64
APPROVAL E. Thorup 6/1/64
NASA APPROVAL [illegible] 6/3/64
MIT APPROVAL D. Hazel 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
VALVE, THREADED,
GAS INJECTON

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012033

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

E-184

2012033

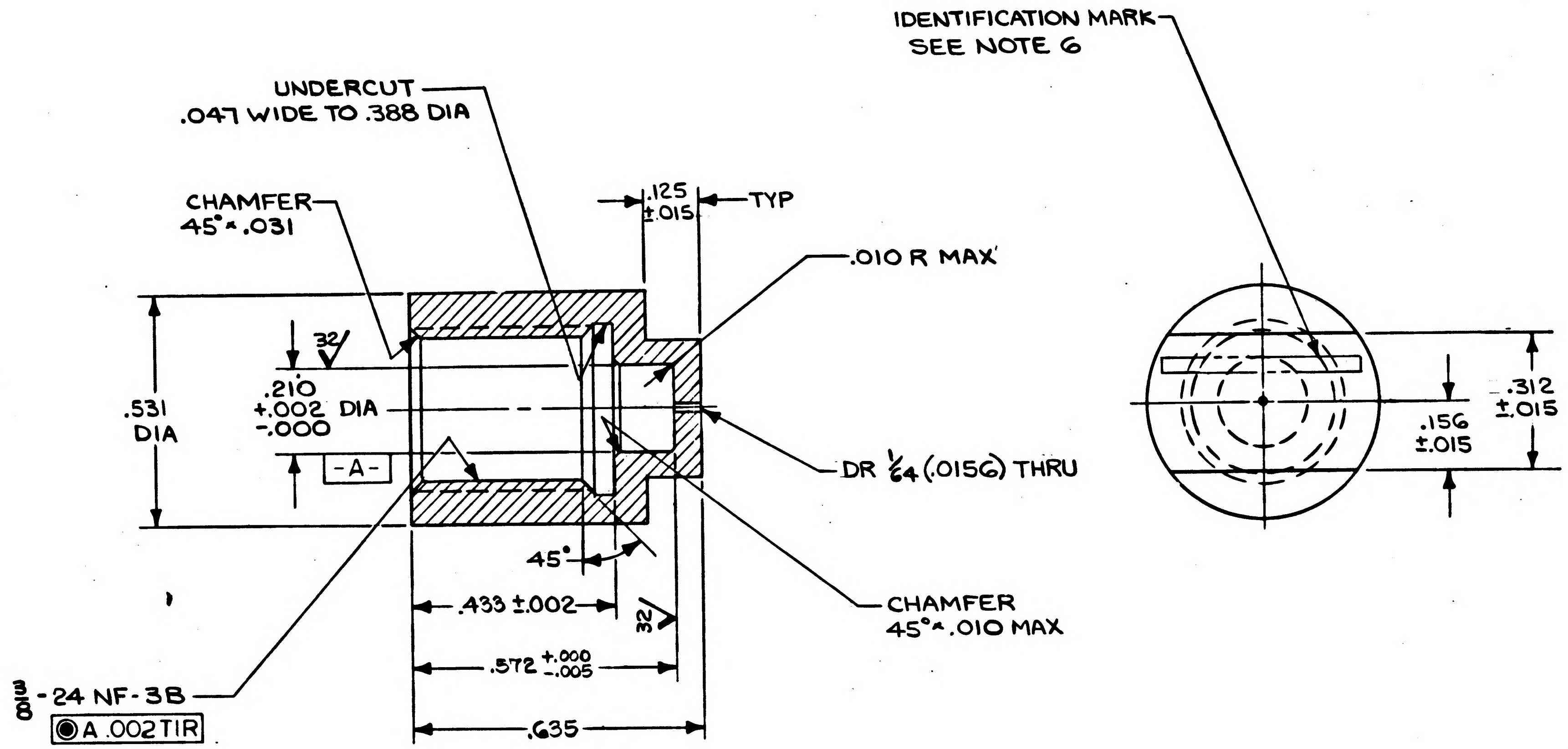
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

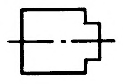
2012034 A

REVISIONS TDRR 09890				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18570	4/27/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.


IDENTIFICATION MARK SEE NOTE 6
UNDERCUT .047 WIDE TO .388 DIA
CHAMFER 45° × .031
.125 ±.015
TYP
.010 R MAX
32
.531 DIA
.210 +.002 -.000 DIA
-A-
DR 1/64 (.0156) THRU
.312 ±.015
.156 ±.015
45°
.433 ±.002
32
CHAMFER 45° × .010 MAX
3/8-24 NF-3B
◎ A .002 TIR
.572 +.000 -.005
.635



ACTUAL SIZE

2012034 A

ITEM	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
6011819	6011000
2011586	2011000
2011717	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911160

DRAWN J. Schiller DATE 5/26/64
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/8/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
GAS INJECTION

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2012034

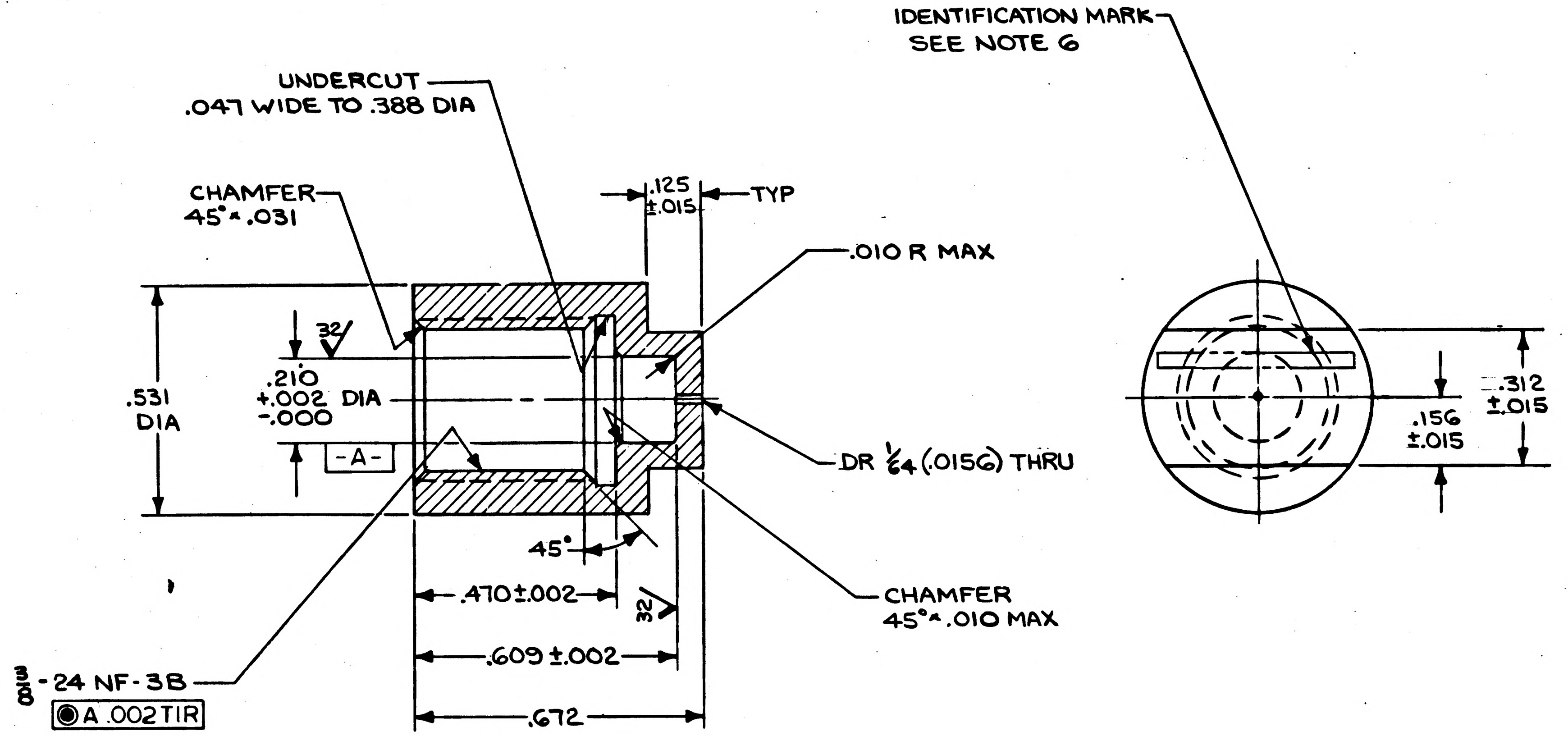
SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2012034

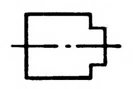
REVISIONS TORR 09850				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63√ FINISH ALL OVER.
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



UNDERCUT
.047 WIDE TO .388 DIA
CHAMFER
45° × .031
.125 ±.015
TYP
.010 R MAX
32
.210 +.002 -.000 DIA
.531 DIA
-A-
DR 1/64 (.0156) THRU
45°
.470±.002
32
.609±.002
.672
CHAMFER
45° × .010 MAX
3/8-24 NF-3B
◉A .002TIR
IDENTIFICATION MARK
SEE NOTE 6
.312 ±.015
.156 ±.015



ACTUAL SIZE

MASTER

ITEM	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011586	
2011717	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOLERANCE ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911160

DRAWN DATE 5/26/64
CHECKED 5/28/64
APPROVAL 5/29/64
APPROVAL 6/1/64
NASA APPROVAL 6/4/64
MIT APPROVAL 6/3/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
GAS INJECTION

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012034

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2012034

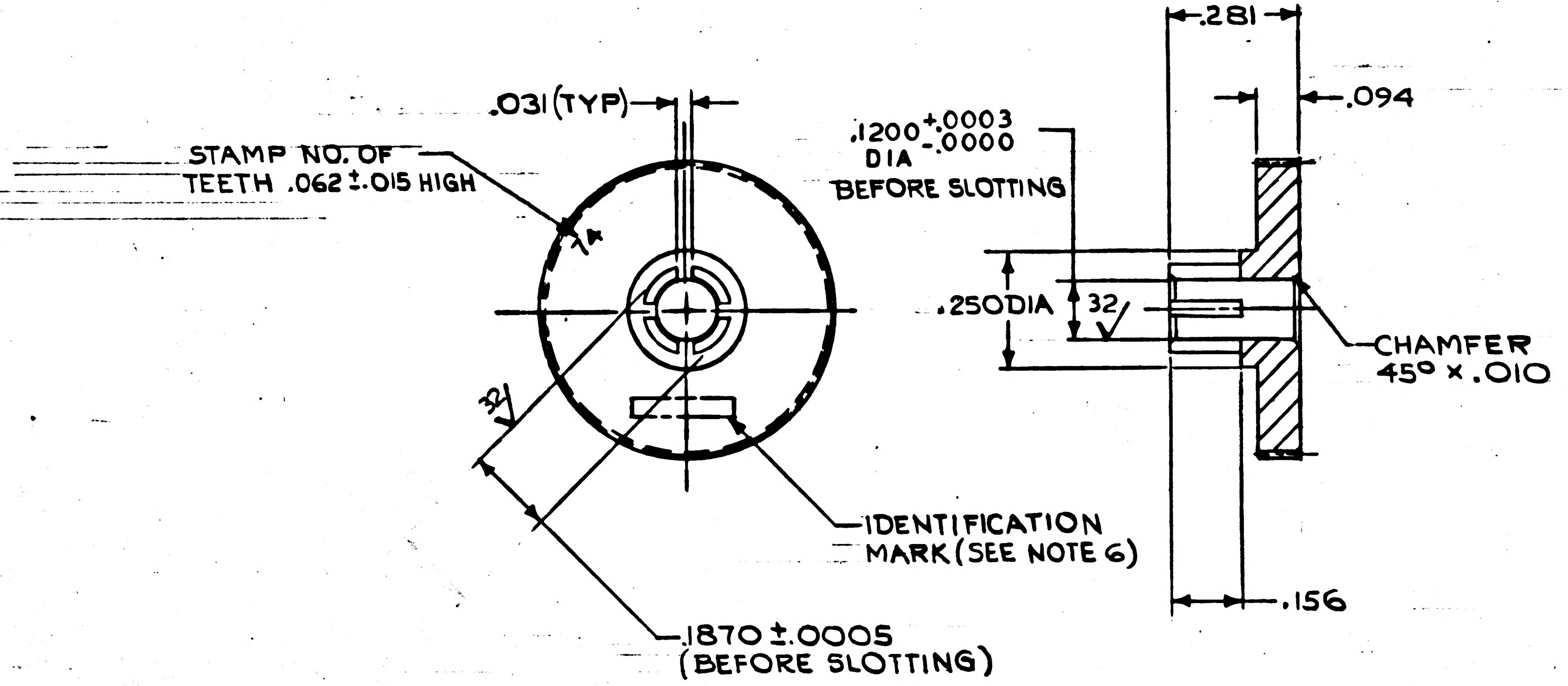
2012035

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

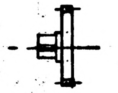
SPUR GEAR DATA

NO. OF TEETH	74
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIAMETER	.61667
OUTSIDE DIAMETER	.6333 $^{+.0000}_{-.0015}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\overset{32}{\surd}$


.031 (TYP)
STAMP NO. OF TEETH .062 ±.015 HIGH
74
32
.1200 +.0003 -.0000 DIA BEFORE SLOTTING
.281
.094
.250 DIA
32
CHAMFER 45° × .010
IDENTIFICATION MARK (SEE NOTE 6)
.156
.1870 ±.0005 (BEFORE SLOTTING)

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
5. PASSIVATE IN ACCORDANCE WITH MIL-STD-171 (TABLE V-A FINISH NO.5.4.1 (KPS-1005I.200)
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:-
$\overset{63}{\surd}$ FINISH ALL OVER
2. GENERAL MACHINING STANDARDS PER ND 1002078.
1 INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327

NOTES:



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011705	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL
FED SPEC QQ-S-763
CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 33386910060

DRAWN E. DRAPALA DATE 1-7-64
CHECKED J. SULLIVAN 6-1-64
APPROVAL 6/30/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR
(74T-120P)

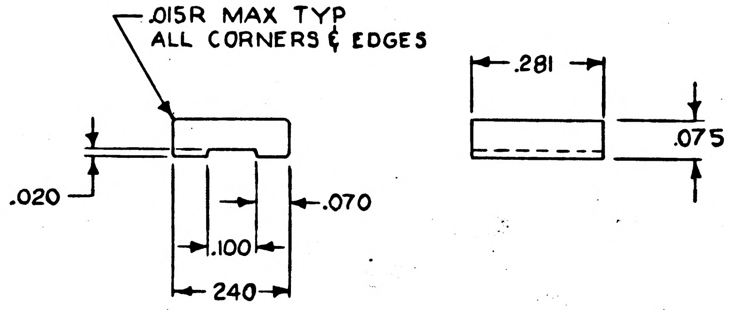
CODE IDENT NO.
SIZE C
NASA NUMBER 2012035
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

E-184

REVISIONS 10420			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: POTTING COMPOUND PER ND 1002009 METHOD "C"
3. IDENTIFY IN ACCORDANCE WITH ND 1002019, NASA PART NO. REV. LETTER & MFRS SYM.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011906	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± [illegible]	± .010	± [illegible]

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 26386910070

DRAWN Paul Cicolo DATE 6/19/64
CHECKED W. P. Murray 6-22-64
APPROVAL [illegible] 6/22/64
APPROVAL E. Thomas 6/22/64
NASA APPROVAL
MIT APPROVAL [illegible] 6/23/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GROMMET
HALF

CODE IDENT NO.
SIZE B
NASA NUMBER 2012118
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

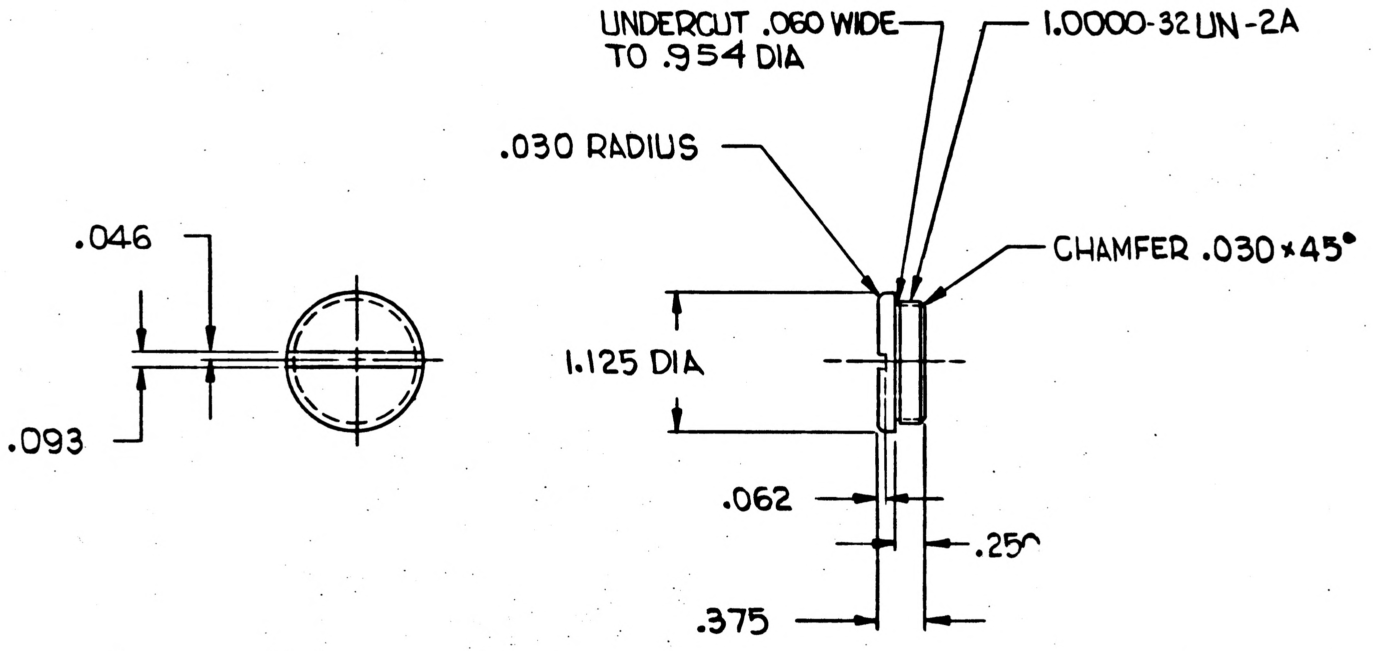
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012124 | A

REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15431	1/7/65	WK

NOTES:
1- INTERPRET DWG PER MIL-D-70327.
2- GENERAL MACHINING STANDARDS PER ND1002078.
3- FINISH 125/ UNLESS OTHERWISE SPECIFIED.
4- REMOVE BURRS PER ND1002079.
5- BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.200).
6- IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED SPEC QQ-A-225/6a COND. T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911070

DRAWN V. AMATO DATE 4-21-64
CHECKED 6/23/64
APPROVAL 6/23/64
APPROVAL E. Dhaup 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PLUG

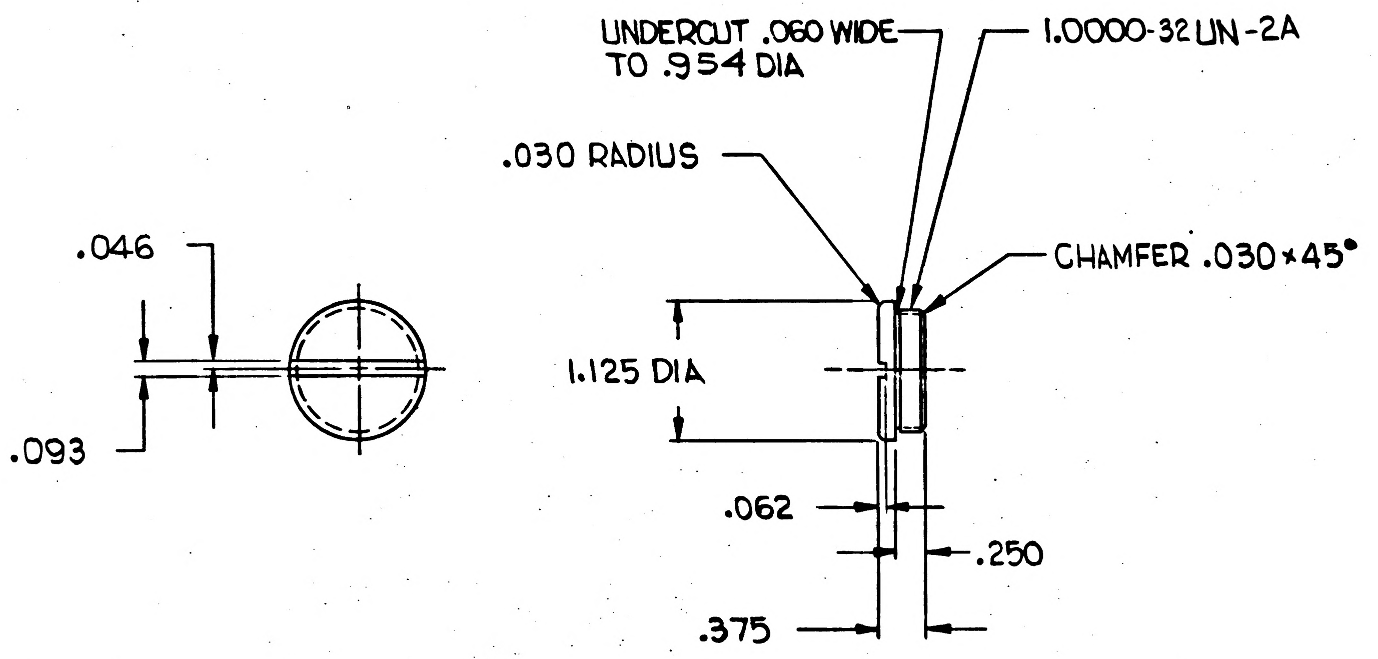
CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012124

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2012124	B

REVISIONS 10420				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 13431	1/7/65	WK
B		REVISED PER TDRR 20198	6/24/65	WK

NOTES:
1- INTERPRET DWG PER MIL-D-70327.
2- GENERAL MACHINING STANDARDS PER ND1002078.
3- FINISH 125/ UNLESS OTHERWISE SPECIFIED.
4- REMOVE BURRS PER ND1002079.
5- BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.200).
6- IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012611	
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED SPEC QQ-A-225/6a
COND. T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911070

DRAWN V. AMATO DATE 4-21-64
CHECKED 6/23/64
APPROVAL 6/23/64
APPROVAL E. Thorup 6/23/64
NASA APPROVAL
MIT APPROVAL W 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLUG

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2012124

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2012124 B

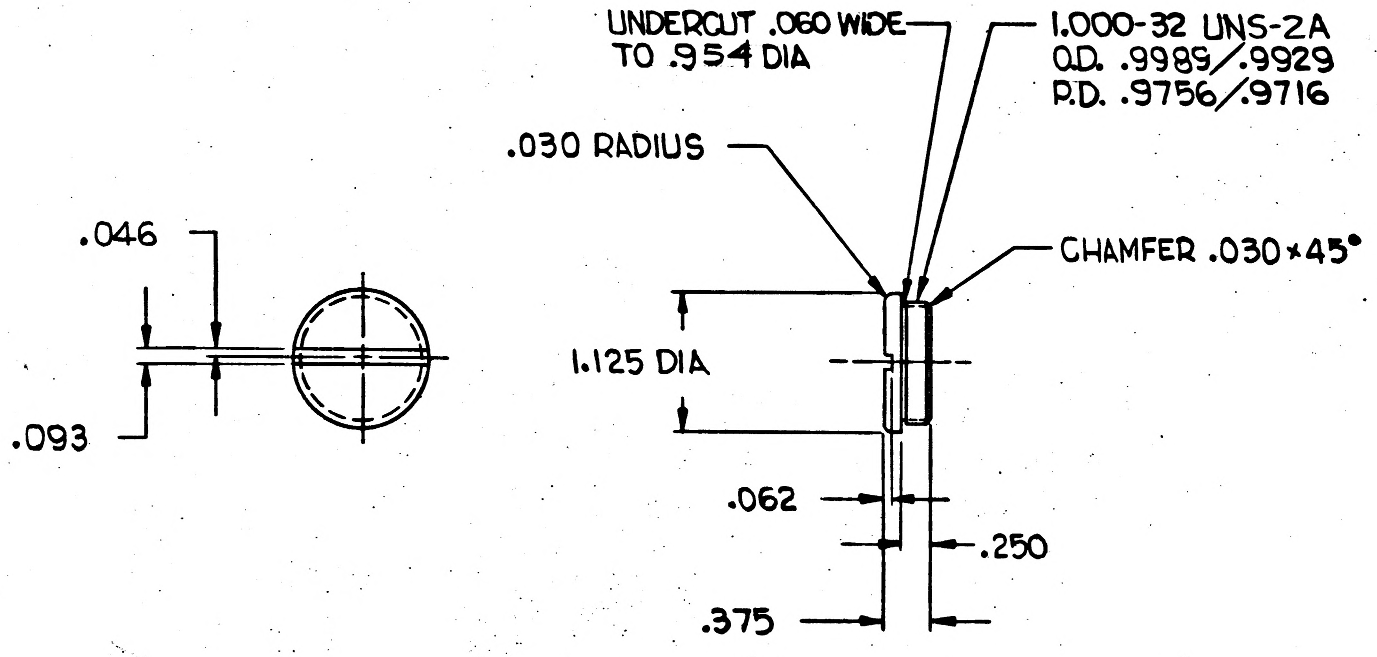
E-184

2012124

REVISIONS 10420

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1- INTERPRET DWG PER MIL-D-70327.
2- GENERAL MACHINING STANDARDS PER ND1002078.
3- FINISH 125/ UNLESS OTHERWISE SPECIFIED.
4- REMOVE BURRS PER ND1002079.
5- BLACK ANODIZE PER MIL-A-8625 TYPE II BLACK (KPS-1005A.200).
6- IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



2012124

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY
FED SPEC QQ-A-225/6a COND. T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911070

DRAWN V. AMATO DATE 4-21-64
CHECKED 6/23/64
APPROVAL 6/23/64
APPROVAL E. Thorup 6/23/64
NASA APPROVAL
MIT APPROVAL 22 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLUG

CODE IDENT NO.
SIZE C
NASA NUMBER 2012124
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

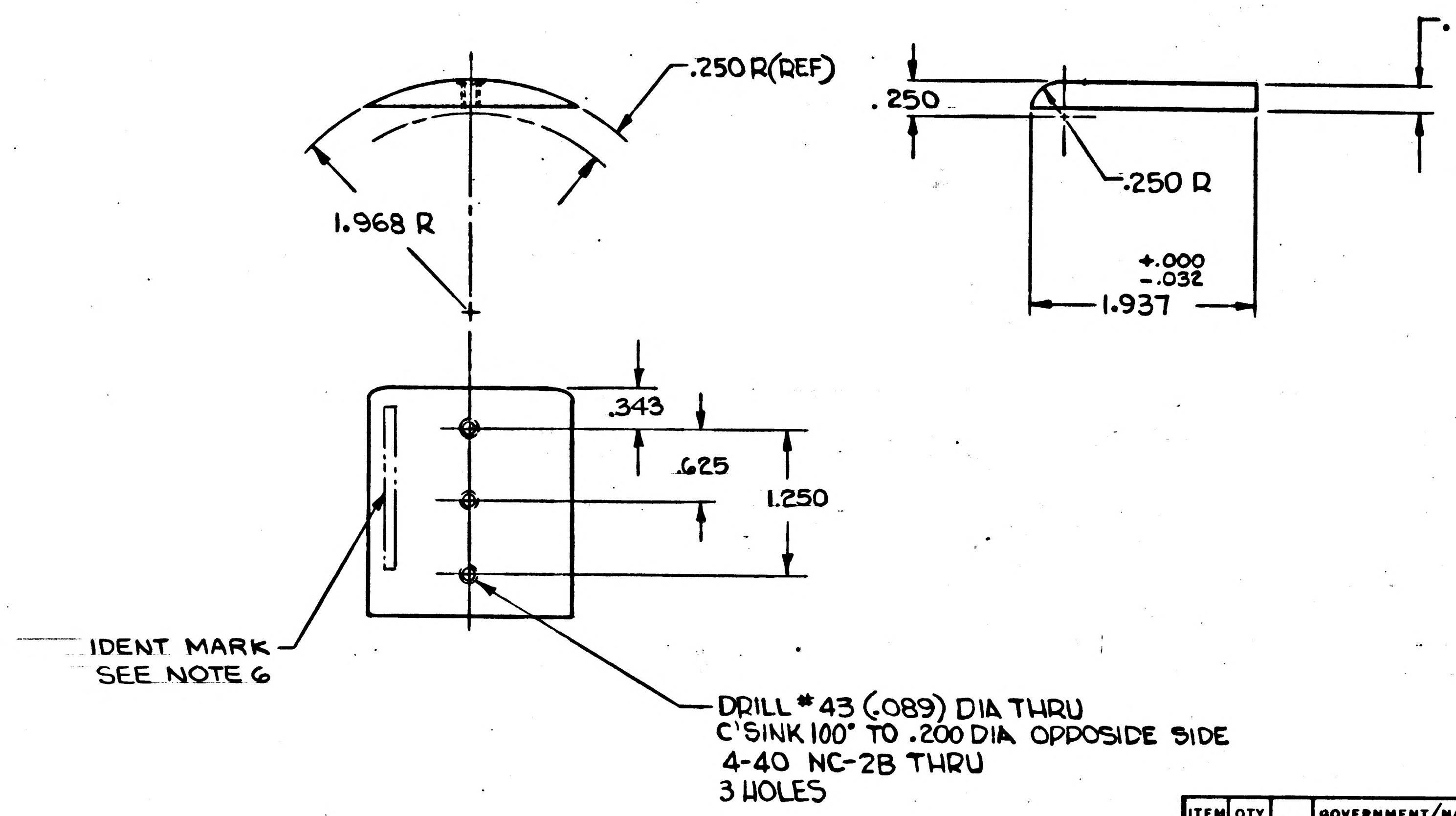
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012137 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 26268	2/23/66	ЧК

REVISIONS 10420

NOTES.
1-INTERPRET DWG. PER MIL-D-70327
2-GENERAL MACHINING STANDARDS ND1002078
3-UNLESS OTHERWISE SPECIFIED
  a. 63✓ FINISH ALL OVER
  b. BREAK SHARP EDGES PER ND1002078
4-REMOVE BURRS ND1002079
5-MATERIAL: HEAVY TUNGSTEN ALLOY PER MIL-T-21014 (TYPE 2)
6-IDENTIFY USING NASA DWG NO. REVISION LETTER
  AND MANUFACTURERS SYMBOL PER ND1002019.


.250 R (REF)
1.968 R
.250
.250 R
.187
+.000
-.032
1.937
.343
.625
1.250
IDENT MARK
SEE NOTE 6
DRILL #43 (.089) DIA THRU
C'SINK 100° TO .200 DIA OPPOSIDE SIDE
4-40 NC-2B THRU
3 HOLES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012138	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911230

DRAWN J. Schiller DATE 6-15-64
CHECKED J. SULLIVAN 6-19-64
APPROVAL G. Rusham 6/23/64
APPROVAL E. Wong 6/22/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

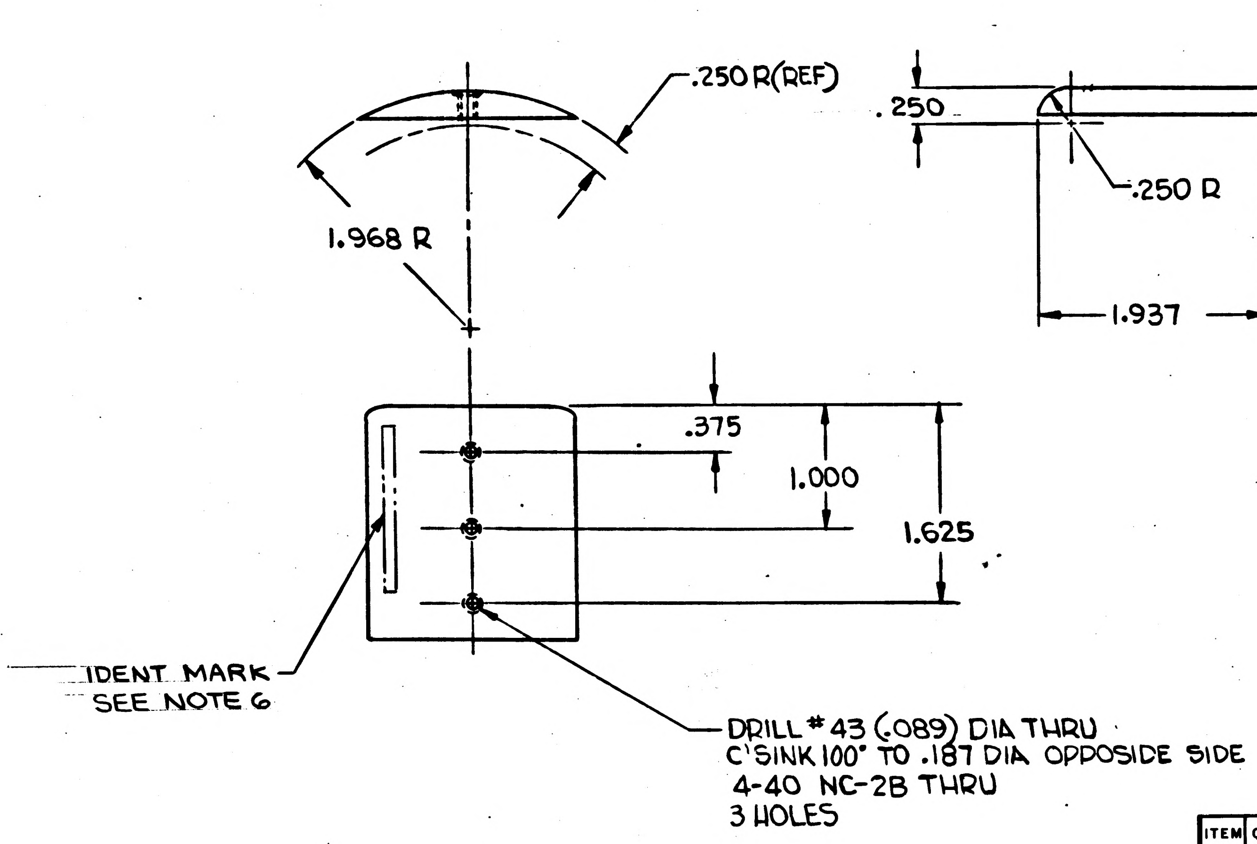
TITLE
COUNTERWEIGHT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2012137
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

2012137

SYM	ZONE	REVISIONS 10420 DESCRIPTION	DATE	APPROVAL

NOTES.
1-INTERPRET DWG. PER MIL-D-70327
2-GENERAL MACHINING STANDARDS ND1002078
3-UNLESS OTHERWISE SPECIFIED
a. 63√ FINISH ALL OVER
b. BREAK SHARP EDGES PER ND1002078
4-REMOVE BURRS ND1002079
5-MATERIAL: HEAVY TUNGSTEN ALLOY PER MIL-T-21014 (TYPE 2)
6-IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



.250 R (REF)
1.968 R
.250
.187
.250 R
1.937
.375
1.000
1.625
IDENT MARK SEE NOTE 6
DRILL # 43 (.089) DIA THRU
C'SINK 100° TO .187 DIA OPPOSIDE SIDE
4-40 NC-2B THRU
3 HOLES

2012137

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012138	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911230

DRAWN DATE 6-15-64
CHECKED J. SULLIVAN 6-19-64
APPROVAL 6/24/64
APPROVAL E. [illegible] 6/22/64
NASA APPROVAL
MIT APPROVAL 23 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT

CODE IDENT NO.
SIZE C
NASA NUMBER 2012137
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

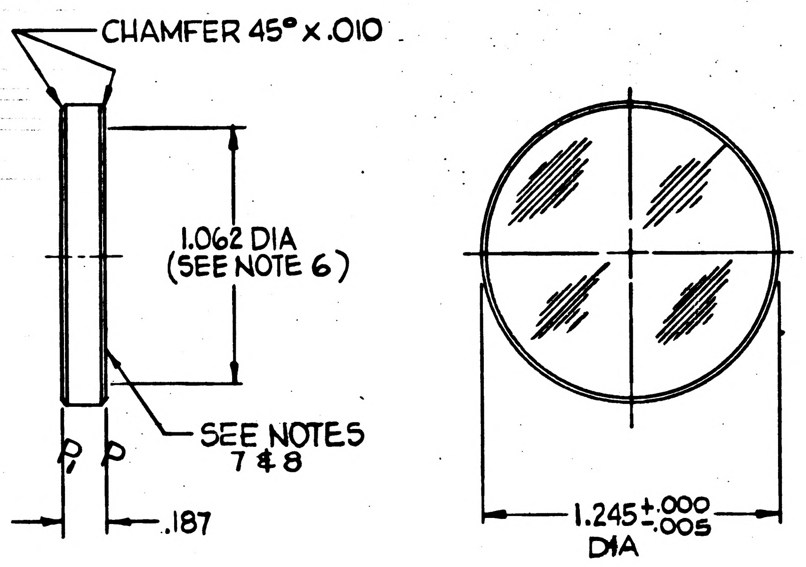
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012162

REVISIONS 10/20				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1.) INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2.) ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3.) MATERIAL: GLASS, OPTICAL PER JAN-G-174, GRADE "C", TYPE 517-645.
4.) CA : 1.062 DIA, SURFACE QUAL 60-40
5.) SURFACES MARKED P & P₁ TO BE POLISHED ALL OTHERS GROUND.
6.) SURFACE FLATNESS ½ FRINGE ¼ FRINGE IRREGTY ON COATED SURFACE "P", 10 FRINGE ON UNCOATED SURFACE "P₁"
7.) AFTER COATING SURFACE "P", TRANSMISSION REFLECTION CURVE TO LIE WITHIN LIMITS SPECIFIED IN NOTE 8. ENVIRONMENT SHALL NOT EFFECT PERFORMANCE AT:
    a.) PRESSURES DOWN TO 10^{-4} MM Hg FOR 100 HOURS TEMPERATURES UP TO 150°F FOR 400 HOURS
    b.) ATMOSPHERE – 100% O_2 AT 5 PSI FOR 400 HOURS.
8.) THE MINIMUM REFLECTION IN THE VISUAL RANGE (.45μ TO .65μ) AND VIEWED AT NORMAL INCIDENCE SHALL BE 90%. THE MINIMUM TRANSMISSION IN THE VISUAL RANGE (.45μ TO .65μ) AND VIEWED AT NORMAL INCIDENCE SHALL BE 2%;
9.). IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (BAGGING).



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 28386910520

DRAWN V. AMATO DATE 4-21-64
CHECKED 6/23/64
APPROVAL 6/23/64
APPROVAL E. Thorup 6/23/64
NASA APPROVAL
MIT APPROVAL 23

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR.

CODE IDENT NO.
SIZE C
NASA NUMBER 2012162.

SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1240

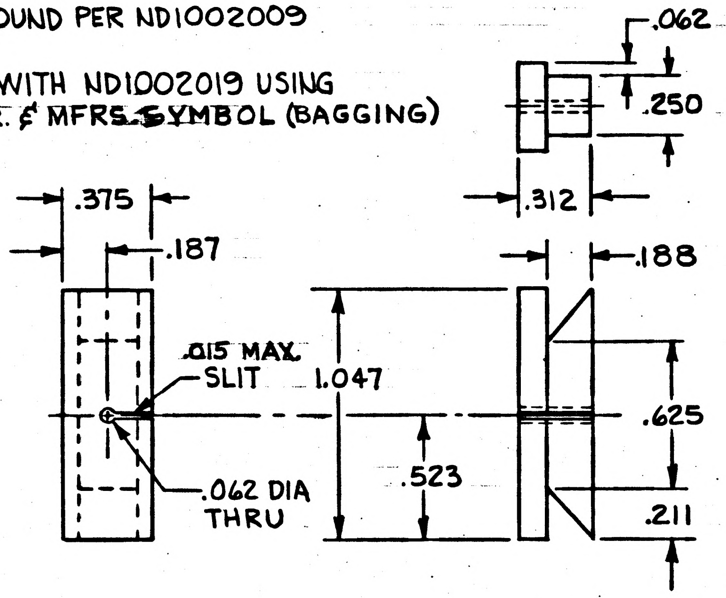
2012162

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

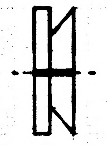
2012164

REVISIONS		DRR 11109	
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL- POTTING COMPOUND PER ND1002009 METHOD C.
3. IDENTIFY IN ACCORDANCE WITH ND1002019 USING NASA DWG. NO, REV. LTR. & MFRS SYMBOL (BAGGING)



MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ±.015 ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 26386910060
DRAWN V. AMATO DATE 5-11-64
CHECKED 7/13/64
APPROVAL E. Fischman 7/14/64
APPROVAL E. Morup 7/14/64
NASA APPROVAL
MIT APPROVAL 21 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE GROMMET

CODE IDENT NO.
SIZE B
NASA NUMBER 2012164
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

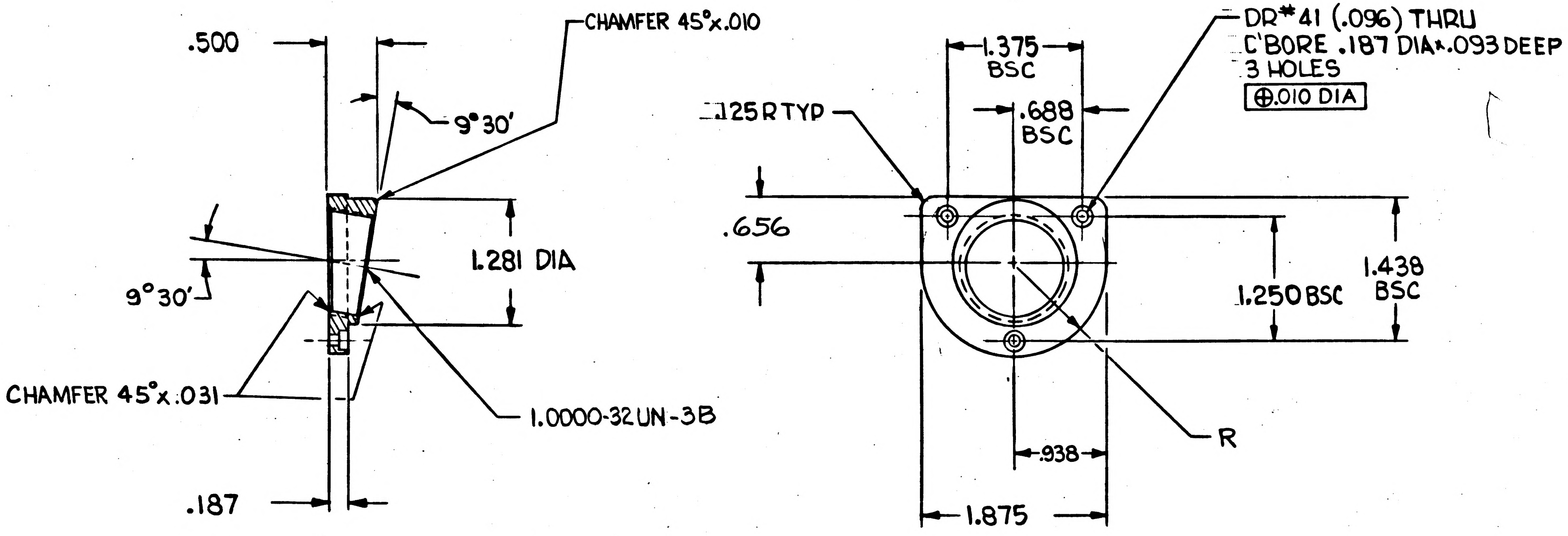
K+E E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012195 A

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-GENERAL MACHINING STANDARDS ND1002078
3-FINISH 125/ UNLESS OTHERWISE SPECIFIED
4-REMOVE BURRS PER ND1002079
5-BLACK ANODIZE PER MIL-A-8625 TYPE II (KPS-1005A.201).
6-IDENTIFY USING NASA PART NO. REVISION LETTER
AND MANUFACTURERS SYMBOL PER ND1002019

REVISIONS 10-20				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 15432	1/7/65	WK


.500
CHAMFER 45°x.010
9°30'
1.281 DIA
9°30'
CHAMFER 45°x.031
1.0000-32UN-3B
.187
1.375 BSC
.688 BSC
.125 R TYP
DR#41 (.096) THRU
C'BORE .187 DIA x.093 DEEP
3 HOLES
⊕.010 DIA
.656
1.250 BSC
1.438 BSC
R
.938
1.875

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011786	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	±0°5'

DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY 2024-T4 FED SPEC QQ-A-268 TEMPER T4
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910670
DRAWN V. AMATO DATE 4-21-64
CHECKED 6/1/64
APPROVAL
APPROVAL E. Moreup 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE PLATE, COVER, MIRROR

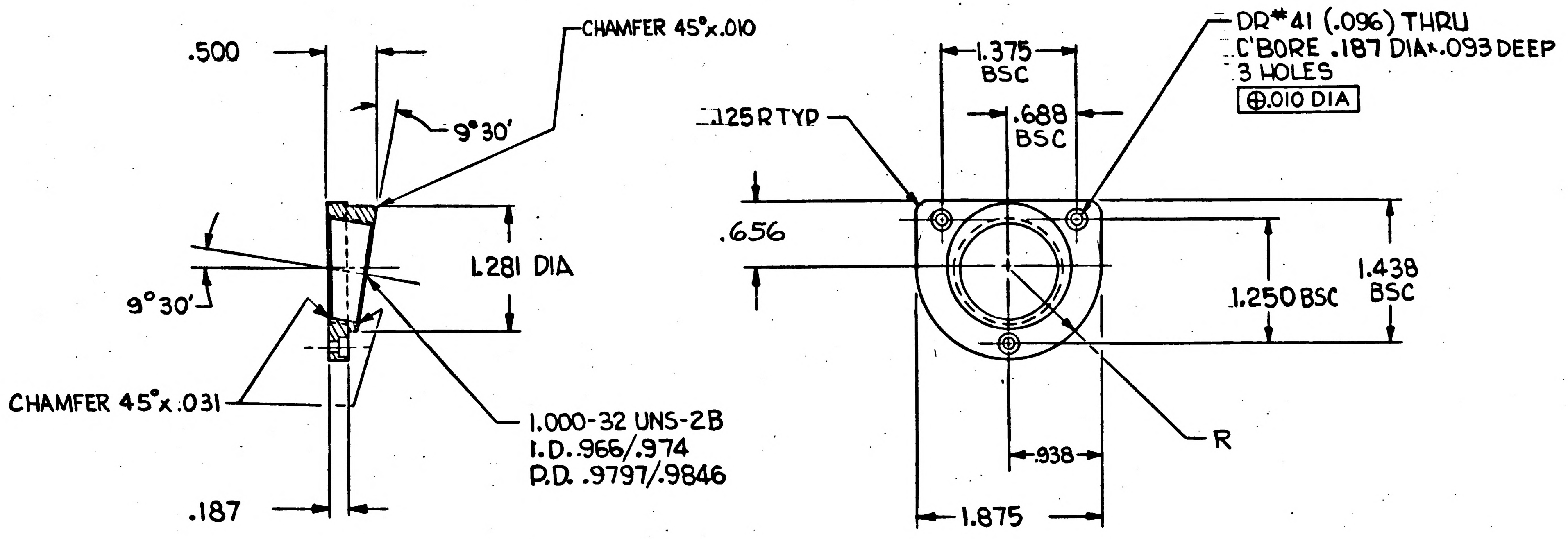
CODE IDENT NO.
SIZE C
NASA NUMBER 2012195
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

2012195

REVISIONS			10-20	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1-INTERPRET DWG PER MIL-D-70327
2-GENERAL MACHINING STANDARDS ND1002078
3-FINISH $^{125}\surd$ UNLESS OTHERWISE SPECIFIED
4-REMOVE BURRS PER ND1002079
5-BLACK ANODIZE PER MIL-A-8625 TYPE II (KPS-1005A.201).
6-IDENTIFY USING NASA PART NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019


.500
CHAMFER 45°x.010
9°30'
1.281 DIA
9°30'
CHAMFER 45°x.031
1.000-32 UNS-2B
I.D. .966/.974
P.D. .9797/.9846
.187
1.375 BSC
.688 BSC
.125 R TYP
.656
DR#41 (.096) THRU
C'BORE .187 DIA x .093 DEEP
3 HOLES
⊕.010 DIA
1.250 BSC
1.438 BSC
R
.938
1.875

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011786	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	±0°5'

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
2024-T4
FED SPEC QQ-A-268
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910670

DRAWN V. AMATO DATE 4-21-64
CHECKED Alpin 6/1/64
APPROVAL
APPROVAL E. Morup 6/23/64
NASA APPROVAL
MIT APPROVAL 23 Jun 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, COVER, MIRROR

CODE IDENT NO.
SIZE C
NASA NUMBER 2012195
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

A 2012222

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 12119		
A		REVISED PER TDRR NO. 15591	1/19/65	WK.

NOTES:
TERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
MENT IN ACCORDANCE WITH SPEC MIL-O-13830.
ERIAL: GLASS, OPTICAL GRADE A PER MIL-G-174
TYPE 523-58.6 FINE ANNEALED
4. ENT & EXIT 1.875 X 2.625 ELLIPTICAL.
RF. QUAL 40-20
SOLN 3 SEC OR BETTER AT 45° INCIDENCE BY
ANSMISSION & REFLECTION.
5. URFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461 Å
ASURED OVER SURFACE OF GLASS WITHIN .062 MAX OF SURFACE EDGES).
UFFACE ② TO BE POLISHED FLAT WITHIN 1/4 FRINGE AT 5461 Å
EASURED OVER SURFACE OF GLASS WITHIN .062 MAX. OF SURFACE EDGES).
AMOND SCRATCH FIG "2" AS SHOWN TO IDENTIFY SIDE FOR MANUFACTURING
URPOSES.
URFACES ① & ② PARALLEL WITHIN 0°0'30"
HE SUM OF THE REFLECTION PERCENTAGE AND THE TRANSMISSION PERCENTAGE
OF THE FINISHED ITEM SHALL BE 95% MIN AVERAGED OVER THE WAVELENGTH
RANGE.
10. EDGES FINE GROUND.
11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER LOT
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURE.
SYMBOL PER ND 1002019
13 APPLY LUXORB PER ND 1002091 TO SURFACES INDICATED

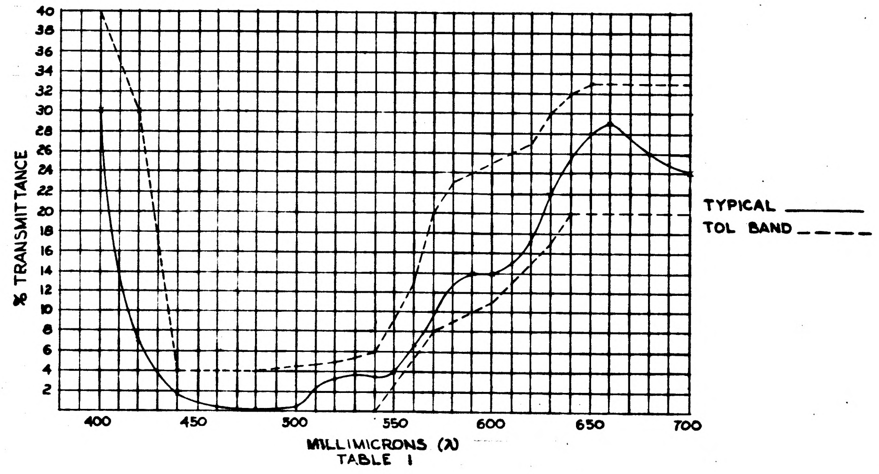
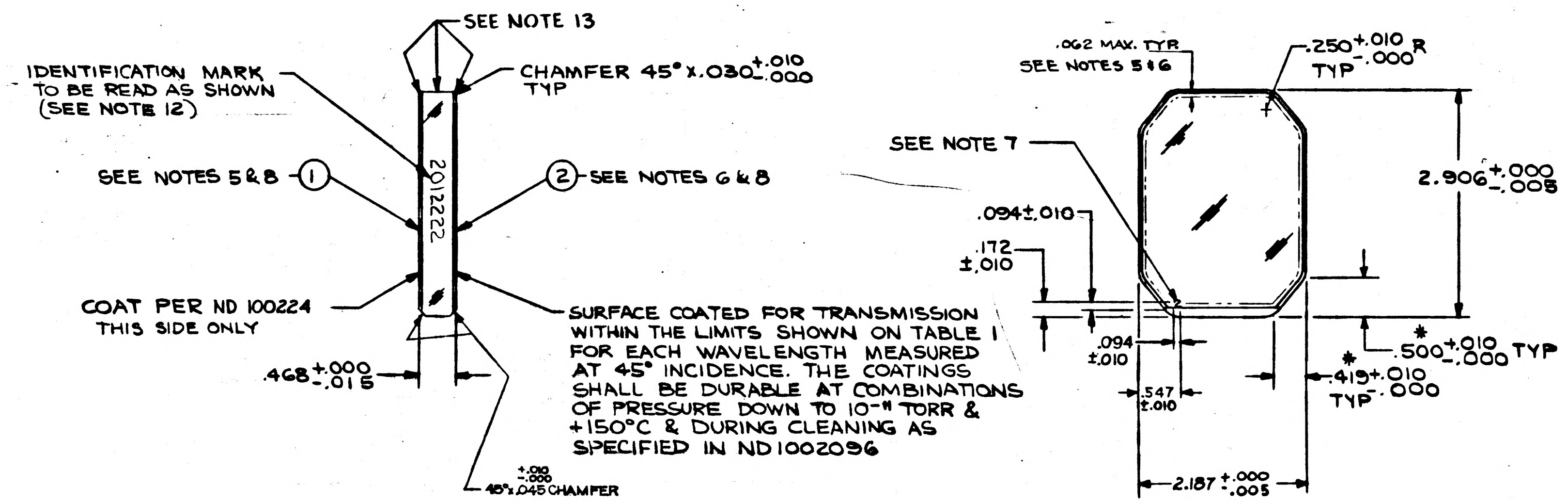


TABLE I


SEE NOTE 13
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° x .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER ND 100224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C & DURING CLEANING AS SPECIFIED IN ND 1002096
.468 +.000 -.015
45° x .045 CHAMFER +.010 -.000
.062 MAX. TYP. SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
SEE NOTE 7
2.906 +.000 -.005
.094 ±.010
.172 ±.010
.094 ±.010
.547 ±.010
* .500 +.010 -.000 TYP
* .415 +.010 -.000 TYP
2.187 +.000 -.005

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

2011701	2011000	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL ON: FRACTIONS ± ~ DECIMALS ±.005 ANGLES ± 1° DO NOT SCALE THIS DRAWING	KOLLSMAN INSTRUMENT CORPORATION ELMHURST NEW YORK KIC PN 28386910550	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL SEE NOTE 3	DRAWN R. BRUNELLE DATE 8-13-64 CHECKED J. SULLIVAN 8-17-64 APPROVAL 8-25-64 APPROVAL 8-21-64	TITLE BEAM SPLITTER
APPLICATION		CONTRACT	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. SIZE D NASA NUMBER 2012222 SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

8	2222102	ⓡ

REVISIONS				TDRR 12119
SYM	ZONE	DESCRIPTION	DATE	APPROV
A		REVISED PER TDRR NO. 15591	1/19/65	WK
B		REVISED PER TDRR 17490	4/2/65	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: GLASS, OPTICAL GRADE A PER MIL-G-174
   TYPE 523-58.6 FINE ANNEALED
4. CA: ENT & EXIT 1.875 X 2.625 ELLIPTICAL.
   SURF. QUAL 40-20
   RESOLN 3 SEC OR BETTER AT 45° INCIDENCE BY TRANSMISSION & REFLECTION.
5. SURFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX. OF SURFACE EDGES).
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11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER LOT
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURE. SYMBOL PER ND 1002019
13. APPLY LUXORB PER ND 1002091 TO SURFACES INDICATED

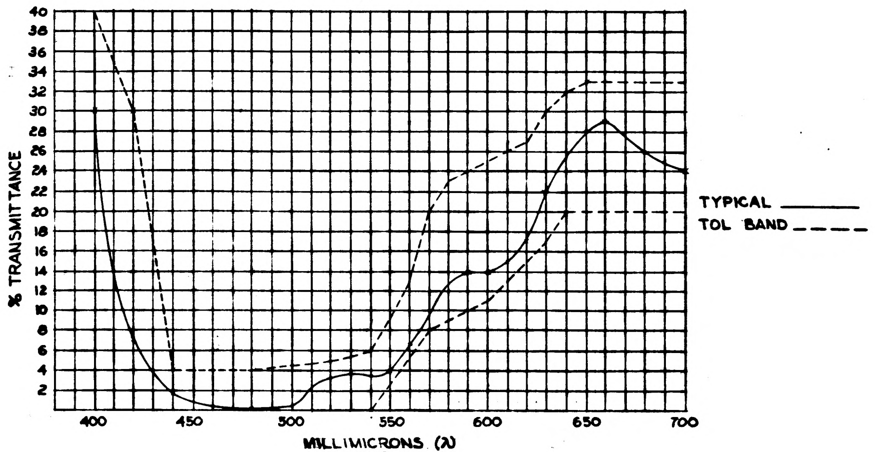
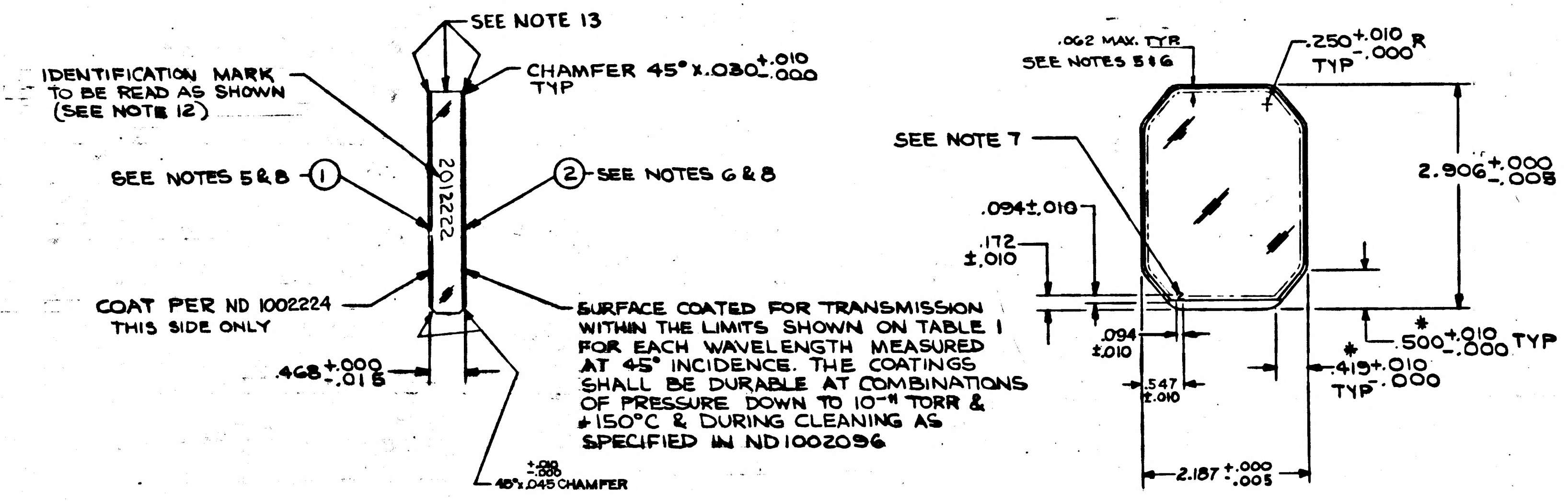


TABLE 1


SEE NOTE 13
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C & DURING CLEANING AS SPECIFIED IN ND 1002096
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45° X .045 CHAMFER +.010 -.000
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SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
SEE NOTE 7
2.906 +.000 -.005
.094 ±.010
.172 ±.010
.094 ±.010
.547 ±.010
* .500 +.010 -.000 TYP
* .419 +.010 -.000 TYP
2.187 +.000 -.005

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ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550

DRAWN R. BRUNELLE DATE 8-13-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL 8-25-64
APPROVAL 9-25-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BEAM SPLITTER

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2012222

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15591	1/19/65	WK.
B		REVISED PER TDRR 17490	4/2/65	WK.
C		REVISED PER TDRR 19571	4/27/65	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: GLASS, OPTICAL GRADE A PER MIL-G-174 TYPE 523-58.6 FINE ANNEALED
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12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURE.
— SYMBOL PER ND 1002019

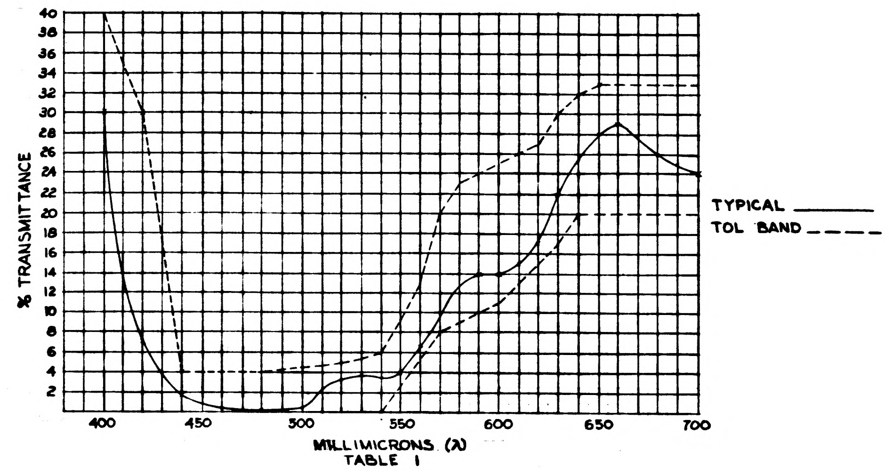
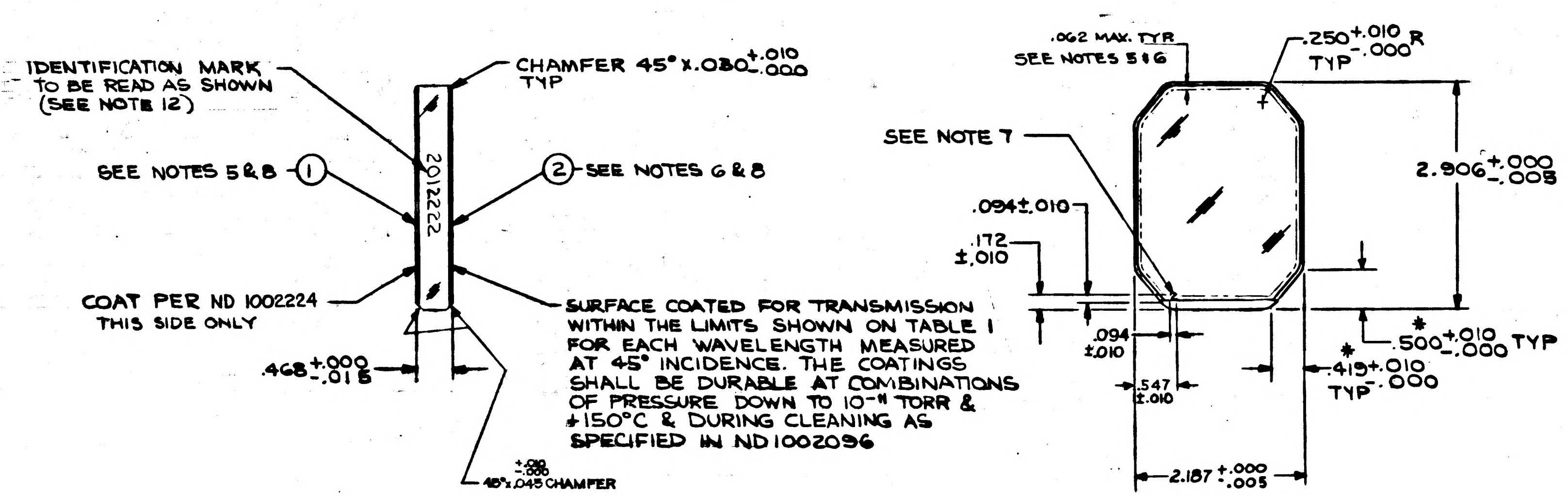


TABLE I


IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C & DURING CLEANING AS SPECIFIED IN ND1002096
.468 +.000 -.015
45° x .045 +.010 -.000 CHAMFER
.062 MAX. TYP
SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
SEE NOTE 7
2.906 +.000 -.005
.094 ±.010
.172 ±.010
.094 ±.010
.547 ±.010
* .500 +.010 -.000 TYP
* .419 +.010 -.000 TYP
2.187 +.000 -.005

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ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550

DRAWN R. BRUNELLE DATE 8-13-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL F. [illegible] 8-25-64
APPROVAL E. [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: BEAM SPLITTER

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2012222
SCALE 1/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

D 2012222

REVISIONS				TDRR 12119
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15591	1/19/65	WK
B		REVISED PER TDRR 17490	4/2/65	WK
C		REVISED PER TDRR 18571	4/27/65	WK
D		REVISED PER TDRR 16587	5/11/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: GLASS, OPTICAL GRADE A PER MIL-G-174
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12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

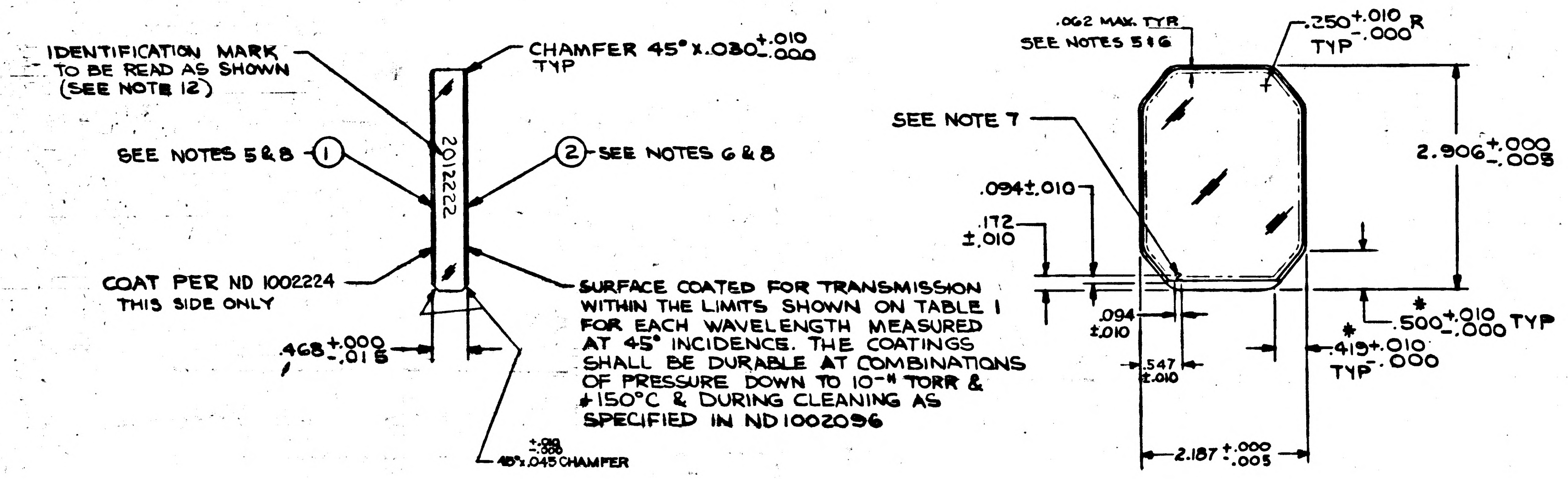
TABLE I

WAVELENGTH BAND BETWEEN λ_1 AND λ_2 IN MILLIMICRONS	MAXIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	MINIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	PEAK VALUE OF TRANSMITTANCE (T) IN PERCENT
400 TO 440	40	0	57
440 TO 540	2	0	8
540 TO 600	14	10	100
600 TO 700	30	24	100

WHERE

$$T = \frac{\int_{\lambda_1}^{\lambda_2} T_\lambda \, d\lambda}{\int_{\lambda_1}^{\lambda_2} d\lambda} \quad \text{AND} \quad T_\lambda = \text{SPECTRAL TRANSMITTANCE OF BEAMSPLITTER AT WAVELENGTH } \lambda$$

NOTE: WHEN SUMMATION IS USED TO APPROXIMATE INTEGRATION, MAXIMUM $\Delta\lambda$ IS 5 MILLIMICRONS


IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
2012222
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C & DURING CLEANING AS SPECIFIED IN ND1002096
.468 +.000 -.015
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SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
SEE NOTE 7
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.172 ±.010
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ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
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TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550
DRAWN R. BRUNELLE DATE 8-13-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL 8-25-64
APPROVAL 8-25-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BEAM SPLITTER

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2012222
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
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E	2012222

REVISIONS		TDRR 12119		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15591	1/19/65	WK.
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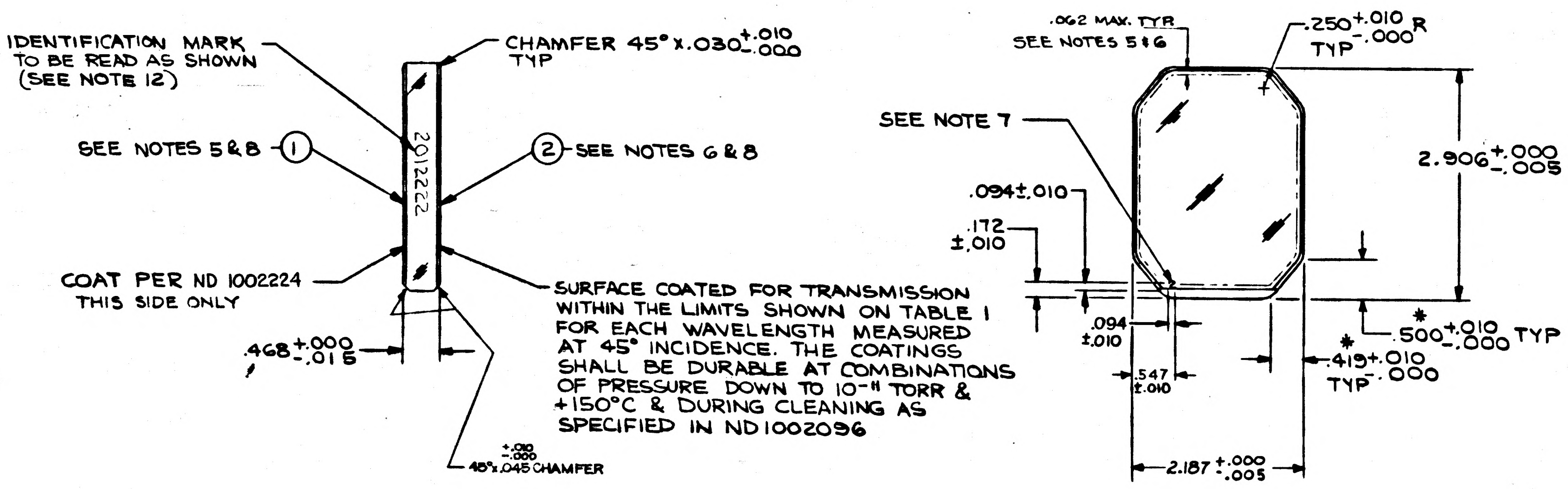
C		REVISED PER TDRR 18571	4/27/65	WK
D		REVISED PER TDRR 18587	5/11/65	WK
E		REVISED PER TDRR 21069	7/28/65	WK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2012222
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ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550
DRAWN R. BRUNELLE DATE 8-13-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL 8-25-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BEAM SPLITTER

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2012222
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

F 2012222

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: GLASS, OPTICAL GRADE A PER MIL-G-174
   TYPE 523-58.6 FINE ANNEALED
4. CA: ENT & EXIT 1.875 X 2.625 ELLIPTICAL.
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   RESOLN 4 SEC OR BETTER AT 45° INCIDENCE BY TRANSMISSION & 3 SEC OR BETTER BY REFLECTION.
5. SURFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX OF SURFACE EDGES).
6. SURFACE ② TO BE POLISHED FLAT WITHIN 1/4 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX. OF SURFACE EDGES).
7.
8. SURFACES ① & ② PARALLEL WITHIN 0°0'30"
9. THE SUM OF THE REFLECTION PERCENTAGE AND THE TRANSMISSION PERCENTAGE OF THE FINISHED ITEM SHALL BE 95% MIN AVERAGED OVER THE WAVELENGTH RANGE.
10. EDGES FINE GROUND.
11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER LOT
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

TABLE I

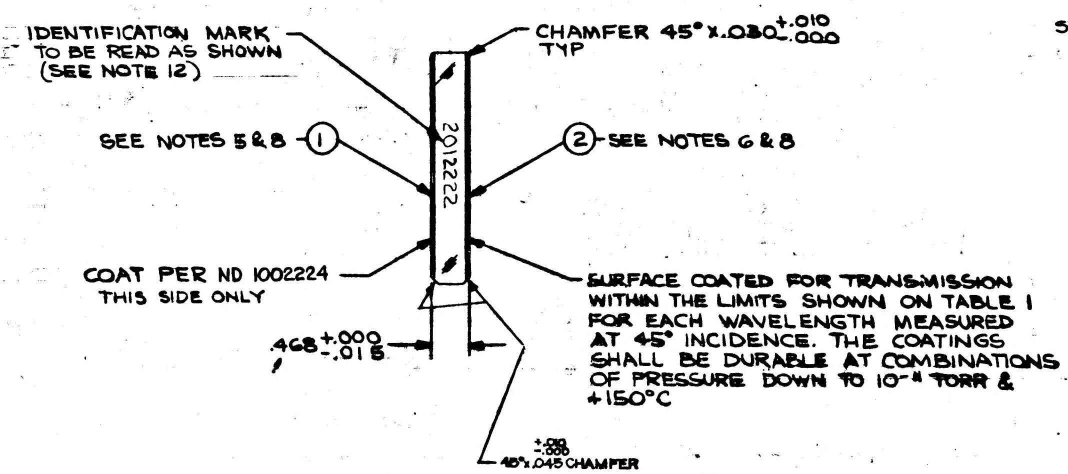
WAVELENGTH BAND BETWEEN λ_1 AND λ_2 IN MILLIMICRONS	MAXIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	MINIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	PEAK VALUE OF TRANSMITTANCE (T) IN PERCENT
400 TO 440	40	0	57
440 TO 540	2	0	8
540 TO 600	14	10	100
600 TO 700	30	24	100

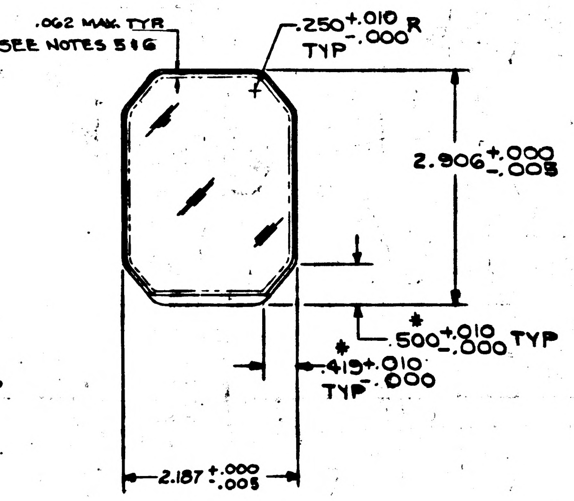
WHERE

$$T = \frac{\int_{\lambda_1}^{\lambda_2} T_\lambda \, d\lambda}{\int_{\lambda_1}^{\lambda_2} d\lambda} \quad \text{AND} \quad T_\lambda = \text{SPECTRAL TRANSMITTANCE OF BEAMSPLITTER AT WAVELENGTH } \lambda$$

NOTE: WHEN SUMMATION IS USED TO APPROXIMATE INTEGRATION, MAXIMUM $\Delta\lambda$ IS 5 MILLIMICRONS

REVISIONS				TDRR 12119
SYM	ZONE	DESCRIPTION	DATE	APPROV
A		REVISED PER TDRR NO. 15591	4/9/65	WK
B		REVISED PER TDRR 17490	4/2/65	WK
C		REVISED PER TDRR 19571	4/27/65	WK
D		REVISED PER TDRR 18587	6/11/65	WK
E		REVISED PER TDRR 21069	7/28/65	WK
F		REVISED PER TDRR 22839	10/6/65	WK


IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻⁸ TORR & +150°C
.468 +.000 -.015
45° X .045 +.010 -.000 CHAMFER


.062 MAX. TYP SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
2.906 +.000 -.005
* .500 +.010 -.000 TYP
* .419 +.010 -.000 TYP
2.187 +.000 -.005

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550

DRAWN R. BRUNELLE DATE 8-13-64
CHECKED T. SULLIVAN 8-17-64
APPROVAL F. Rueckmann 8-25-64
APPROVAL E. Thomas 9-25-64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE

BEAM SPLITTER

CODE IDENT NO. 80230 SIZE D NASA NUMBER 2012222

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

G 2222102

		REVISIONS TDRR 12119		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15591	[illegible]	WK
B		REVISED PER TDRR 17490	4/2/65	WK
C		REVISED PER TDRR 19571	4/27/65	WK
D		REVISED PER TDRR 18587	6/11/65	WK
E		REVISED PER TDRR 21069	7/28/65	WK
F		REVISED PER TDRR 22839	10/[illegible]/65	WK
G		REVISED PER TDRR 23452	11/16/65	WK

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: OPTICAL CROWN GLASS TYPE 522-602 (K50) GRADE A FINE ANNEALED PER MIL-G-174, CLASS II.
4. CA: ENT & EXIT 1.875 X 2.625 ELLIPTICAL.
   SURF. QUAL 40-20
   RESOLN 4 SEC OR BETTER AT 45° INCIDENCE BY TRANSMISSION & 3 SEC OR BETTER BY REFLECTION.
5. SURFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX OF SURFACE EDGES).
6. SURFACE ② TO BE POLISHED FLAT WITHIN 1/4 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX. OF SURFACE EDGES).
7.
8. SURFACES ① & ② PARALLEL WITHIN 0°0'30"
9. THE SUM OF THE REFLECTION PERCENTAGE AND THE TRANSMISSION PERCENTAGE OF THE FINISHED ITEM SHALL BE 95% MIN AVERAGED OVER THE WAVELENGTH RANGE.
10. EDGES FINE GROUND.
11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER LOT
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

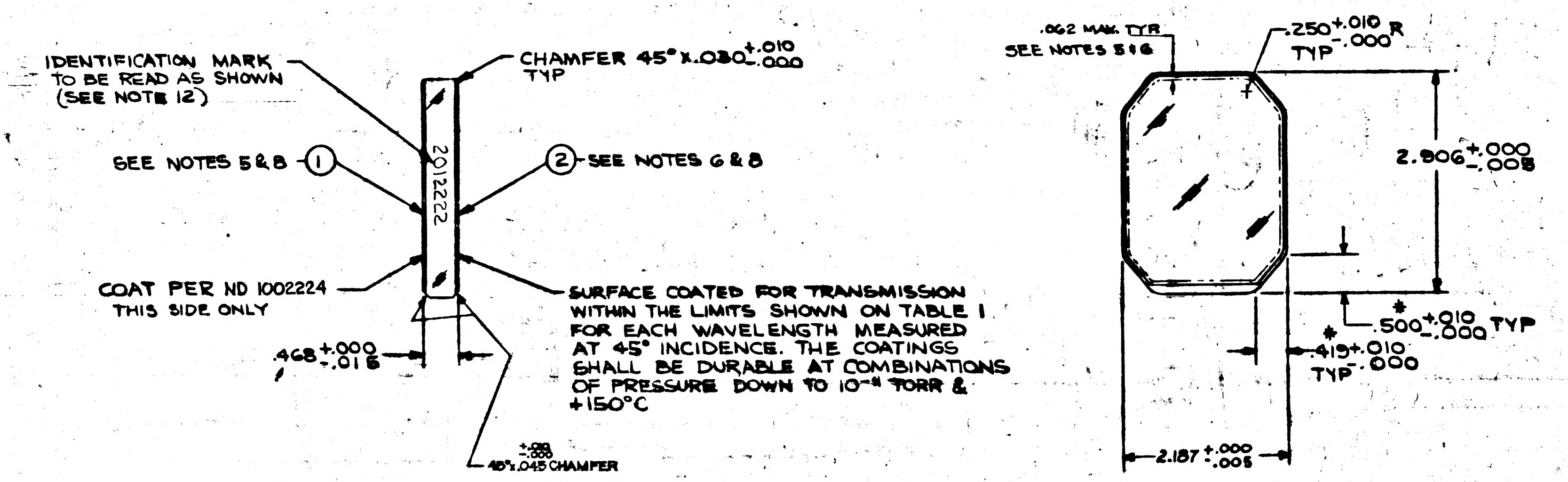
TABLE I

WAVELENGTH BAND BETWEEN λ_1 AND λ_2 IN MILLIMICRONS	MAXIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	MINIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	PEAK VALUE OF TRANSMITTANCE (T) IN PERCENT
400 TO 440	40	0	57
440 TO 540	2	0	8
540 TO 600	14	10	100
600 TO 700	30	24	100

WHERE

$$T = \frac{\int_{\lambda_1}^{\lambda_2} T_\lambda \, d\lambda}{\int_{\lambda_1}^{\lambda_2} d\lambda} \quad \text{AND} \quad T_\lambda = \text{SPECTRAL TRANSMITTANCE OF BEAMSPLITTER AT WAVELENGTH } \lambda$$

NOTE: WHEN SUMMATION IS USED TO APPROXIMATE INTEGRATION, MAXIMUM $\Delta\lambda$ IS 5 MILLIMICRONS



IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
2012222
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻⁸ TORR & +150°C
.468 +.000 -.015
45° .045 CHAMFER +.015 -.000
.062 MAX. TYP SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
2.906 +.000 -.008
* .500 +.010 -.000 TYP
* .415 +.010 -.000 TYP
2.187 +.000 -.005

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~; DECIMALS ±.005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550
DRAWN R. BRUNELLE DATE 8-19-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL G. Rushman 8-25-64
APPROVAL E. Thomp 8-25-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BEAM SPLITTER

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2012222
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

H 2012222

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 15591	1/19/65	WK.
B		REVISED PER TDRR 17490	4/2/65	WK
C		REVISED PER TDRR 18571	4/27/65	WK
D		REVISED PER TDRR 18587	5/11/65	WK
E		REVISED PER TDRR 21069	7/25/65	WK
F		REVISED PER TDRR 22839	[illegible]	WK
G		REVISED PER TDRR 23452	1/4/66	WK
H		REVISED PER TDRR 31650	10/20/66	[illegible]

REVISIONS TDRR 12119

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: OPTICAL CROWN GLASS TYPE 522-602 (K50) GRADE A FINE ANNEALED PER MIL-G-174, CLASS II.
4. a CA: ENT. & EXIT 1.875 X 2.625 ELLIPTICAL SURF. QUAL. 40-20.
   b. RESOLUTION 4 SECONDS OR BETTER AT 45° INCIDENCE BY TRANSMISSION AND 3.2 SECONDS OR BETTER BY REFLECTION.
5. SURFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX OF SURFACE EDGES).
6. SURFACE ② TO BE POLISHED FLAT WITHIN 1/4 FRINGE AT 5461 Å (MEASURED OVER SURFACE OF GLASS WITHIN .062 MAX OF SURFACE EDGES).
7.
8. SURFACES ① & ② PARALLEL WITHIN 0°0'30"
9. THE SUM OF THE REFLECTION PERCENTAGE AND THE TRANSMISSION PERCENTAGE OF THE FINISHED ITEM SHALL BE 95% MIN AVERAGED OVER THE WAVELENGTH RANGE.
10. EDGES FINE GROUND.
11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER LOT
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019

TABLE I

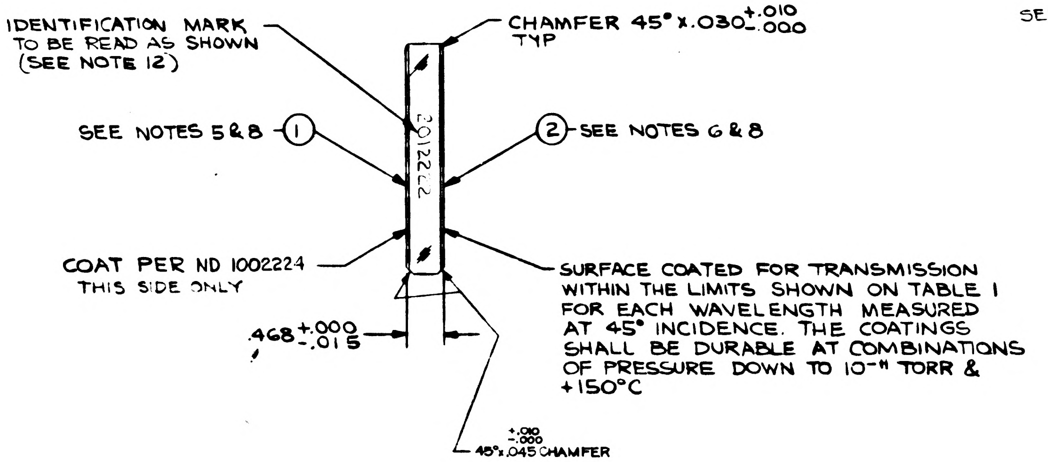
WAVELENGTH BAND BETWEEN λ_1 AND λ_2 IN MILLIMICRONS	MAXIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	MINIMUM INTEGRATED TRANSMITTANCE (T) IN PERCENT	PEAK VALUE OF TRANSMITTANCE (T) IN PERCENT
400 TO 440	40	0	57
440 TO 540	2	0	8
540 TO 600	14	10	100
600 TO 700	30	24	100

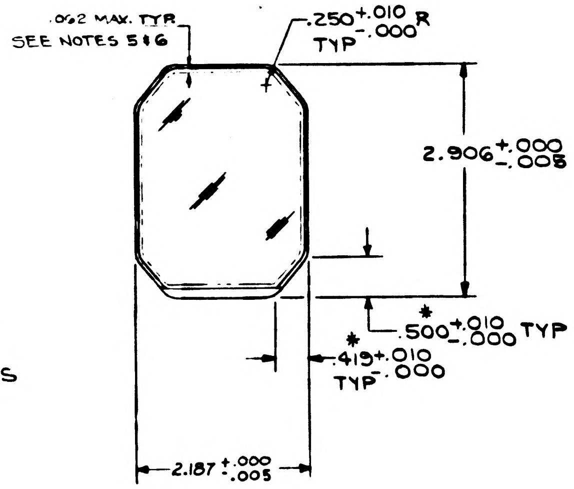
WHERE

$$T = \frac{\int_{\lambda_1}^{\lambda_2} T_\lambda d_\lambda}{\int_{\lambda_1}^{\lambda_2} d_\lambda}$$

AND T_λ = SPECTRAL TRANSMITTANCE OF BEAMSPLITTER AT WAVELENGTH λ

NOTE: WHEN SUMMATION IS USED TO APPROXIMATE INTEGRATION, MAXIMUM $\Delta\lambda$ IS 5 MILLIMICRONS


IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER ND 1002224 THIS SIDE ONLY
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C
.468 +.000 -.015
45° x .045 +.010 -.000 CHAMFER


.062 MAX. TYP SEE NOTES 5 & 6
.250 +.010 -.000 R TYP
2.906 +.000 -.008
* .500 +.010 -.000 TYP
* .419 +.010 -.000 TYP
2.187 +.000 -.005

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550
DRAWN R. BRUNELLE DATE 8-13-64
CHECKED J. SULLIVAN 8-17-64
APPROVAL F. [illegible] 8-25-64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BEAM SPLITTER

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2012222
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2012222 H

	2012222

REVISIONS TDRR 12119				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATERIAL: GLASS, OPTICAL GRADE B PER MIL-G-174 TYPE 523-58.6 FINE ANNEALED
4. CA: ENT & EXIT 1.875 X 2.625 ELLIPTICAL. SURF. QUAL 40-20 RESOLN 3 SEC OR BETTER AT 45° INCIDENCE BY TRANSMISSION & REFLECTION.
5. SURFACE ① TO BE POLISHED FLAT WITHIN 1/2 FRINGE AT 5461Å
6. SURFACE ② TO BE POLISHED FLAT WITHIN 1/4 FRINGE AT 5461Å
7. DIAMOND SCRATCH FIG "2" AS SHOWN TO IDENTIFY SIDE FOR MANUFACTURING PURPOSES
8. SURFACES ① & ② PARALLEL WITHIN 0°0'30"
9. THE SUM OF THE REFLECTION PERCENTAGE AND THE TRANSMISSION PERCENTAGE OF THE FINISHED ITEM SHALL BE 95% MIN AVERAGED OVER THE WAVELENGTH RANGE.
10. EDGES FINE GROUND
11. TRANSMITTANCE CURVE TO BE SUPPLIED WITH EACH BEAMSPLITTER
12. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019
13. APPLY LUXORB PER ND1002091.

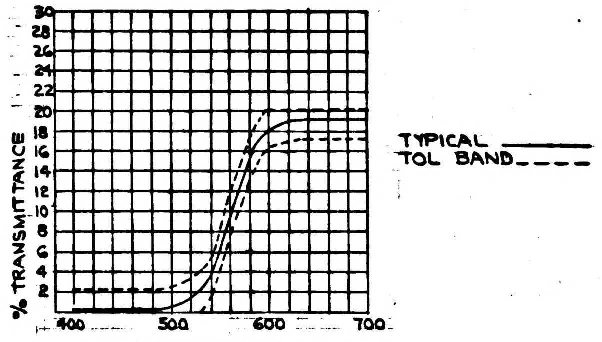
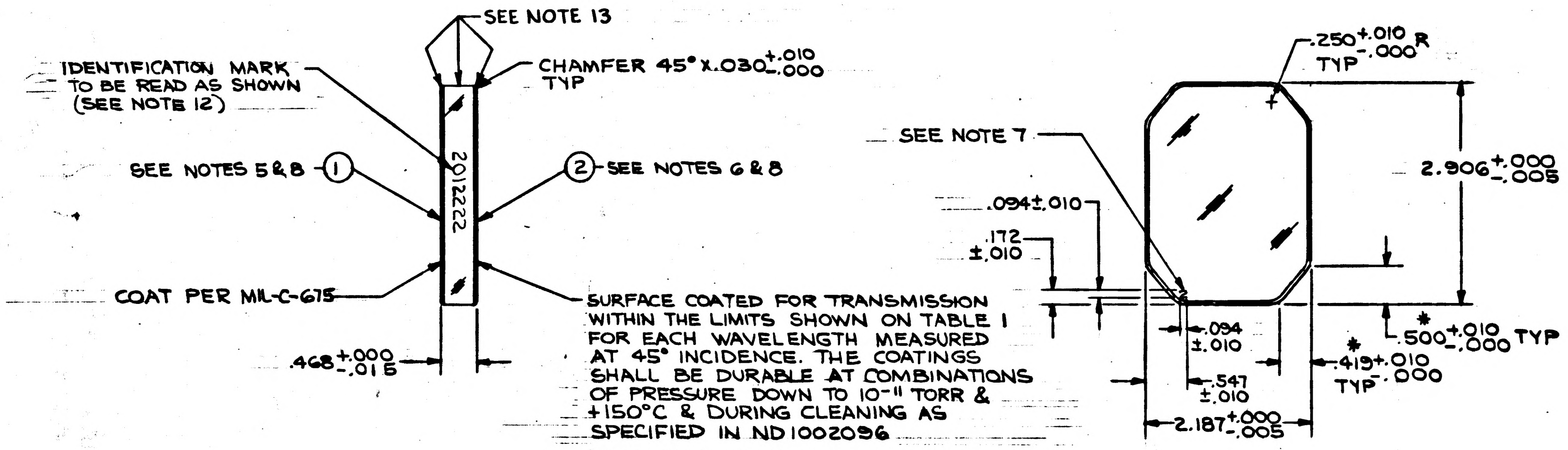


TABLE I


SEE NOTE 13
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 12)
CHAMFER 45° X .030 +.010 -.000 TYP
SEE NOTES 5 & 8 ①
② SEE NOTES 6 & 8
2012222
COAT PER MIL-C-675
.468 +.000 -.015
SURFACE COATED FOR TRANSMISSION WITHIN THE LIMITS SHOWN ON TABLE I FOR EACH WAVELENGTH MEASURED AT 45° INCIDENCE. THE COATINGS SHALL BE DURABLE AT COMBINATIONS OF PRESSURE DOWN TO 10⁻¹¹ TORR & +150°C & DURING CLEANING AS SPECIFIED IN ND1002096
.250 +.010 -.000 R TYP
SEE NOTE 7
2.906 +.000 -.005
.094 ±.010
.172 ±.010
.094 ±.010
.547 ±.010
* .500 +.010 -.000 TYP
* .419 +.010 -.000 TYP
2.187 +.000 -.005

* DIMENSIONS ARE TO THEORETICAL INTERSECTIONS OF PLANES

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910550
DRAWN R. BRUNELLE DATE 8-1964
CHECKED J. SULLIVAN 8-17-64
APPROVAL G. Purchase 8-25-64
APPROVAL E. Thomp 8-25-64
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: BEAM SPLITTER

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2012222

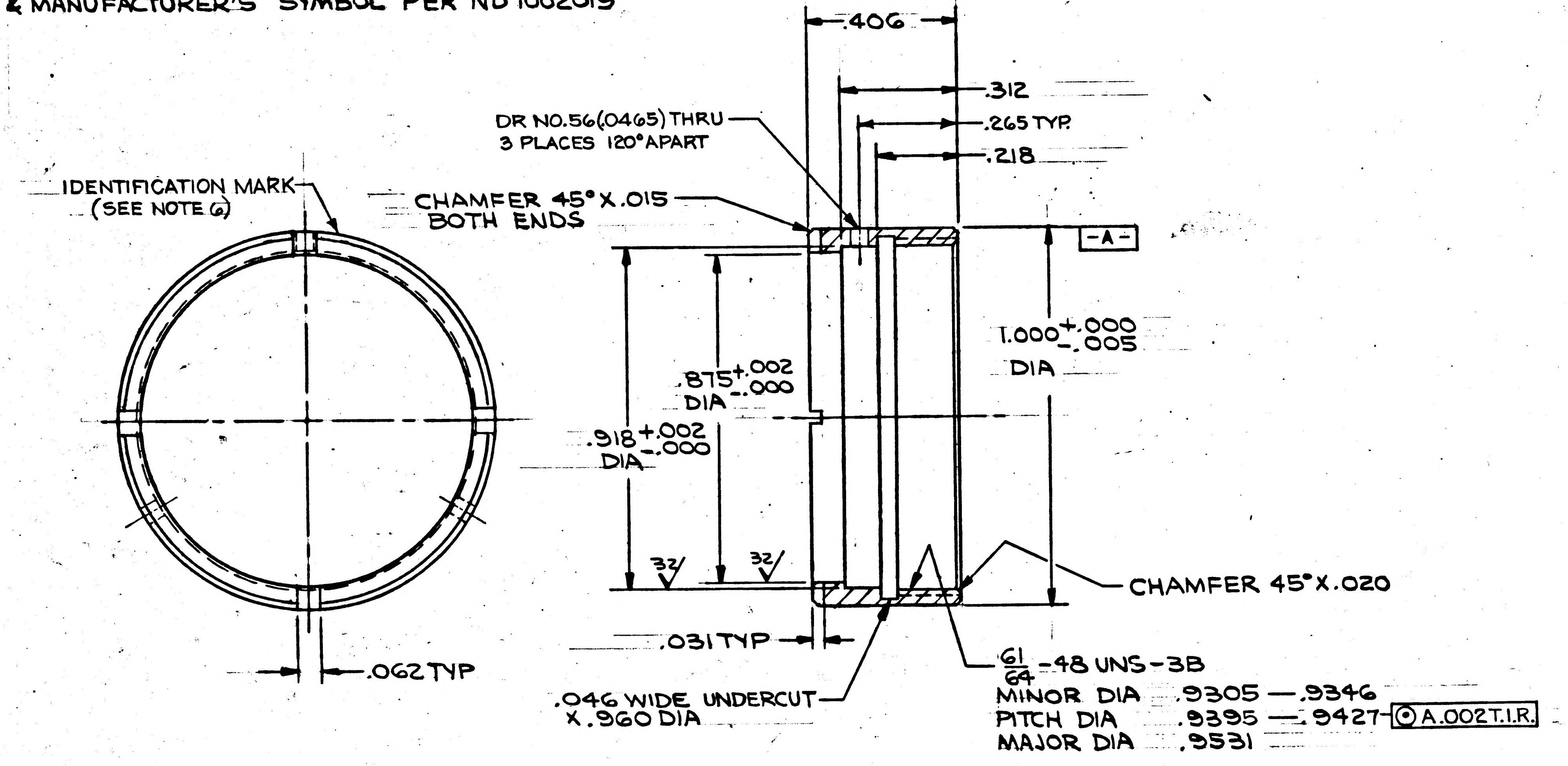
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2

2012353 A

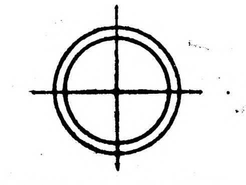
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
		REVISIONS TDRR 10793		
A		REVISED PER TDRR NO. 16685	2/26/65	W.K.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. FINISH : BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



.406
.312
.265 TYP.
.218
DR NO.56 (.0465) THRU
3 PLACES 120° APART
IDENTIFICATION MARK
(SEE NOTE 6)
CHAMFER 45° X .015
BOTH ENDS
-A-
1.000 +.000 -.005 DIA
.875 +.002 -.000 DIA
.918 +.002 -.000 DIA
32/
32/
CHAMFER 45° X .020
.031 TYP
.062 TYP
.046 WIDE UNDERCUT X .960 DIA
61/64 -48 UNS-3B
MINOR DIA .9305 — .9346
PITCH DIA .9395 — .9427 ◎ A .002 T.I.R.
MAJOR DIA .9531

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012480	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910040

DRAWN R. BRUNELLE DATE 6-4-64
CHECKED C. Langdorff 6-11-64
APPROVAL 6/4/64
APPROVAL E. Thorup 7/1/64

NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, LENS,
STAR TRACKER

CODE IDENT NO.
SIZE C
NASA NUMBER 2012353
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

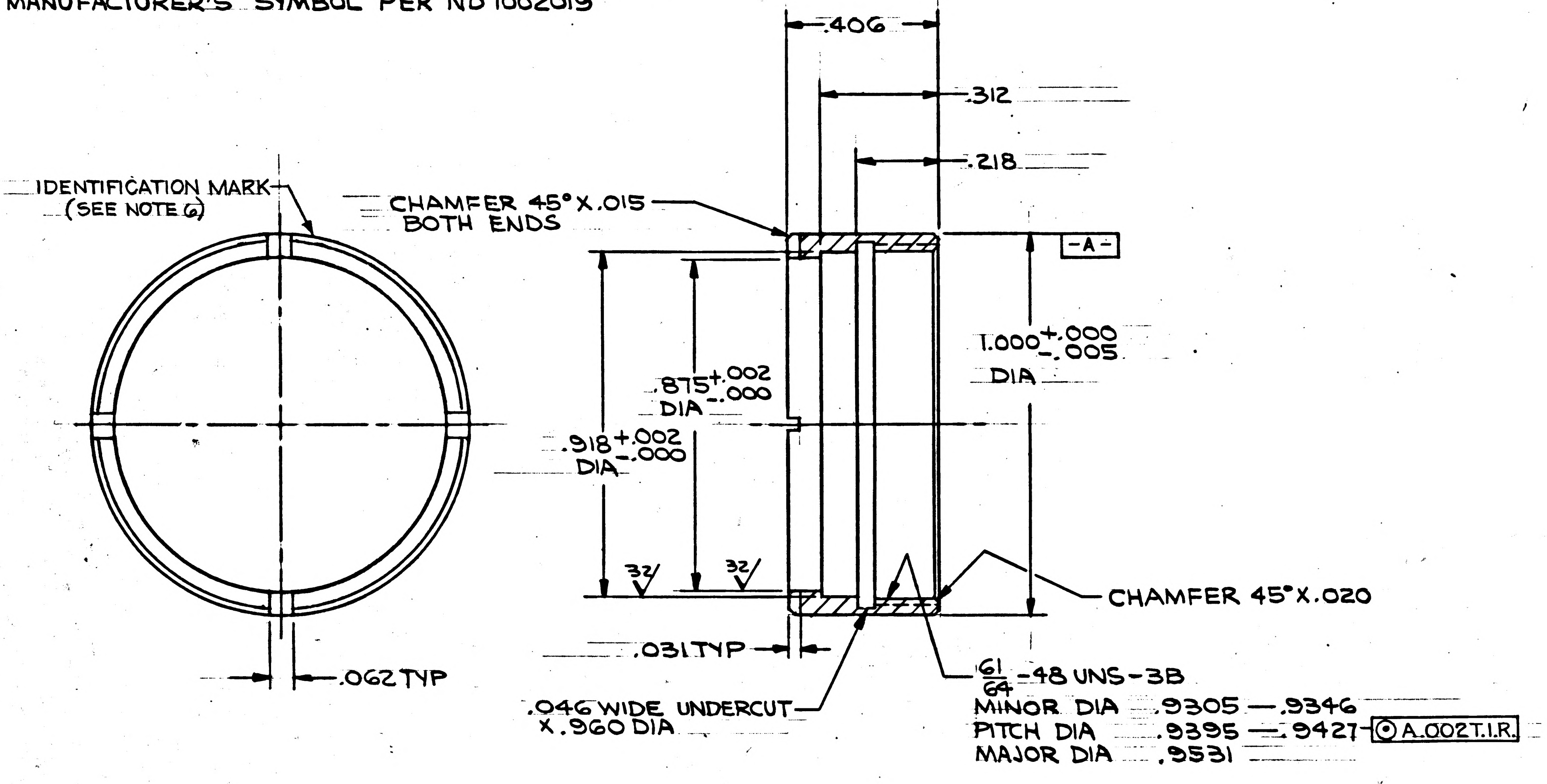
E-184

2012353 n

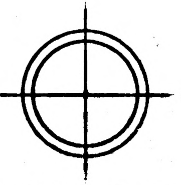
REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   $\overset{63}{\sqrt{}}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. FINISH: BLACK ANODIZE IN ACCORDANCE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



IDENTIFICATION MARK (SEE NOTE 6)
.062 TYP
.406
.312
.218
CHAMFER 45° X .015 BOTH ENDS
-A-
1.000 +.000 -.005 DIA
.875 +.002 -.000 DIA
.918 +.002 -.000 DIA
32
32
CHAMFER 45° X .020
.031 TYP
.046 WIDE UNDERCUT X .960 DIA
61/64 -48 UNS-3B
MINOR DIA .9305 — .9346
PITCH DIA .9395 — .9427 ⊙ A .002 T.I.R.
MAJOR DIA .9531


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012480	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910040

DRAWN R. BRUNELLE DATE 6-4-64
CHECKED 6-11-64
APPROVAL 6/24/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

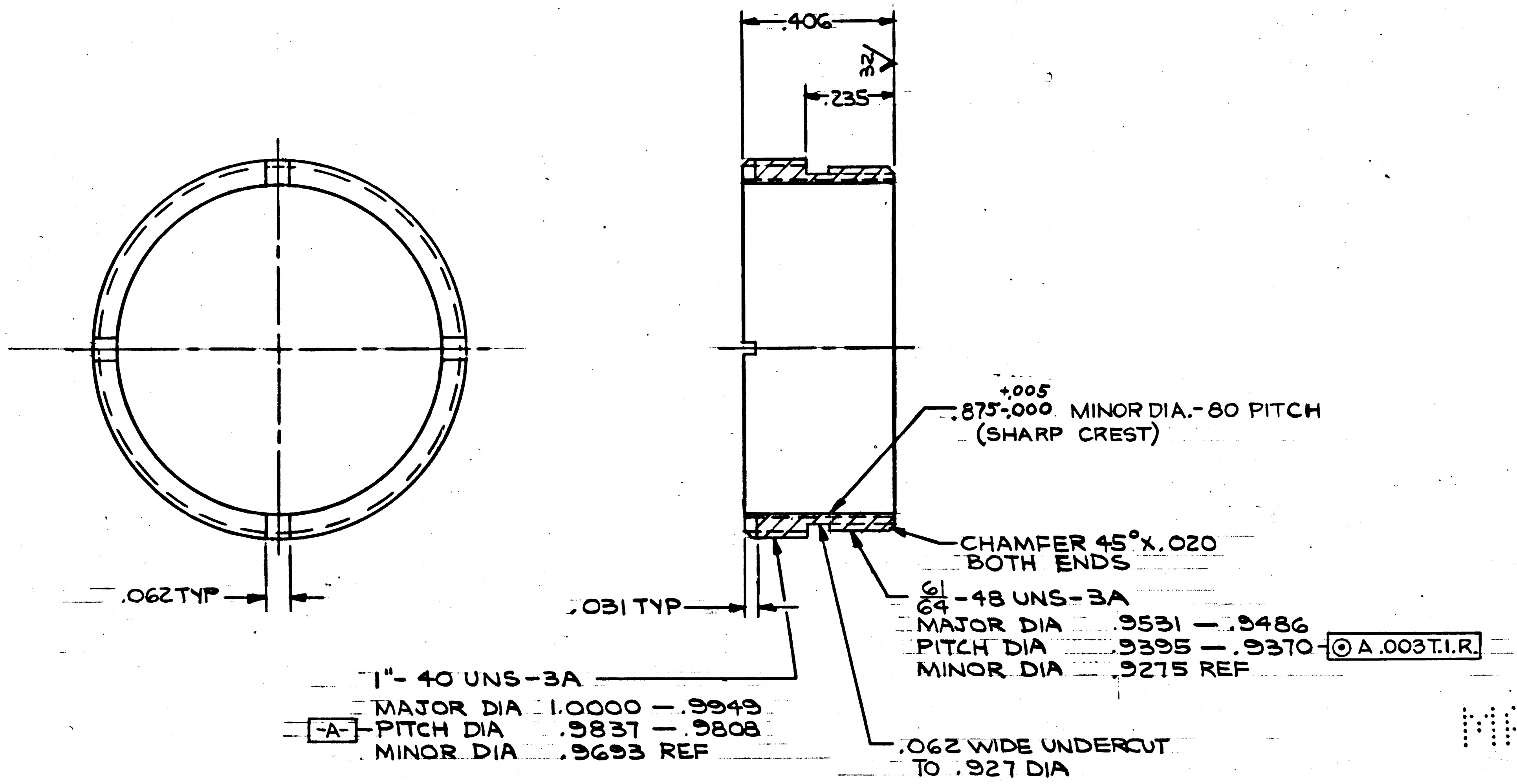
TITLE HOUSING, LENS, STAR TRACKER

CODE IDENT NO.
SIZE C
NASA NUMBER 2012353
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

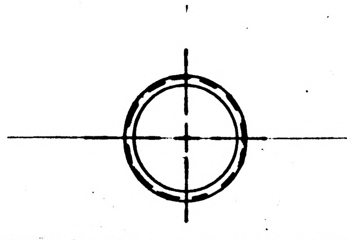
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   $\sqrt{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1
6. BLACKEN IN ACCORDANCE WITH MIL-C-13924 CLASS 3 (KPS-1005 B.100)
7. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019. (TAGGING)



.406
32
.235
+.005 .875 -.000 MINOR DIA.-80 PITCH (SHARP CREST)
CHAMFER 45° x .020 BOTH ENDS
61/64 -48 UNS-3A
MAJOR DIA .9531 — .9486
PITCH DIA .9395 — .9370 ⊙ A .003T.I.R.
MINOR DIA .9275 REF
.062 TYP
.031 TYP
1"- 40 UNS-3A
MAJOR DIA 1.0000 — .9949
-A- PITCH DIA .9837 — .9808
MINOR DIA .9693 REF
.062 WIDE UNDERCUT TO .927 DIA



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012480	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL
FED SPEC QQ-S-763
CLASS 416 COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386910050

DRAWN R. BRUNELLE DATE 6-4-64
CHECKED C. Ravgdoff 6-11-64
APPROVAL E. Rusclmann 6/23/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL L. Walsh 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RING, LOCKING,
STAR TRACKER

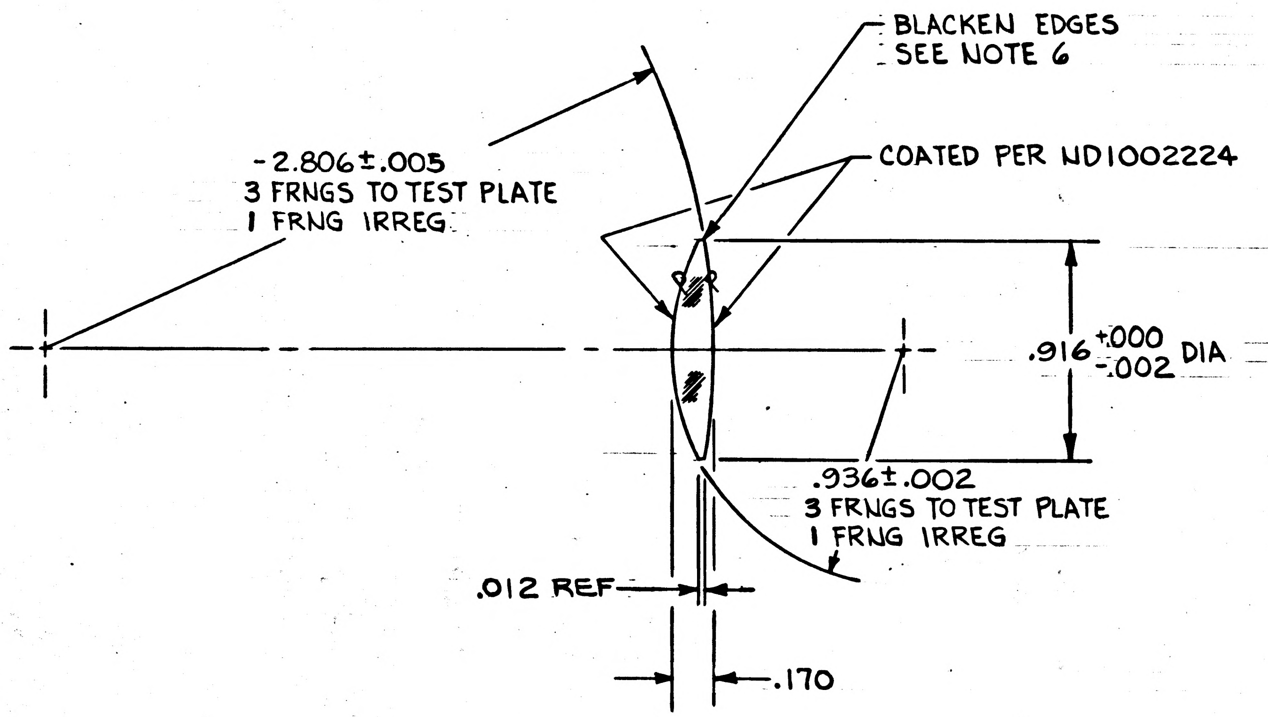
CODE IDENT NO.
SIZE C
NASA NUMBER 2012355
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

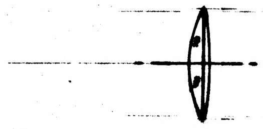
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012357

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B - FINE ANNEALED
   TYPE 517-645
4. CA: ENT = .875 EXIT = .860
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES.
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND
   MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019 (BAGGING)


BLACKEN EDGES
SEE NOTE 6
COATED PER ND1002224
-2.806 ± .005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.916 +.000 -.002 DIA
.936 ± .002
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.012 REF
.170



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012480	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910010

DRAWN V. AMATO DATE 12-13-63
CHECKED C. Langstaff 6-24-64
APPROVAL 6/25/64
APPROVAL E. Morup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE: LENS, POSITIVE
(STAR TRACKER)

CODE IDENT NO. | SIZE C | NASA NUMBER 2012357

SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF 1

E-184

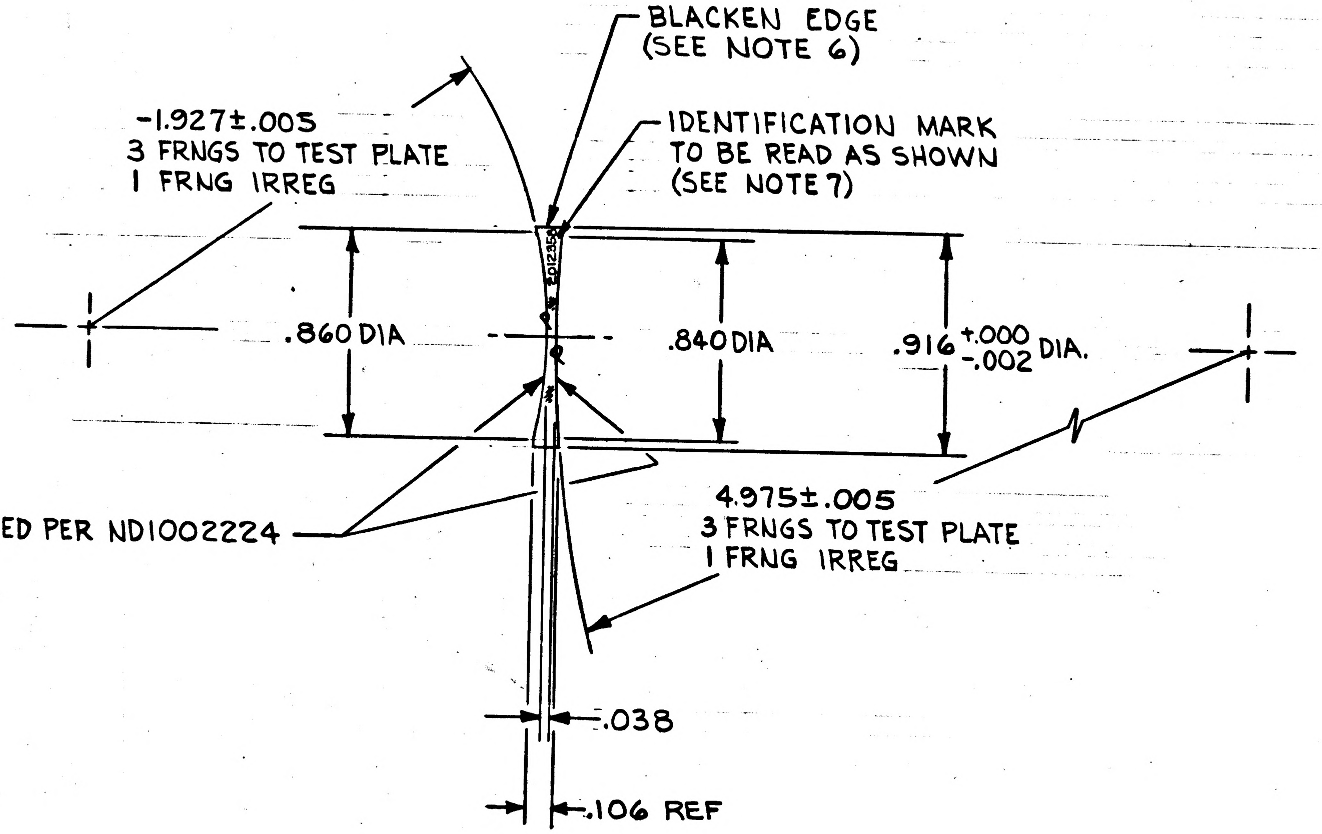
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

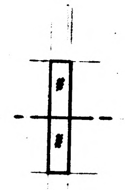
2012358 (r)

REVISIONS TDER 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B-FINE ANNEALED
   TYPE 580-410
4. CA: ENT=.848 EXIT=.824
   SURF. QUAL.: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.


BLACKEN EDGE
(SEE NOTE 6)
-1.927±.005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
IDENTIFICATION MARK
TO BE READ AS SHOWN
(SEE NOTE 7)
2012358
.860 DIA
.840 DIA
.916 +.000 -.002 DIA.
P
P
COATED PER ND1002224
4.975±.005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.038
.106 REF



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012480	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL: SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 28386910020

DRAWN V. AMATO DATE 12-16-63
CHECKED C. Langstoff 6-29-64
APPROVAL 6/29/64
APPROVAL E. Thorup 7/1/64

NASA APPROVAL

MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE
(STAR TRACKER)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012358

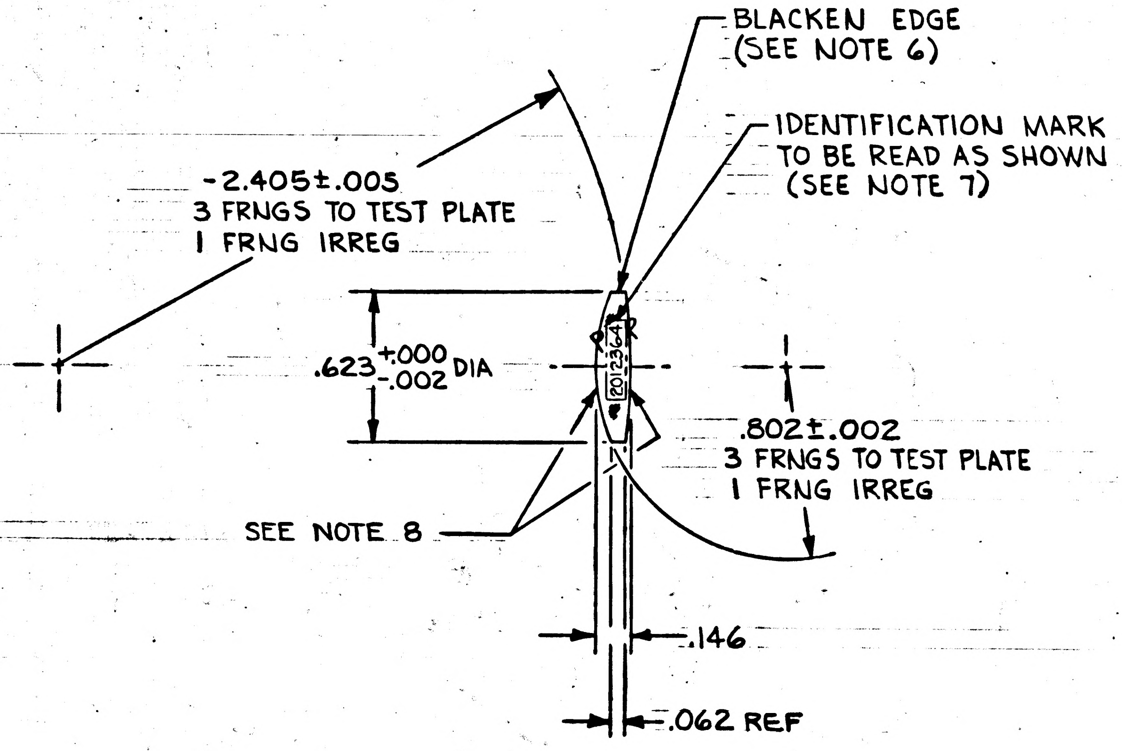
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

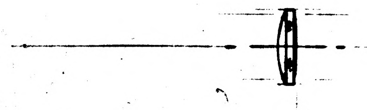
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012364 A

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16662	2/18/65	WK.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B - FINE ANNEALED
   TYPE 517-645
4. CA: ENT=.562 EXIT=.552
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
8. ANTI-REFLECTION COAT PER ND1002224 EXCEPT THAT THE WAVELENGTH RANGE SHALL BE FROM 330 TO 370 MILLI-MICRONS.


BLACKEN EDGE
(SEE NOTE 6)
IDENTIFICATION MARK
TO BE READ AS SHOWN
(SEE NOTE 7)
-2.405±.005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.623 +.000 -.002 DIA
P
P
2012364
.802±.002
3 FRNGS TO TEST PLATE
1 FRNG IRREG
SEE NOTE 8
.146
.062 REF



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910030
DRAWN V. AMATO DATE 12-16-63
CHECKED C. Langstaff 6-24-64
APPROVAL 6/23/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL L. Halzel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE LENS, POSITIVE
(HORIZON SENSING)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012364
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

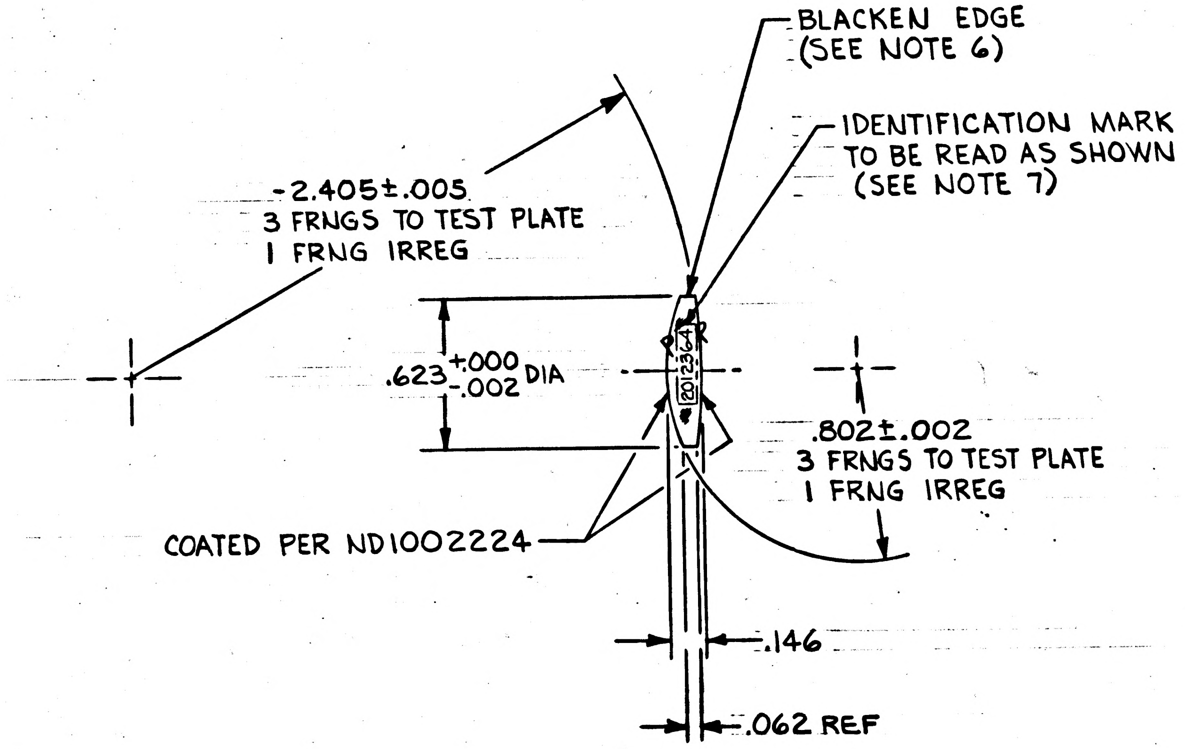
E-154

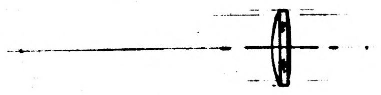
6 5 4 3 2 1

2012364 (r)

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B - FINE ANNEALED
   TYPE 517-645
4. CA: ENT=.562 EXIT=.552
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.


BLACKEN EDGE
(SEE NOTE 6)
IDENTIFICATION MARK
TO BE READ AS SHOWN
(SEE NOTE 7)
-2.405±.005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.623 +.000 -.002 DIA
2012364
P
P
.802±.002
3 FRNGS TO TEST PLATE
1 FRNG IRREG
COATED PER ND1002224
.146
.062 REF



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910030

DRAWN V. AMATO DATE 12-16-63
CHECKED 6-24-64
APPROVAL 6/28/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(HORIZON SENSING)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012364

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-184

6 5 4 3 2 1

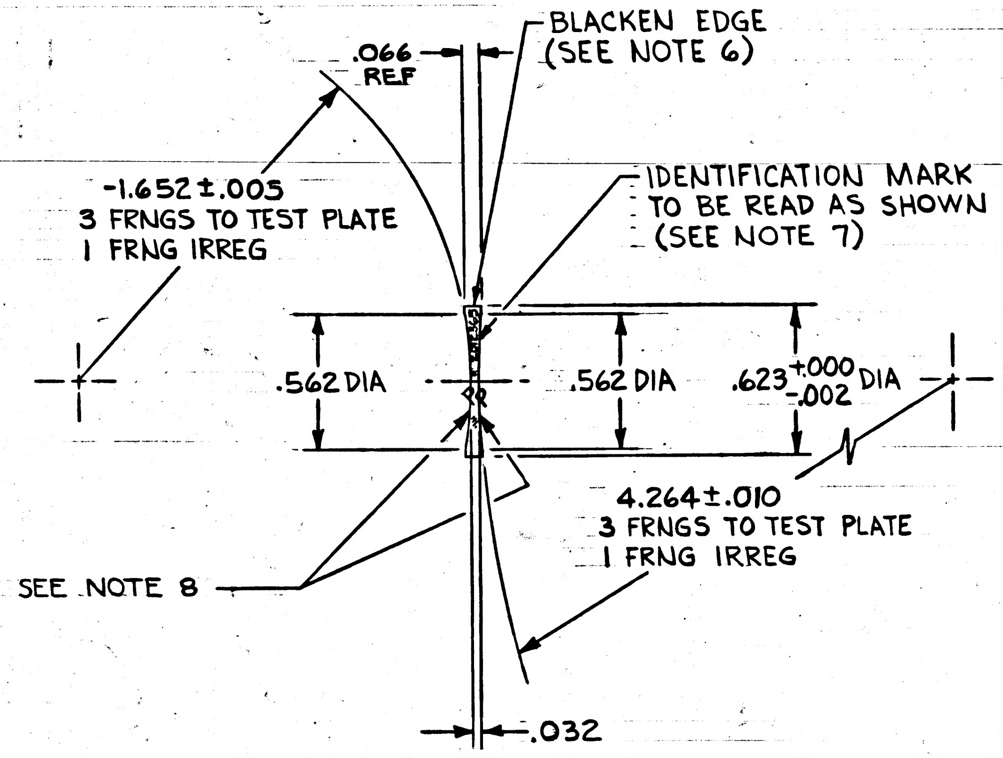
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012365 A

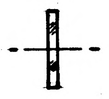
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 10793				
A		REVISED PER TDRR 16663	7/8/65	WK.

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B-FINE ANNEALED
   TYPE 580-410
4. CA: ENT = .546 EXIT = .532
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.
8. ANTI-REFLECTION COAT PER ND1002224 EXCEPT THAT THE WAVELENGTH RANGE SHALL BE FROM 330 TO 370 MILLI-MICRONS.



.066 REF
BLACKEN EDGE (SEE NOTE 6)
-1.652 ± .005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 7)
.562 DIA
.562 DIA
.623 +.000 -.002 DIA
P
P
4.264 ± .010
3 FRNGS TO TEST PLATE
1 FRNG IRREG
SEE NOTE 8
.032



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910040

DRAWN V. AMATO DATE 12-16-63
CHECKED C. Lamplott 1-28-64
APPROVAL 6/25/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE LENS, NEGATIVE (HORIZON SENSING)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012365
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

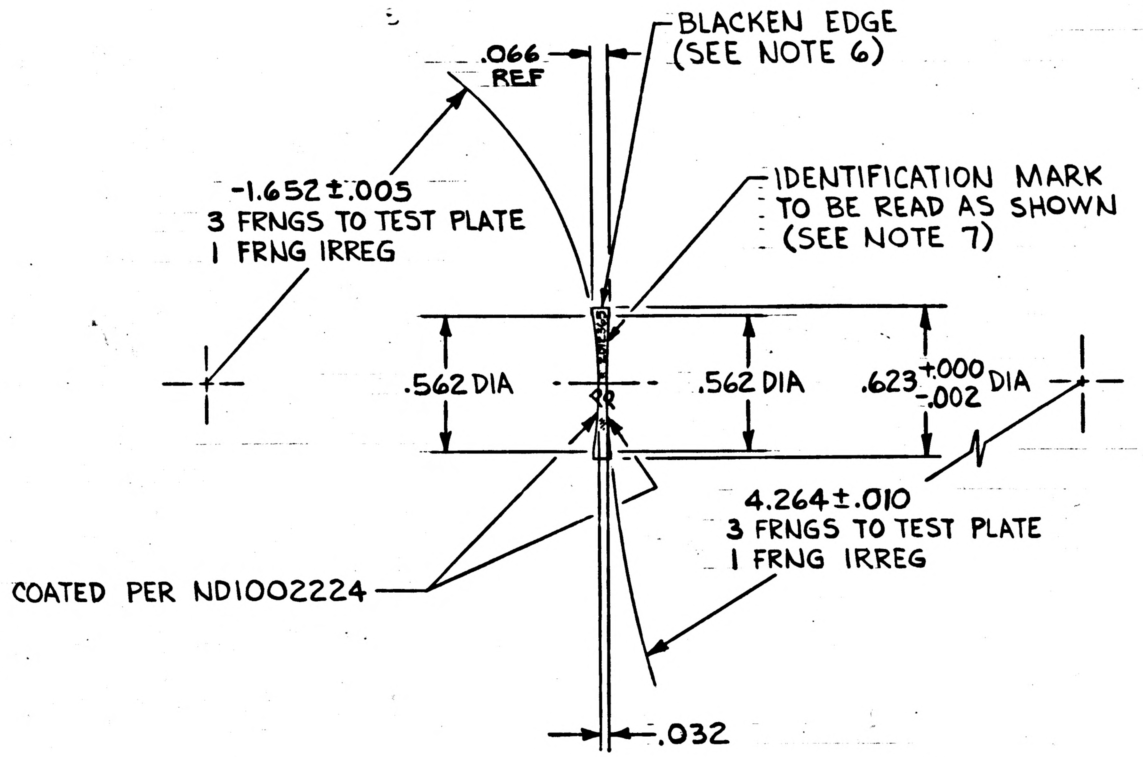
K-184

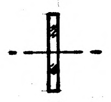
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
GRADE B-FINE ANNEALED
TYPE 580-410
4. CA: ENT=.546 EXIT=.532
SURF. QUAL: 60-40
CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830
BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019.

	2012365	M

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL


.066 REF
BLACKEN EDGE (SEE NOTE 6)
-1.652 ± .005
3 FRNGS TO TEST PLATE
1 FRNG IRREG
IDENTIFICATION MARK TO BE READ AS SHOWN (SEE NOTE 7)
.562 DIA
.562 DIA
.623 +.000 -.002 DIA
4.264 ± .010
3 FRNGS TO TEST PLATE
1 FRNG IRREG
COATED PER ND1002224
.032



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012477	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910040

DRAWN V. AMATO DATE 12-16-63
CHECKED C. Lampton 1-24-64
APPROVAL 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL L Hale 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, NEGATIVE
(HORIZON SENSING)

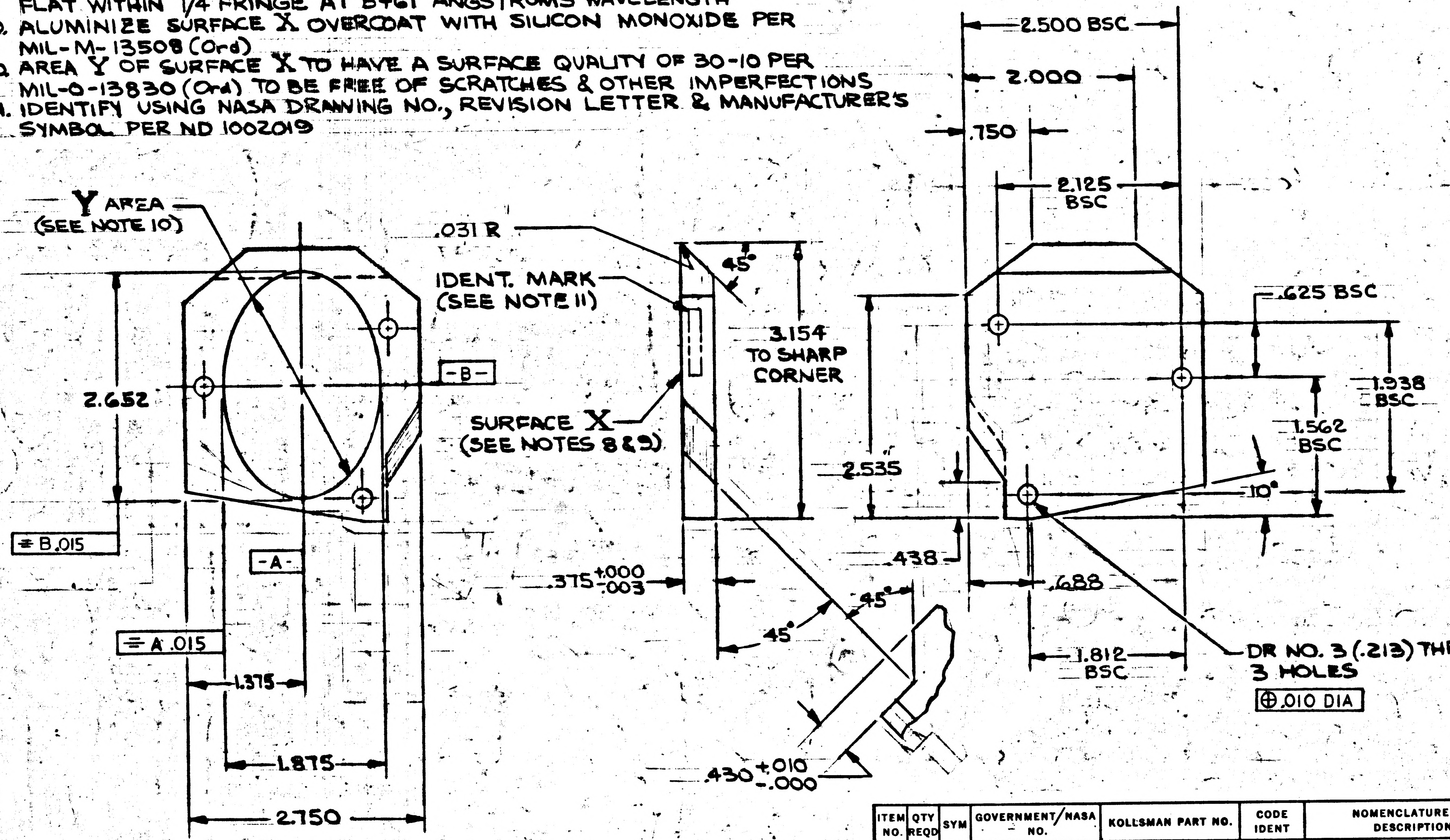
CODE IDENT NO.
SIZE C
NASA NUMBER 2012365
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET | OF

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012366A

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12838	23 Jy 64	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\overset{63}{\surd}$ FINISH ALL OVER
   b) ROUND OFF EDGES .015R MIN
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER PLATING
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord) TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



Y AREA (SEE NOTE 10)
.031 R
IDENT. MARK (SEE NOTE 11)
45°
3.154 TO SHARP CORNER
SURFACE X (SEE NOTES 8 & 9)
-B-
2.652
⌯ B .015
-A-
⌯ A .015
1.375
1.875
2.750
.375 +.000 -.003
45°
45°
.430 +.010 -.000
2.500 BSC
2.000
.750
2.125 BSC
.625 BSC
1.938 BSC
1.562 BSC
10°
2.535
.438
.688
1.812 BSC
DR NO. 3 (.213) THRU 3 HOLES
⊕ .010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910310

DRAWN R. BRUNELLE DATE 1-27-64
CHECKED T. SULLIVAN 6-25-64
APPROVAL 6/23/64
APPROVAL E. [illegible] 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

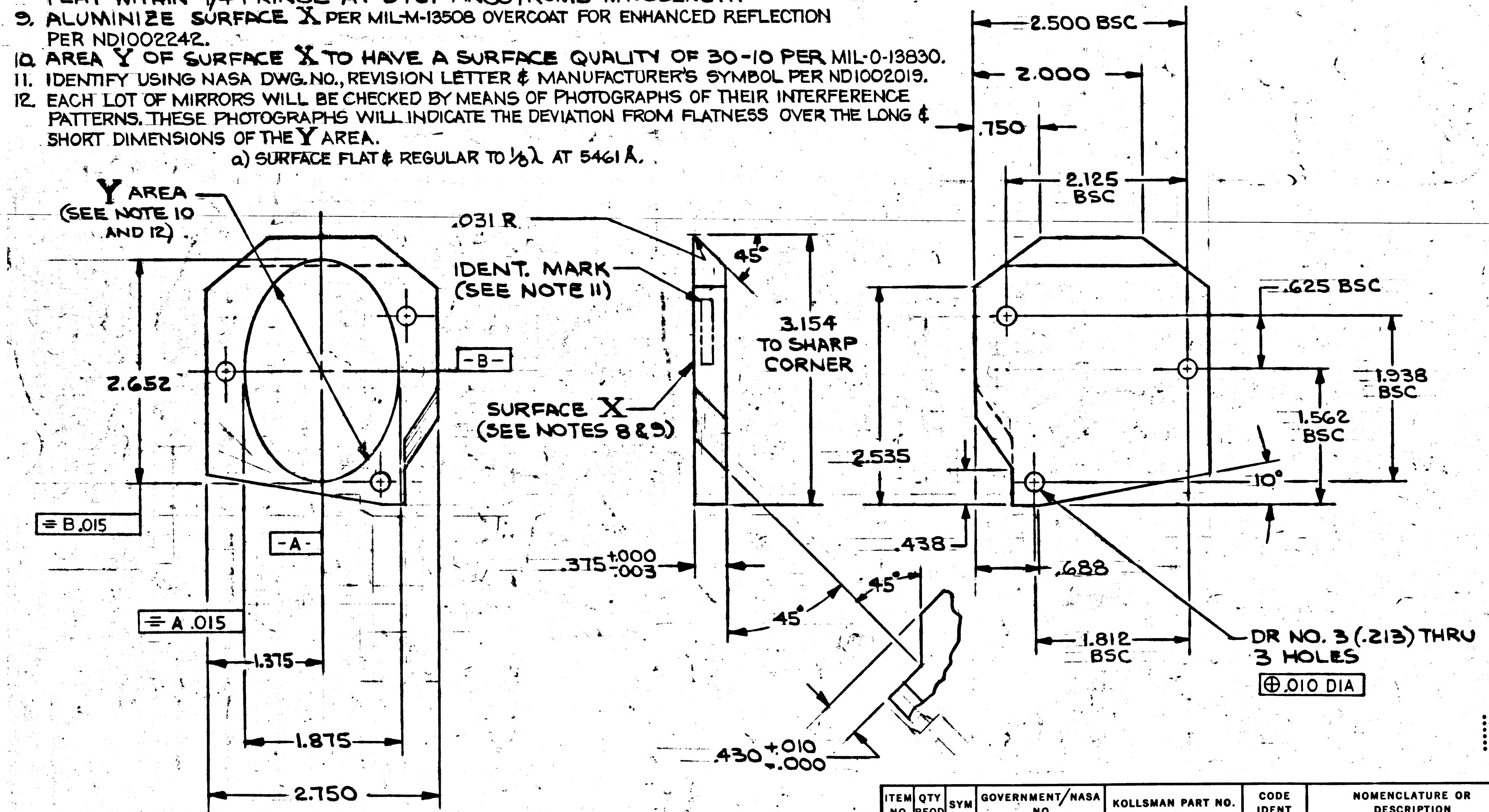
CODE IDENT NO.
SIZE C
NASA NUMBER 2012366
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012366 B

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12838	23 Jly 64	WR
B		REVISED PER TDRR 16667	2/18/65	WP.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63√ FINISH ALL OVER
   b) ROUND OFF EDGES .015R MIN
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER PLATING
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X PER MIL-M-13508 OVERCOAT FOR ENHANCED REFLECTION PER ND1002242.
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-0-13830.
11. IDENTIFY USING NASA DWG. NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019.
12. EACH LOT OF MIRRORS WILL BE CHECKED BY MEANS OF PHOTOGRAPHS OF THEIR INTERFERENCE PATTERNS. THESE PHOTOGRAPHS WILL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG & SHORT DIMENSIONS OF THE Y AREA.
    a) SURFACE FLAT & REGULAR TO 1/8 λ AT 5461 Å.



Y AREA (SEE NOTE 10 AND 12)
.031 R
45°
IDENT. MARK (SEE NOTE 11)
3.154 TO SHARP CORNER
2.652
-B-
SURFACE X (SEE NOTES 8 & 9)
2.535
= B .015
-A-
= A .015
.375 +.000 -.003
45°
45°
.438
.688
1.375
1.875
2.750
.430 +.010 -.000
2.500 BSC
2.000
.750
2.125 BSC
.625 BSC
1.938 BSC
1.562 BSC
10°
1.812 BSC
DR NO. 3 (.213) THRU 3 HOLES
⊕ .010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910310

DRAWN R. BRUNELLE DATE 1-27-64
CHECKED J. SULLIVAN 6-25-64
APPROVAL 6/23/64
APPROVAL E. Whomp 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

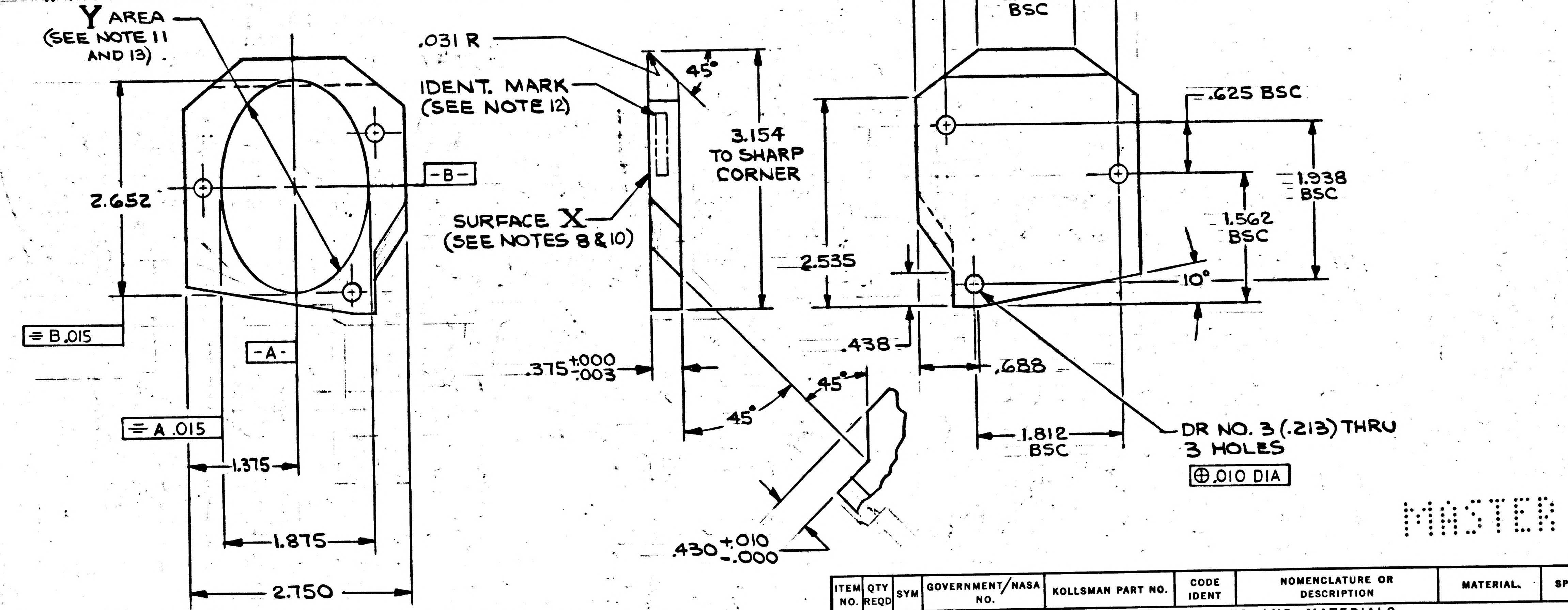
CODE IDENT NO. | SIZE C | NASA NUMBER 2012366
SCALE 1/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2012366	C

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12838	23Ag64	WH.
B		REVISED PER TDRR 16667	2/18/65	WH.
C		REVISED PER TDRR 21530	8/24/65	WH.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63√ FINISH ALL OVER
   b) ROUND OFF EDGES .015R MIN
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER PLATING
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/4 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. HEAT TREAT (STABILIZE & STRESS RELIEVE) PRIOR TO NOTE 10, TO MEET FLATNESS TOLERANCE PER NOTE 8 AS FOLLOWS:
   a) HEAT MIRROR FROM ROOM TEMPERATURE TO 600°F$^{+0°}_{-20°}$F AT THE RATE OF 100°F±10°F PER HOUR.
   b) HOLD TEMPERATURE OF 600°F$^{+0°}_{-20°}$F FOR 1 1/2 HOURS.
   c) COOL AT THE RATE OF 100°F±10°F PER HOUR TO ROOM TEMPERATURE.
   d) RE-CHECK FOR COMPLIANCE TO NOTE 8 AT 70°F±5°F.
   e) REPOLISH AS REQUIRED TO COMPLY TO NOTE 8.
   f) REPEAT HEAT CYCLE IF REWORK IN STEP "e" EXCEEDED 1/2 FRINGE.

13. (CONT)
   a) SURFACE FLAT & REGULAR TO 1/8 λ AT 5461 Å.
   b) MEASUREMENT TO BE MADE AT 70°F ± 10°F.



MASTER

10. ALUMINIZE SURFACE "X" PER MIL-M-13508 OVERCOAT FOR ENHANCED REFLECTION PER ND1002242. HEAT AND COOL THE MIRROR DURING THE ALUMINIZING AND COATING PROCESS AT THE RATE OF 100°F MAX PER HOUR.
11. AREA "Y" OF SURFACE "X" TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830.
12. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
13. EACH LOT OF MIRRORS WILL BE CHECKED BY MEANS OF PHOTOGRAPHS OF THEIR INTERFERENCE PATTERNS. THESE PHOTOGRAPHS WILL INDICATE THE DEVIATION FROM FLATNESS OVER THE LONG & SHORT DIMENSIONS OF THE Y AREA. (SEE CONTINUATION ABOVE)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910310

DRAWN R. BRUNELLE DATE 6-27-64
CHECKED J. SULLIVAN 6-25-64
APPROVAL 6/27/64
APPROVAL E. Murray 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2012366

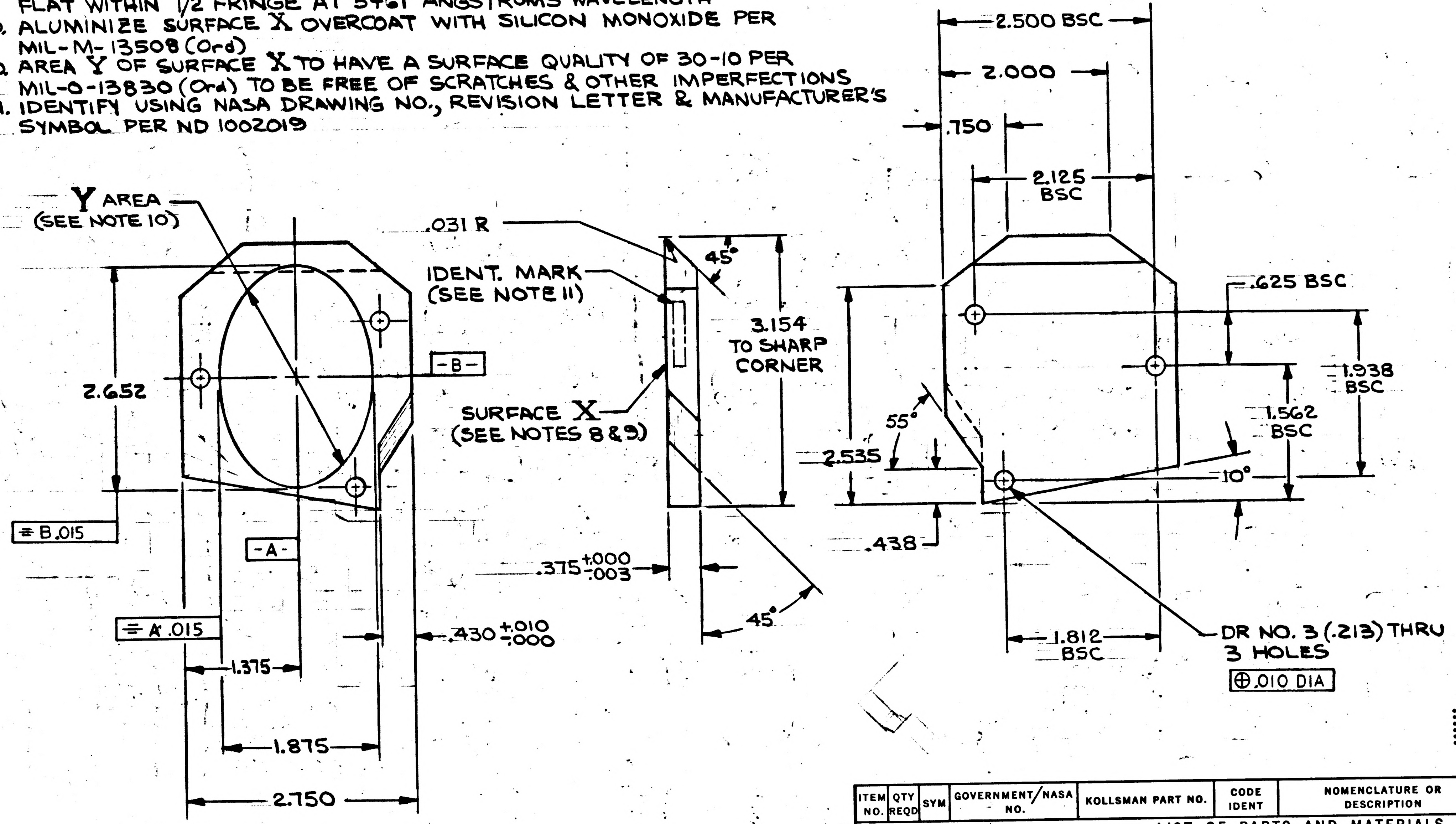
SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

E-154

2012366

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   - a) 63√ FINISH ALL OVER
   - b) ROUND OFF EDGES .015R MIN
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114.
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER PLATING
8. SURFACE MARKED X TO BE LAPPED AND OPTICALLY POLISHED. TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord) TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DRAWING NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



Y AREA
(SEE NOTE 10)
.031 R
IDENT. MARK
(SEE NOTE 11)
45°
3.154
TO SHARP
CORNER
-B-
2.652
SURFACE X
(SEE NOTES 8 & 9)
≡ B .015
-A-
.375 +.000 -.003
45°
≡ A .015
.430 +.010 -.000
1.375
1.875
2.750
2.500 BSC
2.000
.750
2.125
BSC
.625 BSC
1.938
BSC
1.562
BSC
55°
2.535
10°
.438
1.812
BSC
DR NO. 3 (.213) THRU
3 HOLES
⊕ .010 DIA

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910310

DRAWN R. BRUNELLE DATE 1-27-64
CHECKED J. SULLIVAN 6-25-64
APPROVAL 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR, SEXTANT HEAD

CODE IDENT NO.
SIZE C
NASA NUMBER 2012366
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

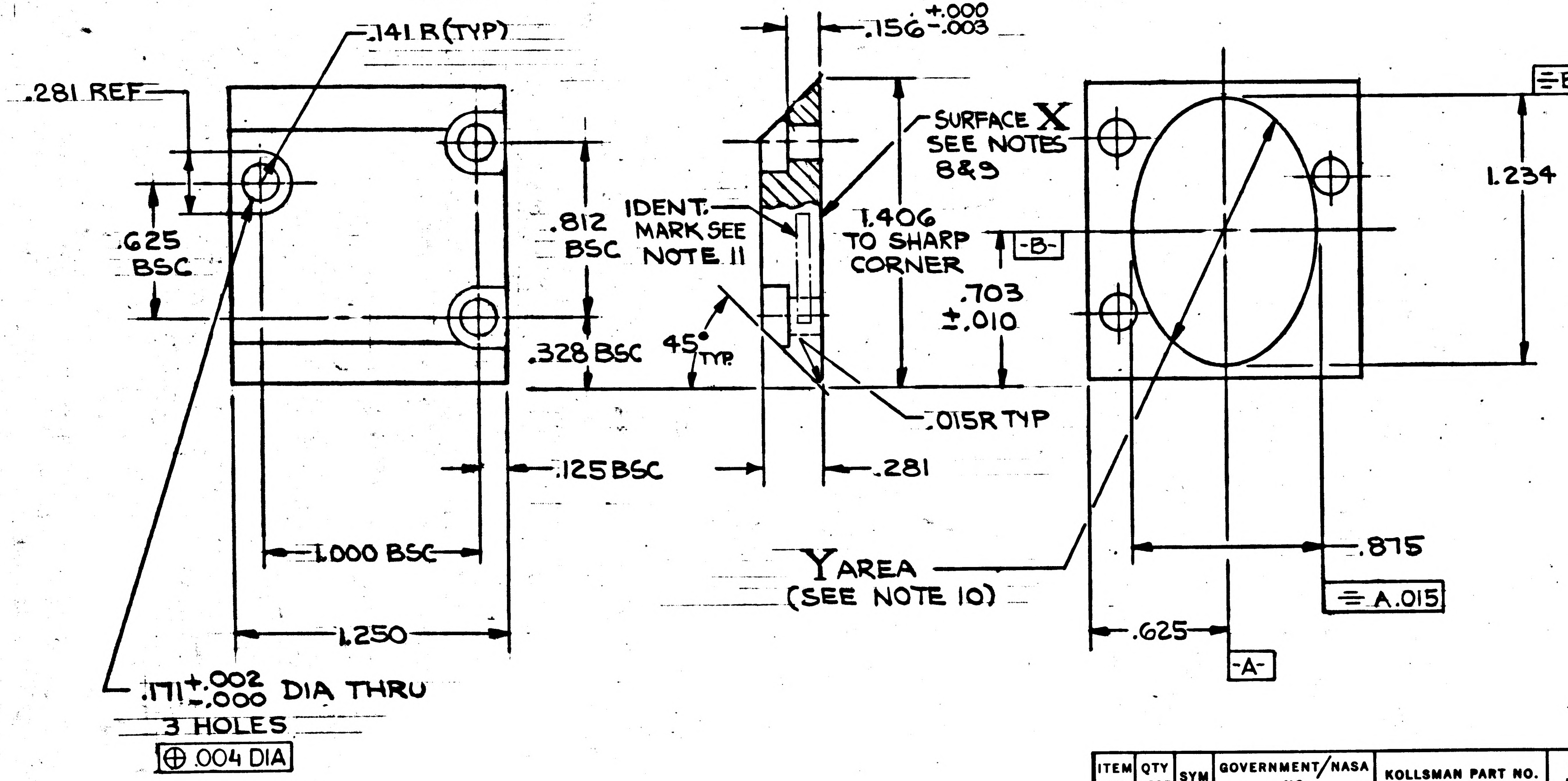
E-154

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

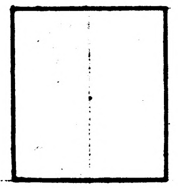
2012368 (r)

REVISIONS 7DER 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2.
7. ALL DIMENSIONS APPLY AFTER NICKEL PLATING.
8. SURFACE MARKED X TO BE LAPPED & OPTICALLY POLISHED. TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord). TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.


.141 R (TYP)
.281 REF
.625 BSC
.812 BSC
.328 BSC
.125 BSC
1.000 BSC
1.250
.171 +.002 -.000 DIA THRU
3 HOLES
⊕ .004 DIA
.156 +.000 -.003
IDENT. MARK SEE NOTE 11
45° TYP
SURFACE X SEE NOTES 8&9
1.406 TO SHARP CORNER
-B-
.703 ±.010
.015R TYP
.281
Y AREA (SEE NOTE 10)
= B .015
1.234
.875
= A .015
.625
-A-

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
SEE NOTE 4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910080

DRAWN R. BRUNELLE DATE 5-15-64
CHECKED C. Langstaff 6-12-64
APPROVAL E. Rasmuhm 6/25/64
APPROVAL E. Thomp 7/1/64
NASA APPROVAL
MIT APPROVAL I. Wagel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR,
STAR TRACKER

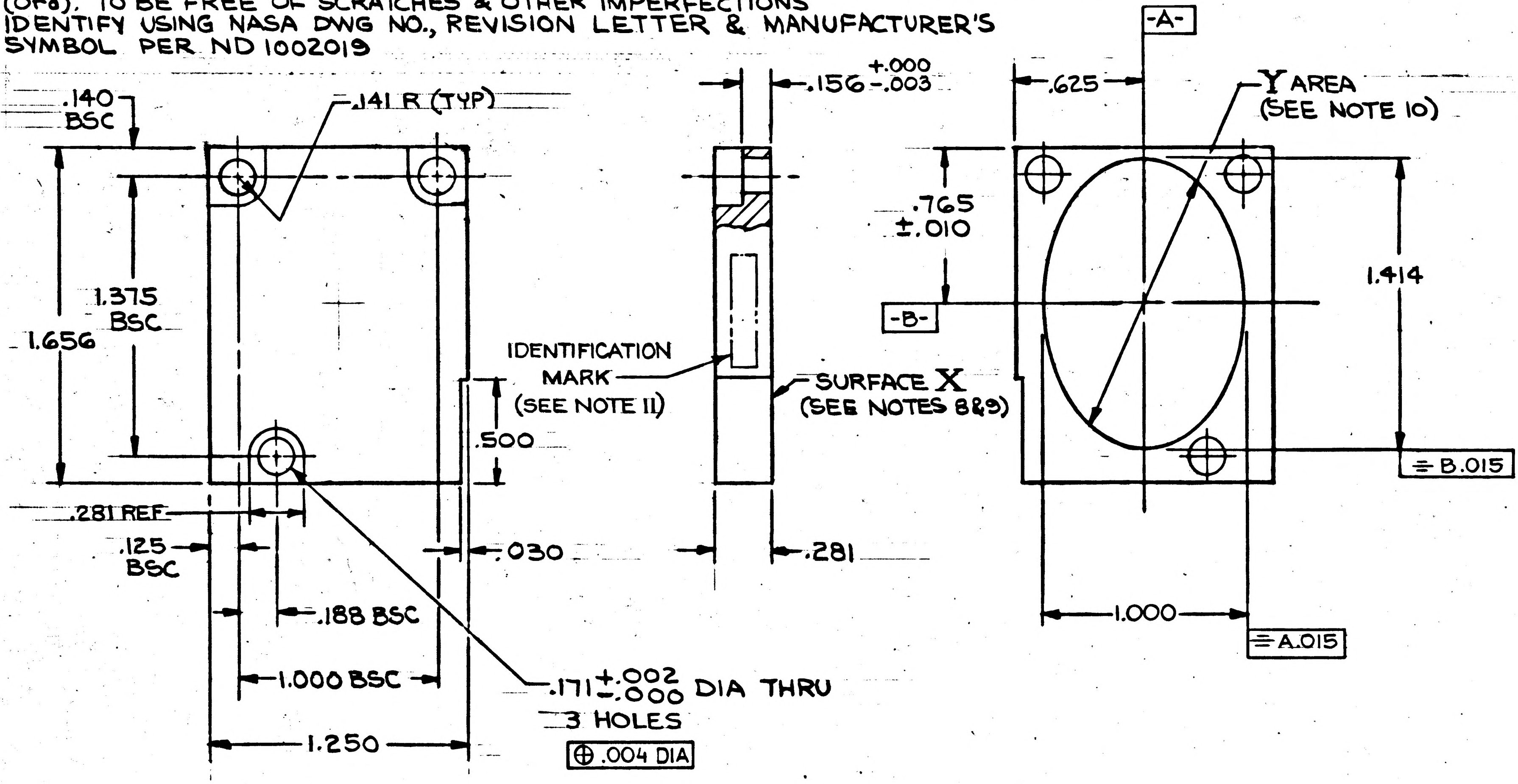
CODE IDENT NO.
SIZE C
NASA NUMBER 2012368
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

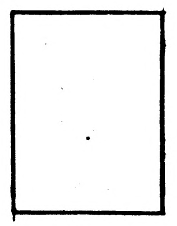
2012369

SYM	ZONE	REVISIONS TDRR 10793 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a) $\overset{63}{\surd}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER ($.005^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER NICKEL PLATING.
8. SURFACE MARKED X TO BE LAPPED & OPTICALLY POLISHED. TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord). TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



.140 BSC
.141 R (TYP)
1.375 BSC
1.656
.500
.281 REF
.125 BSC
.188 BSC
1.000 BSC
1.250
.030
.171 +.002 -.000 DIA THRU
3 HOLES
⊕ .004 DIA
.156 +.000 -.003
IDENTIFICATION MARK (SEE NOTE 11)
SURFACE X (SEE NOTES 8&9)
.281
-A-
.625
Y AREA (SEE NOTE 10)
.765 ±.010
-B-
1.414
= B .015
1.000
= A .015



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± –

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910090

DRAWN R. BRUNELLE DATE 5-14-64
CHECKED C. Langhoff 6-11-64
APPROVAL 6/23/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL I Halzel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR,
STAR TRACKER

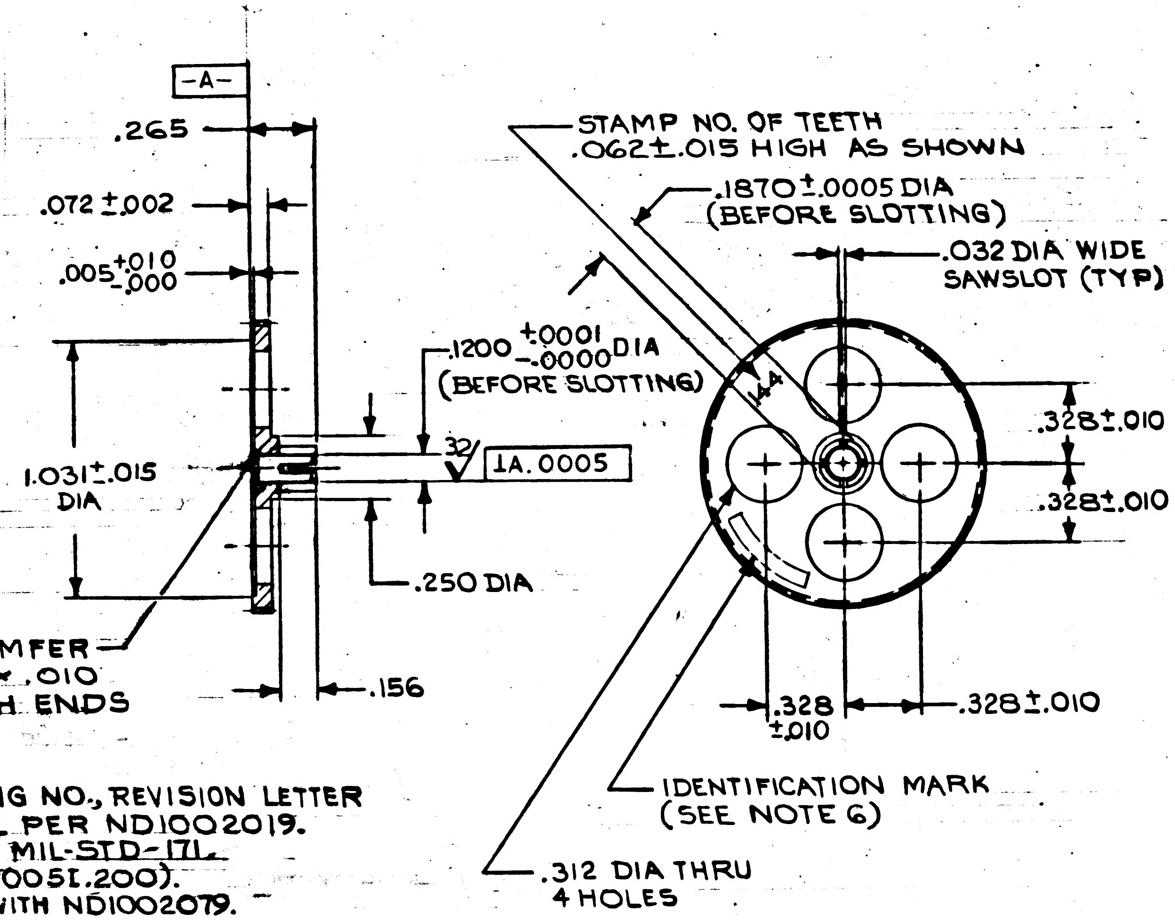
CODE IDENT NO.
SIZE C
NASA NUMBER 2012369
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS	TDRR 10793			
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

NO. OF TEETH	144
DIAMETRAL PITCH	120
PRESSURE ANGLE	20°
PITCH DIA	1.20000
OUTSIDE DIA	1.2166 $^{+.0000}_{-.0015}$
AGMA CLASS	PREC. 3D
GEAR TEETH FINISH	32√

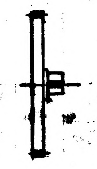


-A-
.265
.072 ± .002
.005 +.010 -.000
1.031 ± .015 DIA
.1200 +.0001 -.0000 DIA (BEFORE SLOTTING)
32√
⊥A .0005
.250 DIA
CHAMFER 45° × .010 BOTH ENDS
.156
STAMP NO. OF TEETH .062 ± .015 HIGH AS SHOWN
.1870 ± .0005 DIA (BEFORE SLOTTING)
.032 DIA WIDE SAWSLOT (TYP)
144
.328 ± .010
.328 ± .010
.328 ±.010
.328 ± .010
IDENTIFICATION MARK (SEE NOTE 6)
.312 DIA THRU 4 HOLES

6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.
5. ~~PASSIVATE IN ACCORDANCE WITH MIL-STD-171, TABLE V-A FINISH NO. 5.4.1. (KPS 10051.200).~~
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.

NOTES:

MASTER


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011703	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-6-763 CLASS 416 (Rc 28-32)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 33386910070

DRAWN E. DRAPALA DATE 1-27-64
CHECKED J. SULLIVAN 4-17-64
APPROVAL 5/28/64
APPROVAL 7/2/64
NASA APPROVAL
MIT APPROVAL 7/2/64

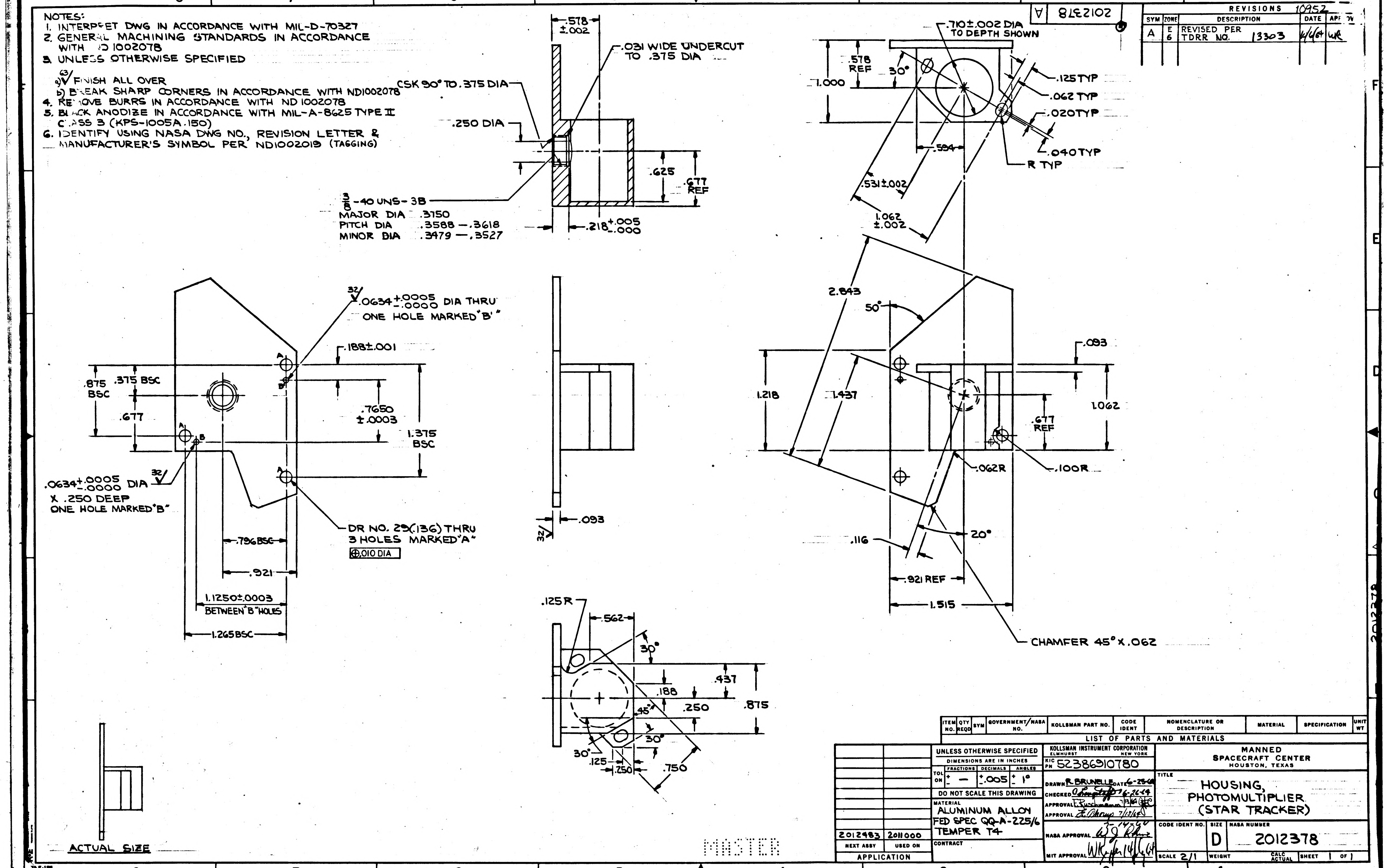
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE GEAR SPUR 144T/120P

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012372

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY


CSK 90° TO .375 DIA
.250 DIA
3/8-40 UNS-3B
MAJOR DIA .3150
PITCH DIA .3588 — .3618
MINOR DIA .3479 — .3527
.578 ±.002
.031 WIDE UNDERCUT TO .375 DIA
.625
.677 REF
.218 +.005 -.000
.710±.002 DIA TO DEPTH SHOWN
.578 REF
30°
1.000
.125 TYP
.062 TYP
.020 TYP
.040 TYP
R TYP
.594
.531±.002
1.062 ±.002
.0634 +.0005 -.0000 DIA THRU ONE HOLE MARKED "B"
32
.188±.001
.875 BSC
.375 BSC
.677
A
B
.7650 ±.0003
1.375 BSC
.0634 +.0005 -.0000 DIA X .250 DEEP ONE HOLE MARKED "B"
DR NO. 29 (.136) THRU 3 HOLES MARKED "A"
⊕ .010 DIA
.796 BSC
.921
1.1250±.0003 BETWEEN "B" HOLES
1.265 BSC
.093
2.843
50°
1.218
1.437
.093
1.062
.677 REF
.062R
.100R
.116
20°
.921 REF
1.515
CHAMFER 45° X .062
.125R
.562
30°
.437
.188
.250
.875
45°
30°
30°
.125
.250
.750
ACTUAL SIZE
MASTER
2012378
D
E
F

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)

A	2012378

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROV
A	E 6	REVISED PER TDRR NO. 13303	4/6/64	WR

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012483	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910780

DRAWN R. BRUNELLE DATE 6-25-64
CHECKED O. Longstaff 6-26-64
APPROVAL F. Ruschmann 7/13/64
APPROVAL E. Ohnmp 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL WK 4/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
PHOTOMULTIPLIER
(STAR TRACKER)

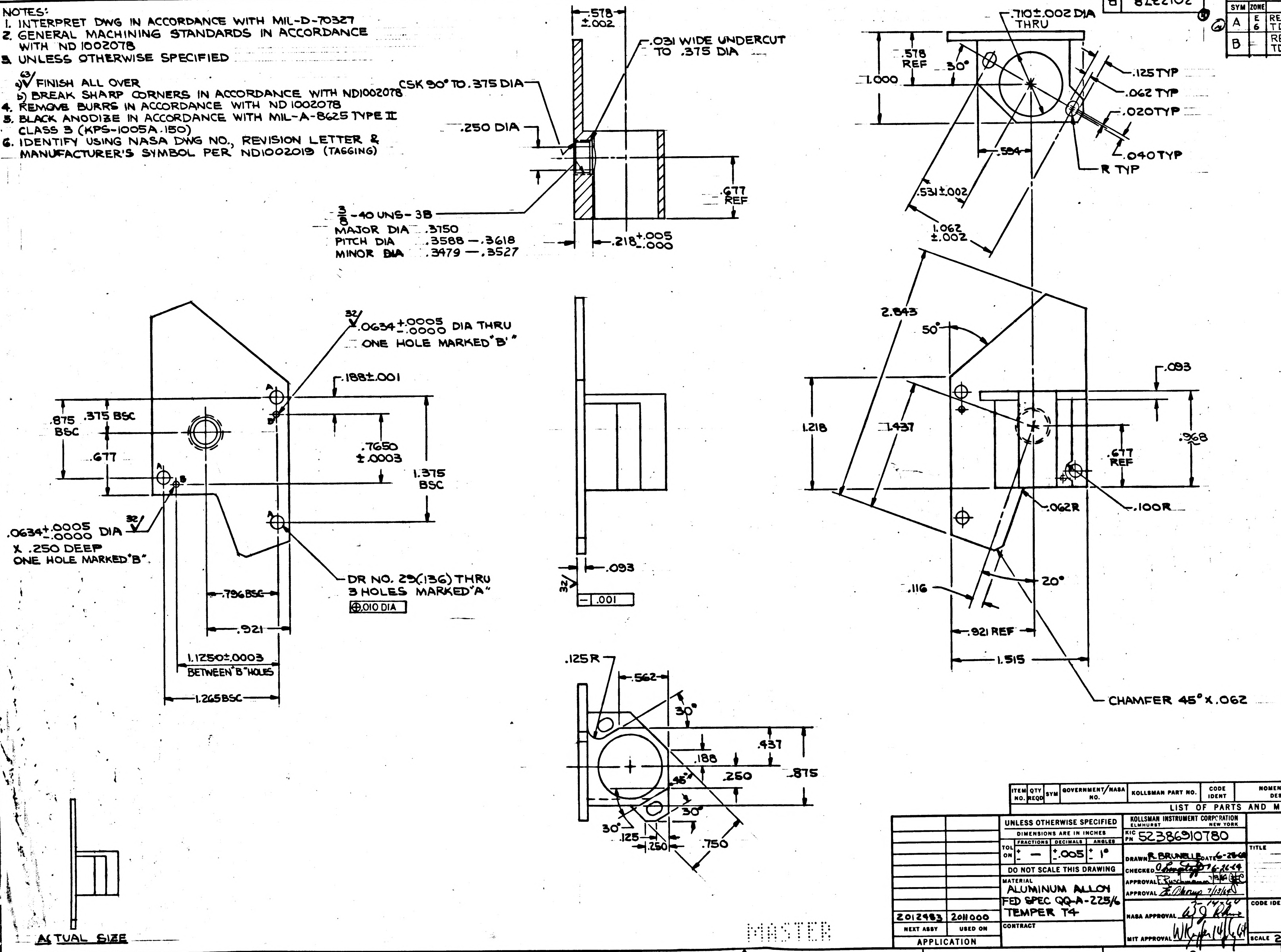
CODE IDENT NO.
SIZE D
NASA NUMBER 2012378
SCALE 2/1
WEIGHT
CALC
ACTUAL
SHEET 1 OF 1

B	2012378

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E 6	REVISED PER TDRR NO. 13303	4/4/64	
B	–	REVISED PER TDRR NO. 16878	12-21-64	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)



.578 ±.002
.031 WIDE UNDERCUT TO .375 DIA
CSK 90° TO .375 DIA
.250 DIA
.677 REF
3/8-40 UNS-3B
MAJOR DIA .3150
PITCH DIA .3588 — .3618
MINOR DIA .3479 — .3527
.218 +.005 −.000
.710±.002 DIA THRU
.578 REF
30°
1.000
.125 TYP
.062 TYP
.020 TYP
.040 TYP
R TYP
.594
.531±.002
1.062 ±.002
32/ .0634 +.0005 −.0000 DIA THRU ONE HOLE MARKED "B"
.188±.001
.875 BSC
.375 BSC
.677
.7650 ±.0003
1.375 BSC
A
B
.0634 +.0005 −.0000 DIA X .250 DEEP ONE HOLE MARKED "B".
32/
DR NO. 29 (.136) THRU 3 HOLES MARKED "A"
⊕ .010 DIA
.796 BSC
.921
1.1250±.0003 BETWEEN "B" HOLES
1.265 BSC
.093
32/
— .001
2.843
50°
.093
1.218
1.437
.968
.677 REF
.062 R
.100 R
.116
20°
.921 REF
1.515
CHAMFER 45° X .062
.125 R
.562
30°
.437
.188
.250
.875
45°
30°
30°
.125
.250
.750
ACTUAL SIZE
MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012483	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910780

DRAWN R. BRUNELLE DATE 6-26-64
CHECKED 6-26-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL 14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

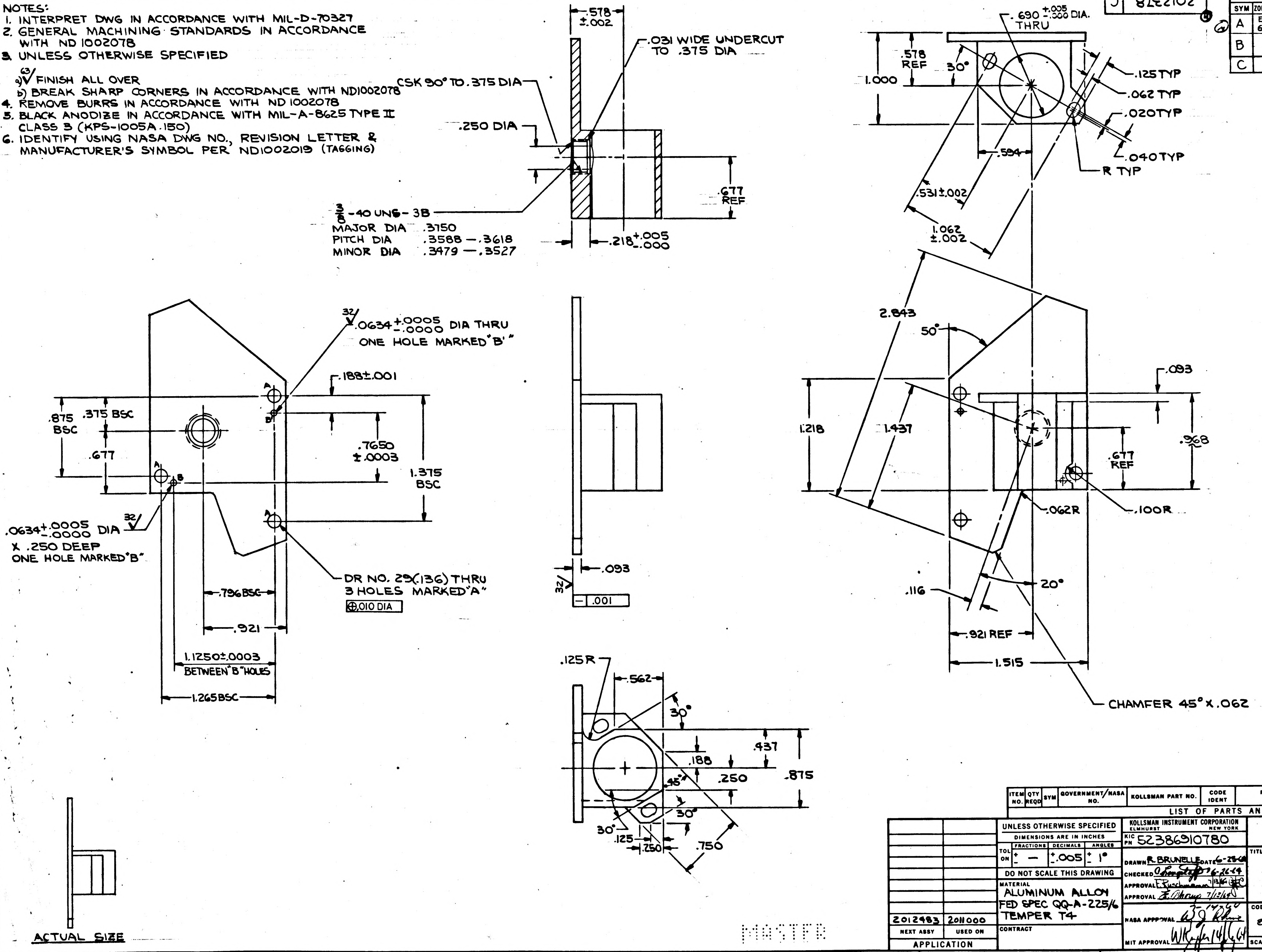
TITLE
HOUSING,
PHOTOMULTIPLIER
(STAR TRACKER)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2012378

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	E 6	REVISED PER TDRR NO. 13303	4/6/64	WK
B		REVISED PER TDRR NO. 16878	12-21-64	9 March 1965
C		REVISED PER TDRR 20442	7/8/65	WK


2012378 C
.578 ±.002
.031 WIDE UNDERCUT TO .375 DIA
CSK 90° TO .375 DIA
.250 DIA
.677 REF
3/8-40 UNS-3B
MAJOR DIA .3750
PITCH DIA .3588 — .3618
MINOR DIA .3479 — .3527
.218 +.005 −.000
.690 +.005 −.000 DIA. THRU
.578 REF
1.000
30°
.125 TYP
.062 TYP
.020 TYP
.040 TYP
R TYP
.594
.531±.002
1.062 ±.002
32/ .0634 +.0005 −.0000 DIA THRU ONE HOLE MARKED "B"
.188±.001
A
B
.875 BSC
.375 BSC
.677
.7650 ±.0003
1.375 BSC
.0634 +.0005 −.0000 DIA X .250 DEEP ONE HOLE MARKED "B"
32/
DR NO. 29 (.136) THRU 3 HOLES MARKED "A"
⊕ .010 DIA
.796 BSC
.921
1.1250±.0003 BETWEEN "B" HOLES
1.265 BSC
.093
32/
— .001
2.843
50°
1.218
1.437
.093
.968
.677 REF
.062 R
.100 R
.116
20°
.921 REF
1.515
CHAMFER 45° X .062
.125 R
.562
30°
.437
.188
.250
.875
45°
30°
30°
.125
.250
.750
ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012483	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±	—	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910780

DRAWN R. BRUNELLE DATE 6-25-64
CHECKED O. Longstaff 6-26-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL 7/13/64
NASA APPROVAL 7-14-64
MIT APPROVAL WK 7/14/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

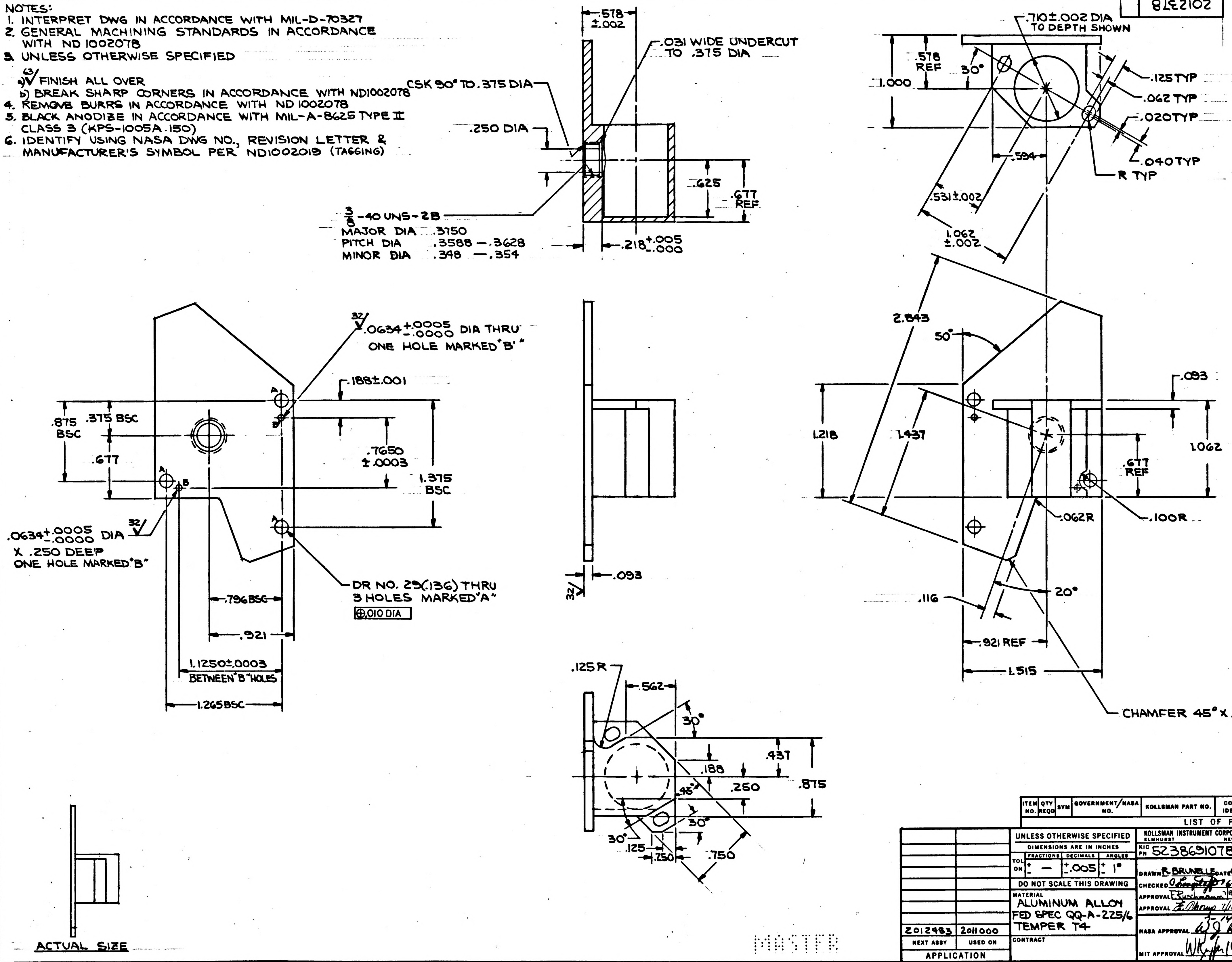
TITLE
HOUSING,
PHOTOMULTIPLIER
(STAR TRACKER)

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2012378

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002078
5. BLACK ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)



CSK 90° TO .375 DIA
.578 ±.002
.031 WIDE UNDERCUT TO .375 DIA
.250 DIA
.625
.677 REF
3/8-40 UNS-2B
MAJOR DIA .3750
PITCH DIA .3588 — .3628
MINOR DIA .348 — .354
.218 +.005 −.000
32/ .0634 +.0005 −.0000 DIA THRU ONE HOLE MARKED "B"
.188±.001
.875 BSC
.375 BSC
.677
.7650 ±.0003
1.375 BSC
A
B
.0634 +.0005 −.0000 DIA X .250 DEEP ONE HOLE MARKED "B"
32/
DR NO. 29 (.136) THRU 3 HOLES MARKED "A"
⊕ .010 DIA
.796 BSC
.921
1.1250±.0003 BETWEEN "B" HOLES
1.265 BSC
32/
.093
.125 R
.562
30°
.437
.188
.250
.875
45°
30°
30°
.125
.250
.750
ACTUAL SIZE
.710±.002 DIA TO DEPTH SHOWN
.578 REF
30°
1.000
.125 TYP
.062 TYP
.020 TYP
.040 TYP
.594
R TYP
.531±.002
1.062 ±.002
2.843
50°
1.218
1.437
.093
1.062
.677 REF
.062 R
.100 R
.116
20°
.921 REF
1.515
CHAMFER 45° X .062

2012378

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012483	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 52386910780

DRAWN R. BRUNELLE DATE 6-25-64
CHECKED O. Lengstorf 6-26-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Ohrum 7/13/64
NASA APPROVAL W. J. Rhine 7-14-64
MIT APPROVAL W. Kupfer 14 July 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE HOUSING, PHOTOMULTIPLIER (STAR TRACKER)

CODE IDENT NO.	SIZE	NASA NUMBER
	D	2012378

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

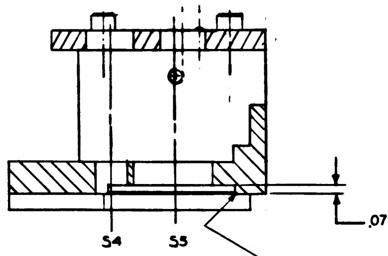
2012380 | A

REVISIONS			14360	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20030	4-8-65	WR

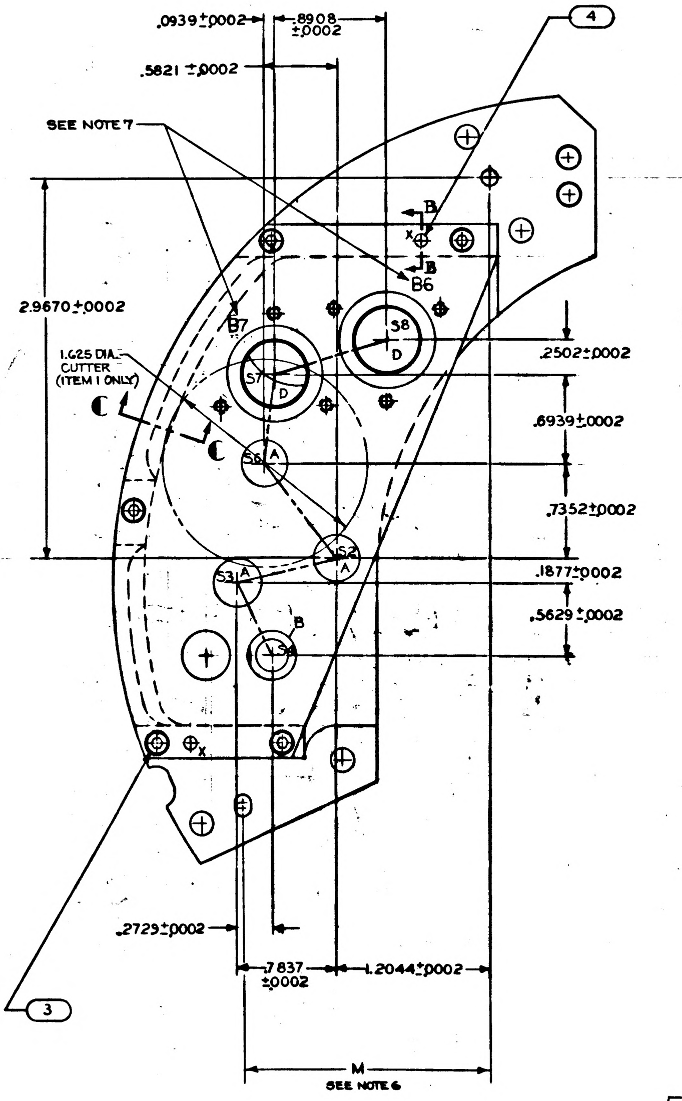
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PRIOR TO MACHINING HOLES "A" THRU "E", ALIGN ITEMS 1 & 2 AND SECURE WITH SCREWS (ITEM 3). MEASURE DIAMETERS OF DOWELS (ITEM 4) AND LINE BORE HOLES (2 PLACES MARKED "X") IN ITEMS 1 & 2 AS DIMENSIONED. DISASSEMBLE, CHAMFER HOLES IN ITEM 1, INSTALL DOWEL PINS AND REASSEMBLE.
6. TO ESTABLISH ORIENTATION OF COORDINATE SYSTEM FOR MACHINING HOLES "A" THRU "E", LINE UP ASSEMBLY SUCH THAT DIMENSION "M" SHALL EQUAL 1.9443 ±.0002.
7. MARK CHARACTERS $^{.14}_{.10}$ HIGH PER ND1002019 AT LOCATION SHOWN.
8. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND10020[illegible]8.

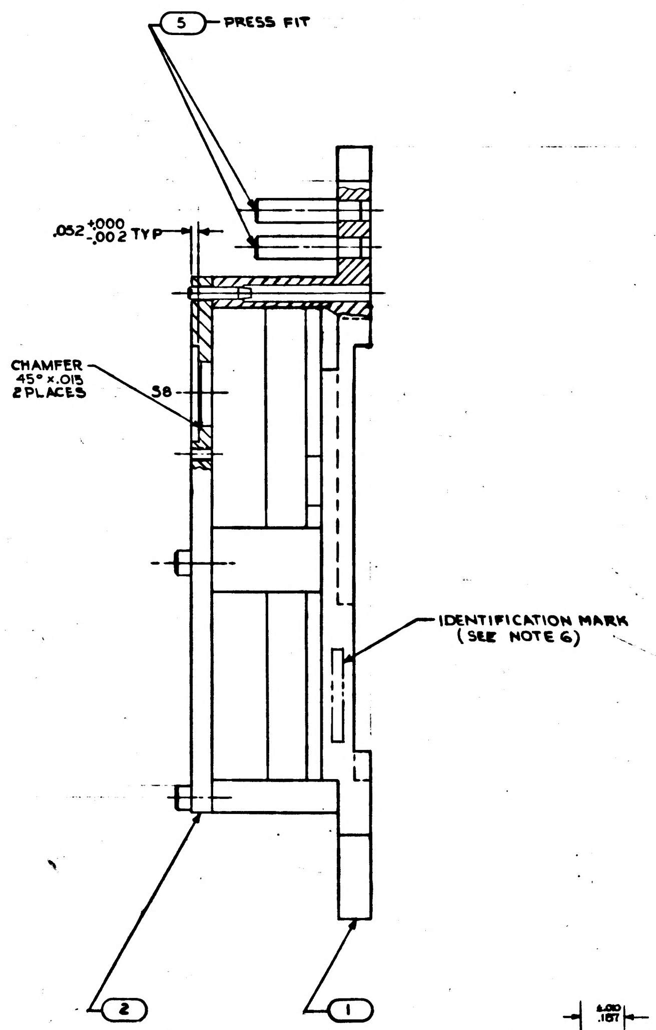
CENTERS	C.D. CHECKING DIM
S2 – S3	$.8056^{+.0005}_{-.0000}$
S3 – S4	$.6253^{+.0005}_{-.0000}$
S4 – S5	.4888 ± .0003
S2 – S6	$.9375^{+.0005}_{-.0000}$
S6 – S7	$.7000^{+.0005}_{-.0000}$
S7 – S8	$.9250^{+.0005}_{-.0000}$

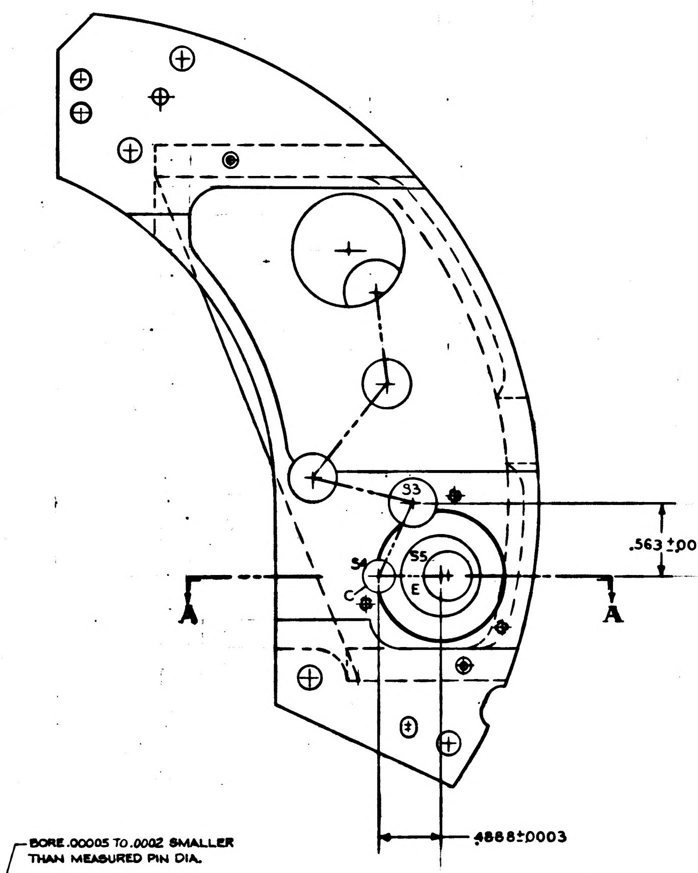
NOTE:-
GEAR TRAINS ARE INDICATED AS SHOWN — - - —

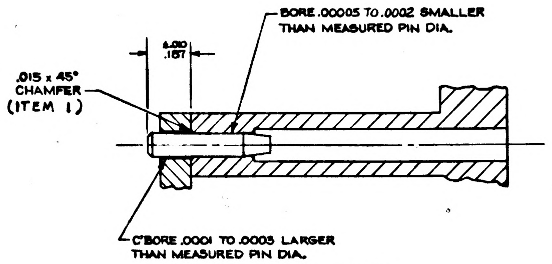

.078
S4
S5
CHAMFER 45° x .015

SECTION A-A

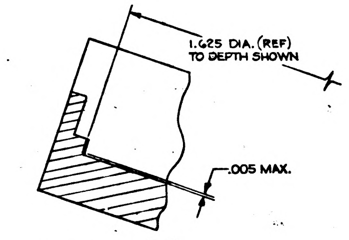

.0939 ±.0002
.8908 ±.0002
.5821 ±.0002
4
SEE NOTE 7
B
B
X
B6
B7
2.9670 ±.0002
1.625 DIA. CUTTER (ITEM 1 ONLY)
C
C
S8
D
S7
D
.2502 ±.0002
.6939 ±.0002
S6
A
.7352 ±.0002
S2
A
S3
A
.1877 ±.0002
.5629 ±.0002
B
S4
X
3
.2729 ±.0002
.7837 ±.0002
1.2044 ±.0002
M
SEE NOTE 6


5 PRESS FIT
.052 +.000 -.002 TYP
CHAMFER 45° x .015 2 PLACES
S8
IDENTIFICATION MARK (SEE NOTE 6)
2
1


S3
.563 ±.002 TO S5
S4
S5
C
E
A
A
.4888 ±.0003


BORE .00005 TO .0002 SMALLER THAN MEASURED PIN DIA.
±.010 .187
.015 x 45° CHAMFER (ITEM 1)
C'BORE .0001 TO .0003 LARGER THAN MEASURED PIN DIA.

SECTION B-B
SCALE: 4:1
SEE NOTE 5


1.625 DIA. (REF) TO DEPTH SHOWN
.005 MAX.

PARTIAL SECTION C-C
(WITH ITEM 2 (2011301) REMOVED)

HOLE	DESCRIPTION	QUANTITY
A	$.3749^{+.0002}_{-.0000}$ DIA THRU ITEMS 2 & 1 32√	3
B	$.3749^{+.0002}_{-.0000}$ DIA THRU ITEM 2 ONLY 32√	1
C	$.2499^{+.0002}_{-.0000}$ DIA THRU ITEM 1 ONLY 32√	1
D	$.5002^{+.0002}_{-.0000}$ DIA THRU ITEM 2 ONLY 32√ CBORE $.760^{+.002}_{-.000}$ DIA TO DEPTH SHOWN	2
E	$.628^{+.005}_{-.000}$ DIA THRU ITEM 1 ONLY 32√ CBORE $1.0003^{+.0005}_{-.0000}$ DIA TO DEPTH SHOWN IN SECTION A-A	1

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	2		2011345	53386910030		PIN, SHOULDER			
4	2		MS16555-620			PIN, DOWEL			
3	4		NAS1352C04LL6	74455157014		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
2	1		2011301	52386910240		PLATE, BEARING (SEXTANT SHAFT DRIVE)			
1	1		2011300	52386910230		HOUSING, GEAR (SEXTANT SHAFT DRIVE)			

APPLICATION	
NEXT ASSY	USED ON
2011705	2011000

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 5°

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911090

DRAWN E. DRAPALA DATE 10-21-64
CHECKED V. Gonzalez 10-30-64
APPROVAL G. Buchanan 11-12-64
APPROVAL F. Sivas 11-12-64
NASA APPROVAL W. J. Rhine 11-17-64
MIT APPROVAL 17 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR,
MACHINING ASSEMBLY OF
(SXT SHAFT DRIVE)

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2012380
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

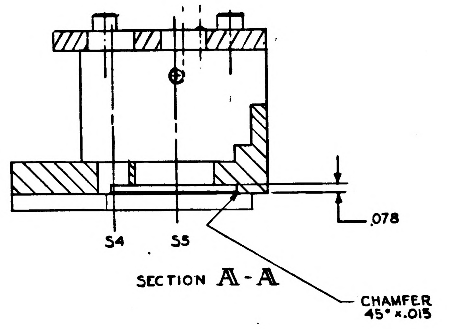
2012380

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PRIOR TO MACHINING HOLES "A" THRU "E", ALIGN ITEMS 1 & 2 AND SECURE WITH SCREWS (ITEM 3). MEASURE DIAMETERS OF DOWELS (ITEM 4) AND LINE BORE HOLES (2 PLACES MARKED "X") IN ITEMS 1 & 2 AS DIMENSIONED. DISASSEMBLE, CHAMFER HOLES IN ITEM 1, INSTALL DOWEL PINS AND REASSEMBLE.
6. TO ESTABLISH ORIENTATION OF COORDINATE SYSTEM FOR MACHINING HOLES "A" THRU "E", LINE UP ASSEMBLY SUCH THAT DIMENSION "M" SHALL EQUAL 1.9443 ±.0002.
7. MARK CHARACTERS $^{.14}_{.10}$ HIGH PER ND1002019 AT LOCATION SHOWN.
8. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.

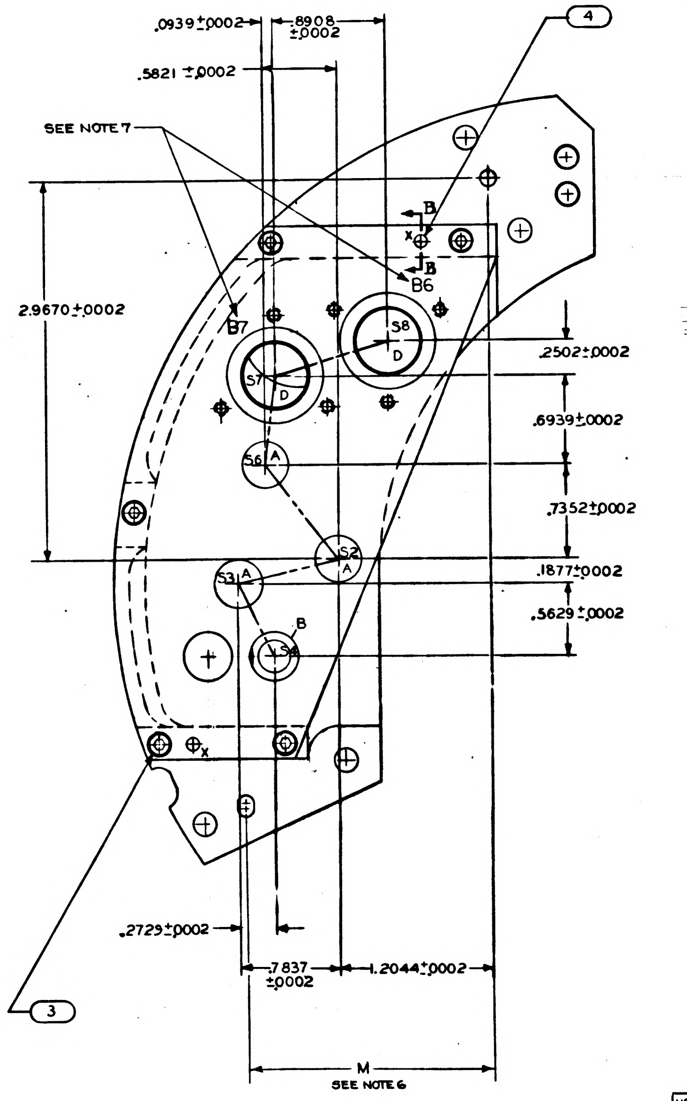
CENTERS	C.D. CHECKING DIM
S2 – S3	$.8056^{+.0005}_{-.0000}$
S3 – S4	$.6253^{+.0005}_{-.0000}$
S4 – S5	.4888 ± .0003
S2 – S6	$.9375^{+.0005}_{-.0000}$
S6 – S7	$.7000^{+.0005}_{-.0000}$
S7 – S8	$.9250^{+.0005}_{-.0000}$

NOTE:-
GEAR TRAINS ARE INDICATED AS SHOWN — - - —

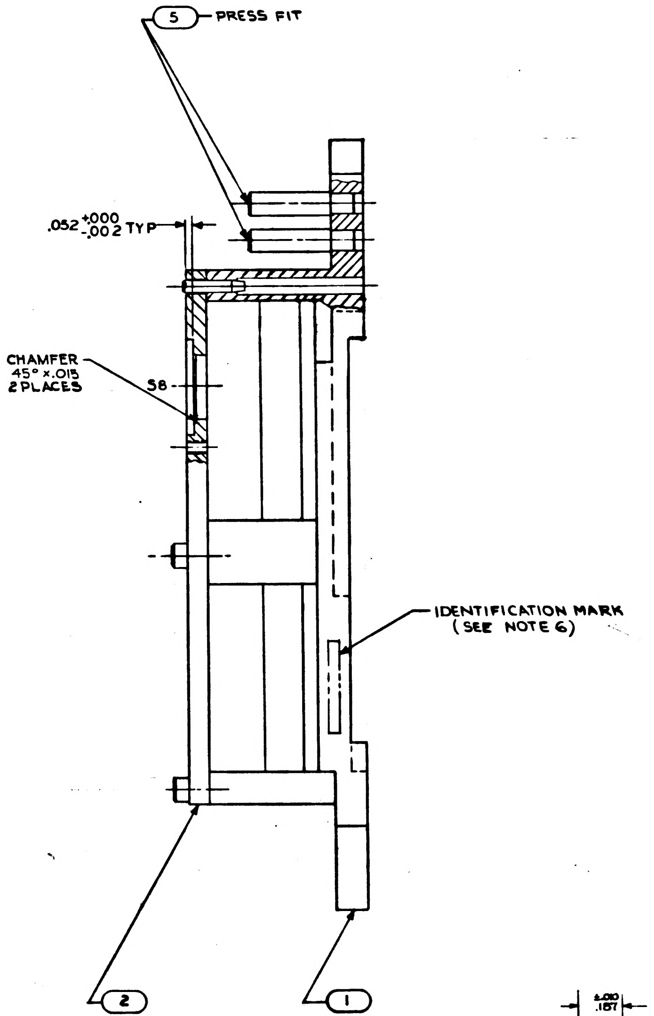


.078
S4
S5
CHAMFER 45° x .015

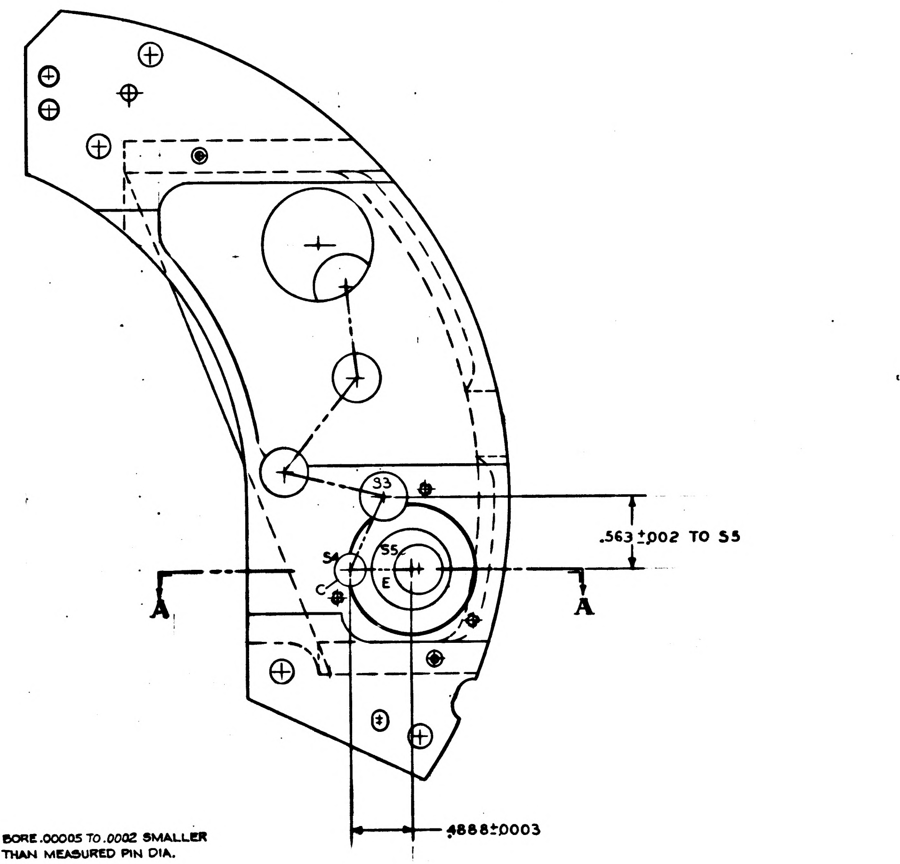
SECTION A-A



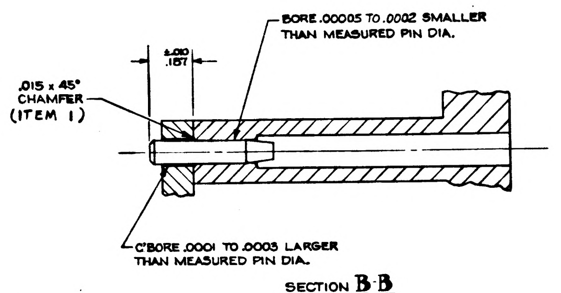
.0939±.0002
.8908 ±.0002
.5821 ±.0002
4
SEE NOTE 7
B
X
B
B6
B7
2.9670±.0002
S8
D
S7
D
.2502±.0002
.6939±.0002
S6
A
.7352±.0002
S2
A
S3
A
.1877±.0002
.5629±.0002
B
S4
X
.2729±.0002
.7837 ±.0002
1.2044±.0002
3
M
SEE NOTE 6



5
PRESS FIT
.052 +.000 -.002 TYP
CHAMFER 45° x .015 2 PLACES
S8
IDENTIFICATION MARK (SEE NOTE 6)
2
1



S3
S4
S5
C
E
.563±.002 TO S5
A
A
.4888±.0003



BORE .00005 TO .0002 SMALLER THAN MEASURED PIN DIA.
±.010 .187
.015 x 45° CHAMFER (ITEM 1)
C'BORE .0001 TO .0003 LARGER THAN MEASURED PIN DIA.

SECTION B-B
SCALE: 4:1
SEE NOTE 5

HOLE	DESCRIPTION	QUANTITY
A	$.3749^{+.0002}_{-.0000}$ DIA THRU ITEMS 2 & 1 32√	3
B	$.3749^{+.0002}_{-.0000}$ DIA THRU ITEM 2 ONLY 32√	1
C	$.2499^{+.0002}_{-.0000}$ DIA THRU ITEM 1 ONLY 32√	1
D	$.5002^{+.0002}_{-.0000}$ DIA THRU ITEM 2 ONLY 32√ CBORE $.760^{+.002}_{-.000}$ DIA TO DEPTH SHOWN	2
E	$.628^{+.005}_{-.000}$ DIA THRU ITEM 1 ONLY 32√ CBORE $1.0003^{+.0005}_{-.0000}$ DIA TO DEPTH SHOWN IN SECTION A-A	1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	2		2011345	53386910030		PIN, SHOULDER			
4	2		MS16555-620			PIN, DOWEL			
3	4		NAS1352C04LL6	74455157014		SCREW, CAP, SOCKET HEAD, SELF-LOCKING			
2	1		2011301	52386910240		PLATE, BEARING (SEXTANT SHAFT DRIVE)			
1	1		2011300	52386910230		HOUSING, GEAR (SEXTANT SHAFT DRIVE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011705	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 5°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911090

DRAWN E. DRAPALA DATE 10-21-64
CHECKED V. Gusto 10-30-64
APPROVAL 11-4-64
APPROVAL 11-12-64
NASA APPROVAL 11-17-64
MIT APPROVAL 17 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, GEAR,
MACHINING ASSEMBLY OF
(SXT SHAFT DRIVE)

CODE IDENT NO.
SIZE E
NASA NUMBER 2012380
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

REVISIONS			14357	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 18004	4/13/65	

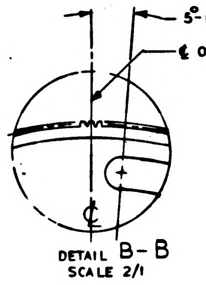
A 2012381

SPUR GEAR DATA

NO. OF TEETH	370
DIAMETRAL PITCH	64
PRESSURE ANGLE	20°
PITCH DIA	5.78125
OUTSIDE DIAMETER	$5.8125^{+.0000}_{-.0030}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\sqrt{32}$

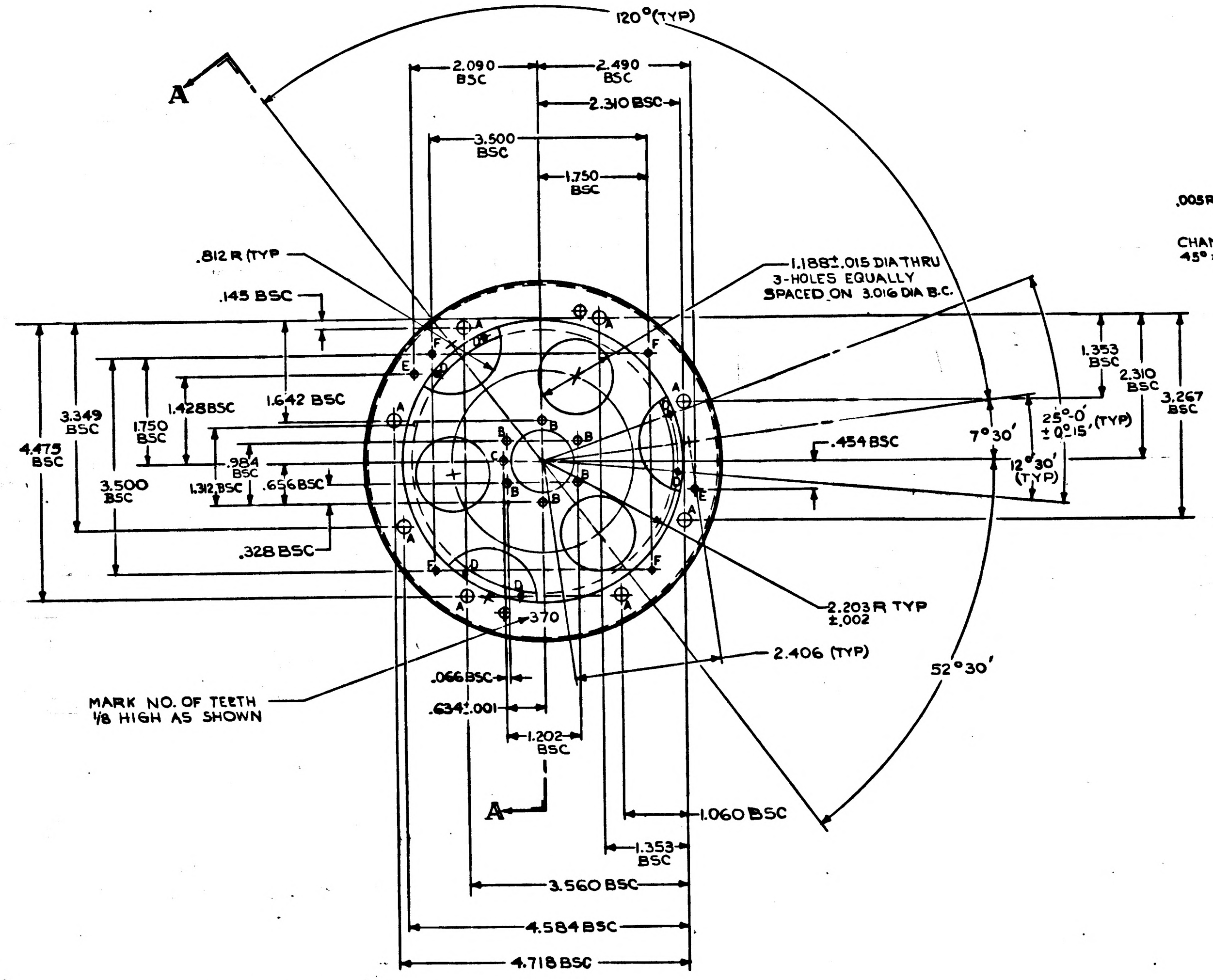
TOTAL COMPOSITE ERROR TO BE MEASURED OVER DIA MARKED WITH ✳

HOLE	DESCRIPTION	QTY	
A	DR 7/32 (.2187) THRU	8	⊕.010 DIA
B	DR NO. 29 (.136) THRU	6	⊕.010 DIA
C	$.1245^{+.0003}_{-.0000}$ DIA THRU $\sqrt{32}$	1	
D	DR NO. 49 (.073) × .264 DEEP CSK 90°$^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-3B × .188 DEEP	6	
E	$.1240^{+.0003}_{-.0000}$ DIA THRU $\sqrt{32}$	2	⊕.010 DIA
F	DR NO. 49 (.073) THRU CSK 90°$^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-2B THRU	4	⊕.004 DIA
G	DR 9/64 (.1406) THRU	2	⊕.010 DIA

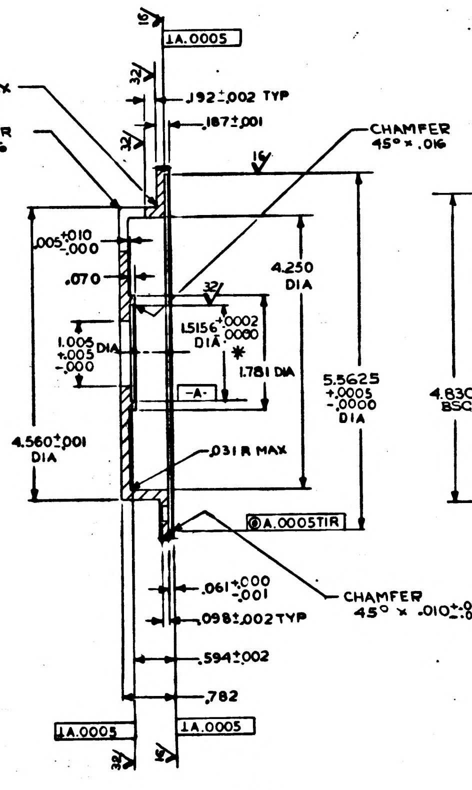


5°-0'± 0°-10' REF
℄ OF GEAR TOOTH
℄

DETAIL B-B
SCALE 2/1

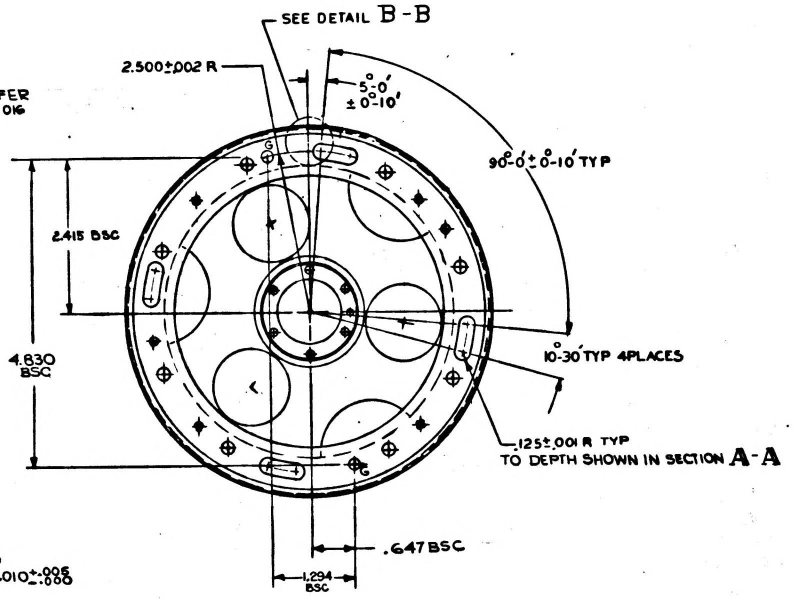


120°(TYP)
A
2.090 BSC
2.490 BSC
2.310 BSC
3.500 BSC
1.750 BSC
.812 R (TYP
.145 BSC
1.188±.015 DIA THRU 3-HOLES EQUALLY SPACED ON 3.016 DIA B.C.
1.642 BSC
1.428 BSC
3.349 BSC
1.750 BSC
4.475 BSC
.984 BSC
3.500 BSC
1.312 BSC
.656 BSC
.328 BSC
1.353 BSC
2.310 BSC
3.267 BSC
.454 BSC
7°30'
25°-0' ±0°-15' (TYP)
12°30' (TYP)
2.203 R TYP ±.002
370
2.406 (TYP)
52°30'
MARK NO. OF TEETH 1/8 HIGH AS SHOWN
.066 BSC
.634±.001
1.202 BSC
A
1.060 BSC
1.353 BSC
3.560 BSC
4.584 BSC
4.718 BSC
A B C D E F G



⊥A.0005
.005 R MAX
CHAMFER 45° × .016
.192±.002 TYP
.187±.001
CHAMFER 45° × .016
4.250 DIA
.005+.010 -.000
.070
1.5156 +.0002 -.0000 DIA ✳
1.005 +.005 -.000 DIA
1.781 DIA
-A-
5.5625 +.0005 -.0000 DIA
4.560±.001 DIA
.031 R MAX
⊚A.0005 TIR
.061 +.000 -.001
CHAMFER 45° × .010 +.005 -.000
.098±.002 TYP
.594±.002
.782
⊥A.0005
⊥A.0005

SECTION A-A



SEE DETAIL B-B
2.500±.002 R
5°-0' ±0°-10'
90°-0'±0°-10' TYP
2.415 BSC
4.830 BSC
10°-30' TYP 4 PLACES
.125±.001 R TYP TO DEPTH SHOWN IN SECTION A-A
.647 BSC
1.294 BSC

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED
   a $\sqrt{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200).
6. HEAT TREAT PER ND1002114 PAR 3.7.4b TO Rc 30-34.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012386	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ ; DECIMALS ±.005 ; ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910290
DRAWN E. DRAPALA DATE 10-28-64
CHECKED H E Ramsey 11-10-64
APPROVAL 11-12-64
APPROVAL 11-12-64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR, STATIONARY
370T-64P

CODE IDENT NO.
SIZE E
NASA NUMBER 2012381
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

2012381

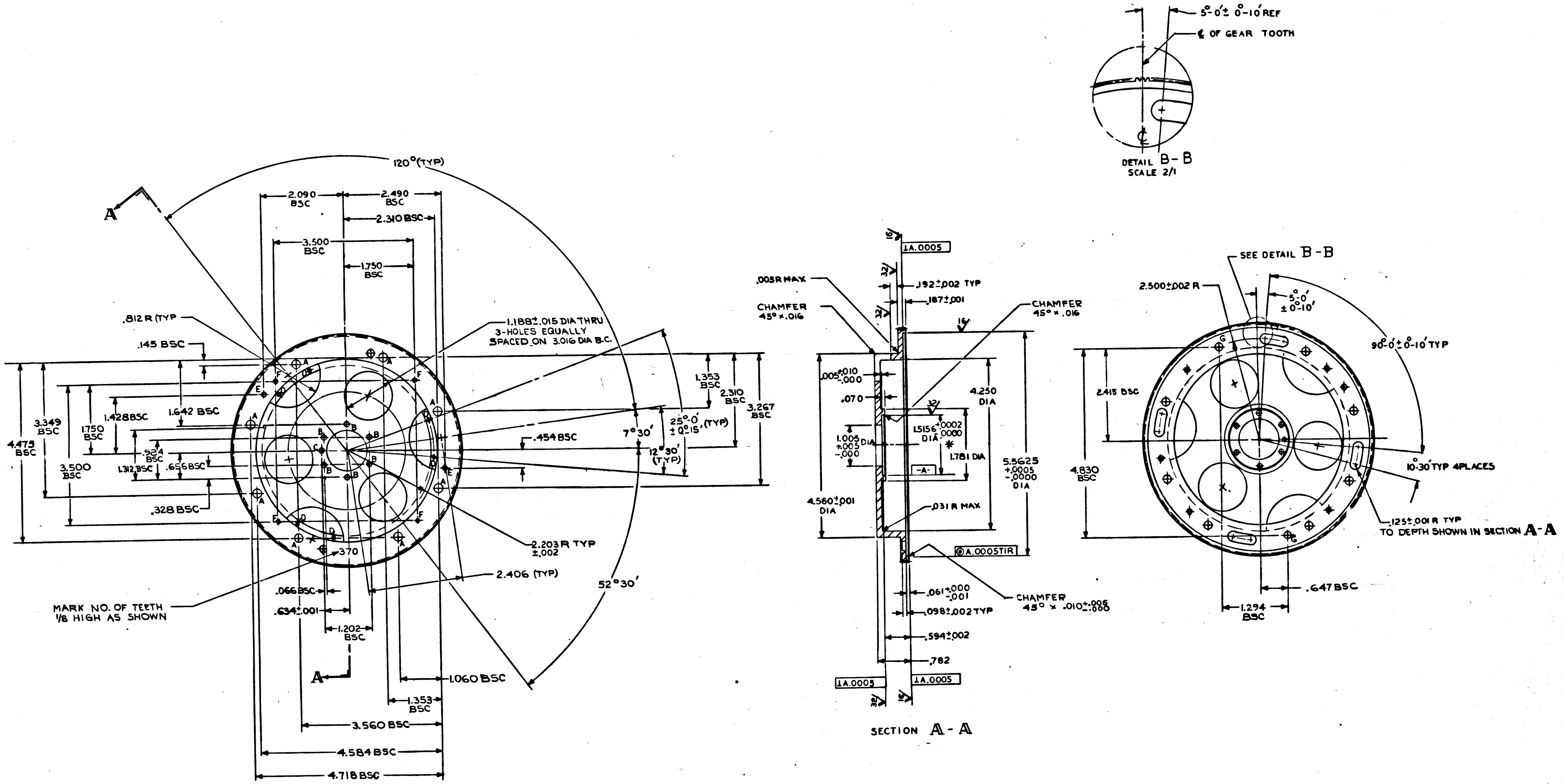
REVISIONS 14357				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

SPUR GEAR DATA

NO. OF TEETH	370
DIAMETRAL PITCH	64
PRESSURE ANGLE	20°
PITCH DIA	5.78125
OUTSIDE DIAMETER	$5.8125^{+.0000}_{-.0030}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	$\sqrt{32}$

TOTAL COMPOSITE ERROR TO BE MEASURED OVER DIA MARKED WITH *

HOLE	DESCRIPTION	QTY	
A	DR 7/32 (.2187) THRU	8	⊕ .010 DIA
B	DR NO. 29 (.136) THRU	6	⊕ .010 DIA
C	$.0931^{+.0005}_{-.0000}$ DIA THRU $\sqrt{32}$	1	
D	DR NO. 49 (.073) × .264 DEEP CSK $90°^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-3B × .188 DEEP	6	
E	$.1240^{+.0003}_{-.0000}$ DIA THRU $\sqrt{32}$	2	⊕ .010 DIA
F	DR NO. 49 (.073) THRU CSK $90^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-2B THRU	4	⊕ .004 DIA
G	DR 9/64 (.1406) THRU	2	⊕ .010 DIA



5°-0' ± 0°-10' REF
℄ OF GEAR TOOTH
DETAIL B-B
SCALE 2/1
120° (TYP)
A
2.090 BSC
2.490 BSC
2.310 BSC
3.500 BSC
1.750 BSC
.812 R (TYP
.145 BSC
1.188 ± .015 DIA THRU 3-HOLES EQUALLY SPACED ON 3.016 DIA B.C.
3.349 BSC
4.475 BSC
1.750 BSC
1.428 BSC
1.642 BSC
.924 BSC
1.312 BSC
.656 BSC
3.500 BSC
.328 BSC
1.353 BSC
2.310 BSC
3.267 BSC
25°0' ± 0°15' (TYP)
7°30'
12°30' (TYP)
.454 BSC
2.203 R TYP ±.002
370
2.406 (TYP)
52°30'
MARK NO. OF TEETH 1/8 HIGH AS SHOWN
.066 BSC
.634 ± .001
1.202 BSC
1.060 BSC
1.353 BSC
3.560 BSC
4.584 BSC
4.718 BSC
.003 R MAX
CHAMFER 45° × .016
.192 ± .002 TYP
.187 ± .001
⊥ A .0005
.005 +.010 -.000
.070
1.005 +.005 -.000 DIA
4.250 DIA
1.5156 +.0002 -.0000 DIA *
1.781 DIA
-A-
5.5625 +.0005 -.0000 DIA
4.560 ± .001 DIA
.031 R MAX
◎ A .0005 TIR
.061 +.000 -.001
.098 ± .002 TYP
.594 ± .002
.782
CHAMFER 45° × .010 +.005 -.000
SECTION A-A
SEE DETAIL B-B
2.500 ± .002 R
5°-0' ± 0°-10'
90°-0' ± 0°-10' TYP
2.415 BSC
4.830 BSC
10°-30' TYP 4 PLACES
.125 ± .001 R TYP TO DEPTH SHOWN IN SECTION A-A
1.294 BSC
.647 BSC

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED
   a $\sqrt{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-10051.200).
6. HEAT TREAT PER ND1002114 PAR 3.7.4b TO Rc 30-34.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012387	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 0°30'

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910290
DRAWN E. DRAPALA DATE 10-28-64
CHECKED H E Pressey 11-10-64
APPROVAL 11-12-64
APPROVAL 11-12-64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL 11/11/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR, STATIONARY
370T-64P

CODE IDENT NO.
SIZE E
NASA NUMBER 2012381
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

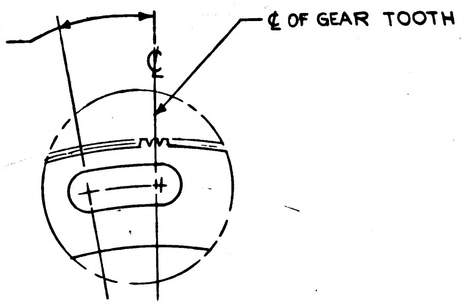
REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

2012382

SPUR GEAR DATA

NO. OF TEETH	370
DIAMETRAL PITCH	64
PRESSURE ANGLE	20°
PITCH DIA	5.78125
OUTSIDE DIAMETER	5.8125 $^{+.0000}_{-.0030}$
AGMA CLASS	PREC 2D
GEAR TEETH FINISH	32√

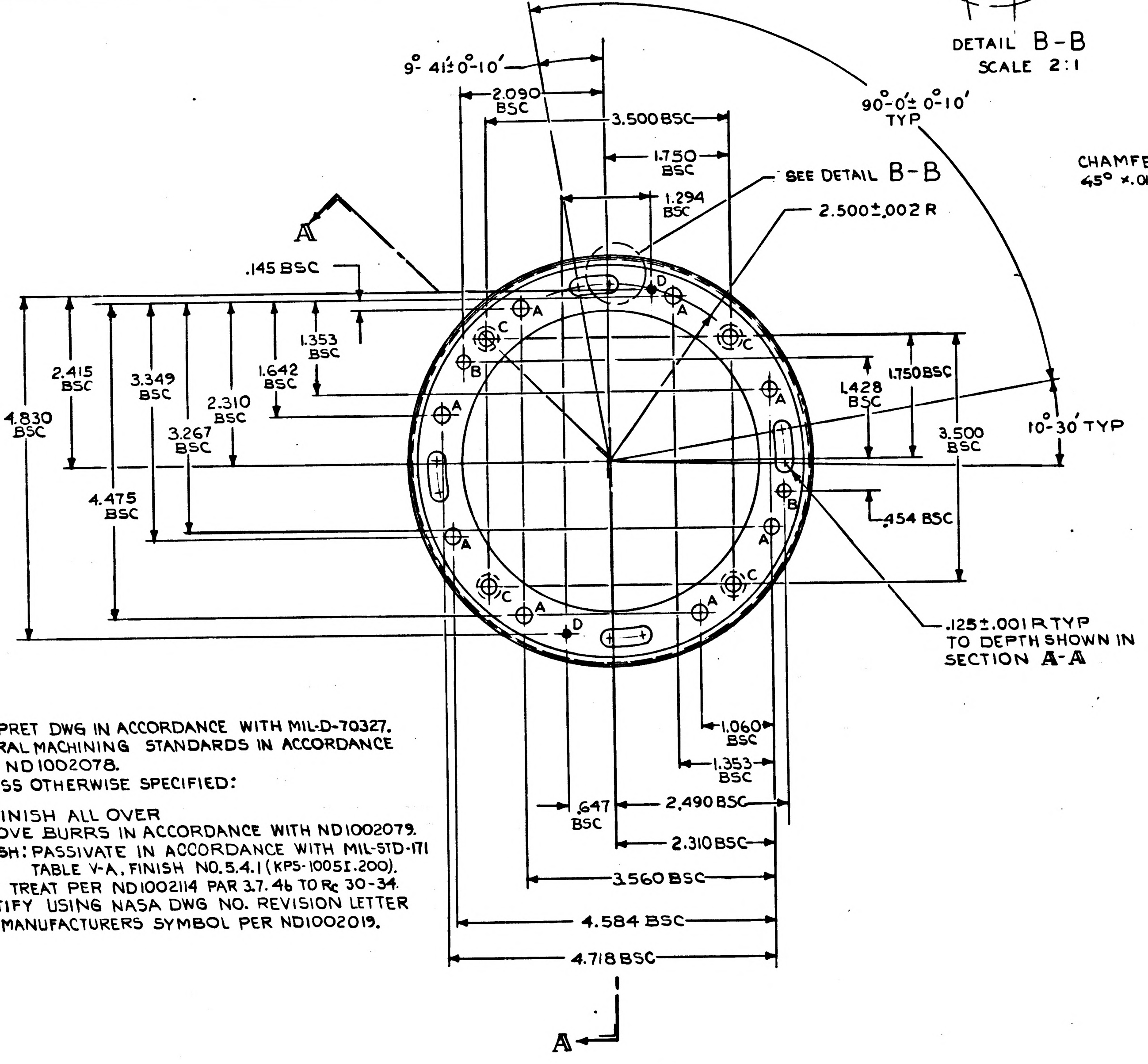
TOTAL COMPOSITE ERROR TO BE MEASURED OVER DIA MARKED WITH *



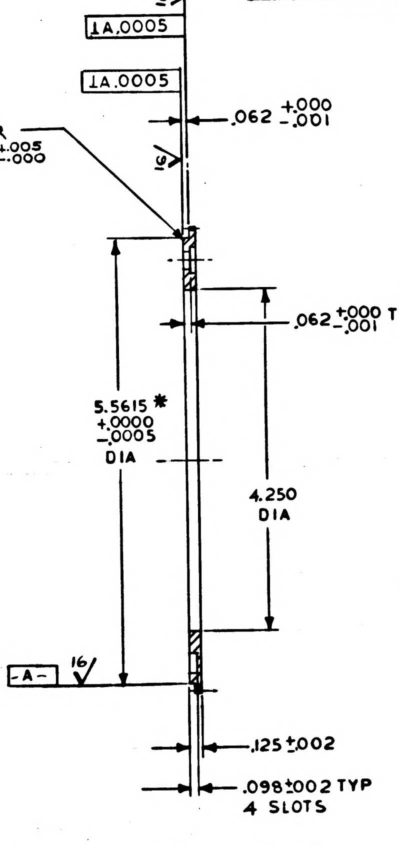
9°-41'±0°-10'
(REF)
℄ OF GEAR TOOTH
℄

DETAIL B-B
SCALE 2:1

	HOLE	DESCRIPTION	QTY
⊕.010 DIA	A	DR 7/32 (.2187) THRU	8
⊕.010 DIA	B	.188 DIA × .037 DEEP	2
⊕.010 DIA	C	DR NO.3 (.2130) THRU CBORE .328 DIA OPP SIDE TO DEPTH SHOWN IN SECTION A-A	4
⊕.004 DIA	D	DR NO. 49 (.073) THRU CSK 90° $^{+0°}_{-5°}$ TO .109 DIA 2-56 NC-2B THRU	2

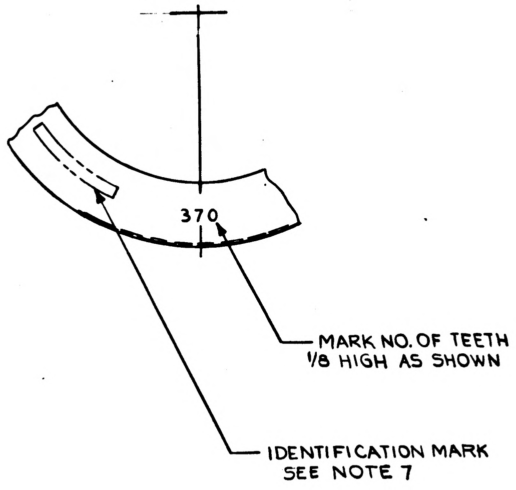


A
9°-41'±0°-10'
2.090 BSC
3.500 BSC
1.750 BSC
1.294 BSC
SEE DETAIL B-B
2.500±.002 R
90°-0'±0°-10' TYP
.145 BSC
1.353 BSC
1.642 BSC
2.415 BSC
3.349 BSC
2.310 BSC
3.267 BSC
4.830 BSC
4.475 BSC
1.428 BSC
1.750 BSC
3.500 BSC
10°-30' TYP
.454 BSC
.125±.001 R TYP TO DEPTH SHOWN IN SECTION A-A
A
B
C
D
1.060 BSC
1.353 BSC
.647 BSC
2.490 BSC
2.310 BSC
3.560 BSC
4.584 BSC
4.718 BSC
A



16
⊥A.0005
⊥A.0005
.062 $^{+.000}_{-.001}$
CHAMFER 45° × .010 $^{+.005}_{-.000}$
.062 $^{+.000}_{-.001}$ TYP
5.5615 * $^{+.0000}_{-.0005}$ DIA
4.250 DIA
-A-
16
.125±.002
.098±.002 TYP 4 SLOTS

SECTION A-A



370
MARK NO. OF TEETH 1/8 HIGH AS SHOWN
IDENTIFICATION MARK SEE NOTE 7

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
a 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-STD-171 TABLE V-A, FINISH NO. 5.4.1 (KPS-1005I.200).
6. HEAT TREAT PER ND1002114 PAR 3.7.4b TO Rc 30-34.
7. IDENTIFY USING NASA DWG NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012387	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ±0°-30'
DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 33386910300
DRAWN E.DRAPALA DATE 10-29-64
CHECKED H.C.Pressey 11-10-64
APPROVAL F. Rushmore 11-12-64
APPROVAL F. Sirano 11-12-64
NASA APPROVAL W.J. Rhine 11-17-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR, SPUR, MOVABLE
370T-64P

CODE IDENT NO.
SIZE D
NASA NUMBER 2012382
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

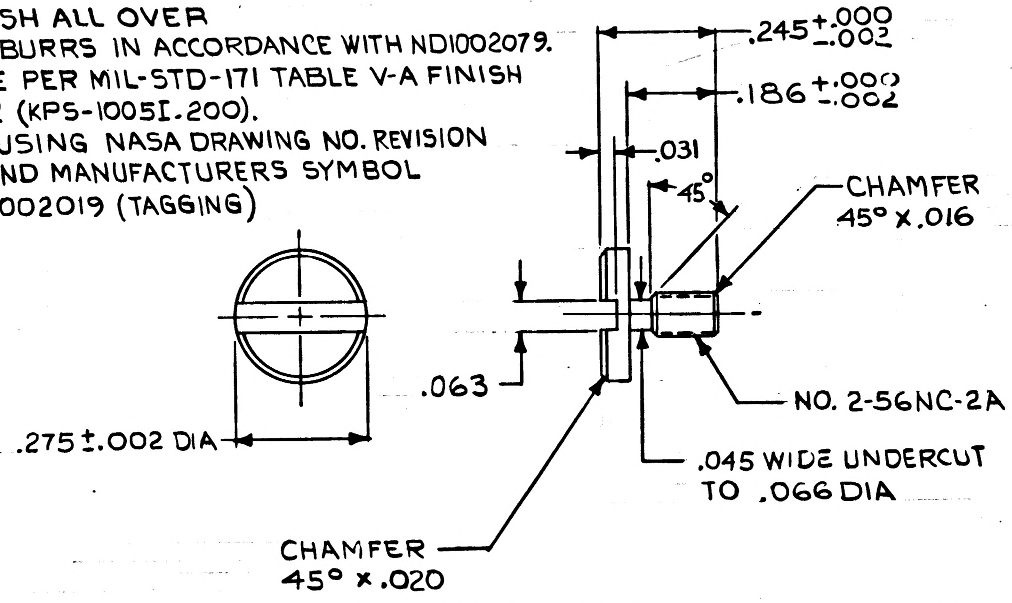
AD-1360

2012382

REVISIONS 14351			
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED a $\overset{63}{\surd}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005I.200).
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012387	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416, COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK

KIC PN 45386910070

DRAWN E. DRAPALA DATE 10-30-64
CHECKED HCPressy 11-10-64
APPROVAL 10-12-64
APPROVAL Y. Sivoco 11-12-64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL W Kupfer 17 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE

SCREW, MINIATURE

CODE IDENT NO.	SIZE	NASA NUMBER
	B	2012383

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

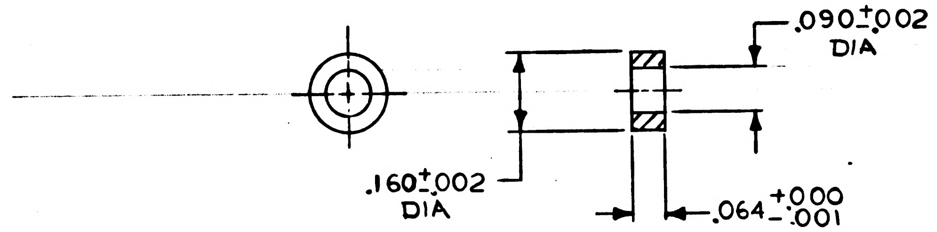
E-183

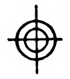
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012384

REVISIONS		14351	
SYM	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED $\sqrt[63]{}$ a FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-10051.200).
6. IDENTIFY USING NASA DRAWING NO. REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)




ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012387	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± —	± —

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416, COND A
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 45386910060
DRAWN E. DRAPALA DATE 10-30-64
CHECKED H E Prussey 11-10-64
APPROVAL G. Ruhlmann 11-12-64
APPROVAL F. Sitow 11-12-64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL W Kupfer 17 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE BUSHING

CODE IDENT NO.
SIZE B
NASA NUMBER 2012384
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

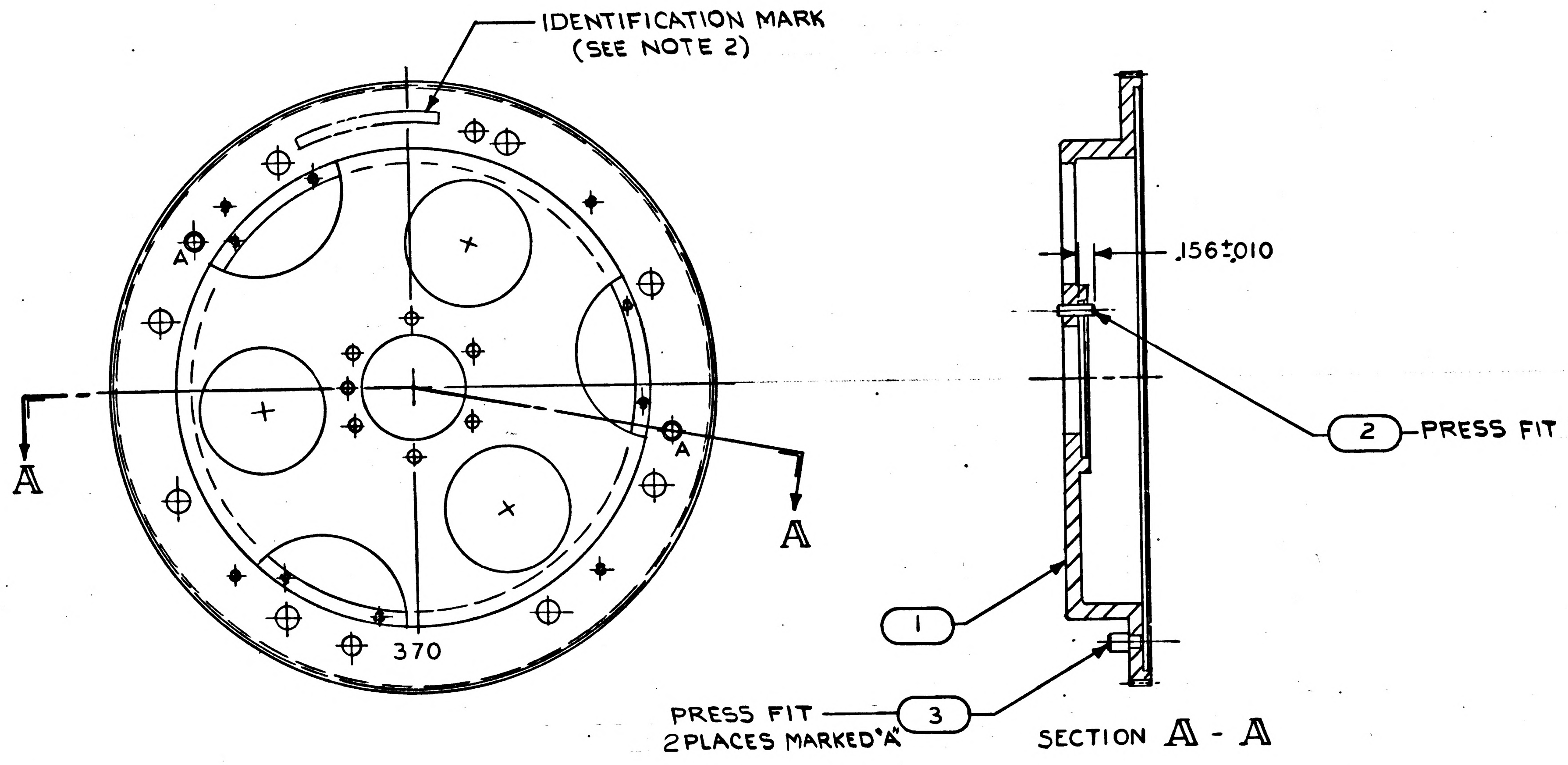
E-153

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012386

SYM	ZONE	REVISIONS 14351 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



SECTION A - A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	2		2011339	53386910010		PIN, SHOULDER			
2	1		MS16555-625			PIN, DOWEL			
1	1		2012382	33386910300		GEAR, SPUR, MOVABLE 370T - 64P			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012387	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ——	± ——	± ——

DO NOT SCALE THIS DRAWING

MATERIAL ——

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911100

DRAWN E.DRAPALA DATE 10-3-64
CHECKED H C Pressey 11-10-64
APPROVAL 11-12-64
APPROVAL 11-12-64
NASA APPROVAL W J Rhine 11-17-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR AND PIN,
ASSY OF

CODE IDENT NO.
SIZE C
NASA NUMBER 2012386
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

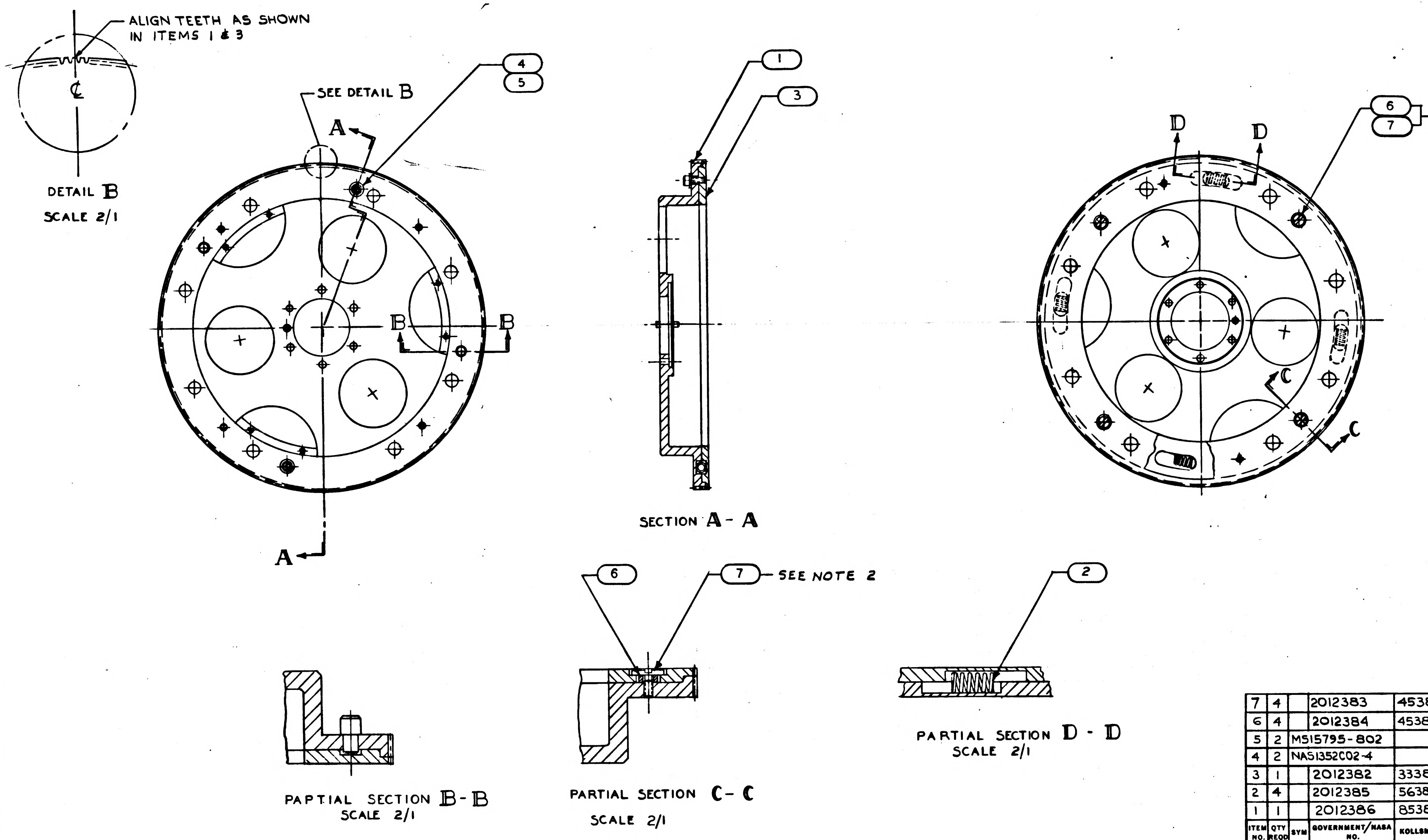
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012387

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS 1-351				

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (H) PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. PRIOR TO ASSEMBLING SCREWS AND SPRINGS, LAP PARTS 1 AND 3, IF NECESSARY, TO ACQUIRE A MAX. TORQUE OF 20 OUNCE INCHES, WHEN AXIS OF PARTS ARE VERTICAL AND PART 1 IS RESTING ON PART 3.
4. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING).



ALIGN TEETH AS SHOWN IN ITEMS 1 & 3
℄
DETAIL B
SCALE 2/1
SEE DETAIL B
A
A
4
5
B
B
1
3
SECTION A - A
D
D
6
7
REF
C
C
6
7 SEE NOTE 2
2
PAPTIAL SECTION B-B
SCALE 2/1
PARTIAL SECTION C - C
SCALE 2/1
PARTIAL SECTION D - D
SCALE 2/1

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
7	4		2012383	45386910070		SCREW, MINIATURE			
6	4		2012384	45386910060		BUSHING			
5	2	MS15795-802				WASHER FLAT			
4	2	NAS1352C02-4				SCREW, CAP, SOCKET HEAD			
3	1		2012382	33386910300		GEAR SPUR, MOVABLE			
2	4		2012385	56386910560		SPRING, HELICAL COMPRESSION			
1	1		2012386	85386911100		GEAR AND PIN, ASSY OF			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911110
DRAWN E. DRAPALA DATE 10-3-64
CHECKED H E Prussy 11-10-64
APPROVAL F. Ruchmann 11-12-64
APPROVAL F. Sisco 11-12-64
NASA APPROVAL W J Rhine 11-12-64
MIT APPROVAL 17 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
GEAR AND SPRING
ASSY OF
(SXT SHAFT DRIVE)

CODE IDENT NO. | SIZE D | NASA NUMBER 2012387
SCALE 1/1 | WEIGHT | CALC ACTUAL | SHEET | OF

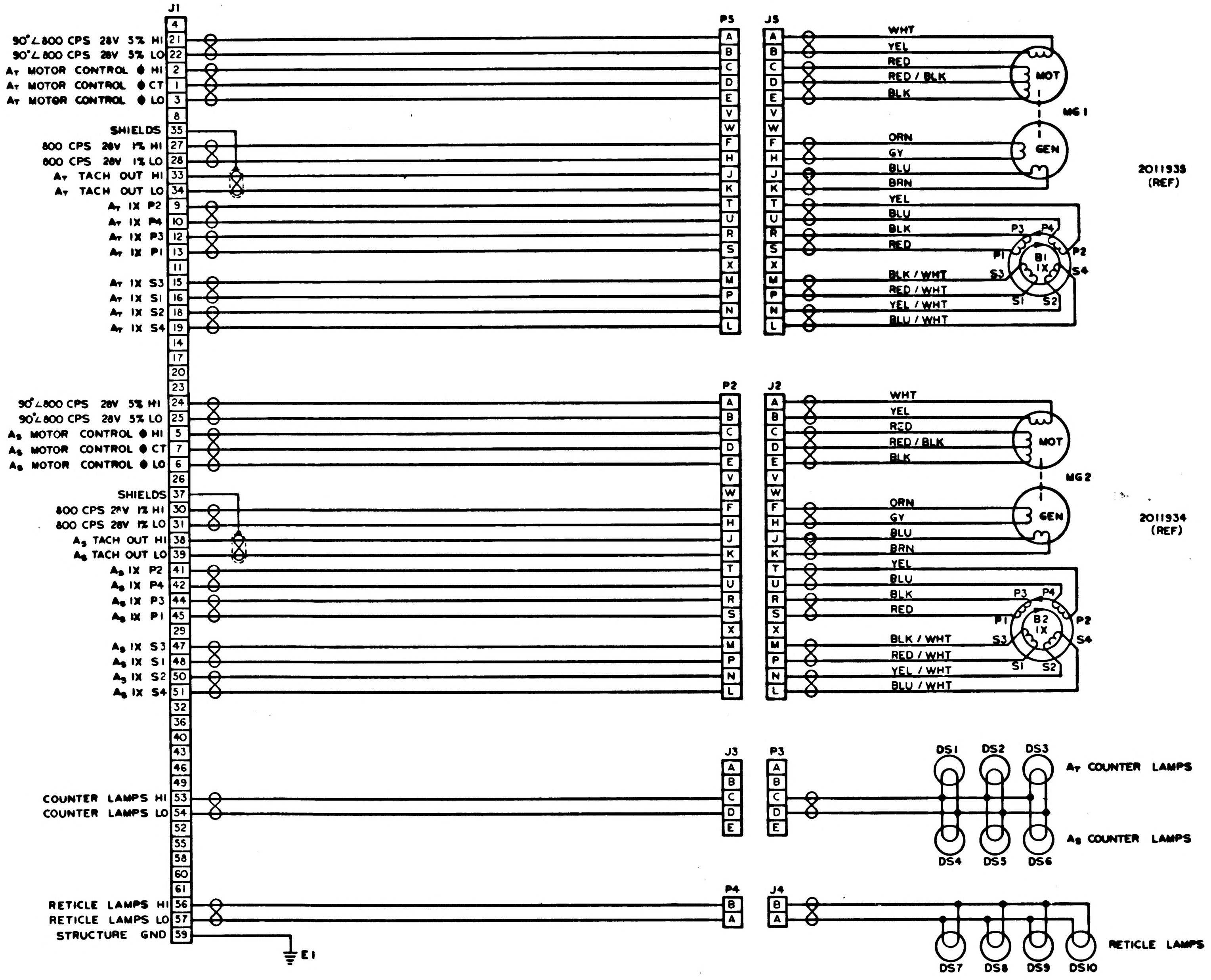
MASTER

AD-1380

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS, OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS TDRR 2.661

SYM	ZONE	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 32835	R.F.P.		1/27/67	


J1
90°∠800 CPS 28V 5% HI 21
90°∠800 CPS 28V 5% LO 22
A_T MOTOR CONTROL ● HI 2
A_T MOTOR CONTROL ● CT 1
A_T MOTOR CONTROL ● LO 3
SHIELDS 35
800 CPS 28V 1% HI 27
800 CPS 28V 1% LO 28
A_T TACH OUT HI 33
A_T TACH OUT LO 34
A_T 1X P2 9
A_T 1X P4 10
A_T 1X P3 12
A_T 1X P1 13
A_T 1X S3 15
A_T 1X S1 16
A_T 1X S2 18
A_T 1X S4 19
90°∠800 CPS 28V 5% HI 24
90°∠800 CPS 28V 5% LO 25
A_S MOTOR CONTROL ● HI 5
A_S MOTOR CONTROL ● CT 7
A_S MOTOR CONTROL ● LO 6
SHIELDS 37
800 CPS 28V 1% HI 30
800 CPS 28V 1% LO 31
A_S TACH OUT HI 38
A_S TACH OUT LO 39
A_S 1X P2 41
A_S 1X P4 42
A_S 1X P3 44
A_S 1X P1 45
A_S 1X S3 47
A_S 1X S1 48
A_S 1X S2 50
A_S 1X S4 51
COUNTER LAMPS HI 53
COUNTER LAMPS LO 54
RETICLE LAMPS HI 56
RETICLE LAMPS LO 57
STRUCTURE GND 59
4 8 11 14 17 20 23 26 29 32 36 40 43 46 49 52 55 58 60 61
E1
P5 J5
WHT YEL RED RED / BLK BLK
MOT
MG1
ORN GY BLU BRN
GEN
YEL BLU BLK RED
BLK / WHT RED / WHT YEL / WHT BLU / WHT
P1 P2 P3 P4 S1 S2 S3 S4
B1 1X
2011935 (REF)
P2 J2
MG2
B2 1X
2011934 (REF)
J3 P3
DS1 DS2 DS3
A_T COUNTER LAMPS
A_S COUNTER LAMPS
DS4 DS5 DS6
2011913 (REF)
P4 J4
RETICLE LAMPS
DS7 DS8 DS9 DS10
2011731 (REF)

REF DESIG	PART NO	DESCRIPTION
B1	1012157	RESOLVER RECEIVER ONE SPEED
B2	1012157	RESOLVER RECEIVER ONE SPEED
DS1	1010493	LAMP MINIATURE
DS2	↕	↕
DS3		
DS4		
DS5		
DS6	1010493	LAMP MINIATURE
DS7	MS24367-715	LAMP INCANDESCANT
DS8	↕	↕
DS9		
DS10	MS24367-715	LAMP INCANDESCANT
E1	MS25036-1	TERMINAL LUG CRIMP STYLE INSULATED
J1	1010771-007	CONNECTOR ELECTRICAL
J2	1011740-3	↕
J3	1011646	
J4	1011748-2	
J5	1011740-3	CONNECTOR ELECTRICAL
*MG1	1012156-4	SERVO MOTOR-TACHOMETER GENERATOR
*MG1	1012156-1	SERVO MOTOR-TACHOMETER GENERATOR
*MG2	1012156-1	SERVO MOTOR-TACHOMETER GENERATOR
*MG2	1012156-4	SERVO MOTOR-TACHOMETER GENERATOR
P2	1011758-1	CONNECTOR ELECTRICAL
P3	1011647	↕
P4	1011748-1	
P5	1011758-1	CONNECTOR ELECTRICAL

* FOR PROPER SERVO MOTOR-TACHOMETER GENERATOR CONFIGURATION CHECK DWG-2011000

NOTE

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

DWGS FOR REF

2011713 SCT BASE HARNESS ASSY
2011934 SCT SHAFT DRIVE HARNESS, ASSY OF
2011935 SCT TRUNNION DRIVE HARNESS, ASSY OF
2011913 LAMP AND HARNESS, ASSY OF
2011731 HOUSING AND LAMP, ASSY OF

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Vanderbeck 8-12-65
CHECKED [illegible] 8/16/65
APPROVED [illegible]
APPROVED
APPROVED MIT [illegible] 17 Aug 65
APPROVED MSC [illegible]
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

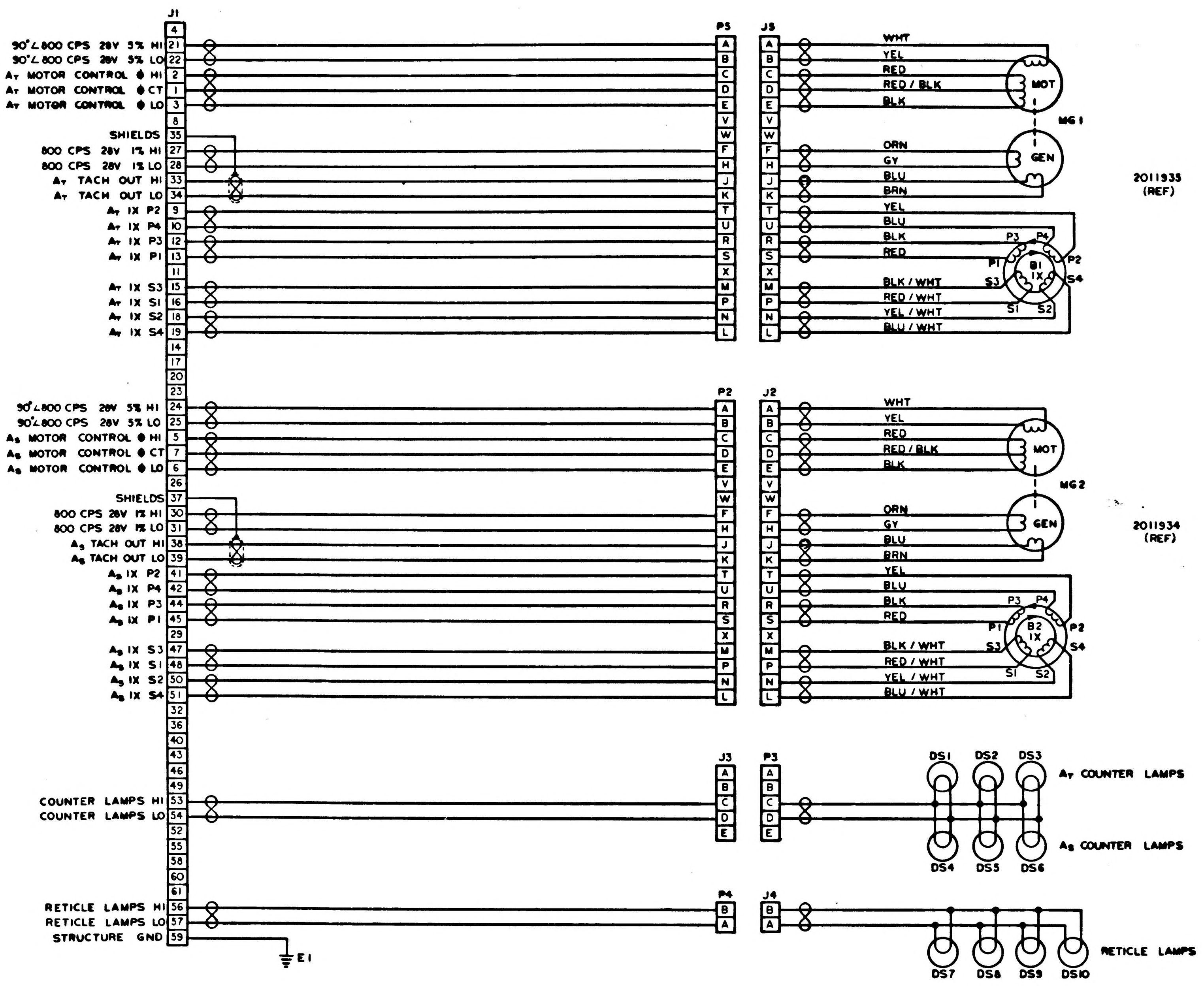
SCHEMATIC DIAGRAM SCANNING TELESCOPE

CODE IDENT NO.
SIZE E
DRAWING NO. 2012390
SCALE —
SHEET OF

2012390 A

REVISIONS TDRR 2 061

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 32835	R.F.P.		1/27/67	


J1
90°∠800 CPS 28V 5% HI 21
90°∠800 CPS 28V 5% LO 22
A_T MOTOR CONTROL ϕ HI 2
A_T MOTOR CONTROL ϕ CT 1
A_T MOTOR CONTROL ϕ LO 3
SHIELDS 35
800 CPS 28V 1% HI 27
800 CPS 28V 1% LO 28
A_T TACH OUT HI 33
A_T TACH OUT LO 34
A_T 1X P2 9
A_T 1X P4 10
A_T 1X P3 12
A_T 1X P1 13
A_T 1X S3 15
A_T 1X S1 16
A_T 1X S2 18
A_T 1X S4 19
90°∠800 CPS 28V 5% HI 24
90°∠800 CPS 28V 5% LO 25
A_S MOTOR CONTROL ϕ HI 5
A_S MOTOR CONTROL ϕ CT 7
A_S MOTOR CONTROL ϕ LO 6
SHIELDS 37
800 CPS 28V 1% HI 30
800 CPS 28V 1% LO 31
A_S TACH OUT HI 38
A_S TACH OUT LO 39
A_S 1X P2 41
A_S 1X P4 42
A_S 1X P3 44
A_S 1X P1 45
A_S 1X S3 47
A_S 1X S1 48
A_S 1X S2 50
A_S 1X S4 51
COUNTER LAMPS HI 53
COUNTER LAMPS LO 54
RETICLE LAMPS HI 56
RETICLE LAMPS LO 57
STRUCTURE GND 59
E1
P5
J5
P2
J2
J3
P3
P4
J4
WHT
YEL
RED
RED / BLK
BLK
MOT
MG1
ORN
GY
BLU
BRN
GEN
BLK / WHT
RED / WHT
YEL / WHT
BLU / WHT
B1 1X
B2 1X
MG2
2011935 (REF)
2011934 (REF)
DS1 DS2 DS3
A_T COUNTER LAMPS
A_S COUNTER LAMPS
DS4 DS5 DS6
2011913 (REF)
RETICLE LAMPS
DS7 DS8 DS9 DS10
2011731 (REF)

REF DESIG	PART NO	DESCRIPTION
B1	1012157	RESOLVER RECEIVER ONE SPEED
B2	1012157	RESOLVER RECEIVER ONE SPEED
DS1	1010493	LAMP MINIATURE
DS2	↕	↕
DS3		
DS4		
DS5		
DS6	1010493	LAMP MINIATURE
DS7	MS24367-715	LAMP INCANDESCANT
DS8	↕	↕
DS9		
DS10	MS24367-715	LAMP INCANDESCANT
E1	MS25036-1	TERMINAL LUG CRIMP STYLE INSULATED
J1	1010771-007	CONNECTOR ELECTRICAL
J2	1011740-3	↕
J3	1011646	
J4	1011748-2	
J5	1011740-3	CONNECTOR ELECTRICAL
*MG1	1012156-4	SERVO MOTOR-TACHOMETER GENERATOR
*MG1	1012156-1	SERVO MOTOR-TACHOMETER GENERATOR
*MG2	1012156-1	SERVO MOTOR-TACHOMETER GENERATOR
*MG2	1012156-4	SERVO MOTOR-TACHOMETER GENERATOR
P2	1011758-1	CONNECTOR ELECTRICAL
P3	1011647	↕
P4	1011748-1	
P5	1011758-1	CONNECTOR ELECTRICAL

* FOR PROPER SERVO MOTOR-TACHOMETER GENERATOR CONFIGURATION CHECK DWG-2011000

NOTE

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

DWGS FOR REF

2011713 SCT BASE HARNESS ASSY
2011934 SCT SHAFT DRIVE HARNESS, ASSY OF
2011935 SCT TRUNNION DRIVE HARNESS, ASSY OF
2011913 LAMP AND HARNESS, ASSY OF
2011731 HOUSING AND LAMP, ASSY OF

MASTER

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Hendershot 8-12-66
CHECKED
APPROVED
APPROVED
APPROVED MIT
APPROVED MSC
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM SCANNING TELESCOPE

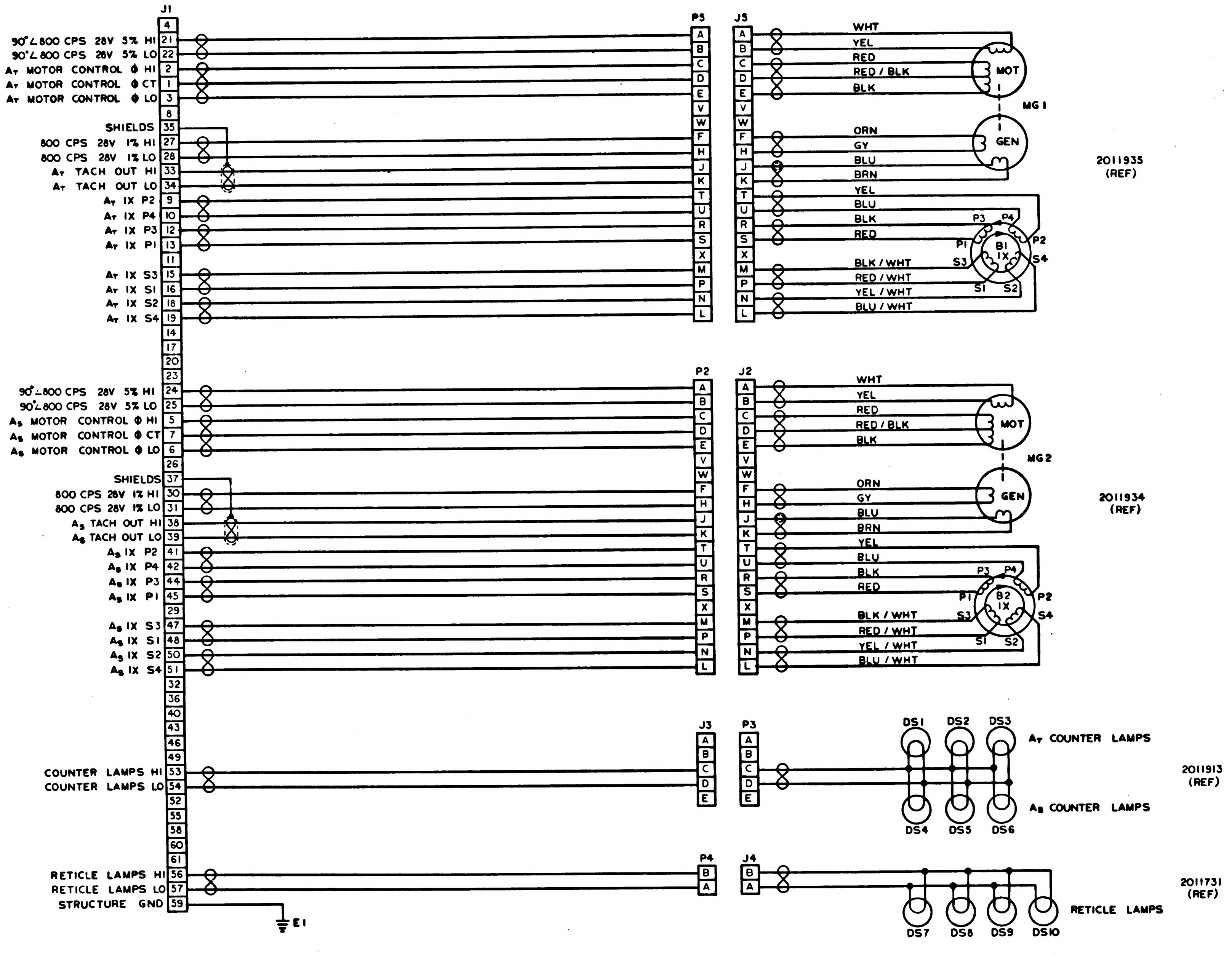
CODE IDENT NO.
SIZE E
DRAWING NO. 2012390
SCALE —
SHEET OF

2012390 A

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS


J1
4
90°∠800 CPS 28V 5% HI 21
90°∠800 CPS 28V 5% LO 22
A_T MOTOR CONTROL Φ HI 2
A_T MOTOR CONTROL Φ CT 1
A_T MOTOR CONTROL Φ LO 3
8
SHIELDS 35
800 CPS 28V 1% HI 27
800 CPS 28V 1% LO 28
A_T TACH OUT HI 33
A_T TACH OUT LO 34
A_T 1X P2 9
A_T 1X P4 10
A_T 1X P3 12
A_T 1X P1 13
11
A_T 1X S3 15
A_T 1X S1 16
A_T 1X S2 18
A_T 1X S4 19
14
17
20
23
90°∠800 CPS 28V 5% HI 24
90°∠800 CPS 28V 5% LO 25
A_S MOTOR CONTROL Φ HI 5
A_S MOTOR CONTROL Φ CT 7
A_S MOTOR CONTROL Φ LO 6
26
SHIELDS 37
800 CPS 28V 1% HI 30
800 CPS 28V 1% LO 31
A_S TACH OUT HI 38
A_S TACH OUT LO 39
A_S 1X P2 41
A_S 1X P4 42
A_S 1X P3 44
A_S 1X P1 45
29
A_S 1X S3 47
A_S 1X S1 48
A_S 1X S2 50
A_S 1X S4 51
32
36
40
43
46
49
COUNTER LAMPS HI 53
COUNTER LAMPS LO 54
52
55
58
60
61
RETICLE LAMPS HI 56
RETICLE LAMPS LO 57
STRUCTURE GND 59
E1
P5
J5
A B C D E V W F H J K T U R S X M P N L
WHT
YEL
RED
RED / BLK
BLK
MOT
MG1
ORN
GY
BLU
BRN
GEN
YEL
BLU
BLK
RED
P3
P4
P1
P2
B1
1X
S3
S4
S1
S2
BLK / WHT
RED / WHT
YEL / WHT
BLU / WHT
2011935
(REF)
P2
J2
A B C D E V W F H J K T U R S X M P N L
WHT
YEL
RED
RED / BLK
BLK
MOT
MG2
ORN
GY
BLU
BRN
GEN
YEL
BLU
BLK
RED
P3
P4
P1
P2
B2
1X
S3
S4
S1
S2
BLK / WHT
RED / WHT
YEL / WHT
BLU / WHT
2011934
(REF)
J3
P3
A B C D E
DS1
DS2
DS3
A_T COUNTER LAMPS
A_S COUNTER LAMPS
DS4
DS5
DS6
2011913
(REF)
P4
J4
B A
RETICLE LAMPS
DS7
DS8
DS9
DS10
2011731
(REF)

REF DESIG	PART NO	DESCRIPTION
B1	1012157	RESOLVER RECEIVER ONE SPEED
B2	1012157	RESOLVER RECEIVER ONE SPEED
DS1	1010493	LAMP MINIATURE
DS2	↕	↕
DS3		
DS4		
DS5		
DS6	1010493	LAMP MINIATURE
DS7	MS24367-715	LAMP INCANDESCANT
DS8	↕	↕
DS9		
DS10	MS24367-715	LAMP INCANDESCANT
E1	MS25036-1	TERMINAL LUG CRIMP STYLE INSULATED
J1	1010771-007	CONNECTOR ELECTRICAL
J2	1011740-3	↕
J3	1011646	
J4	1011748-2	
J5	1011740-3	CONNECTOR ELECTRICAL
MG1	1012156-1	SERVO MOTOR - TACHOMETER GENERATOR
MG2	1012156-1	SERVO MOTOR - TACHOMETER GENERATOR
P2	1011758-1	CONNECTOR ELECTRICAL
P3	1011647	↕
P4	1011748-1	
P5	1011758-1	CONNECTOR ELECTRICAL

NOTE

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

DWGS FOR REF

2011713	SCT BASE HARNESS ASSY
2011934	SCT SHAFT DRIVE HARNESS, ASSY OF
2011935	SCT TRUNNION DRIVE HARNESS, ASSY OF
2011913	LAMP AND HARNESS, ASSY OF
2011731	HOUSING AND LAMP, ASSY OF

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN Wunderlich 8-12-65
CHECKED C.E. Costa 8/16/65
APPROVED 8/16/65
APPROVED
APPROVED MIT 17 Aug 65
APPROVED MSC 8/17/65
DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
SCANNING TELESCOPE

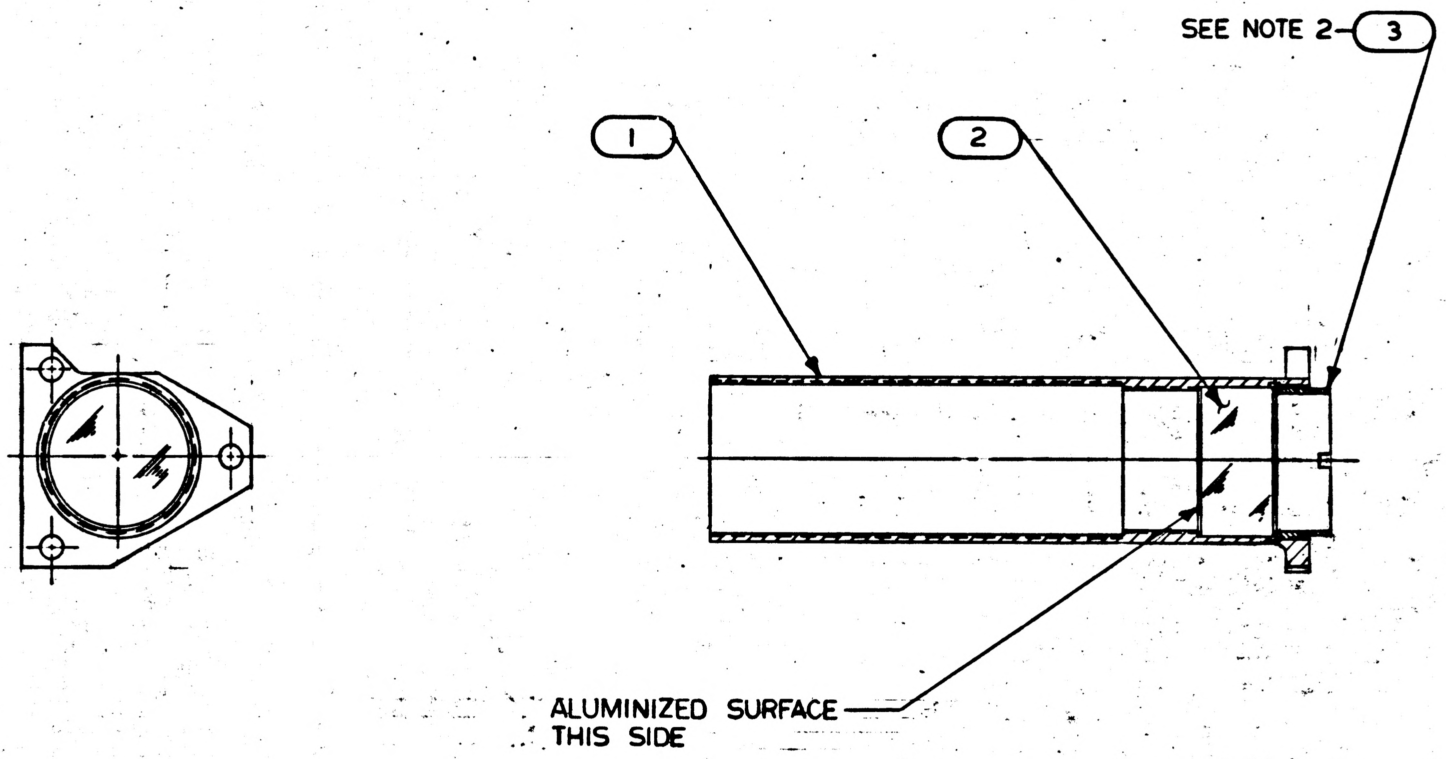
CODE IDENT NO.
SIZE E
DRAWING NO. 2012390
SCALE —
SHEET 1 OF 1

2012390

REVISIONS 17376				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. VIBRATION PROOF ASSEMBLY USING ONE (1) DROP OF LOCKING COMPOUND, (ON ITEM 3) GRADE H PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		2012499	57386911413		RING, FILTER RETAINING			
2	1	✱	1012153	68420001001		FILTER, LIGHT			
1	1		2012453	57386911080		HOUSING, FILTER			

LIST OF PARTS AND MATERIALS

✱ PURCHASE ITEM-SEE SOURCE CONTROL DRAWING BEFORE ORDERING.

MASTER

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ – ~	+ – ~	+ – ~

DO NOT SCALE THIS DRAWING

MATERIAL ~

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911270

DRAWN DATE 1-29-65
CHECKED J. SULLIVAN 2-19-65
APPROVAL 3-9-65
APPROVAL 3-9-65
NASA APPROVAL 3-9-65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING AND FILTER, ASSEMBLY OF
(SXT)

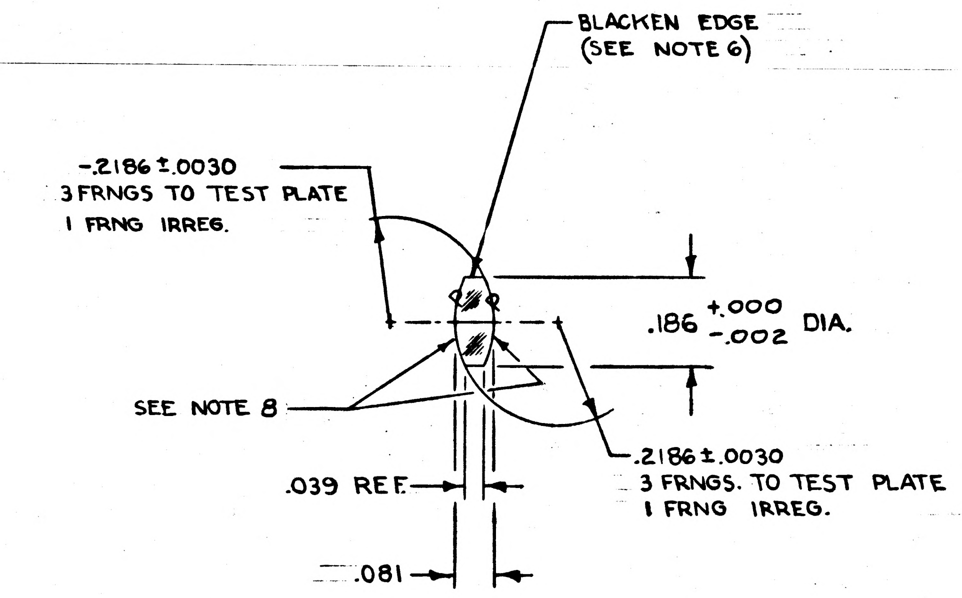
CODE IDENT NO. | SIZE C | NASA NUMBER 2012393

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2012395 A

REVISIONS 15037				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16664	2/18/64	WK

NOTES:
1. INTERPERT DWG. IN ACCORDANCE WITH MIL-D-70327
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B- FINE ANNEALED
   TYPE 516-641
4. CA: ENT = .116 EXIT = .116
   SURF. QUAL: 60-40
   CTRG. ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR. 3.5.12
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG. NO; REVISION LETTER AND
   MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019. (BAGGING)
8. ANTI-REFLECTION COAT PER ND1002224 EXCEPT THAT THE
   WAVELENGTH RANGE SHALL BE FROM 330 TO 370 MILLI-MICRONS.



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012479	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910570

DRAWN P.CICCOLO DATE 11-23-64
CHECKED W. Murray 11-30-64
APPROVAL
APPROVAL E. Thomas 12/4/64
NASA APPROVAL W. J. Rhine 12-22-64
MIT APPROVAL W. Geffen 22 Dec 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE (COLLECTOR)
HORIZON SENSING

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012395

SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET | OF

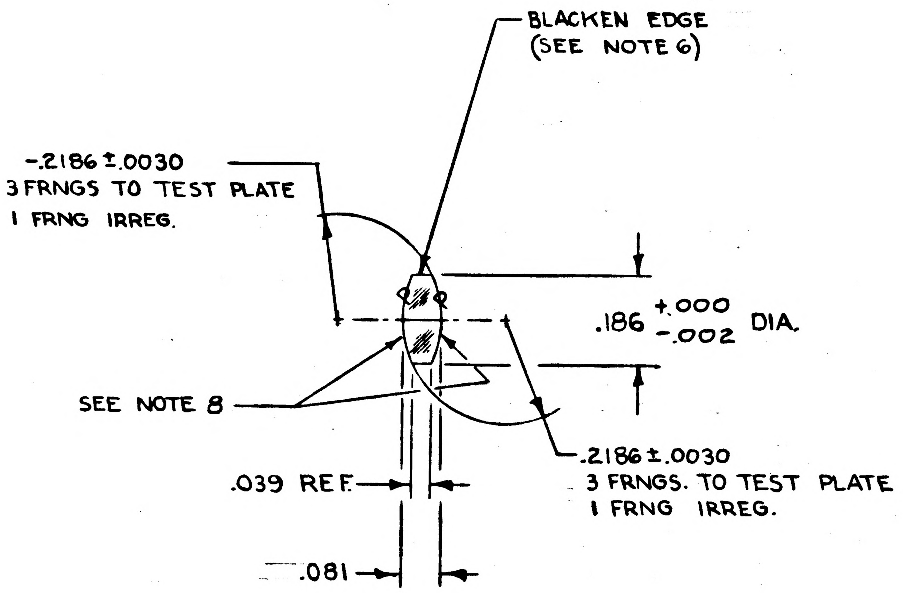
AD-1340

2012395 B

REVISIONS		15037		
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16664	2/18/64	WK
B		REVISED PER TDRR 19204	5/4/65	WK

NOTES:

1. INTERPERT DWG. IN ACCORDANCE WITH MIL-D-70327
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B- FINE ANNEALED
   TYPE 516-641
4. CA: ENT = .116 EXIT = .116
   SURF. QUAL: 60-40
   CTRG. ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR.3.5.12
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG. NO; REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019. (BAGGING)
8. ANTI-REFLECTION COAT PER ND1002224 EXCEPT TO ENSURE NO MORE THAN 1.0 PERCENT REFLECTANCE AT ANY WAVELENGTH BETWEEN 330 AND 370 MILLI-MICRONS.



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012479	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910570

DRAWN P.CICCOLO DATE 11-23-64
CHECKED W Murray 11-30-64
APPROVAL
APPROVAL E. Thomas 12/4/64
NASA APPROVAL W. J. Rhine 12-22-64
MIT APPROVAL W Griffin 22 Dec 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE (COLLECTOR)
HORIZON SENSING

CODE IDENT NO.	SIZE	NASA NUMBER
80230	C	2012395

SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET | OF

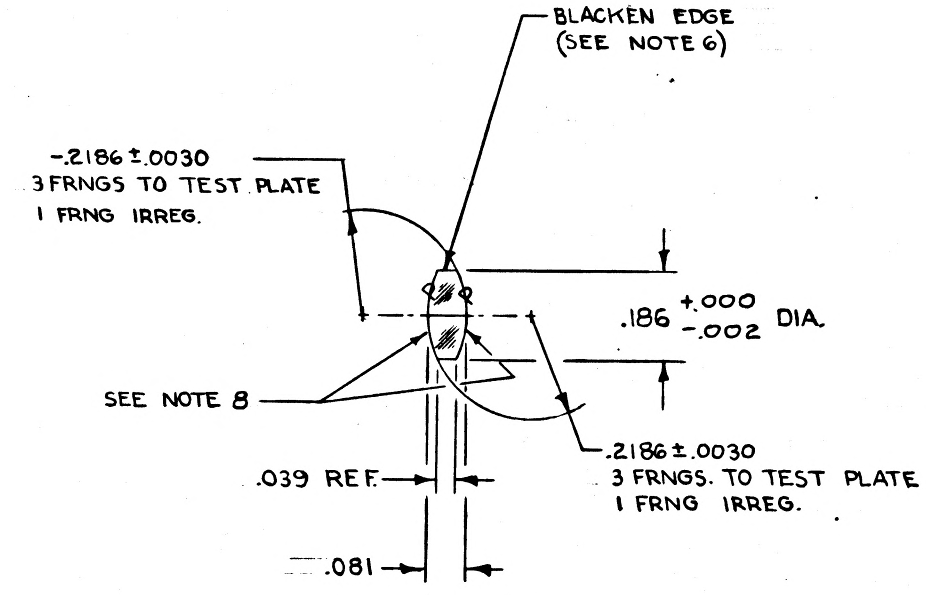
AD-1340

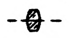
2012395

REVISIONS 15037				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPERT DWG. IN ACCORDANCE WITH MIL-D-70327
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B- FINE ANNEALED
   TYPE 516-641
4. CA: ENT = .116 EXIT = .116
   SURF. QUAL: 60-40
   CTRG. ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR.3.5.12
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG. NO; REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND 1002019. (BAGGING)
8. ANTI-REFLECTION COAT TO ENSURE MINIMUM TRANSMISSION OF 95% AT 3500 Å AND MINIMUM TRANSMISSION OF 90% AT ANY WAVE LENGTH FROM 3300 Å TO 3700 Å. COATING SHALL SATISFY SECTIONS 3.7 AND 3.8 OF ND 1002224 OVER THE ABOVE WAVE LENGTH RANGE.


BLACKEN EDGE (SEE NOTE 6)
-.2186 ±.0030 3 FRNGS TO TEST PLATE 1 FRNG IRREG.
.186 +.000 -.002 DIA.
SEE NOTE 8
.2186 ±.0030 3 FRNGS. TO TEST PLATE 1 FRNG IRREG.
.039 REF.
.081



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012479	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910570

DRAWN P.CICCOLO DATE 11-23-64
CHECKED W Murray 11-30-64
APPROVAL
APPROVAL E. Thomas 12/4/64
NASA APPROVAL W J Rhine 12-22-64
MIT APPROVAL W Jeffer 22 Dec 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE (COLLECTOR)
HORIZON SENSING

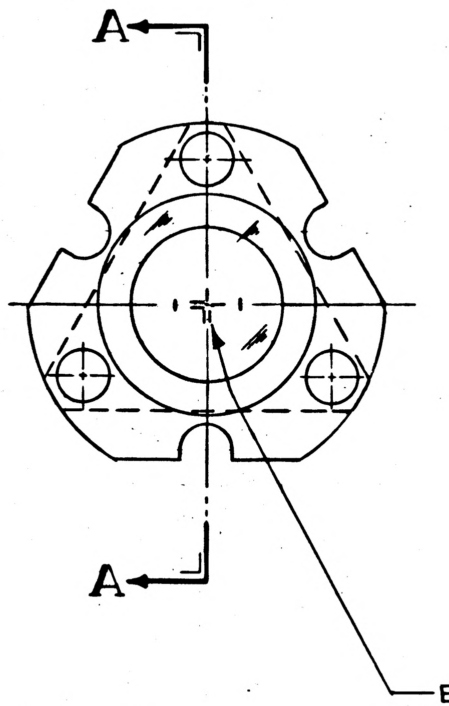
CODE IDENT NO.
SIZE C
NASA NUMBER 2012395
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET OF

2012425	A

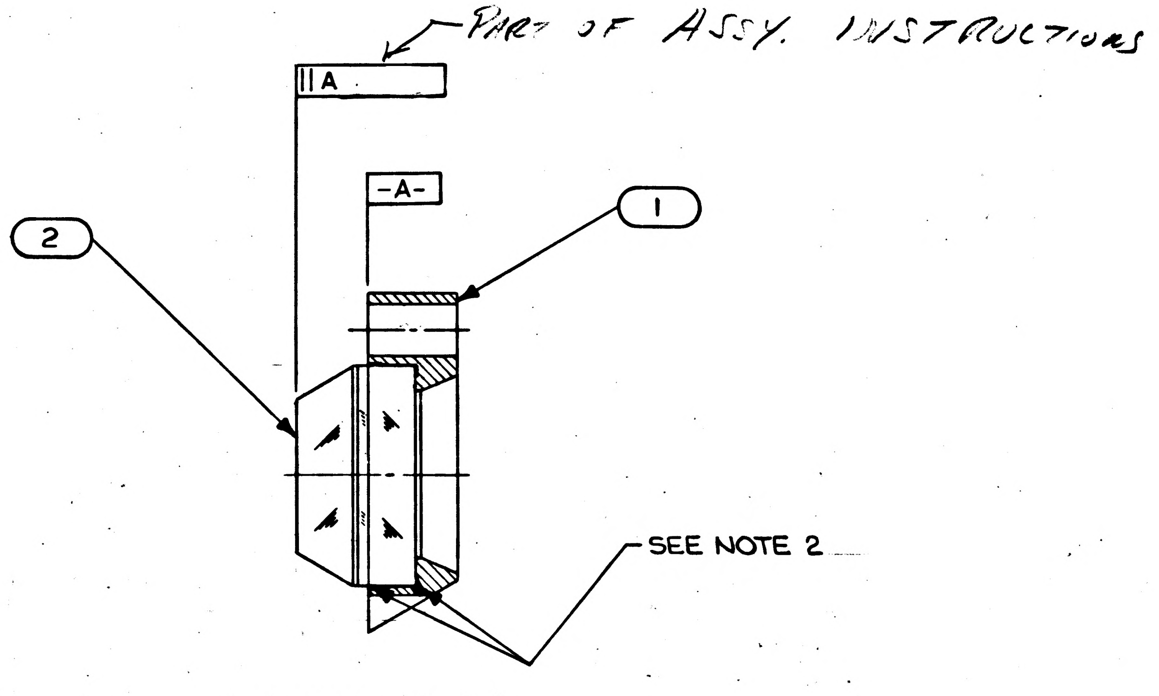
REVISIONS 16910				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 20437	7/1/65	WK

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT RETICLE IN PLACE (ORIENTATE AS SHOWN) USING ADHESIVE. TYPE VII - RIGID, IN ACCORDANCE WITH ND1002004.
3. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)

assembly instructions pending



ENGRAVING TO BE PARALLEL WITH VERTICLE ℄ WITHIN 1°
SEE NOTE 2



SECTION A-A

2	1		2012497	76386910160		RETICLE, ASSEMBLY OF (SXT)			
1	1		2012427	57386911400		HOLDER, RETICLE			
ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012426	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911200
DRAWN J. Schiller DATE 12-31-64
CHECKED J. SULLIVAN 1-29-65
APPROVAL
APPROVAL E. Mhoup 2-23-65
NASA APPROVAL W J Rhine 2-26-65
MIT APPROVAL W Cuff 26 Feb 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE AND HOLDER,
ASSEMBLY OF

CODE IDENT NO. 80230
SIZE C
NASA NUMBER 2012425
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

AD-1340

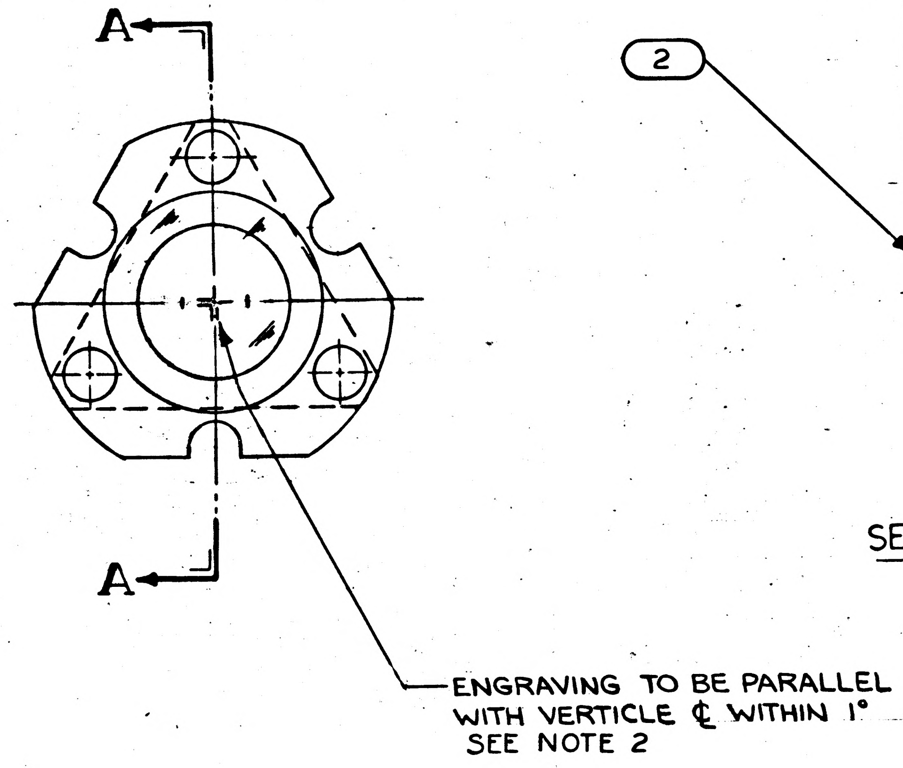
2012425

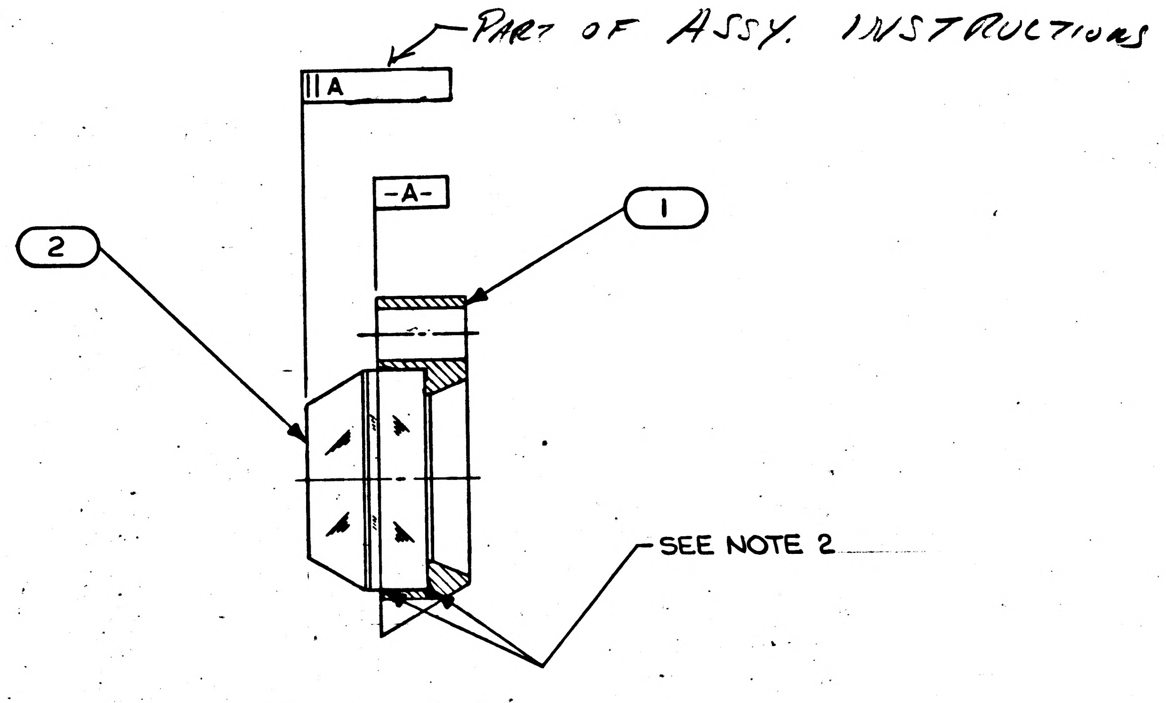
REVISIONS 16910				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT RETICLE IN PLACE (ORIENTATE AS SHOWN) USING ADHESIVE TYPE II IN ACCORDANCE WITH ND 1002004.
3. IDENTIFY USING NASA DRAWING NUMBER, REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019. (BAGGING)

assembly instructions pending





SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2012497	76386910160		RETICLE, ASSEMBLY OF (SXT)			
1	1		2012427	57386911400		HOLDER, RETICLE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012426	2011000

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
±	~	~	~

DO NOT SCALE THIS DRAWING
MATERIAL ~
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911200
DRAWN F. Schiller DATE 12-31-64
CHECKED J. SULLIVAN 1-29-65
APPROVAL
APPROVAL E. Mourys 2-23-65
NASA APPROVAL W. J. Rhine 2-26-65
MIT APPROVAL W. Kupfer 26 Feb 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
RETICLE AND HOLDER,
ASSEMBLY OF

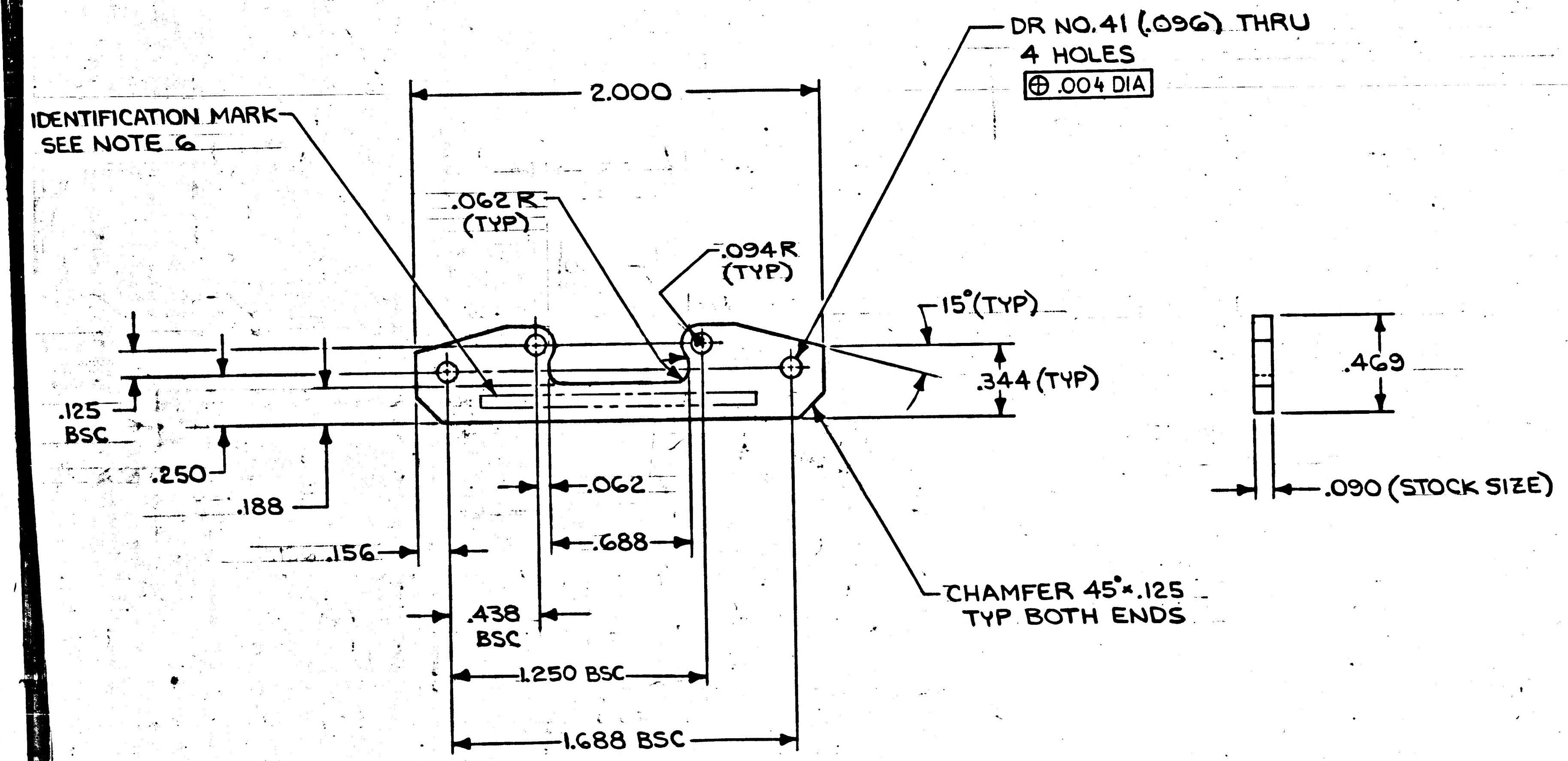
CODE IDENT NO.
SIZE C
NASA NUMBER 2012425
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2012431 A

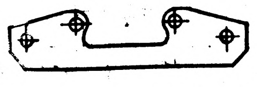
REVISIONS 16167

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 16385	2/18/65	

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625 TYPE II
   (KPS-1005A.150 TYPE II, CLASS 2)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



DR NO. 41 (.096) THRU
4 HOLES
⊕ .004 DIA
2.000
IDENTIFICATION MARK
SEE NOTE 6
.062 R
(TYP)
.094 R
(TYP)
15° (TYP)
.344 (TYP)
.469
.125
BSC
.250
.188
.062
.688
.156
.438
BSC
1.250 BSC
1.688 BSC
CHAMFER 45° × .125
TYP BOTH ENDS
.090 (STOCK SIZE)



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011890	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED. SPEC QQ-A-250/4
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910580

DRAWN DATE 1-8-65
CHECKED P.A. Leone 1-26-65
APPROVAL 2-1-65
APPROVAL 2/4/65
NASA APPROVAL 2/3/65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

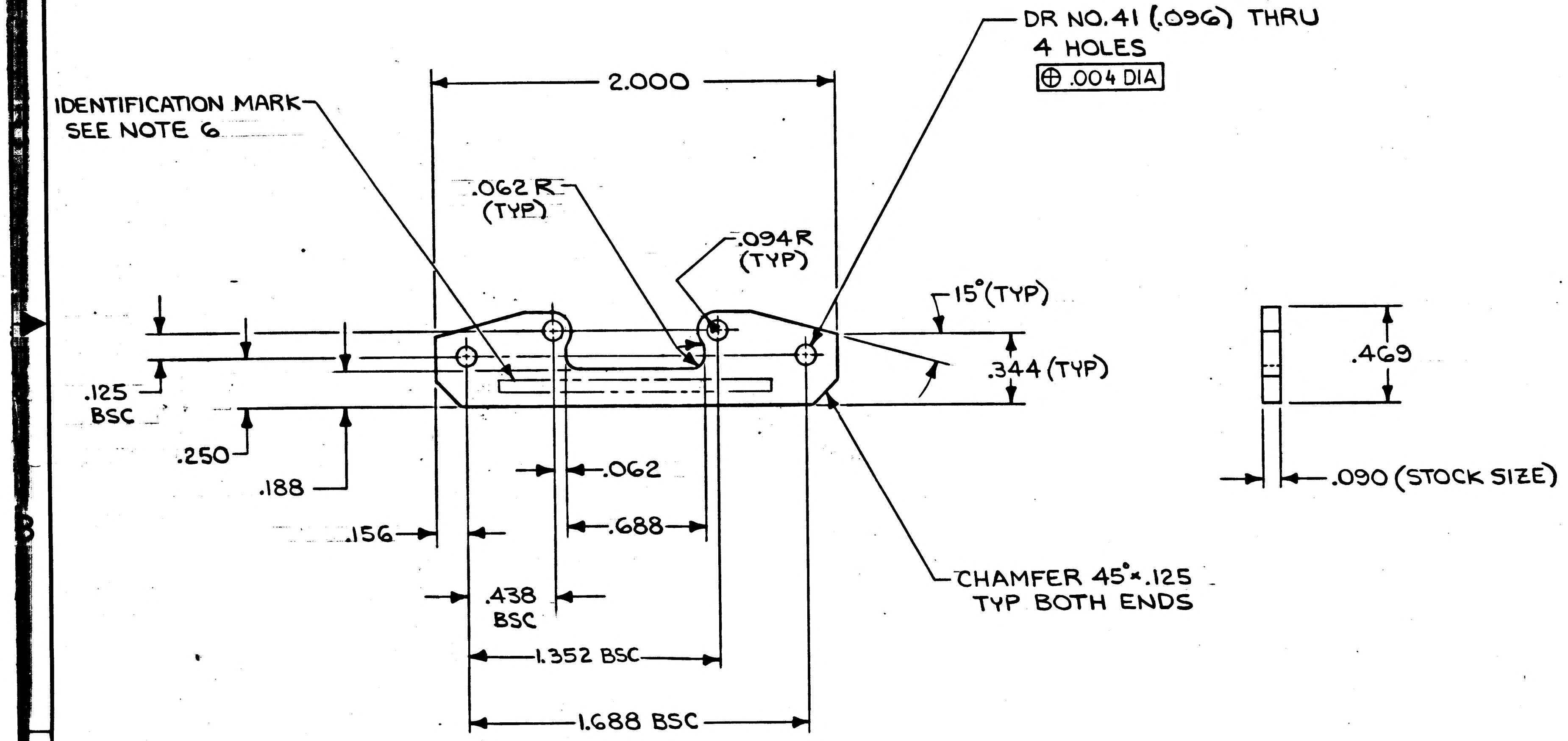
TITLE
PLATE, MOUNTING, CONNECTOR

CODE IDENT NO.
SIZE C
NASA NUMBER 2012431
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

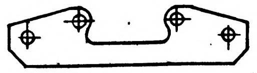
2012431

REVISIONS 16167				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: ANODIZE (SULFURIC) PER MIL-A-8625 TYPE II (KPS-1005A.150 TYPE II, CLASS 2)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



DR NO.41 (.096) THRU
4 HOLES
⊕ .004 DIA
2.000
IDENTIFICATION MARK
SEE NOTE 6
.062 R (TYP)
.094 R (TYP)
15° (TYP)
.344 (TYP)
.125 BSC
.250
.188
.156
.062
.688
.438 BSC
1.352 BSC
1.688 BSC
CHAMFER 45° × .125
TYP BOTH ENDS
.469
.090 (STOCK SIZE)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011890	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED. SPEC QQ-A-250/4
TEMPER T3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910580

DRAWN DATE 1-8-65
CHECKED P.A. Leone 1-26-65
APPROVAL 2-1-65
APPROVAL 2/4/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PLATE, MOUNTING, CONNECTOR

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012431

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

2012431

AD-1340

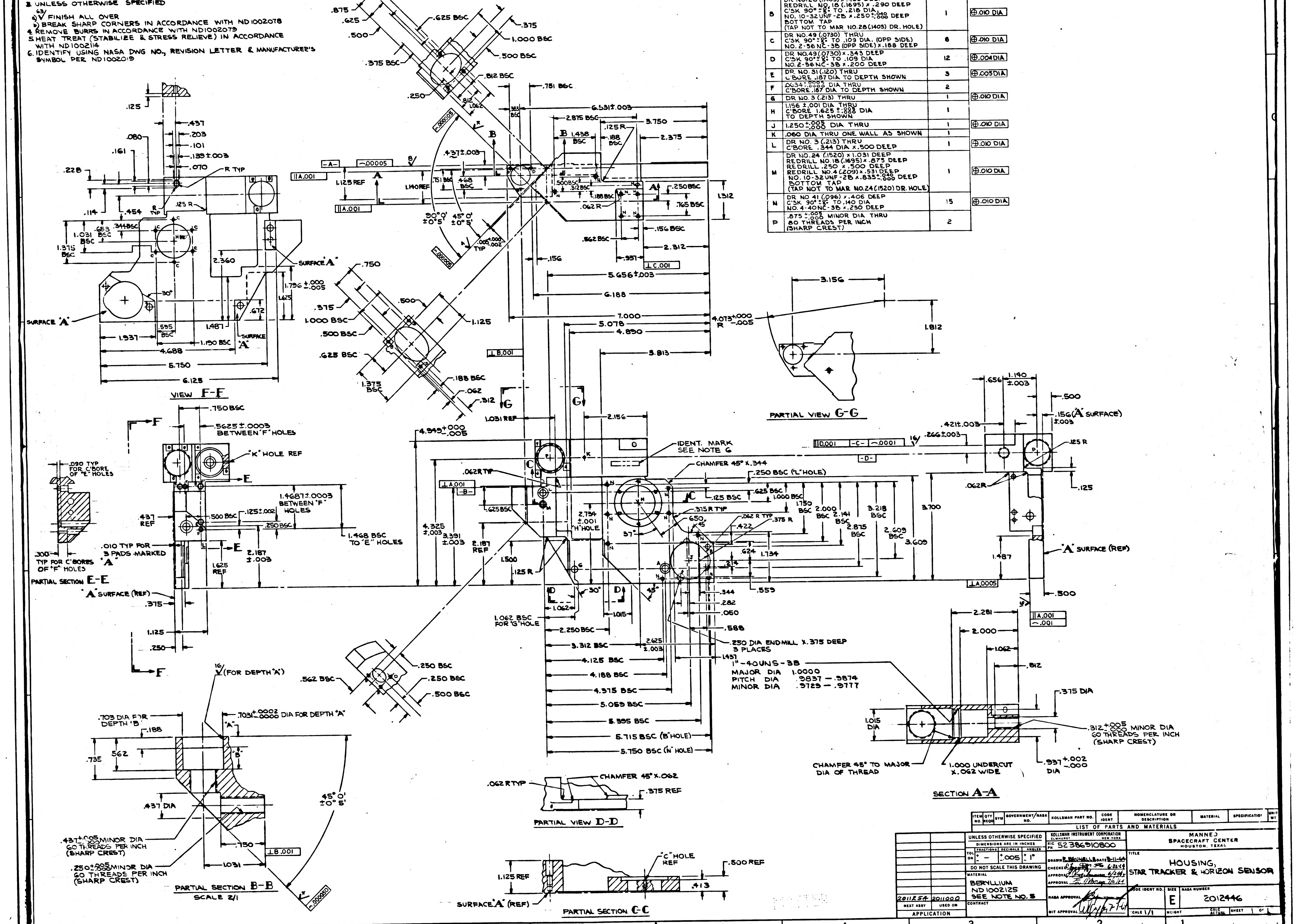
NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019

A	2012446

REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 18855	5/5/65	WK.

HOLE CHART

HOLE	DESCRIPTION	QUANTITY	
A	DR NO. 3 (.213) THRU C'BORE .344 x .203 DEEP	1	⊕.010 DIA
B	DR NO. 28 (.1405) x .406 DEEP REDRILL NO. 18 (.1695) x .290 DEEP C'SK 90° ±8° TO .218 DIA. NO. 10-32 UNF-2B x .250 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 28 (.1405) DR. HOLE)	1	⊕.010 DIA
C	DR NO. 49 (.0730) THRU C'SK 90° ±8° TO .109 DIA. (OPP SIDE) NO. 2-56 NC-3B (OPP SIDE) x .188 DEEP	6	⊕.010 DIA
D	DR NO. 49 (.0730) x .343 DEEP C'SK 90° ±8° TO .109 DIA NO. 2-56 NC-3B x .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .187 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0634 +.0005 -.0000 DIA THRU C'BORE .187 DIA TO DEPTH SHOWN	2	
G	DR NO. 3 (.213) THRU	1	⊕.010 DIA
H	1.156 ±.001 DIA THRU C'BORE 1.625 +.005 -.000 DIA TO DEPTH SHOWN	1	
J	1.250 +.005 -.000 DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA x .500 DEEP	1	⊕.010 DIA
M	DR NO. 24 (.1520) x 1.031 DEEP REDRILL NO. 18 (.1695) x .875 DEEP REDRILL .250 x .500 DEEP REDRILL NO. 4 (.209) x .531 DEEP NO. 10-32 UNF-2B x .835 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 24 (.1520) DR. HOLE)	1	⊕.010 DIA
N	DR NO. 41 (.096) x .406 DEEP C'SK 90° ±8° TO .140 DIA NO. 4-40 NC-3B x .250 DEEP	15	⊕.010 DIA
P	.875 +.005 -.000 MINOR DIA THRU 80 THREADS PER INCH (SHARP CREST)	2	


VIEW F-F
SURFACE "A"
PARTIAL VIEW G-G
PARTIAL SECTION E-E
"A" SURFACE (REF)
"K" HOLE REF
IDENT. MARK SEE NOTE 6
CHAMFER 45° x .344
.250 DIA ENDMILL x .375 DEEP 3 PLACES
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 - .9874
MINOR DIA .9725 - .9777
.250 BSC ("L" HOLE)
1.468 BSC TO "E" HOLES
1.4687±.0003 BETWEEN "F" HOLES
.5625±.0003 BETWEEN "F" HOLES
.010 TYP FOR 3 PADS MARKED "A"
.090 TYP FOR C'BORE OF "E" HOLES
.300 TYP FOR C'BORES OF "F" HOLES
1.062 BSC FOR "G" HOLE
.703 DIA FOR DEPTH "B"
.7031 +.0002 -.0000 DIA FOR DEPTH "A"
.437 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.250 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
PARTIAL SECTION B-B SCALE 2/1
45° 0' ±0° 5'
90° 0' ±0° 5'
.062 R TYP
CHAMFER 45° x .062
.375 REF
PARTIAL VIEW D-D
"C" HOLE REF
.500 REF
1.125 REF
SURFACE "A" (REF)
PARTIAL SECTION C-C
.312 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.375 DIA
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT x .062 WIDE
.937 +.002 -.000 DIA
1.015 DIA
.156 ("A" SURFACE)
"A" SURFACE (REF)
SECTION A-A
4.073 +.000 -.005 R
3.156
1.812
7.000
6.531±.003
5.656±.003
5.750 BSC ("N" HOLE)
5.715 BSC ("B" HOLE)

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011254	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800
DRAWN R. BRUNELLE DATE 3-11-64
CHECKED JS 6-26-64
APPROVAL 6/29/64
APPROVAL 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
STAR TRACKER & HORIZON SENSOR

CODE IDENT NO.
SIZE E
NASA NUMBER 2012446
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
  a) 63√ FINISH ALL OVER
  b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019

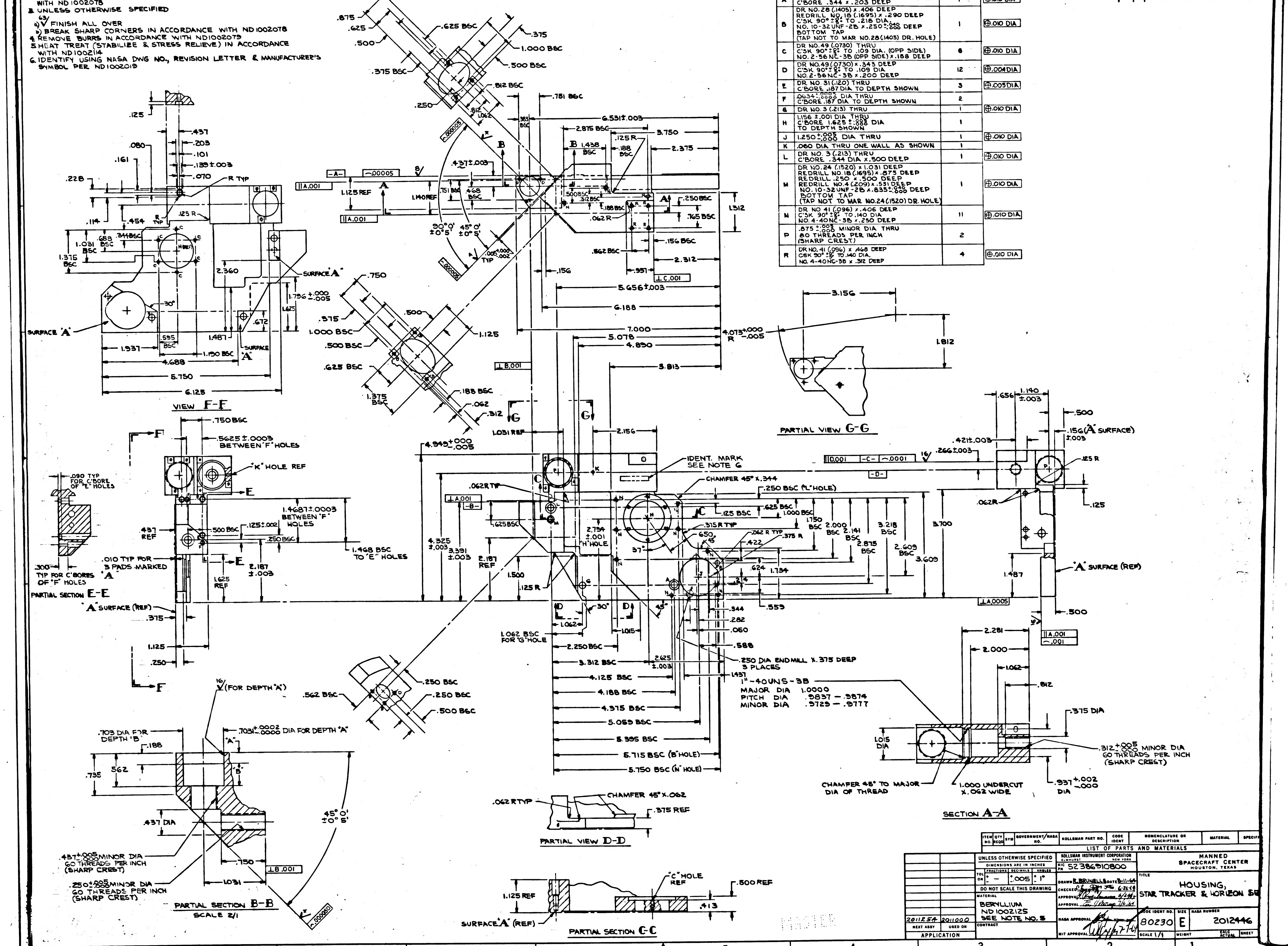
HOLE CHART

HOLE	DESCRIPTION	QUANTITY	
A	DR NO. 3 (.213) THRU C'BORE .344 x .203 DEEP	1	⊕.010 DIA
B	DR NO. 28 (.1405) x .406 DEEP REDRILL NO. 18 (.1695) x .290 DEEP C'SK 90° ±8° TO .218 DIA. NO. 10-32 UNF-2B x .250 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 28 (.1405) DR. HOLE)	1	⊕.010 DIA
C	DR NO. 49 (.0730) THRU C'SK 90° ±8° TO .109 DIA. (OPP SIDE) NO. 2-56 NC-3B (OPP SIDE) x .188 DEEP	6	⊕.010 DIA
D	DR NO. 49 (.0730) x .343 DEEP C'SK 90° ±8° TO .109 DIA NO. 2-56 NC-3B x .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .187 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0634 +.0005 -.0000 DIA THRU C'BORE .187 DIA TO DEPTH SHOWN	2	
G	DR NO. 3 (.213) THRU	1	⊕.010 DIA
H	1.156 ±.001 DIA THRU C'BORE 1.625 +.003 -.000 DIA TO DEPTH SHOWN	1	
J	1.250 +.005 -.000 DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA x .500 DEEP	1	⊕.010 DIA
M	DR NO. 24 (.1520) x 1.031 DEEP REDRILL NO. 18 (.1695) x .875 DEEP REDRILL .250 x .500 DEEP REDRILL NO. 4 (.209) x .531 DEEP NO. 10-32 UNF-2B x .835 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 24 (.1520) DR. HOLE)	1	⊕.010 DIA
N	DR NO. 41 (.096) x .406 DEEP C'SK 90° ±8° TO .140 DIA NO. 4-40 NC-3B x .250 DEEP	11	⊕.010 DIA
P	.875 +.005 -.000 MINOR DIA THRU 80 THREADS PER INCH (SHARP CREST)	2	
R	DR NO. 41 (.096) x .468 DEEP CSK 90° ±8° TO .140 DIA. NO. 4-40 NC-3B x .312 DEEP	4	⊕.010 DIA

B 2012446

REVISIONS 10828

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 18855	5/15/65	WK.
B		REVISED PER TDRR 18876	7/1/65	WK



VIEW F-F
SURFACE "A"
PARTIAL SECTION E-E
"A" SURFACE (REF)
.010 TYP FOR 3 PADS MARKED "A"
.090 TYP FOR C'BORE OF "E" HOLES
.300 TYP FOR C'BORES OF "F" HOLES
.5625±.0003 BETWEEN "F" HOLES
"K" HOLE REF
1.4687±.0003 BETWEEN "F" HOLES
1.468 BSC TO "E" HOLES
PARTIAL VIEW G-G
IDENT. MARK SEE NOTE 6
CHAMFER 45° X .344
.250 BSC ("L" HOLE)
2.734 ±.001 "H" HOLE
1.062 BSC FOR "G" HOLE
.250 DIA ENDMILL X .375 DEEP 3 PLACES
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 — .9874
MINOR DIA .9725 — .9777
5.715 BSC ("B" HOLE)
5.750 BSC ("N" HOLE)
"A" SURFACE (REF)
.156 ("A" SURFACE)
SECTION A-A
.312 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT X .062 WIDE
.937 +.002 -.000 DIA
.375 DIA
1.015 DIA
.703 DIA FOR DEPTH "B"
.7031 +.0002 -.0000 DIA FOR DEPTH "A"
(FOR DEPTH "A")
.437 DIA
.437 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.250 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
45° 0' ±0° 5'
PARTIAL SECTION B-B SCALE 2/1
.062 R TYP
CHAMFER 45° X .062
.375 REF
PARTIAL VIEW D-D
"C" HOLE REF
.500 REF
1.125 REF
.413
SURFACE "A" (REF)
PARTIAL SECTION C-C
90° 0' ±0° 5'
45° 0' ±0° 5'

LIST OF PARTS AND MATERIALS

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIF

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ±.005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800
DRAWN R. BRUNELLE DATE 3-11-64
CHECKED JFG 6-26-64
APPROVAL 6/26/64
APPROVAL 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
STAR TRACKER & HORIZON SE

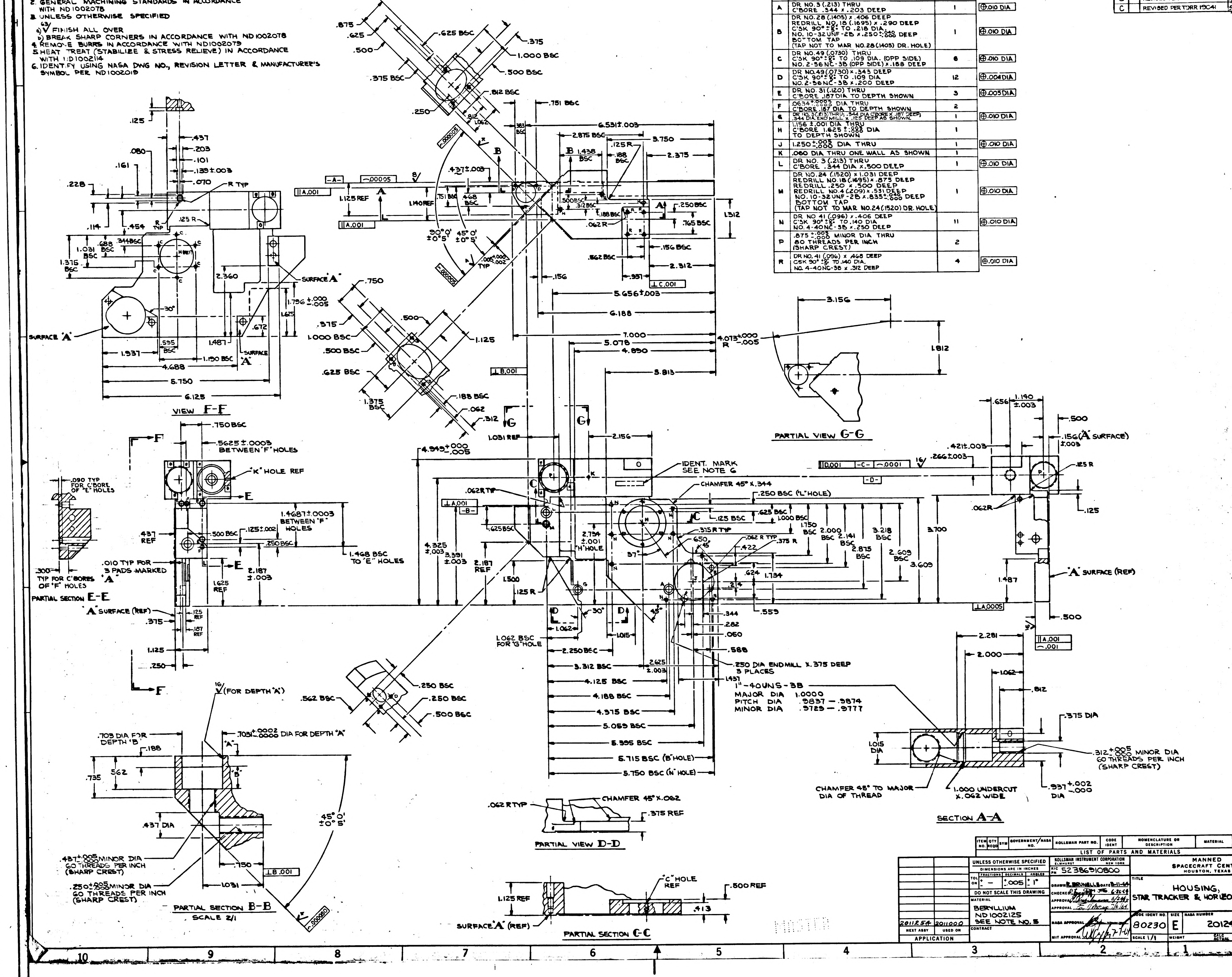
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2012446
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
  a) 63/√ FINISH ALL OVER
  b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019

REVISIONS 10829				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 18855	5/5/65	WK.
B		REVISED PER TDRR 18876	5/4/65	WK
C		REVISED PER TDRR 19041	5/1/65	WK

HOLE CHART

HOLE	DESCRIPTION	QUANTITY	
A	DR NO. 3 (.213) THRU C'BORE .344 x .203 DEEP	1	⊕.010 DIA
B	DR NO. 28 (.1405) x .406 DEEP REDRILL NO. 18 (.1695) x .290 DEEP C'SK 90° $\pm^{5°}_{0°}$ TO .218 DIA. NO. 10-32UNF-2B x .250 $^{+.040}_{-.000}$ DEEP BOTTOM TAP (TAP NOT TO MAR NO. 28 (.1405) DR. HOLE)	1	⊕.010 DIA
C	DR NO. 49 (.0730) THRU C'SK 90° $\pm^{5°}_{0°}$ TO .109 DIA. (OPP SIDE) NO. 2-56NC-3B (OPP SIDE) x .188 DEEP	6	⊕.010 DIA
D	DR NO. 49 (.0730) x .343 DEEP C'SK 90° $\pm^{5°}_{0°}$ TO .109 DIA NO. 2-56NC-3B x .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .187 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0634 $^{+.0005}_{-.0000}$ DIA THRU C'BORE .187 DIA TO DEPTH SHOWN	2	
G	DR NO. 3 (.213) THRU; .344 DIA C'BORE X .187 DEEP; .344 DIA END MILL x .125 DEEP AS SHOWN.	1	⊕.010 DIA
H	1.156 ±.001 DIA THRU C'BORE 1.625 $\pm^{.005}_{.000}$ DIA TO DEPTH SHOWN	1	
J	1.250 $^{+.005}_{-.000}$ DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA x .500 DEEP	1	⊕.010 DIA
M	DR NO. 24 (.1520) x 1.031 DEEP REDRILL NO. 18 (.1695) x .875 DEEP REDRILL .250 x .500 DEEP REDRILL NO. 4 (.209) x .531 DEEP NO. 10-32UNF-2B x .835 $^{+.040}_{-.000}$ DEEP BOTTOM TAP (TAP NOT TO MAR NO. 24 (.1520) DR. HOLE)	1	⊕.010 DIA
N	DR NO 41 (.096) x .406 DEEP C'SK 90° $\pm^{5°}_{0°}$ TO .140 DIA NO. 4-40NC-3B x .250 DEEP	11	⊕.010 DIA
P	.875 $^{+.005}_{-.000}$ MINOR DIA THRU 80 THREADS PER INCH (SHARP CREST)	2	
R	DR NO. 41 (.096) x .468 DEEP CSK 90° $\pm^{5°}_{0°}$ TO .140 DIA. NO. 4-40NC-3B x .312 DEEP	4	⊕.010 DIA


VIEW F-F
SURFACE "A"
PARTIAL VIEW G-G
PARTIAL SECTION E-E
"A" SURFACE (REF)
"K" HOLE REF
.5625 ±.0003 BETWEEN "F" HOLES
1.4687 ±.0003 BETWEEN "F" HOLES
1.468 BSC TO "E" HOLES
.010 TYP FOR 3 PADS MARKED "A"
.090 TYP FOR C'BORE OF "E" HOLES
.300 TYP FOR C'BORES OF "F" HOLES
IDENT. MARK SEE NOTE 6
CHAMFER 45° X .344
.250 BSC ("L" HOLE)
"H" HOLE
1.062 BSC FOR "G" HOLE
5.715 BSC ("B" HOLE)
5.750 BSC ("N" HOLE)
.250 DIA ENDMILL X .375 DEEP 3 PLACES
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 — .9874
MINOR DIA .9729 — .9777
.312 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT X .062 WIDE
.937 $^{+.002}_{-.000}$ DIA
SECTION A-A
.703 DIA FOR DEPTH "B"
.7031 $^{+.0002}_{-.0000}$ DIA FOR DEPTH "A"
(FOR DEPTH "A")
.437 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.250 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
PARTIAL SECTION B-B SCALE 2/1
CHAMFER 45° X .062
PARTIAL VIEW D-D
"C" HOLE REF
SURFACE "A" (REF)
PARTIAL SECTION C-C

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± — ; DECIMALS ± .005 ; ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800

DRAWN R. BRUNELLE DATE 3-11-64
CHECKED 6-26-64
APPROVAL 6/24/64
APPROVAL 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

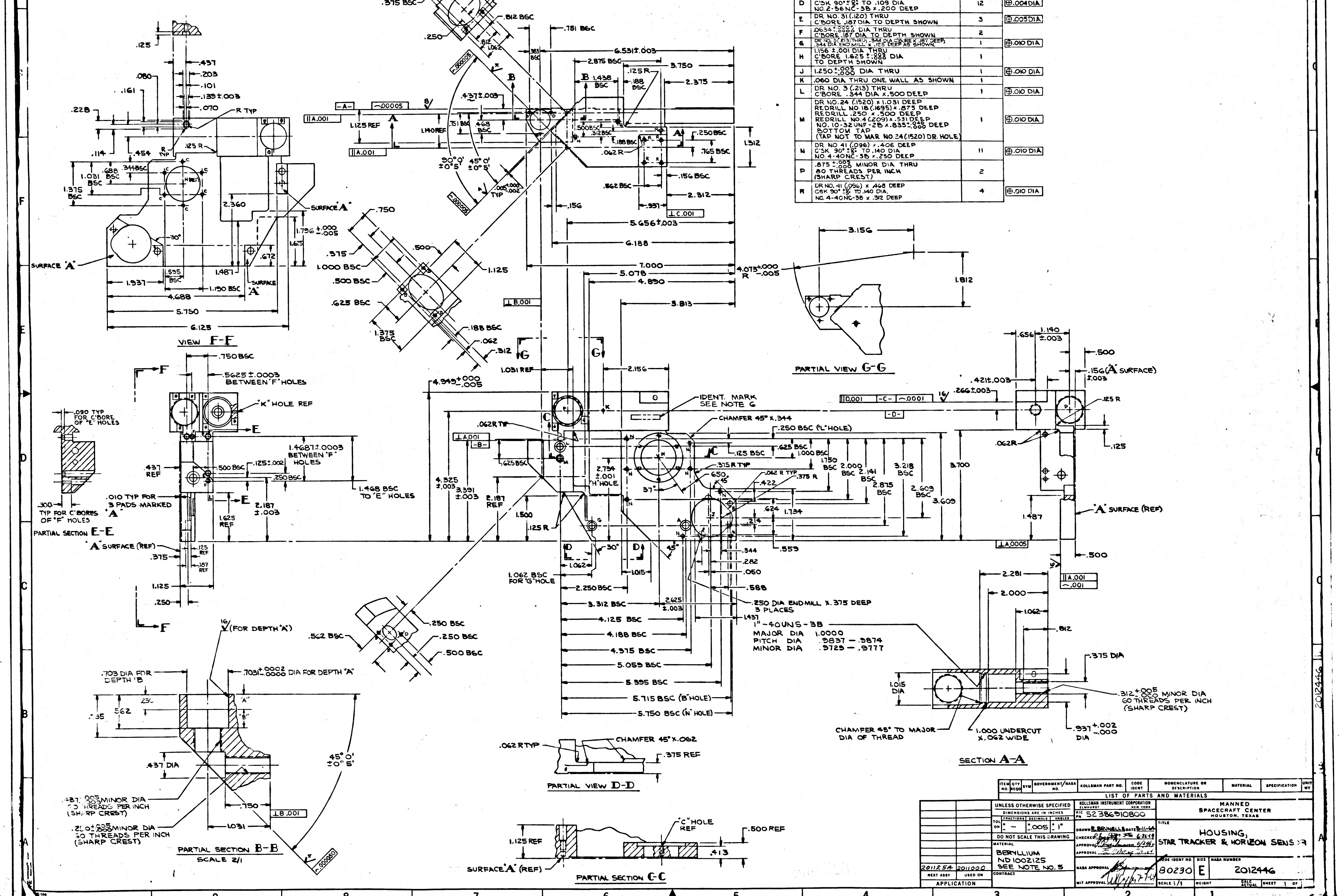
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
STAR TRACKER & HORIZON SENSOR

CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2012446
SCALE 1/1
WEIGHT
CALC / ACTUAL
SHEET 1 OF 1

D 2012446

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   a) 63/✓ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019


VIEW F-F
SURFACE "A"
PARTIAL SECTION E-E
.090 TYP FOR C'BORE OF "E" HOLES
"K" HOLE REF
1.4687±.0003 BETWEEN "F" HOLES
.5625±.0003 BETWEEN "F" HOLES
1.468 BSC TO "E" HOLES
.010 TYP FOR 3 PADS MARKED "A"
.300 TYP FOR C'BORES OF "F" HOLES
"A" SURFACE (REF)
IDENT. MARK SEE NOTE 6
CHAMFER 45° X .344
.250 BSC ("L" HOLE)
2.734 ±.001 "H" HOLE
1.062 BSC FOR "G" HOLE
5.715 BSC ("B" HOLE)
5.750 BSC ("N" HOLE)
.250 DIA ENDMILL X .375 DEEP 3 PLACES
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 - .9874
MINOR DIA .9729 - .9777
PARTIAL VIEW G-G
"A" SURFACE (REF)
SECTION A-A
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT X .062 WIDE
.937 +.002 -.000 DIA
.312 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.375 DIA
PARTIAL VIEW D-D
CHAMFER 45° X .062
.062 R TYP
.375 REF
PARTIAL SECTION C-C
"C" HOLE REF
.500 REF
SURFACE "A" (REF)
PARTIAL SECTION B-B
SCALE 2/1
16/ (FOR DEPTH "A")
.703 DIA FOR DEPTH "B"
.7031 +.0002 -.0000 DIA FOR DEPTH "A"
.437 DIA
.437 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.210 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
45° 0' ±0° 5'
90° 0' ±0° 5'
7.000
5.078
4.890
3.813
6.531±.003
5.656±.003
6.188
4.073 +.000 -.005 R
4.949 +.000 -.005

HOLE	DESCRIPTION	QUANTITY	
A	DR NO. 3 (.213) THRU C'BORE .344 x .203 DEEP	1	⊕.010 DIA
B	DR NO. 28 (.1405) x .406 DEEP REDRILL NO. 18 (.1695) x .290 DEEP C'SK 90° ±0° TO .218 DIA. NO. 10-32 UNF-2B x .250 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 28 (.1405) DR. HOLE)	1	⊕.010 DIA
C	DR NO. 49 (.0730) THRU C'SK 90° ±0° TO .109 DIA. (OPP SIDE) NO. 2-56 NC-3B (OPP SIDE) x .188 DEEP	6	⊕.010 DIA
D	DR NO. 49 (.0730) x .343 DEEP C'SK 90° ±0° TO .109 DIA NO. 2-56 NC-3B x .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .187 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0634 +.0005 -.0000 DIA THRU C'BORE .187 DIA TO DEPTH SHOWN	2	
G	DR NO. 3 (.213) THRU; .344 DIA C'BORE X .187 DEEP; .344 DIA. END MILL x .125 DEEP AS SHOWN.	1	⊕.010 DIA
H	1.156 ±.001 DIA THRU C'BORE 1.625 +.003 -.000 DIA TO DEPTH SHOWN	1	
J	1.250 +.005 -.000 DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA x .500 DEEP	1	⊕.010 DIA
M	DR NO. 24 (.1520) x 1.031 DEEP REDRILL NO. 18 (.1695) x .875 DEEP REDRILL .250 x .500 DEEP REDRILL NO. 4 (.209) x .531 DEEP NO. 10-32 UNF-2B x .835 +.040 -.000 DEEP BOTTOM TAP (TAP NOT TO MAR NO. 24 (.1520) DR. HOLE)	1	⊕.010 DIA
N	DR NO 41 (.096) x .406 DEEP C'SK 90° ±0° TO .140 DIA NO. 4-40 NC-3B x .250 DEEP	11	⊕.010 DIA
P	.875 +.005 -.000 MINOR DIA THRU 80 THREADS PER INCH (SHARP CREST)	2	
R	DR NO. 41 (.096) x .468 DEEP CSK 90° ±0° TO .140 DIA. NO. 4-40 NC-3B x .312 DEEP	4	⊕.010 DIA

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 18855	5/5/65	
B		REVISED PER TDRR 18876	5/1/65	
C		REVISED PER TDRR 19041	5/1/65	
D		REVISED PER TDRR 21302	6/2/65	

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± —; DECIMALS ±.005; ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800
DRAWN R. BRUNELLE DATE 8-11-64
CHECKED FS 6-26-64
APPROVAL 6/24/64
APPROVAL
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS
TITLE
HOUSING,
STAR TRACKER & HORIZON SENSOR
CODE IDENT NO. 80230
SIZE E
NASA NUMBER 2012446
SCALE 1/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

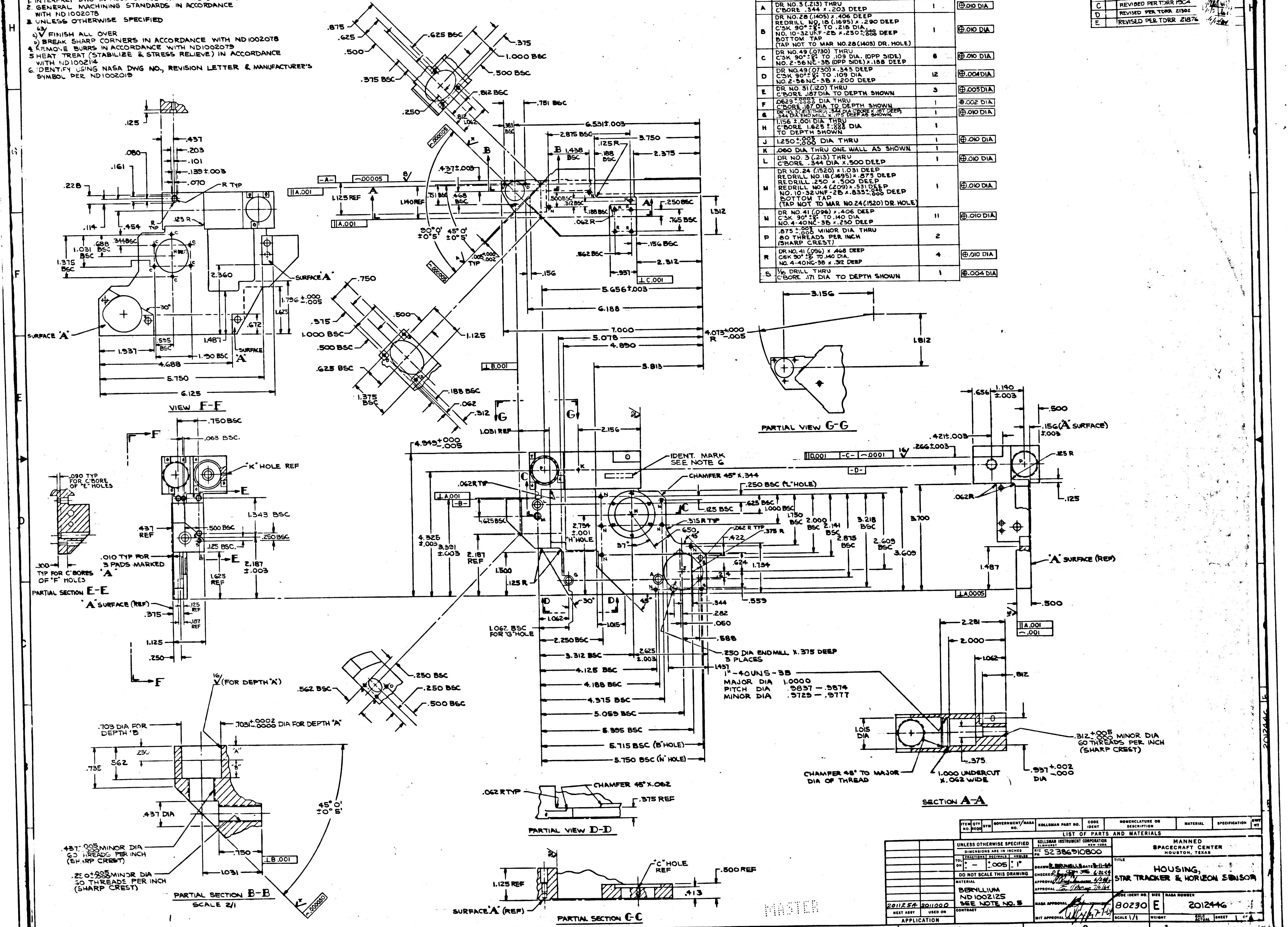
2012446

A		REVISED PER TDRR NO. 18551	
B		REVISED PER TDRR 18876	
C		REVISED PER TDRR 19C4	
D		REVISED PER TDRR 21302	
E		REVISED PER TDRR 21876	

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\overset{63}{\checkmark}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019

HOLE CHART

HOLE	DESCRIPTION	QUANTITY	
A	DR NO.3 (.213) THRU C'BORE .344 x .203 DEEP	1	⊕.010 DIA
B	DR NO.28 (.1405) x .406 DEEP REDRILL NO.18 (.1695) x .290 DEEP C'SK 90° $\pm$ 8° TO .218 DIA. NO. 10-32 UNF-2B x .250 $^{+.040}_{-.000}$ DEEP BOTTOM TAP (TAP NOT TO MAR NO.28 (.1405) DR. HOLE)	1	⊕.010 DIA
C	DR NO.49 (.0730) THRU C'SK 90° $\pm$ 8° TO .109 DIA. (OPP SIDE) NO. 2-56 NC-3B (OPP SIDE) x .188 DEEP	6	⊕.010 DIA
D	DR NO.49 (.0730) x .343 DEEP C'SK 90° $\pm$ 8° TO .109 DIA NO. 2-56 NC-3B x .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .187 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0629 $^{+.0005}_{-.0000}$ DIA THRU C'BORE .187 DIA TO DEPTH SHOWN	1	⊕.002 DIA
G	DR NO. 3 (.213) THRU; .344 DIA C'BORE x .187 DEEP; .344 DIA END MILL x .175 DEEP AS SHOWN.	1	⊕.010 DIA
H	1.156 $\pm$.001 DIA THRU C'BORE 1.625 $^{+.003}_{-.000}$ DIA TO DEPTH SHOWN	1	
J	1.250 $^{+.005}_{-.000}$ DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA x .500 DEEP	1	⊕.010 DIA
M	DR NO.24 (.1520) x 1.031 DEEP REDRILL NO.18 (.1695) x .875 DEEP REDRILL .250 x .500 DEEP REDRILL NO.4 (.209) x .531 DEEP NO. 10-32 UNF-2B x .835 $^{+.040}_{-.000}$ DEEP BOTTOM TAP (TAP NOT TO MAR NO.24 (.1520) DR. HOLE)	1	⊕.010 DIA
N	DR NO. 41 (.096) x .406 DEEP C'SK 90° $\pm$ 8° TO .140 DIA NO. 4-40 NC-3B x .250 DEEP	11	⊕.010 DIA
P	.875 $^{+.003}_{-.000}$ MINOR DIA THRU 80 THREADS PER INCH (SHARP CREST)	2	
R	DR NO. 41 (.096) x .468 DEEP CSK 90° $\pm$ 8° TO .140 DIA. NO. 4-40 NC-3B x .312 DEEP	4	⊕.010 DIA
S	1/16 DRILL THRU C'BORE .171 DIA TO DEPTH SHOWN	1	⊕.004 DIA



VIEW F-F
PARTIAL VIEW G-G
PARTIAL SECTION E-E
SECTION A-A
PARTIAL SECTION B-B
SCALE 2/1
PARTIAL VIEW D-D
PARTIAL SECTION C-C
SURFACE "A"
"A" SURFACE (REF)
SURFACE "A" (REF)
.156 ("A" SURFACE) ±.003
IDENT. MARK SEE NOTE 6
CHAMFER 45° x .344
.250 BSC ("L" HOLE)
"K" HOLE REF
.090 TYP FOR C'BORE OF "E" HOLES
.010 TYP FOR 3 PADS MARKED "A"
.300 TYP FOR C'BORES OF "F" HOLES
1.062 BSC FOR "G" HOLE
2.734 ±.001 "H" HOLE
5.715 BSC ("B" HOLE)
5.750 BSC ("N" HOLE)
.250 DIA ENDMILL x .375 DEEP 3 PLACES
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 - .9874
MINOR DIA .9725 - .9777
.312 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT x .062 WIDE
.937 $^{+.002}_{-.000}$ DIA
1.015 DIA
.703 DIA FOR DEPTH "B"
.703 $^{+.0002}_{-.0000}$ DIA FOR DEPTH "A"
16/ (FOR DEPTH "A")
.437 DIA
.437 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.250 $^{+.005}_{-.000}$ MINOR DIA 60 THREADS PER INCH (SHARP CREST)
45° 0' ±0° 5'
30° 0' ±0° 5'
CHAMFER 45° x .062
.062 R TYP
"C" HOLE REF
.500 REF
1.125 REF
6.531 ±.003
7.000
6.188
5.656 ±.003
5.078
4.890
3.813
4.949 $^{+.000}_{-.005}$
4.325 ±.003
3.391 ±.003
4.073 $^{+.000}_{-.005}$ R
3.156
1.812
6.125
5.750
4.688
MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	$\pm$ —	$\pm$.005	$\pm$ 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800

DRAWN R. BRUNELLE DATE 3-11-64
CHECKED 6-26-64
APPROVAL 6/24/64
APPROVAL 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
STAR TRACKER & HORIZON SENSOR

CODE IDENT NO.	SIZE	NASA NUMBER
80230	E	2012446

SCALE 1/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

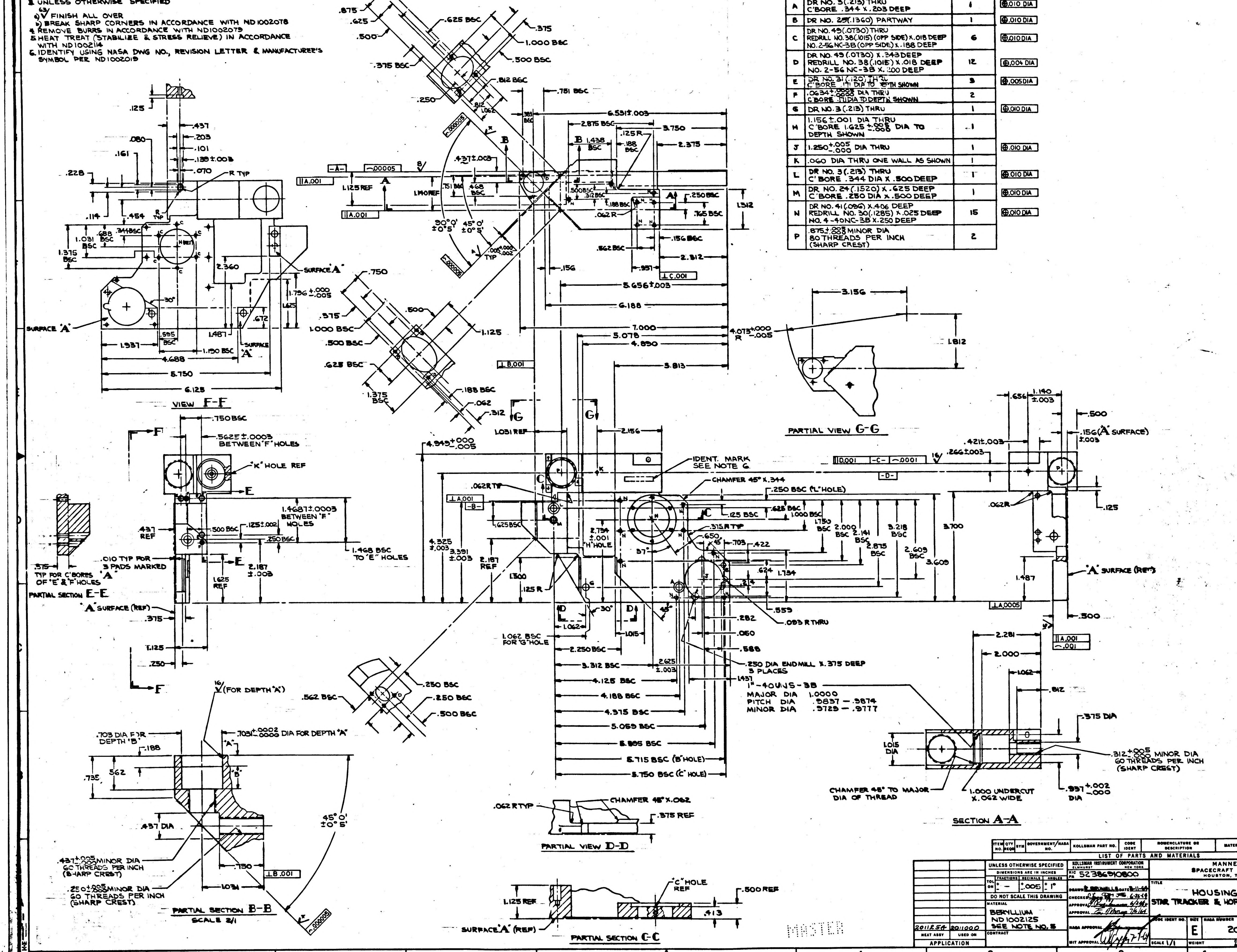
2012446

REVISIONS				10825.
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED
   a) $\sqrt{}^{63}$ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079
5. HEAT TREAT (STABILIZE & STRESS RELIEVE) IN ACCORDANCE WITH ND1002114
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019

HOLE CHART

HOLE	DESCRIPTION	QUANTITY	
A	DR NO. 3(.213) THRU C'BORE .344 X .203 DEEP	4	⊕.010 DIA
B	DR NO. 29(.1360) PARTWAY	1	⊕.010 DIA
C	DR NO. 49(.0730) THRU REDRILL NO. 38(.1015) (OPP SIDE) X .018 DEEP NO. 2-56NC-3B (OPP SIDE) X .188 DEEP	6	⊕.010 DIA
D	DR NO. 49 (.0730) X .343 DEEP REDRILL NO. 38 (.1015) X .018 DEEP NO. 2-56 NC-3B X .200 DEEP	12	⊕.004 DIA
E	DR NO. 31 (.120) THRU C'BORE .171 DIA TO DEPTH SHOWN	3	⊕.005 DIA
F	.0634 +.0003 -.0000 DIA THRU C'BORE .171 DIA TO DEPTH SHOWN	2	
G	DR NO. 3 (.213) THRU	1	⊕.010 DIA
H	1.156 ±.001 DIA THRU C'BORE 1.625 +.005 -.000 DIA TO DEPTH SHOWN	1	
J	1.250 +.005 -.000 DIA THRU	1	⊕.010 DIA
K	.060 DIA THRU ONE WALL AS SHOWN	1	
L	DR NO. 3 (.213) THRU C'BORE .344 DIA X .500 DEEP	1	⊕.010 DIA
M	DR NO. 24 (.1520) X .625 DEEP C'BORE .250 DIA X .500 DEEP	1	⊕.010 DIA
N	DR NO. 41 (.096) X .406 DEEP REDRILL NO. 30 (.1285) X .025 DEEP NO. 4-40NC-3B X .250 DEEP	15	⊕.010 DIA
P	.875 +.005 -.000 MINOR DIA 80 THREADS PER INCH (SHARP CREST)	2	



VIEW F-F
SURFACE "A"
.125
.437
.203
.101
.139 ±.003
.070
.080
.161
.228
R TYP
.114
.454
.344 BSC
.688 BSC
1.031 BSC
1.375 BSC
2.360
1.796 +.000 -.005
1.625
.672
.595 BSC
1.937
1.487
1.150 BSC
4.688
5.750
6.125
.875
.625
.500
.625 BSC
.375
1.000 BSC
.500 BSC
.375 BSC
.812 BSC
.250
.781 BSC
6.531 ±.003
2.875 BSC
3.750
1.438 BSC
.125 R
.188 BSC
2.375
.437 ±.003
1.125 REF
1.140 REF
.751 BSC
.468 BSC
.500 BSC
.312 BSC
.188 BSC
.250 BSC
.765 BSC
1.312
.062 R
.156 BSC
.562 BSC
.951
2.312
90° 0' ±0° 5'
45° 0' ±0° 5'
TYP
.156
5.656 ±.003
6.188
7.000
5.078
4.890
3.813
4.073 +.000 -.005 R
.750
.500
.375
1.000 BSC
.500 BSC
.625 BSC
1.125
1.375 BSC
.188 BSC
.062
.312
PARTIAL VIEW G-G
3.156
1.812
VIEW E-E
.750 BSC
.562 ±.0003 BETWEEN "F" HOLES
"K" HOLE REF
1.4687 ±.0003 BETWEEN "F" HOLES
.437 REF
.500 BSC
.125 ±.002
.250 BSC
1.468 BSC TO "E" HOLES
.010 TYP FOR 3 PADS MARKED "A"
.315 TYP FOR C'BORES OF "E" & "F" HOLES
PARTIAL SECTION E-E
"A" SURFACE (REF)
.375
1.625 REF
2.187 ±.003
1.125
.250
4.949 +.000 -.005
1.031 REF
2.156
IDENT. MARK SEE NOTE 6
CHAMFER 45° X .344
.250 BSC ("L" HOLE)
.062 R TYP
4.325 ±.003
3.391 ±.003
2.187 REF
.625 BSC
.125 BSC
.625 BSC
1.000 BSC
1.750 BSC
2.000 BSC
2.141 BSC
2.815 BSC
3.218 BSC
2.609 BSC
3.609
3.700
2.734 ±.001 "H" HOLE
.315 R TYP
.650
.703
.422
.624
1.734
37°
1.300
.125 R
30°
45°
.282
.060
.588
.559
.093 R THRU
.250 DIA ENDMILL X .375 DEEP 3 PLACES
1.437
2.625 ±.003
1.062 BSC FOR "G" HOLE
1.062
1.015
2.250 BSC
3.312 BSC
4.125 BSC
4.188 BSC
4.375 BSC
5.059 BSC
5.805 BSC
5.715 BSC ("B" HOLE)
5.750 BSC ("C" HOLE)
1"-40UNS-3B
MAJOR DIA 1.0000
PITCH DIA .9837 - .9874
MINOR DIA .9729 - .9777
.656
1.140 ±.003
.500
.156 ("A" SURFACE) ±.003
.421 ±.003
.266 ±.003
.062 R
.125
"A" SURFACE (REF)
1.487
.500
SECTION A-A
2.281
2.000
1.062
.812
.375 DIA
1.015 DIA
.312 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
CHAMFER 45° TO MAJOR DIA OF THREAD
1.000 UNDERCUT X .062 WIDE
.937 +.002 -.000 DIA
.250 BSC
.250 BSC
.500 BSC
.562 BSC
$\sqrt{}^{16}$ (FOR DEPTH "A")
.703 DIA FOR DEPTH "B"
.7031 +.0002 -.0000 DIA FOR DEPTH "A"
.188
.735
.562
.437 DIA
.437 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.250 +.005 -.000 MINOR DIA 60 THREADS PER INCH (SHARP CREST)
.750
1.031
⊥B.001
45° 0' ±0° 5'
PARTIAL SECTION B-B
SCALE 2/1
.062 R TYP
CHAMFER 45° X .062
.375 REF
PARTIAL VIEW D-D
1.125 REF
"C" HOLE REF
.500 REF
.413
SURFACE "A" (REF)
PARTIAL SECTION C-C
MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011254	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND1002125
SEE NOTE NO. 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910800

DRAWN R. BRUNELLE DATE 3-11-64
CHECKED 6-26-64
APPROVAL 6/24/64
APPROVAL 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

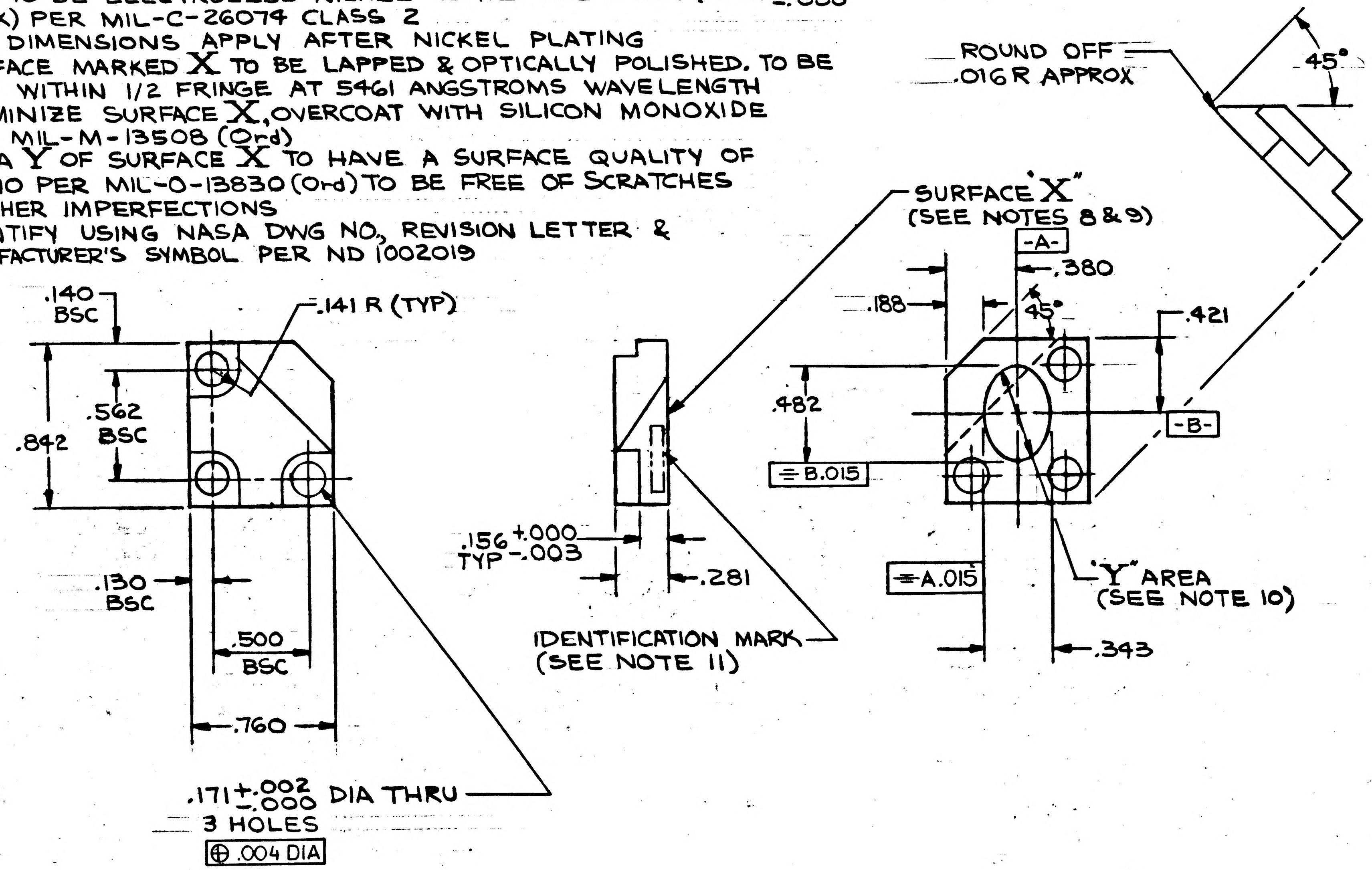
TITLE
HOUSING,
STAR TRACKER & HORIZON SENSOR

CODE IDENT NO.
SIZE E
NASA NUMBER 2012446
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

2012451 A

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 12223	9/1/64	WK.

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER (.005 $^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER NICKEL PLATING
8. SURFACE MARKED X TO BE LAPPED & OPTICALLY POLISHED. TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X, OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord) TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



ROUND OFF
.016 R APPROX
45°
.140 BSC
.141 R (TYP)
.562 BSC
.842
.130 BSC
.500 BSC
.760
.171 +.002 −.000 DIA THRU
3 HOLES
⊕ .004 DIA
SURFACE "X"
(SEE NOTES 8 & 9)
.156 +.000 −.003 TYP
.281
IDENTIFICATION MARK
(SEE NOTE 11)
-A-
.380
.188
45°
.421
.482
-B-
⌯ B .015
⌯ A .015
"Y" AREA
(SEE NOTE 10)
.343

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910810

DRAWN R. BRUNELLE DATE 5-14-64
CHECKED C. Langstoff 6-12-64
APPROVAL 6/23/64
APPROVAL 7/2/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER.
HOUSTON, TEXAS

TITLE
MIRROR,
HORIZON SENSOR

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012451
SCALE 2/1	WEIGHT CALC ACTUAL	SHEET 1 OF 1

E-154

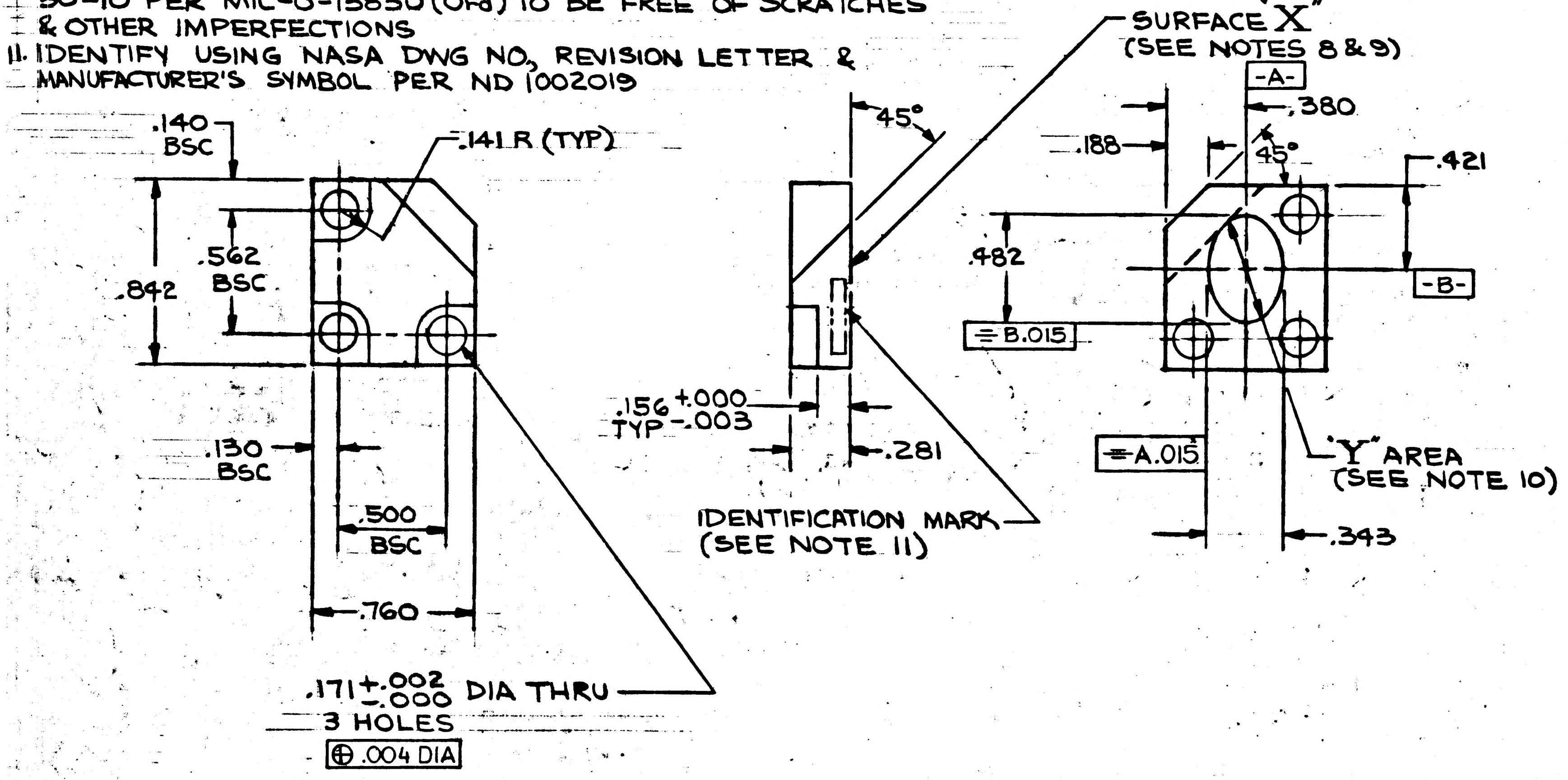
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012451

REVISIONS TDRR 10793

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED:
   a) 63/√ FINISH ALL OVER
   b) BREAK SHARP CORNERS IN ACCORDANCE WITH ND 1002078
4. HEAT TREAT (STABILIZE & STRESS RELIEVE) PER ND 1002114
5. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
6. PART TO BE ELECTROLESS NICKEL COATED ALL OVER (.005 $^{+.001}_{-.000}$ THICK) PER MIL-C-26074 CLASS 2
7. ALL DIMENSIONS APPLY AFTER NICKEL PLATING
8. SURFACE MARKED X TO BE LAPPED & OPTICALLY POLISHED. TO BE FLAT WITHIN 1/2 FRINGE AT 5461 ANGSTROMS WAVELENGTH
9. ALUMINIZE SURFACE X, OVERCOAT WITH SILICON MONOXIDE PER MIL-M-13508 (Ord)
10. AREA Y OF SURFACE X TO HAVE A SURFACE QUALITY OF 30-10 PER MIL-O-13830 (Ord) TO BE FREE OF SCRATCHES & OTHER IMPERFECTIONS
11. IDENTIFY USING NASA DWG NO, REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



.140 BSC
.141 R (TYP)
.562 BSC
.842
.130 BSC
.500 BSC
.760
.171 +.002 -.000 DIA THRU
3 HOLES
⊕ .004 DIA
45°
.156 +.000 -.003 TYP
.281
IDENTIFICATION MARK (SEE NOTE 11)
SURFACE "X" (SEE NOTES 8 & 9)
-A-
.380
.188
45°
.421
.482
-B-
⏥ B.015
⏥ A.015
"Y" AREA (SEE NOTE 10)
.343

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
BERYLLIUM
ND 1002125
(SEE NOTE 4)

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910810

DRAWN R. BRUNELLE DATE 5-14-64
CHECKED C. Langstaff 6-12-64
APPROVAL E. Rustin 6/23/64
APPROVAL E. Dhorup 7/2/64
NASA APPROVAL
MIT APPROVAL L. Walz 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR,
HORIZON SENSOR

CODE IDENT NO. | SIZE C | NASA NUMBER 2012451

SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

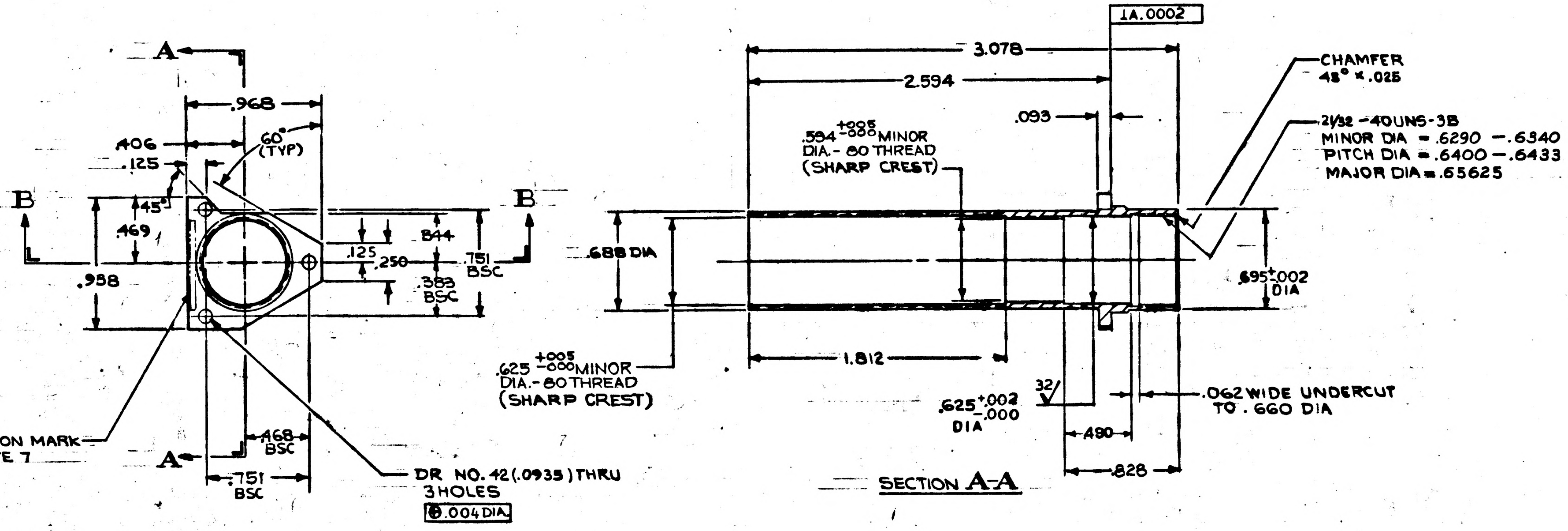
2012453 A

SYM	ZONE	DESCRIPTION	DATE	APPROV
A	D&E 5	REVISED PER TDRR NO. 13304	10/1/64	WK.

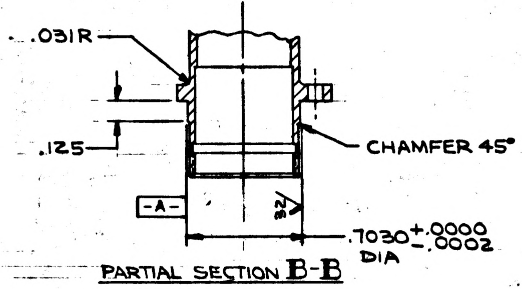
REVISIONS 1082

NOTES:

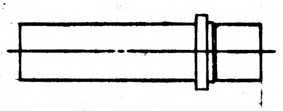
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63/ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL-STD 171 TABLE V-A FINISH NO. 5.4.1.
6. BLACKEN PER MIL-C-13924, CLASS 3 (KPS-1005B.100)
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.


A
.968
.406
.125
60° (TYP)
45°
.469
.958
B
B
.125
.250
.844
.751 BSC
.383 BSC
IDENTIFICATION MARK SEE NOTE 7
A
.468 BSC
.751 BSC
DR NO. 42 (.0935) THRU 3 HOLES
.004 DIA
⊥A.0002
3.078
2.594
.093
.594 +005 -000 MINOR DIA. - 80 THREAD (SHARP CREST)
.688 DIA
.625 +005 -000 MINOR DIA. - 80 THREAD (SHARP CREST)
1.812
.625 +.002 -.000 DIA
32/
.490
.828
CHAMFER 45° × .025
21/32 -40UNS-3B
MINOR DIA = .6290 - .6340
PITCH DIA = .6400 - .6433
MAJOR DIA = .65625
.695 ±.002 DIA
.062 WIDE UNDERCUT TO .660 DIA

SECTION A-A


.031R
.125
CHAMFER 45°
-A-
32/
.7030 +.0000 -.0002 DIA

PARTIAL SECTION B-B



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911080

DRAWN E. DRAPALA DATE 5-20-64
CHECKED C. [illegible] 6-11-64
APPROVAL E. [illegible] 7-2-64
APPROVAL E. [illegible] 7-6-64
NASA APPROVAL
MIT APPROVAL W[illegible] 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE HOUSING, LENS

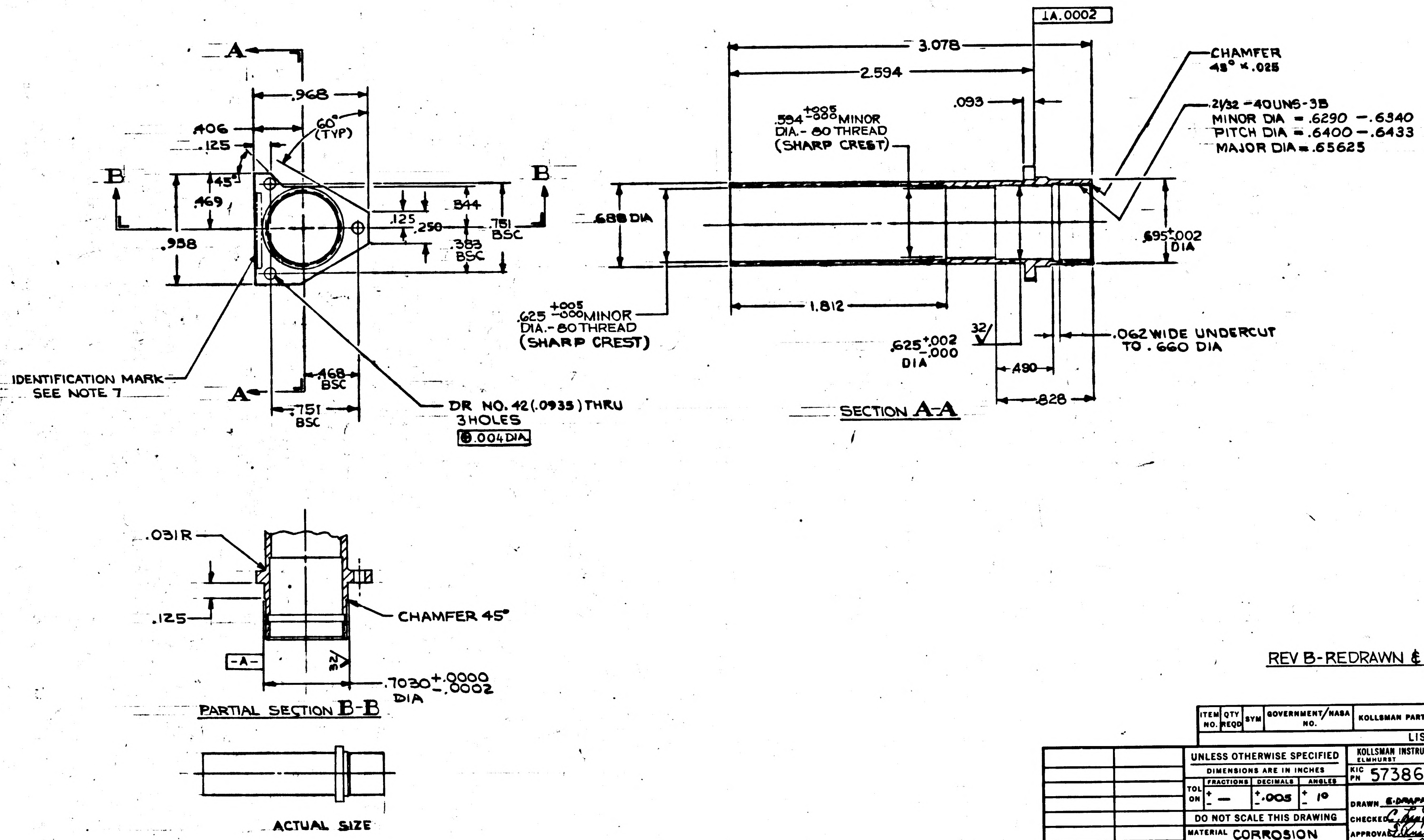
CODE IDENT NO.	SIZE	NASA NUMBER
	D	2012453

SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

B 2012453

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
REVISIONS 10828				
A	D&E 3	REVISED PER TDRR NO. 13304	10/14/64	W.K.
B		REVISED PER TDRR NO. 17464	[illegible]	W.R.
		replaced by Rev C		

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   $\sqrt{}^{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASS VATE PER MIL-STD 171 TABLE V-A FINISH NO. 5.4.1.
6. BLACKEN PER MIL-C-13924, CLASS 3 (KPS-1005B.100)
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.


A
A
B
B
.968
.406
.125
60° (TYP)
45°
.469
.938
.344
.125
.250
.751 BSC
.383 BSC
.468 BSC
.751 BSC
IDENTIFICATION MARK SEE NOTE 7
DR NO. 42 (.0935) THRU 3 HOLES
⊕ .004 DIA
⊥A .0002
3.078
2.594
.093
.594 +.005 -.000 MINOR DIA. - 80 THREAD (SHARP CREST)
CHAMFER 45° × .025
21/32 - 40UNS-3B
MINOR DIA = .6290 - .6340
PITCH DIA = .6400 - .6433
MAJOR DIA = .65625
.688 DIA
.695 ±.002 DIA
.625 +.005 -.000 MINOR DIA. - 80 THREAD (SHARP CREST)
1.812
.625 +.002 -.000 DIA
32
.490
.828
.062 WIDE UNDERCUT TO .660 DIA
.031R
.125
CHAMFER 45°
-A-
32
.7030 +.0000 -.0002 DIA

SECTION A-A

PARTIAL SECTION B-B

ACTUAL SIZE

REV B-REDRAWN & REPLACED BY REV C

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911080

DRAWN E. DRAPALA DATE 5-20-64
CHECKED 6-11-64
APPROVAL 7-2-64
APPROVAL 7-6-64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, LENS

CODE IDENT NO. | SIZE D | NASA NUMBER 2012453

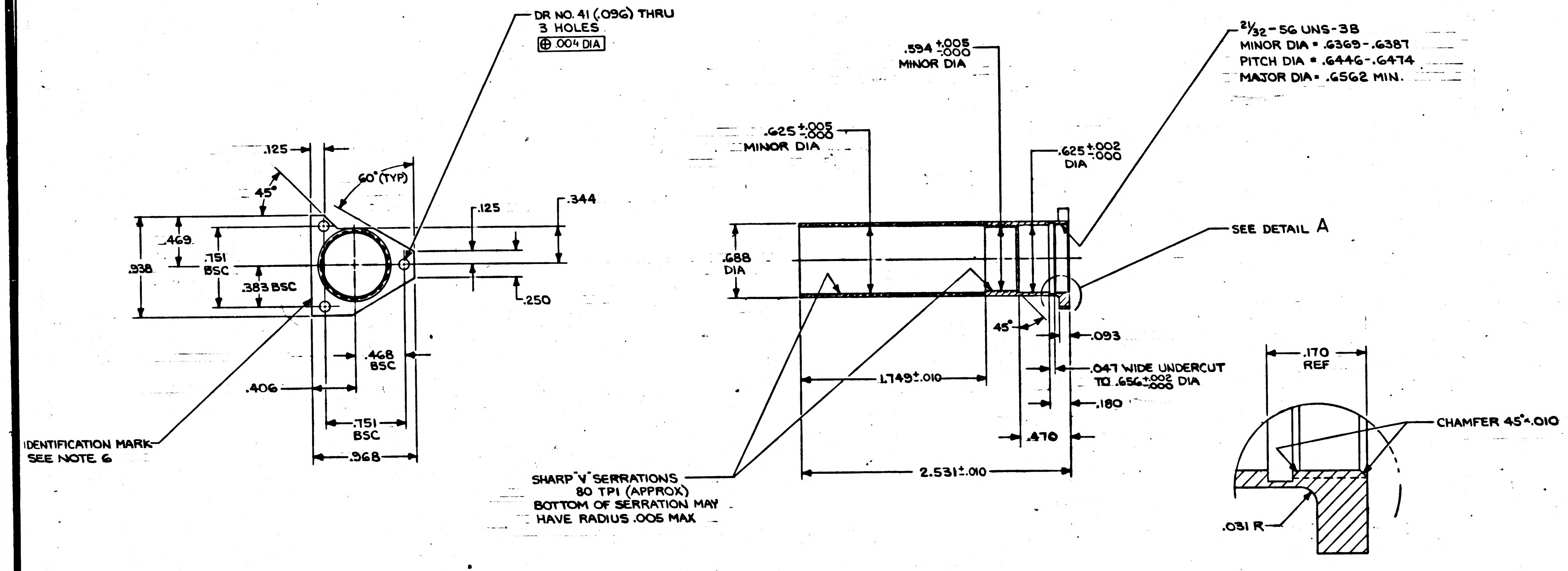
SCALE 2/1 | WEIGHT | CALC ACTUAL | SHEET 1 OF

MASTER

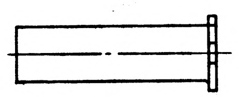
C	2012453

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
C		REVISED PER TDRR NO. 17494	[illegible]	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: PASSIVATE PER MIL-STD-171 TABLE V ~ FINISH NO. 5.4.1 (KPS-1005I.200)
   BLACKEN PER MIL-C-13924, CLASS 3 (KPS-10058.100)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.


DR NO. 41 (.096) THRU
3 HOLES
⊕ .004 DIA
.125
45°
60° (TYP)
.125
.344
.469
.938
.151 BSC
.383 BSC
.250
.468 BSC
.406
.751 BSC
.968
IDENTIFICATION MARK SEE NOTE 6
.594 +.005 -.000 MINOR DIA
.625 +.005 -.000 MINOR DIA
.625 +.002 -.000 DIA
21/32-56 UNS-3B
MINOR DIA = .6369-.6387
PITCH DIA = .6446-.6474
MAJOR DIA = .6562 MIN.
SEE DETAIL A
.688 DIA
45°
.093
1.749±.010
.047 WIDE UNDERCUT TO .656 +.002 -.000 DIA
.180
.470
2.531±.010
SHARP "V" SERRATIONS
80 TPI (APPROX)
BOTTOM OF SERRATION MAY HAVE RADIUS .005 MAX
.170 REF
CHAMFER 45°±.010
.031 R

DETAIL A
SCALE 10/1



ACTUAL SIZE

MASTER

REPLACES REV B WITH CHANGES

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012393	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED. SPEC QQ-S-763 CLASS 416 COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911080
DRAWN DATE 1-27-65
CHECKED T. SULLIVAN 2-19-65
APPROVAL 2-25-65
APPROVAL E. Morgan 3-9-65
NASA APPROVAL
MIT APPROVAL W. Kupfer 18 Mar 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

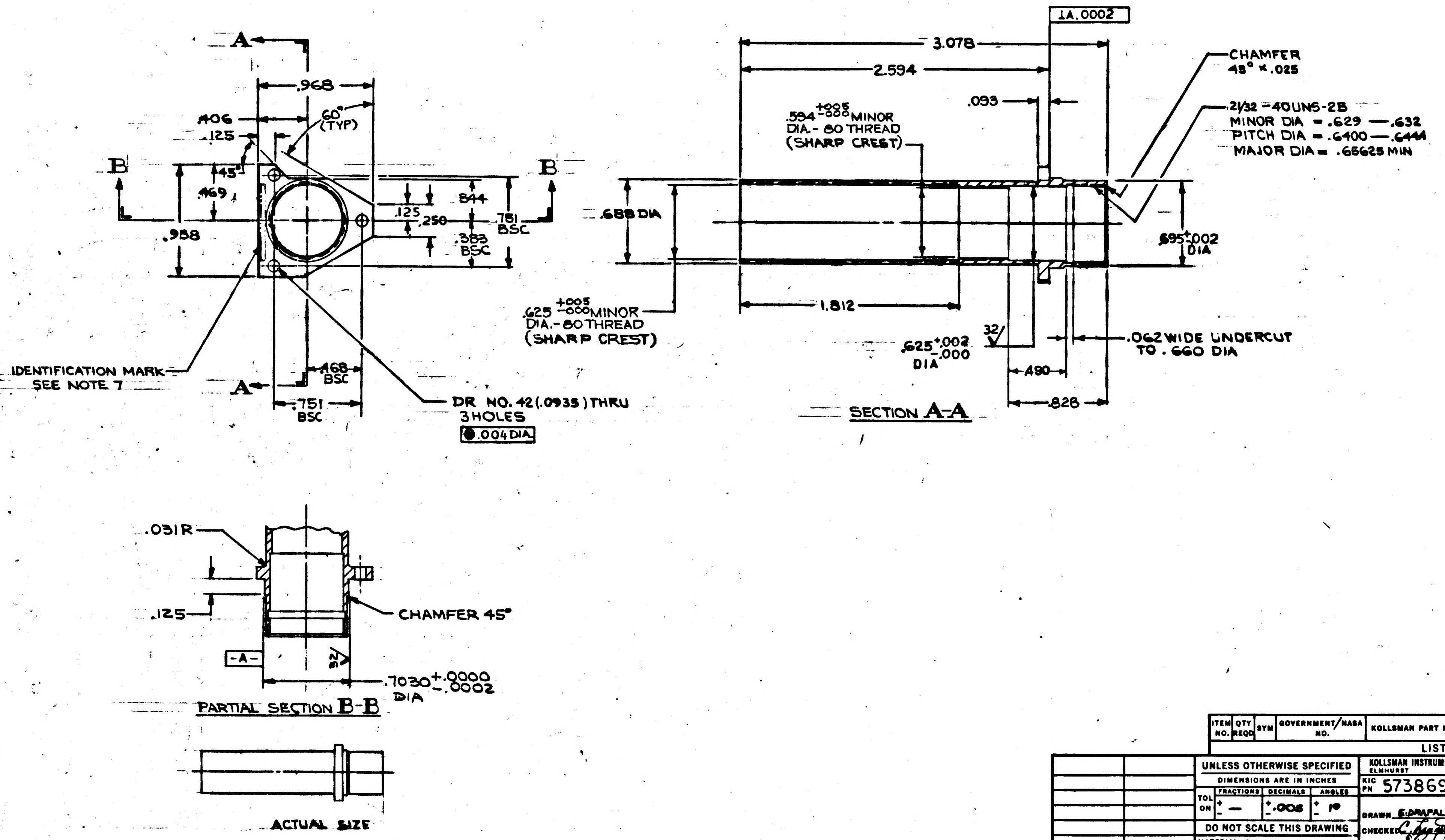
TITLE
HOUSING, FILTER
(SXT)

CODE IDENT NO. | SIZE D | NASA NUMBER 2012453
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

2012453

REVISIONS			10'29	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   63/ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL-STD 171 TABLE V-A FINISH NO. 5.4.1.
6. BLACKEN PER MIL-C-13924, CLASS 3 (KPS-1005B.100)
7. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019.



A
.968
.406
.125
60° (TYP)
B
45°
.469
.958
.125
.250
.844
.781 BSC
.383 BSC
.468 BSC
.751 BSC
IDENTIFICATION MARK SEE NOTE 7
DR NO. 42 (.0935) THRU 3 HOLES
.004 DIA
A .0002
3.078
2.594
.093
CHAMFER 45° × .025
.594 +.005 -.000 MINOR DIA. - 80 THREAD (SHARP CREST)
21/32 - 40UNS-2B
MINOR DIA = .629 — .632
PITCH DIA = .6400 — .6444
MAJOR DIA = .65625 MIN
.688 DIA
.695 ±.002 DIA
1.812
.625 +.005 -.000 MINOR DIA. - 80 THREAD (SHARP CREST)
.625 +.002 -.000 DIA
32/
.490
.828
.062 WIDE UNDERCUT TO .660 DIA
SECTION A-A
.031R
.125
CHAMFER 45°
-A-
32/
.7030 +.0000 -.0002 DIA
PARTIAL SECTION B-B
ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416 COND H
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911080
DRAWN E. DRAPALA DATE ~~5-20-64~~
CHECKED C. [illegible] 6-11-64
APPROVAL E. [illegible] 7-2-64
APPROVAL E. [illegible] 7-6-64
NASA APPROVAL
MIT APPROVAL W. [illegible] 7-7-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, LENS

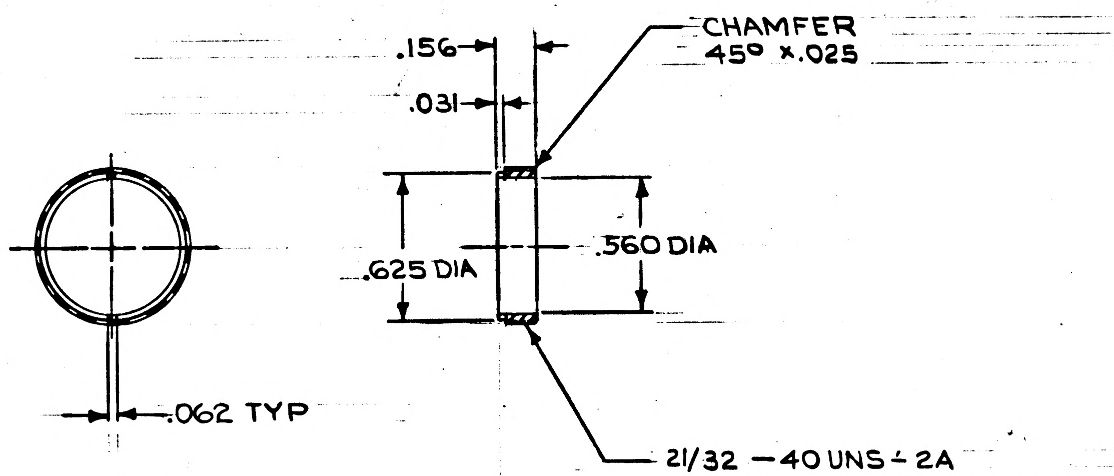
CODE IDENT NO.
SIZE D
NASA NUMBER 2012453
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

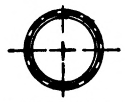
INCHES
0 1 2

2012455 (r)

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63√ FINISH ALL OVER
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1.
6. FINISH: BLACKEN PER MIL-C-13924, CLASS 3 (KPS-1005B.100)
7. IDENTIFY USING NASA DRAWING NO, REVISION LETTER & MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND1002019 (TAGGING)





ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012477	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-763 CLASS 416, COND. H

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911100

DRAWN E. DRAPALA DATE 5-19-64
CHECKED C. [illegible] 6-11-64
APPROVAL [illegible] 6/25/64
APPROVAL E. [illegible] 7/1/64
NASA APPROVAL [illegible]
MIT APPROVAL L. Hafe 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE RING, LOCKING

CODE IDENT NO.
SIZE C
NASA NUMBER 2012455
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

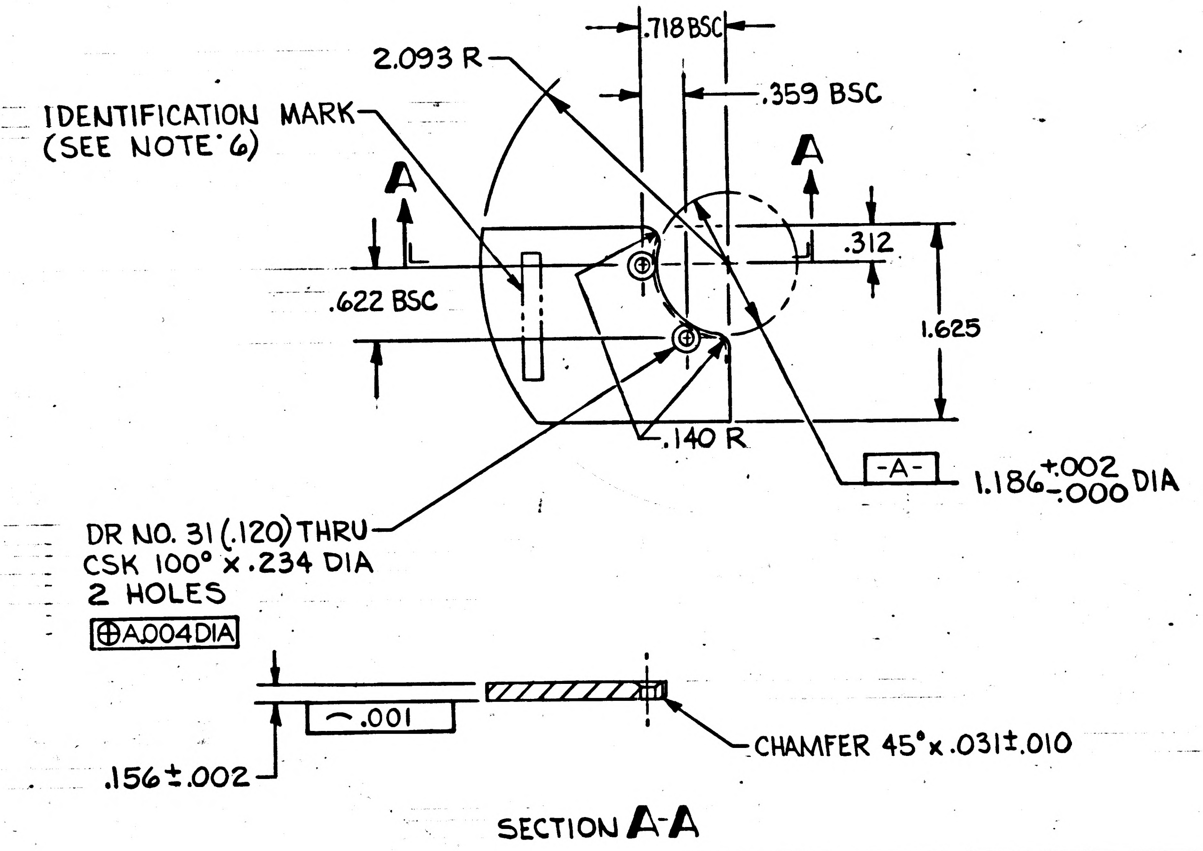
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012456 A

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR NO. 17488	4/2/65	WK

REVISIONS TDRR 10793

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. 63 √ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATL: HEAVY TUNGSTEN ALLOY PER MIL-T-21014 (TYPE 2).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.


.718 BSC
2.093 R
.359 BSC
IDENTIFICATION MARK (SEE NOTE 6)
A
A
.312
.622 BSC
1.625
.140 R
-A-
1.186 +.002 -.000 DIA
DR NO. 31 (.120) THRU
CSK 100° x .234 DIA
2 HOLES
⊕ A .004 DIA
⌒ .001
CHAMFER 45° x .031 ± .010
.156 ± .002
SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910820

DRAWN V. AMATO DATE 5-20-64
CHECKED C. Langstaff 6- -64
APPROVAL 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL O Wagel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT
RIGHT HAND

CODE IDENT NO. -
SIZE C
NASA NUMBER 2012456
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

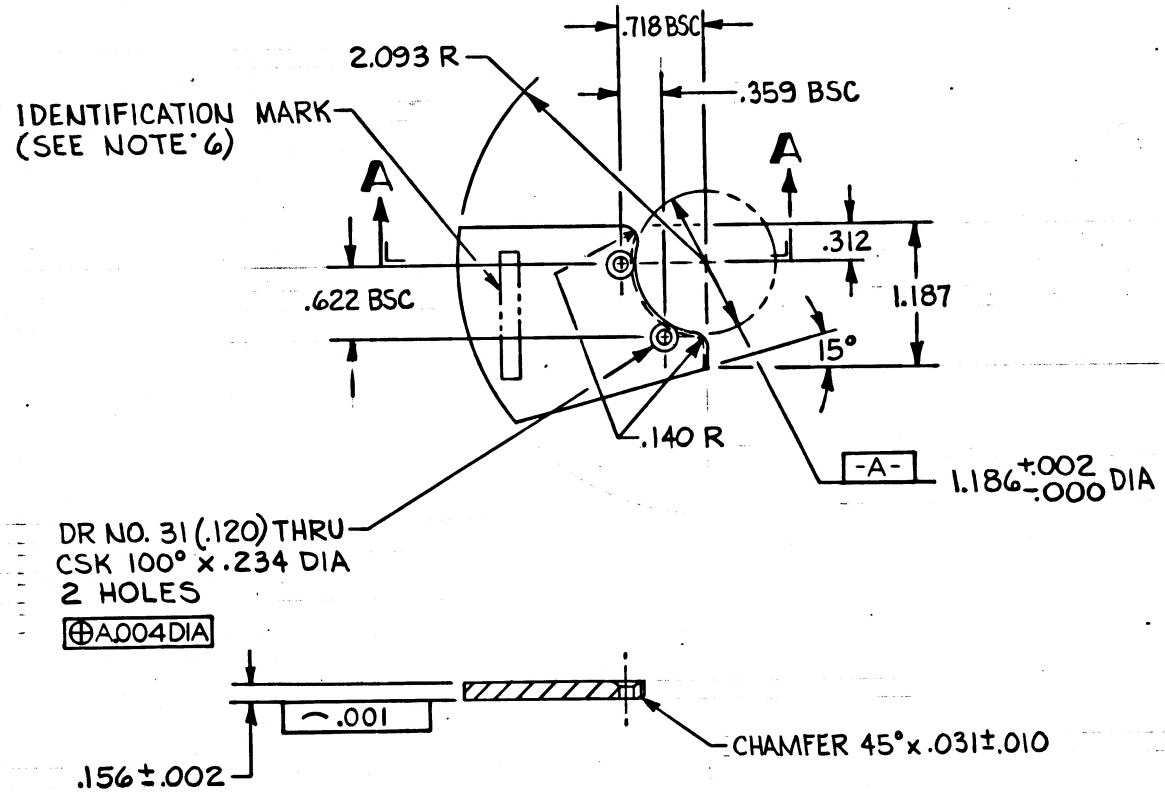
E-154

2012456 (r)

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt{}^{63}$ FINISH ALL OVER.
   b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATL: HEAVY TUNGSTEN ALLOY PER MIL-T-21014 (TYPE 2).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.


.718 BSC
2.093 R
.359 BSC
IDENTIFICATION MARK
(SEE NOTE 6)
A
A
.312
.622 BSC
1.187
15°
.140 R
-A-
1.186 +.002 -.000 DIA
DR NO. 31 (.120) THRU
CSK 100° x .234 DIA
2 HOLES
⊕A.004DIA
⌒.001
CHAMFER 45° x .031±.010
.156±.002

SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910820

DRAWN V. AMATO DATE 5-20-64
CHECKED C. Lanat[illegible] 6- -64
APPROVAL [illegible] 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL O Nafel 7/2/67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT
RIGHT HAND

CODE IDENT NO. –
SIZE C
NASA NUMBER 2012456
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

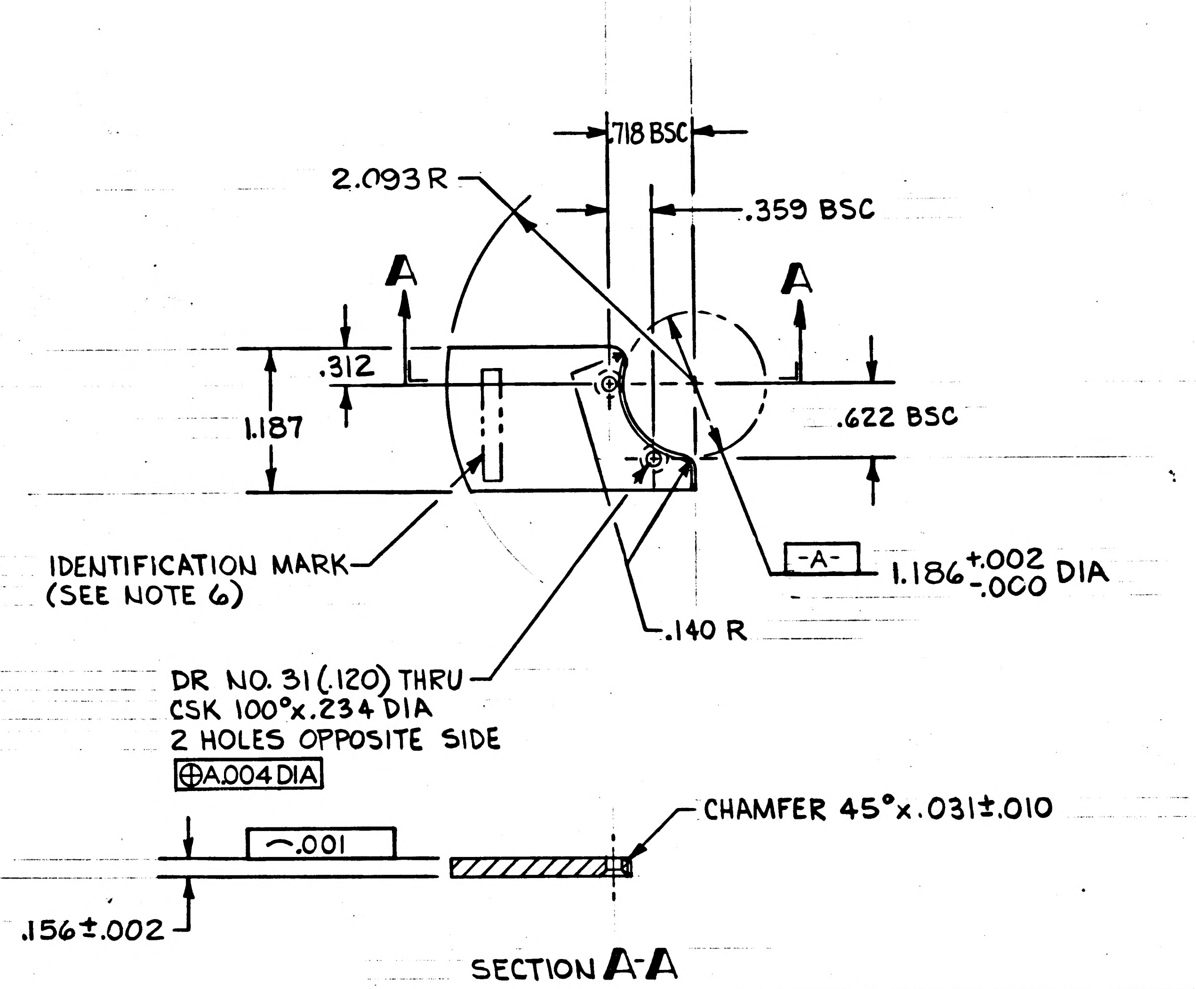
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012457 (r)

REVISIONS TDRR 10793				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   - a. $\sqrt[63]{}$ FINISH ALL OVER
   - b. BREAK SHARP CORNERS IN ACCORDANCE WITH ND1002078.
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. MATL: HEAVY TUNGSTEN ALLOY PER MIL-T-21014 (TYPE 2).
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.


.718 BSC
2.093 R
.359 BSC
A
A
.312
1.187
.622 BSC
-A-
1.186 +.002 -.000 DIA
IDENTIFICATION MARK (SEE NOTE 6)
.140 R
DR NO. 31 (.120) THRU
CSK 100° x .234 DIA
2 HOLES OPPOSITE SIDE
⊕ A .004 DIA
⌒ .001
CHAMFER 45° x .031 ± .010
.156 ± .002
SECTION A-A

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011712	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 5

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910830

DRAWN V. AMATO DATE 5-21-64
CHECKED C. Langstaff 6- -64
APPROVAL 6/25/64
APPROVAL E. Morey 7/1/64
NASA APPROVAL
MIT APPROVAL I Wa 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
COUNTERWEIGHT
LEFT HAND

CODE IDENT NO.
SIZE C
NASA NUMBER 2012457

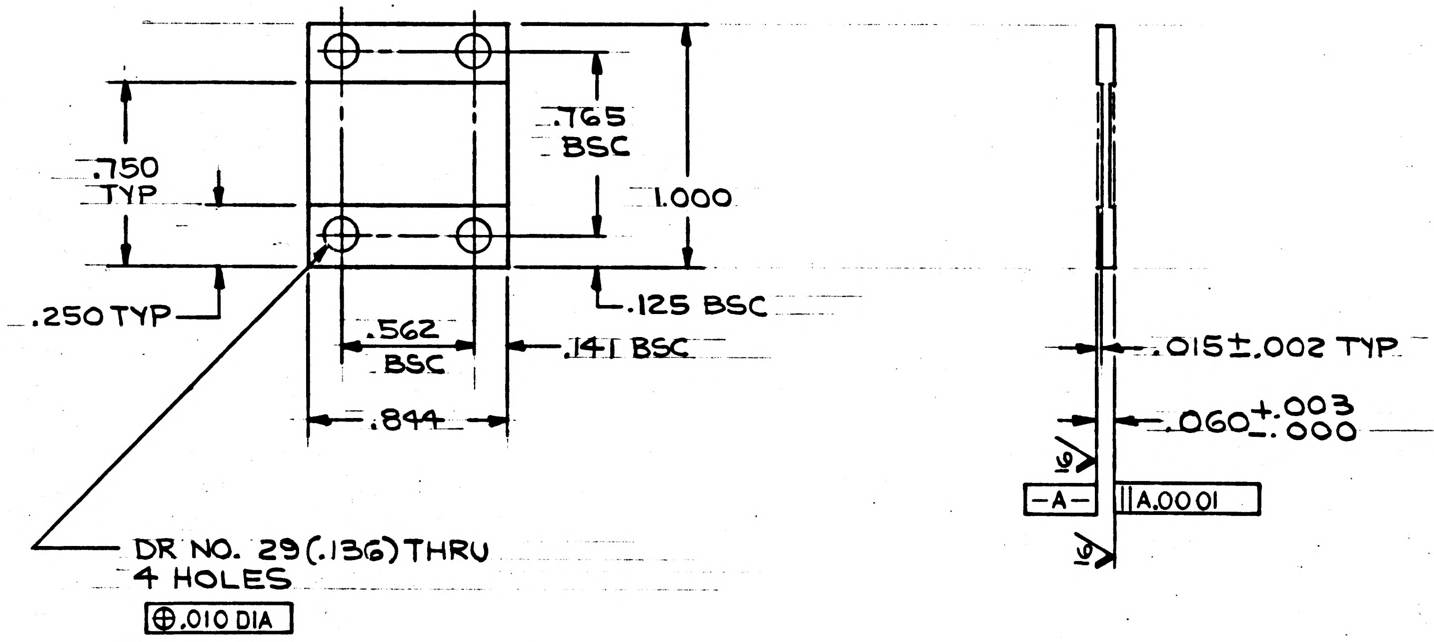
SCALE 1/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

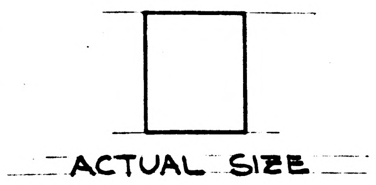
2012461 (r)

REVISIONS				TDRR 10793
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078
3. UNLESS OTHERWISE SPECIFIED:
   63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.2 (KPS-1005 I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 *(TAGGING)*



MASTER


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± –

DO NOT SCALE THIS DRAWING

MATERIAL
CORROSION RESISTANT STEEL
FED SPEC QQ-S-766
CLASS 302 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910860

DRAWN R. BRUNELLE DATE 5-25-64
CHECKED C. Longstaff 6-11-64
APPROVAL 6/25/64
APPROVAL E. Thorup 9/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER

CODE IDENT NO.
SIZE C
NASA NUMBER 2012461
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

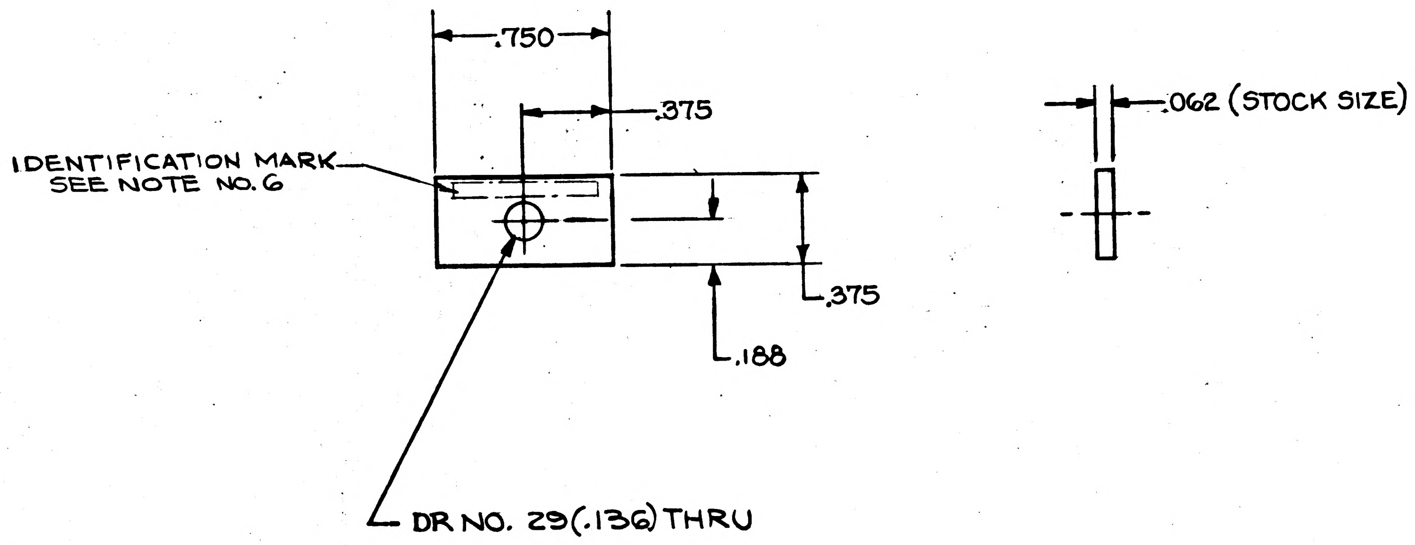
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

SYM	ZONE	REVISIONS TDRR 10793 DESCRIPTION	DATE	APPROVAL

2012462

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   63√ FINISH ON ALL MACHINED SURFACES
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO 5.4.2 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± –

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-766 CLASS 302 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910500

DRAWN R. BRUNELLE DATE 5-25-64
CHECKED C. Langstaff 6-12-64
APPROVAL 6/29/64
APPROVAL 7/1/64
NASA APPROVAL
MIT APPROVAL 7/2/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER

CODE IDENT NO.
SIZE C
NASA NUMBER 2012462
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

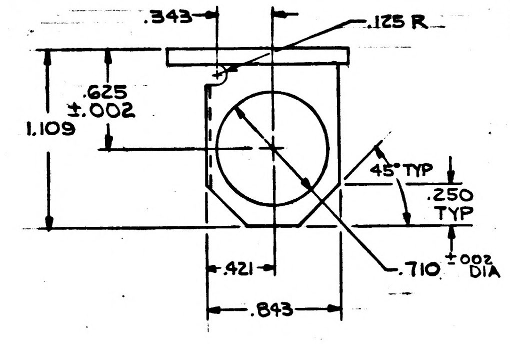
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
63 √ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

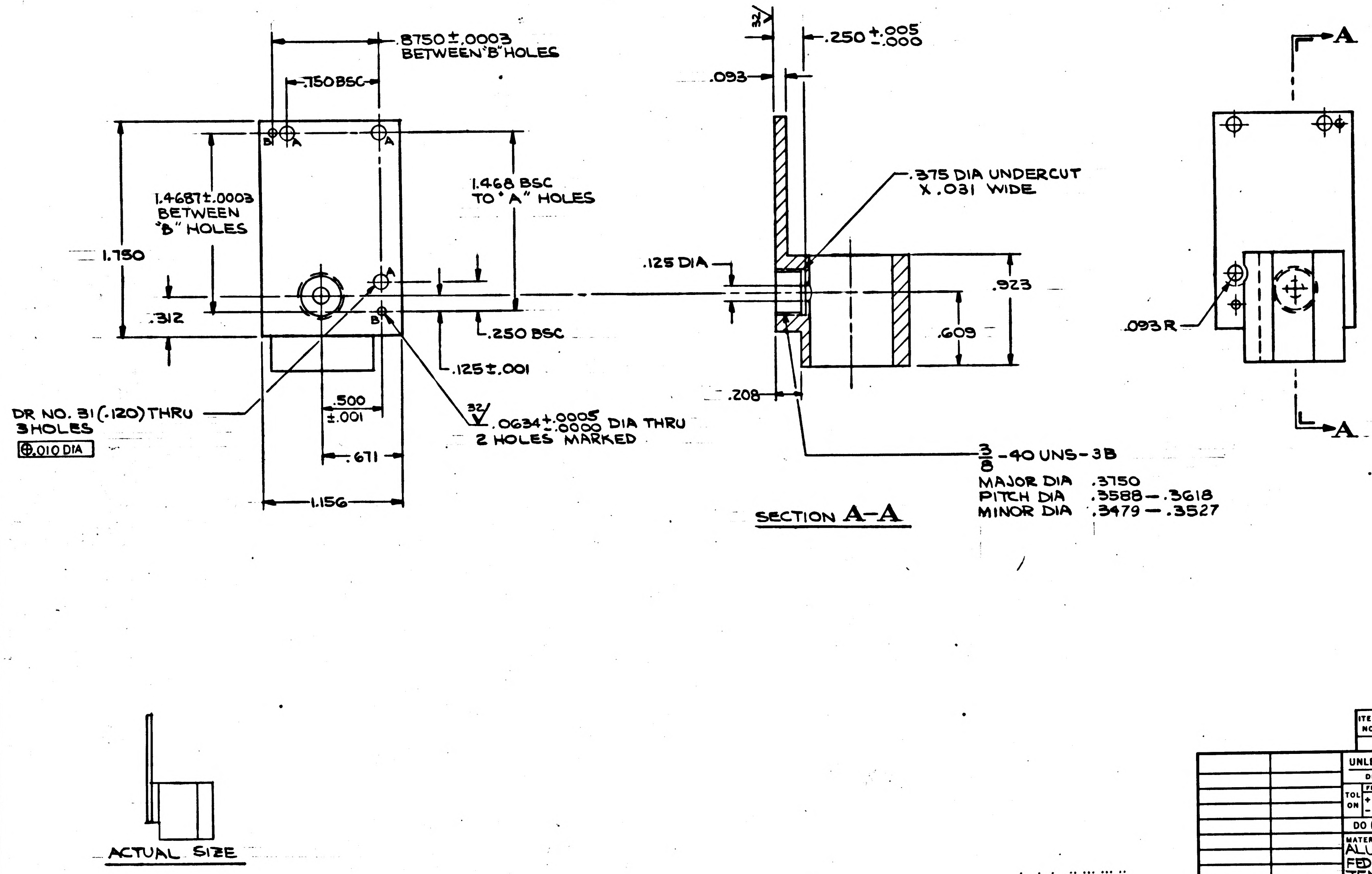
2012471 | A

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 4	REVISED PER TDRR NO. 13305	10Oct4	WK



.343
.125 R
.625 ±.002
1.109
45° TYP
.250 TYP
.421
.710 ±.002 DIA
.843



.8750±.0003 BETWEEN 'B' HOLES
.750 BSC
B A A
1.4687±.0003 BETWEEN "B" HOLES
1.468 BSC TO "A" HOLES
1.750
.312
A B
.250 BSC
.125±.001
.500 ±.001
.671
1.156
DR NO. 31 (.120) THRU 3 HOLES
⊕ .010 DIA
32 √ .0634 +.0005 -.0000 DIA THRU 2 HOLES MARKED
32
.250 +.005 -.000
.093
.375 DIA UNDERCUT X .031 WIDE
.125 DIA
.923
.609
.208
3/8-40 UNS-3B
MAJOR DIA .3750
PITCH DIA .3588-.3618
MINOR DIA .3479-.3527
SECTION A-A
A
A
.093 R
ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012481	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910890
DRAWN R. BRUNELLE DATE 5-29-64
CHECKED C. Langstaff 6-11-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Rhoung 7/13/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL 14 Jul 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE HOUSING, PHOTO MULTIPLIER (H.S.)

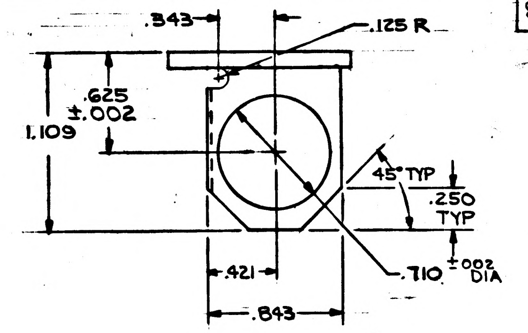
CODE IDENT NO. | SIZE D | NASA NUMBER 2012471
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5 BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 2 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)

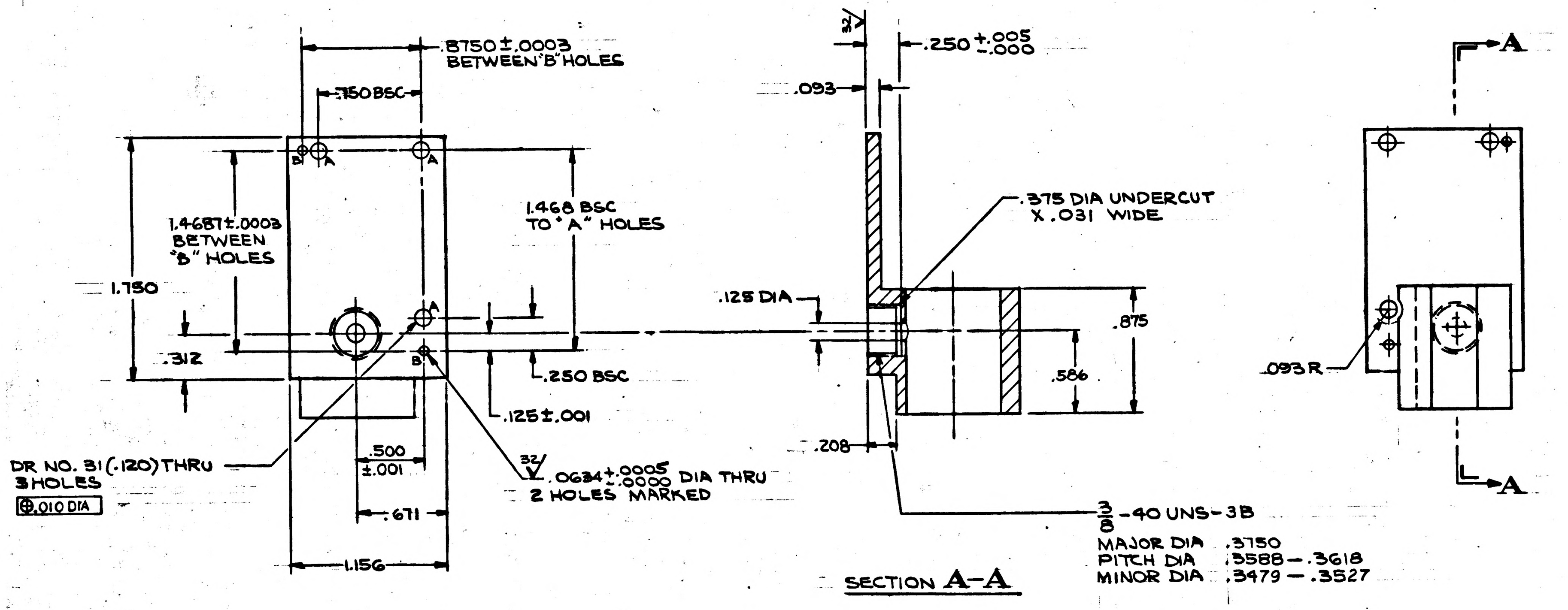
B 2012471

REVISIONS 10952

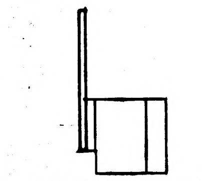
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 4	REVISED PER TDRR NO. 13305	[illegible]	WL
B		REVISED PER TDRR NO. 16683	2/[illegible]/65	WL



.343
.125 R
.625 ±.002
1.109
45° TYP
.250 TYP
.421
.843
.710 ±.002 DIA



.8750 ±.0003 BETWEEN "B" HOLES
.750 BSC
B
A
A
1.4687 ±.0003 BETWEEN "B" HOLES
1.468 BSC TO "A" HOLES
1.750
.312
A
B
.250 BSC
.125 ±.001
DR NO. 31 (.120) THRU 3 HOLES
⊕.010 DIA
.500 ±.001
.671
1.156
32/√ .0634 +.0005 −.0000 DIA THRU 2 HOLES MARKED
32/√
.250 +.005 −.000
.093
.375 DIA UNDERCUT X .031 WIDE
.125 DIA
.875
.586
.208
3/8-40 UNS-3B
MAJOR DIA .3750
PITCH DIA .3588 — .3618
MINOR DIA .3479 — .3527
SECTION A-A
A
A
.093 R



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012481	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4
CONTRACT

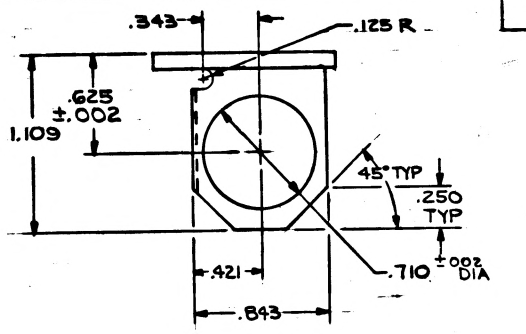
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910890
DRAWN R. BRUNELLE DATE 5-29-64
CHECKED C. Kampstaff 6-11-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Ohong 7/13/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL W [illegible] 14 Jul 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING, PHOTO MULTIPLIER (H.S.)

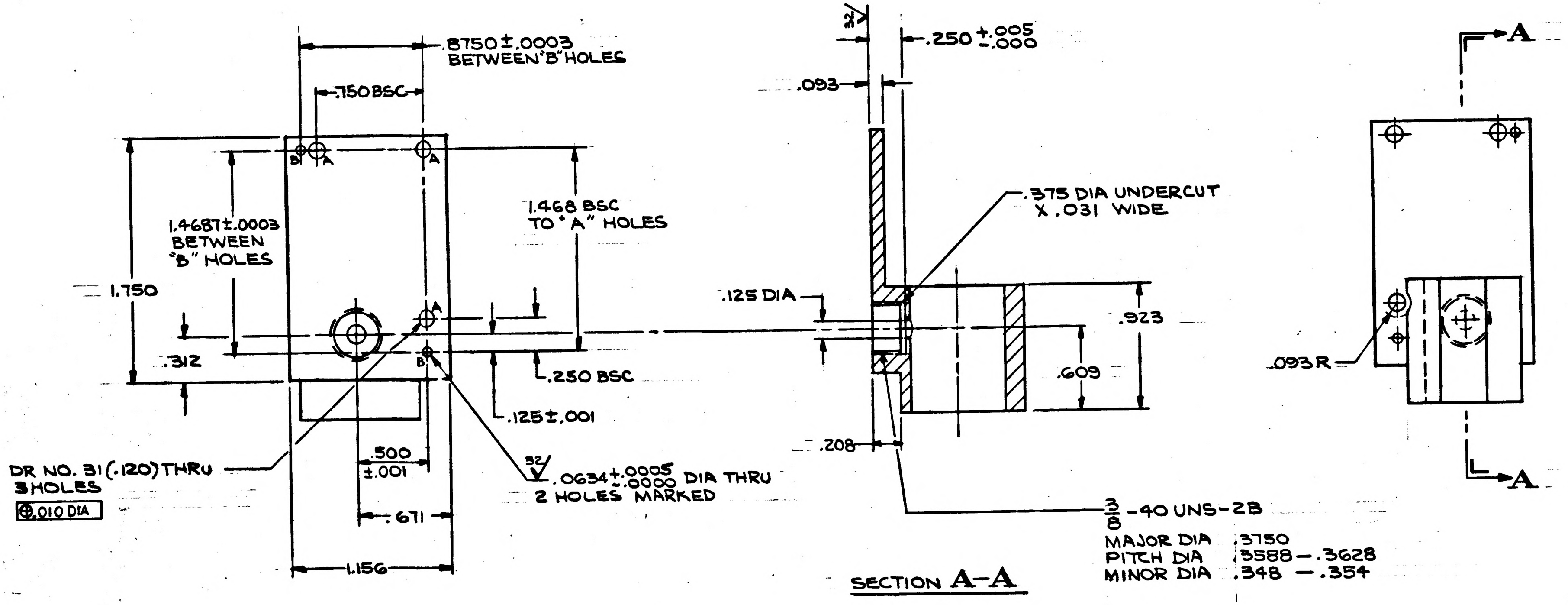
CODE IDENT NO.
SIZE D
NASA NUMBER 2012471
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

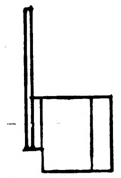
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   63/√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1003A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)


.343
.125 R
.625
±.002
1.109
45° TYP
.250
TYP
.421
.843
.710 ±.002 DIA

2012471

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


.8750±.0003
BETWEEN "B" HOLES
.750 BSC
B
A
A
1.4687±.0003
BETWEEN
"B" HOLES
1.468 BSC
TO "A" HOLES
1.750
.312
A
B
.250 BSC
.125±.001
.500
±.001
.671
1.156
DR NO. 31 (.120) THRU
3 HOLES
⊕.010 DIA
32/√ .0634 +.0005 −.0000 DIA THRU
2 HOLES MARKED
32/√
.250 +.005 −.000
.093
.375 DIA UNDERCUT
X .031 WIDE
.125 DIA
.923
.609
.208
3/8-40 UNS-2B
MAJOR DIA .3750
PITCH DIA .3588 — .3628
MINOR DIA .348 — .354
SECTION A-A
A
A
.093 R



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2012481	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED. SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910890

DRAWN R. BRUNELLE DATE 5-29-64
CHECKED C. Lumpkin 6-11-64
APPROVAL E. Ruschmann 7/13/64
APPROVAL E. Thorup 7/13/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL 14 JUL 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
PHOTO MULTIPLIER (H.S.)

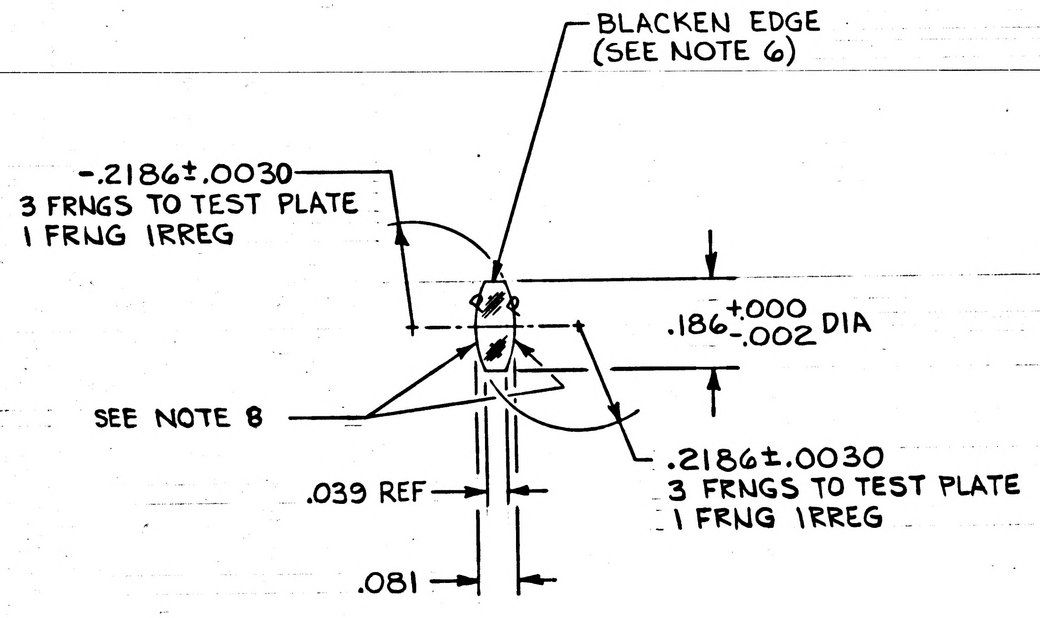
CODE IDENT NO.
SIZE D
NASA NUMBER 2012471
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

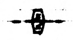
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012472 A

REVISIONS			TDRR 10793	
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16665	3/8/65	WK

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B - FINE ANNEALED
   TYPE 516-641
4. CA: ENT= .116 EXIT= .116
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR. 3.5.12
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (BAGGING)
8. ANTI-REFLECTION COAT PER ND100222 AS MODIFIED BY THE FOLLOWING:
   a) WAVELENGTH RANGE FROM 330 TO 550 MILLI-MICRONS.
   b) REFLECTANCE REQUIREMENTS: THE AVERAGE REFLECTANCE PER SURFACE INTEGRATED OVER THE ABOVE WAVELENGTH RANGE SHALL NOT EXCEED 1% MEASURED NORMAL TO SURFACE.





ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012478	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910540

DRAWN V. AMATO DATE 6-2-64
CHECKED C. Lamptoff 6-24-64
APPROVAL G. Dunham 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL I. Nagel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(COLLECTOR) STAR TRACKER

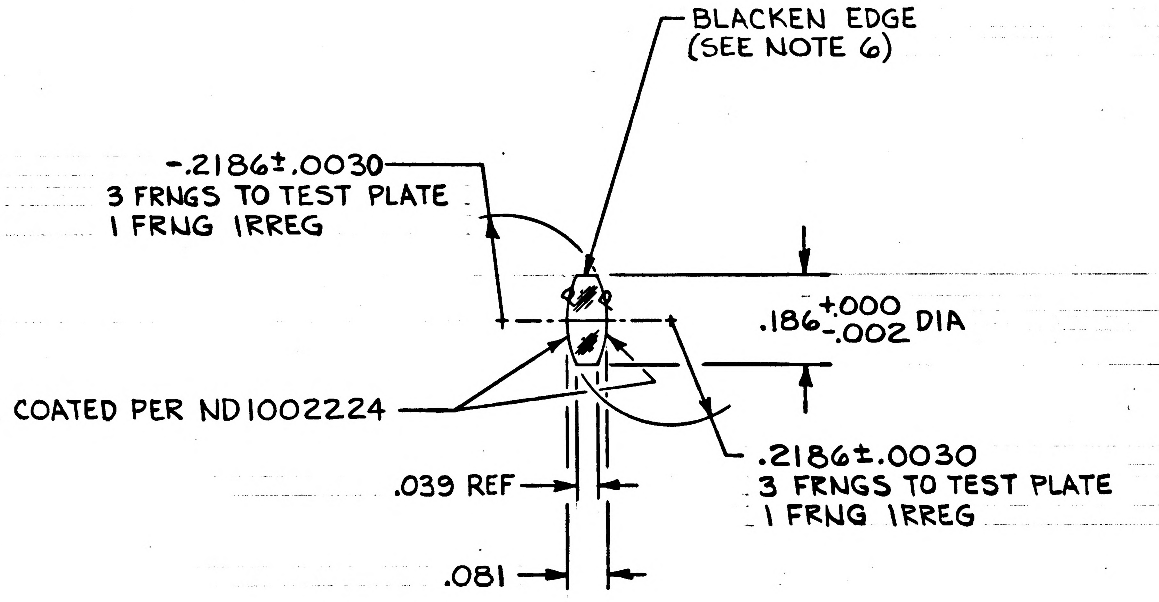
CODE IDENT NO.
SIZE C
NASA NUMBER 2012472
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

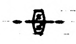
E-184

2012472

SYM	ZONE	REVISIONS TDRR 10793 DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ELEMENT IN ACCORDANCE WITH SPEC MIL-O-13830.
3. MATL: GLASS, OPTICAL PER MIL-G-174
   GRADE B - FINE ANNEALED
   TYPE 516-641
4. CA: ENT = .116 EXIT = .116
   SURF. QUAL: 60-40
   CTRG ERROR 3 MINUTES
5. SURFACES MARKED "P" POL. ALL OTHERS GRD.
6. BLACKEN IN ACCORDANCE WITH SPEC MIL-O-13830 PAR. 3.5.12
   BLKING MATL: BLACK INK PER FED. SPEC TT-I-528.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL IN ACCORDANCE WITH ND1002019. (BAGGING)


BLACKEN EDGE
(SEE NOTE 6)
-.2186±.0030
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.186 +.000 -.002 DIA
COATED PER ND1002224
.2186±.0030
3 FRNGS TO TEST PLATE
1 FRNG IRREG
.039 REF
.081
P
P


ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012479	2011000
2012478	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTE 3
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 28386910540
DRAWN V. AMATO DATE 6-2-64
CHECKED C. Lampton 6-24-64
APPROVAL G. Rinehimer 6/25/64
APPROVAL E. Thorup 7/1/64
NASA APPROVAL
MIT APPROVAL I. Nagel 7/2/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
LENS, POSITIVE
(COLLECTOR)

CODE IDENT NO. | SIZE C | NASA NUMBER 2012472
SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

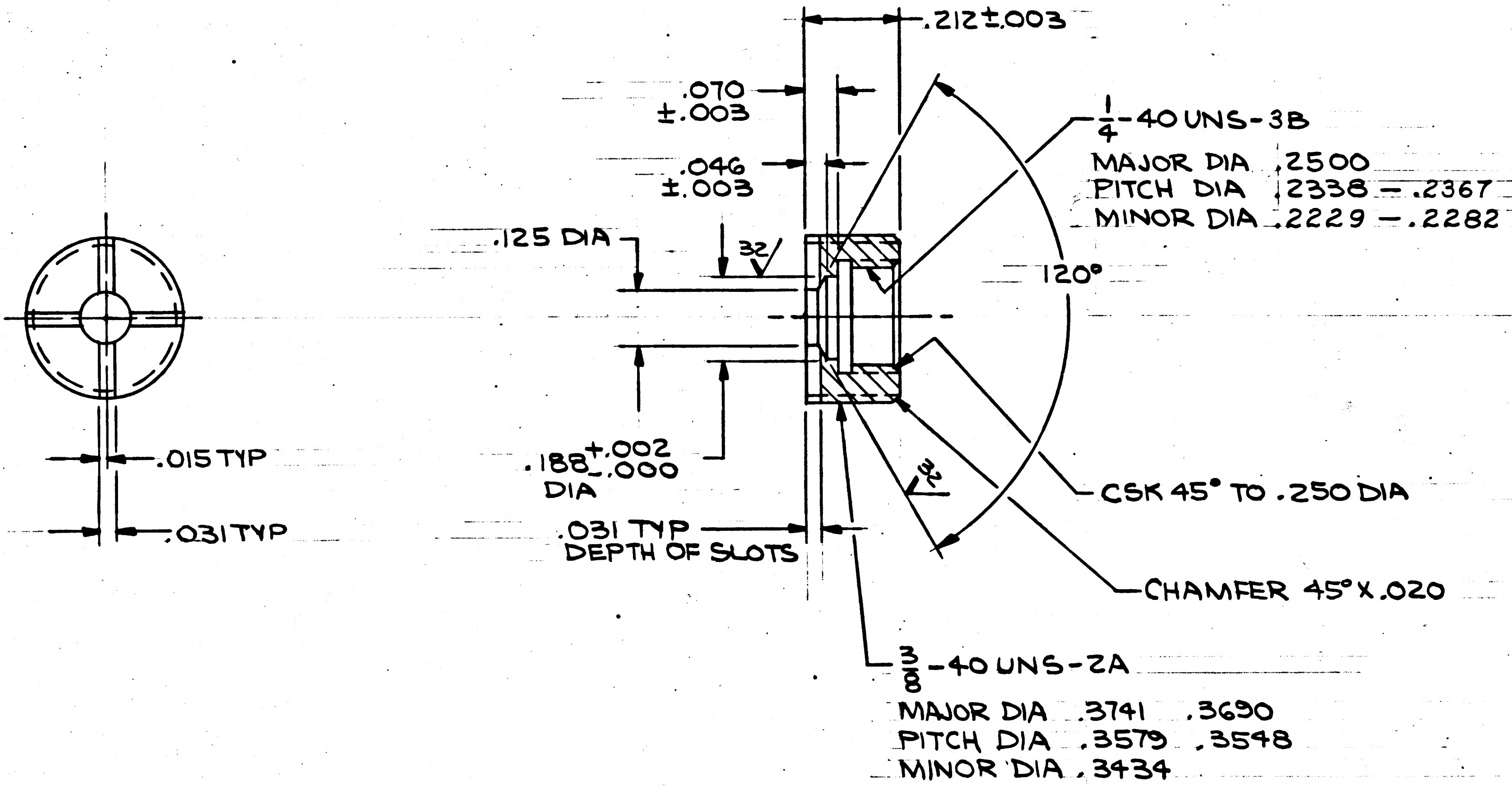
E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

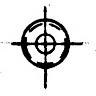
2012474 A

REVISIONS 10952				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	C 2	REVISED PER TDRR NO. 13307	10/6/64	wk

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)



.212±.003
.070 ±.003
.046 ±.003
.125 DIA
32/
1/4-40 UNS-3B
MAJOR DIA .2500
PITCH DIA .2338 — .2367
MINOR DIA .2229 — .2282
120°
.015 TYP
.031 TYP
.188 +.002 -.000 DIA
.031 TYP DEPTH OF SLOTS
32
CSK 45° TO .250 DIA
CHAMFER 45°X.020
3/8-40 UNS-2A
MAJOR DIA .3741 .3690
PITCH DIA .3579 .3548
MINOR DIA .3434



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2012478	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL ALUMINUM ALLOY FED. SPEC QQ-A-225/6 TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911180

DRAWN R. BRUNELLE DATE 6-3-64
CHECKED C Langstaff 6-11-64
APPROVAL E Rinehimer 6/25/64
APPROVAL E. Dhoney 7/7/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE HOUSING, CONDENSER LENS (S.T.)

CODE IDENT NO.	SIZE	NASA NUMBER
	C	2012474

SCALE 4/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

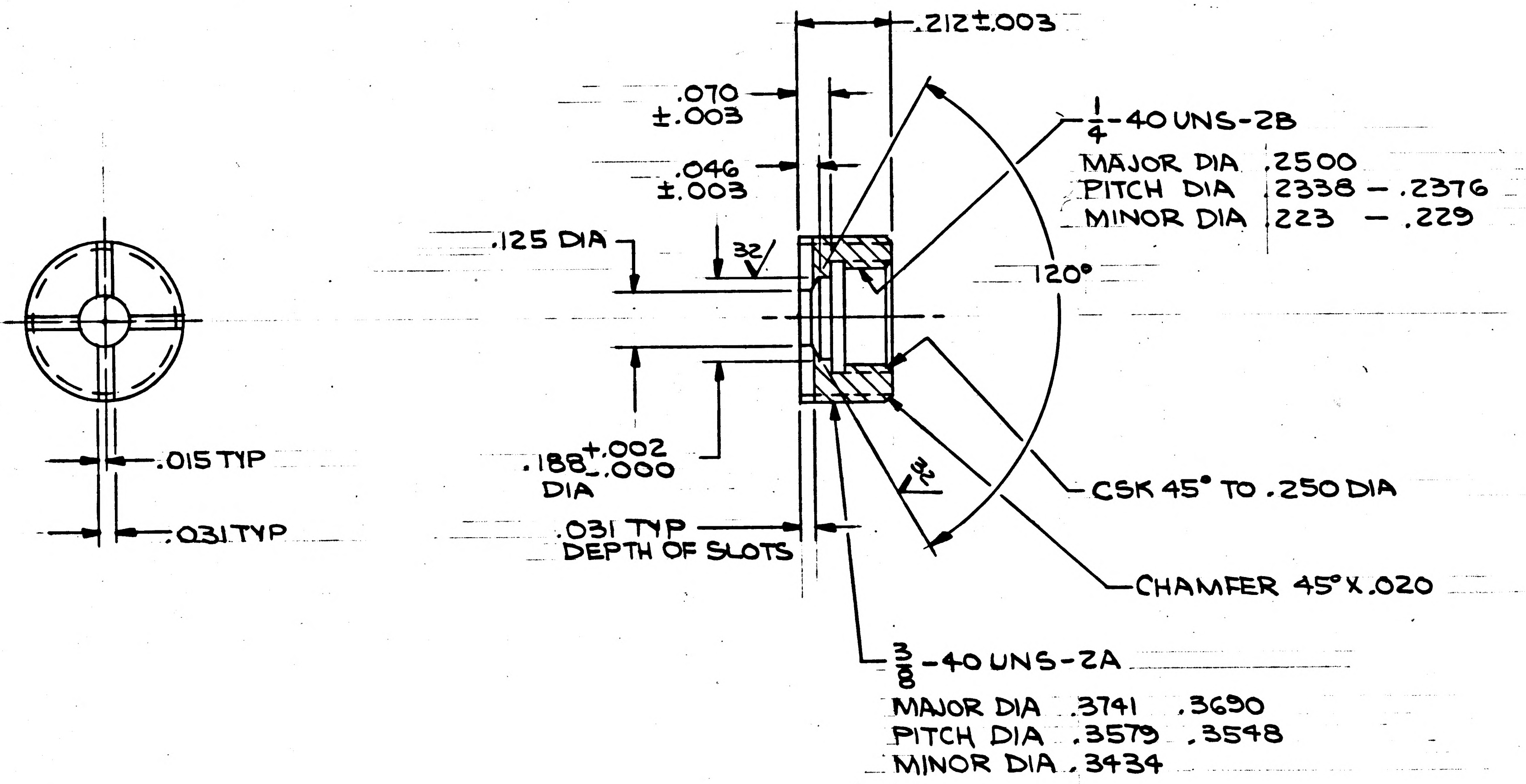
2012474

2012474

REVISIONS 10952

SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED $\sqrt{}^{63}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND1002019 (TAGGING)



.212±.003
.070 ±.003
.046 ±.003
.125 DIA
32
120°
1/4-40 UNS-2B
MAJOR DIA .2500
PITCH DIA .2338 - .2376
MINOR DIA .223 - .229
.188 +.002 -.000 DIA
.031 TYP DEPTH OF SLOTS
32
CSK 45° TO .250 DIA
CHAMFER 45° X .020
.015 TYP
.031 TYP
3/8-40 UNS-2A
MAJOR DIA .3741 .3690
PITCH DIA .3579 .3548
MINOR DIA .3434

ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012478	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± -	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED. SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911180

DRAWN R. BRUNEL S DATE 6-3-64
CHECKED C Rangstaff 6-11-64
APPROVAL E. Rinehimer 6/25/64
APPROVAL E. Dhorup 7/7/64
NASA APPROVAL W J Rhine 7-14-64
MIT APPROVAL W Hoffs 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
CONDENSER LENS (S.T.)

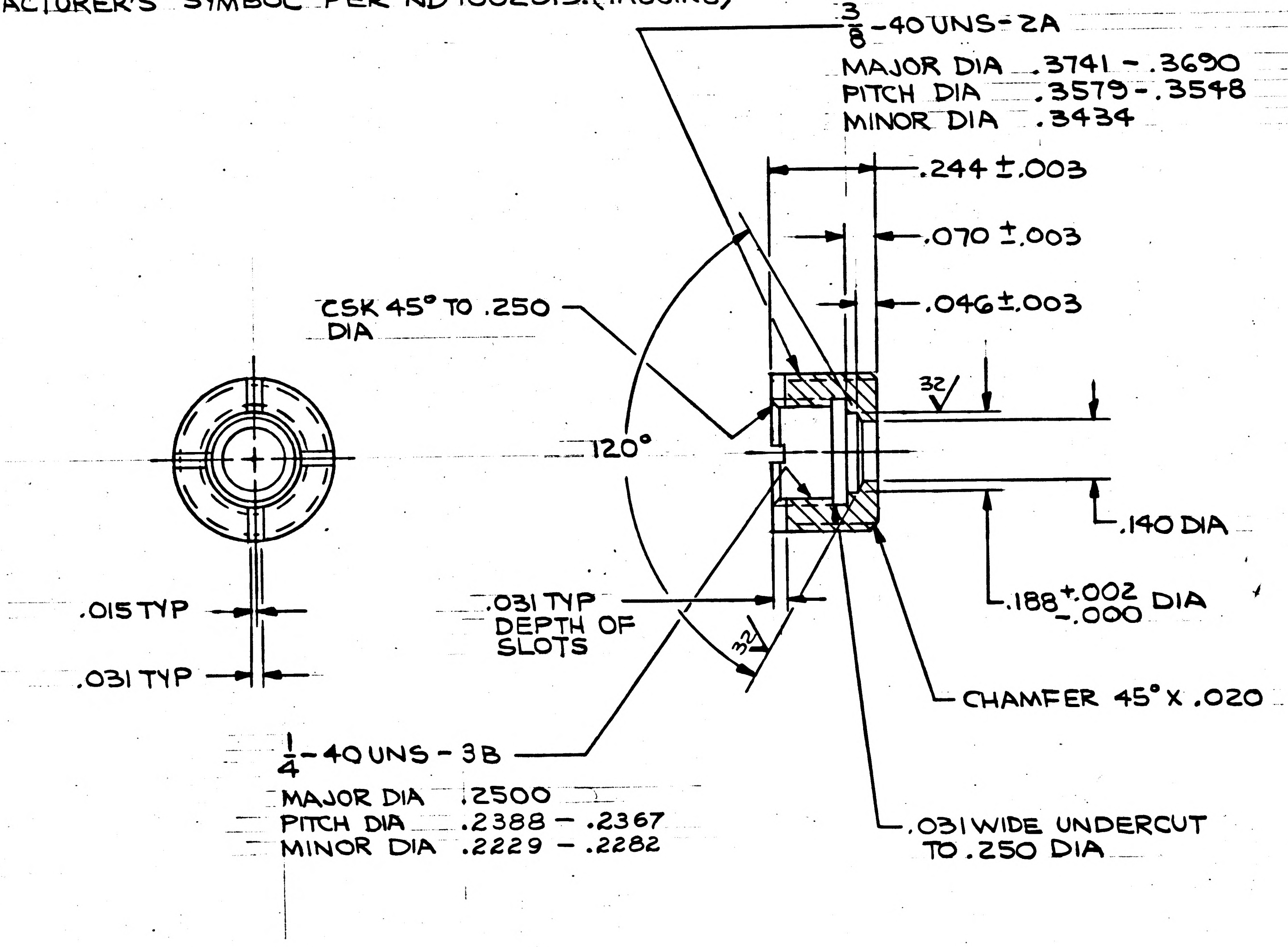
CODE IDENT NO.
SIZE C
NASA NUMBER 2012474
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

2012475 A

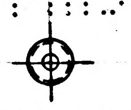
REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A	B 5	REVISED PER TDRR NO. 13306	10/6/64	WK.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED 63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019. (TAGGING)



3/8-40 UNS-2A
MAJOR DIA .3741 - .3690
PITCH DIA .3579 - .3548
MINOR DIA .3434
.244 ±.003
.070 ±.003
.046 ±.003
CSK 45° TO .250 DIA
32√
120°
.140 DIA
.188 +.002 -.000 DIA
.015 TYP
.031 TYP
.031 TYP DEPTH OF SLOTS
32√
CHAMFER 45° X .020
1/4-40 UNS-3B
MAJOR DIA .2500
PITCH DIA .2388 - .2367
MINOR DIA .2229 - .2282
.031 WIDE UNDERCUT TO .250 DIA

MASTER



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012479	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911190

DRAWN R. BRUNELLE DATE 6-2-64
CHECKED C. Langstaff 6-11-64
APPROVAL E. Rumbun 6/25/64
APPROVAL E. Thorup 6/6/64
NASA APPROVAL
MIT APPROVAL 9-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
CONDENSER LENS (H.S.)

CODE IDENT NO. | SIZE C | NASA NUMBER 2012475

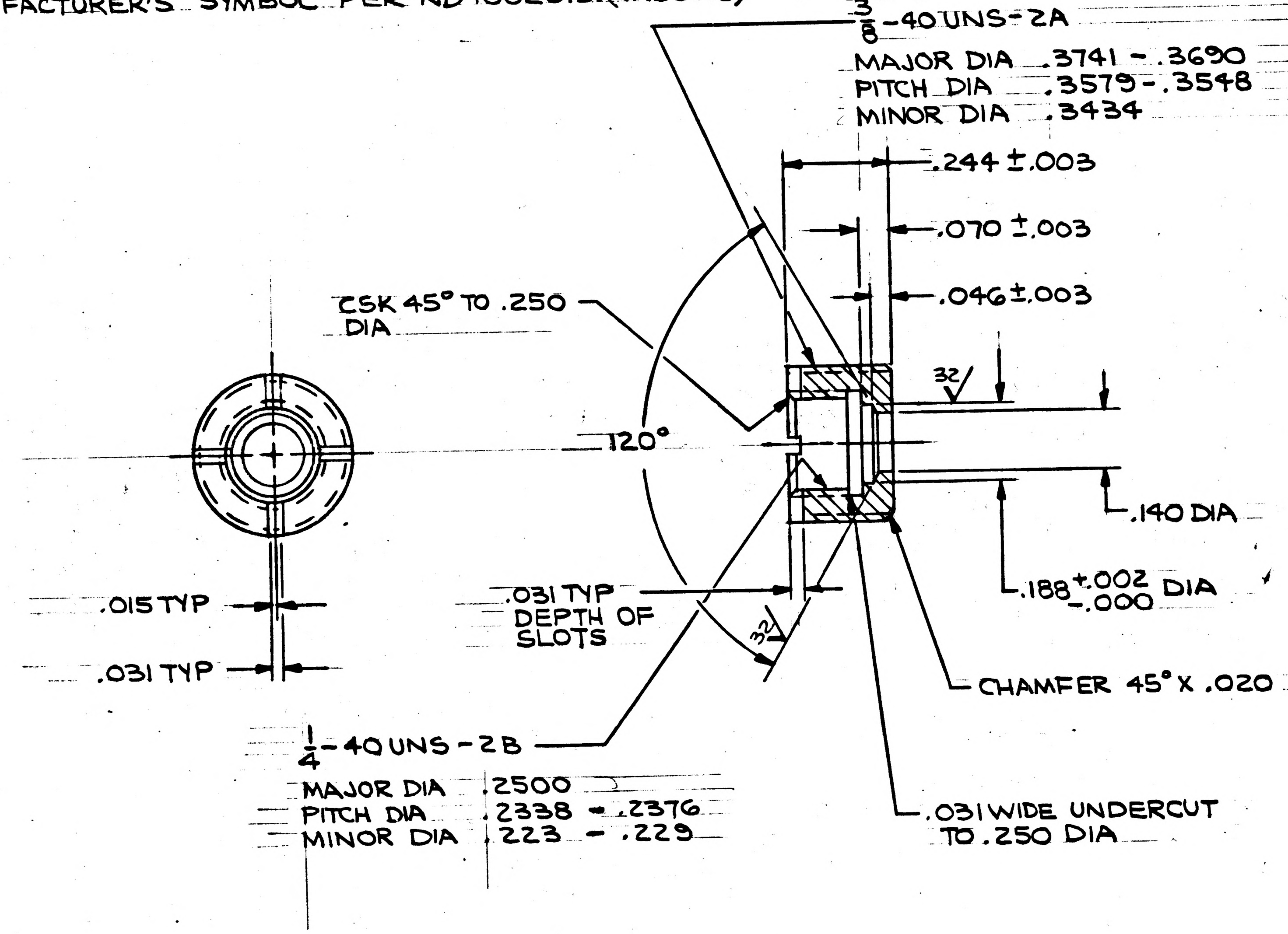
SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012475

REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED
   63/ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. BLACK SULFURIC ANODIZE IN ACCORDANCE WITH MIL-A-8625 TYPE II CLASS 3 (KPS-1005A.150)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019 (TAGGING)



3/8-40 UNS-2A
MAJOR DIA .3741-.3690
PITCH DIA .3579-.3548
MINOR DIA .3434
.244 ±.003
.070 ±.003
.046 ±.003
CSK 45° TO .250 DIA
32/
120°
.140 DIA
.188 +.002 -.000 DIA
.015 TYP
.031 TYP
.031 TYP DEPTH OF SLOTS
32/
CHAMFER 45° X .020
1/4-40 UNS-2B
MAJOR DIA .2500
PITCH DIA .2338 - .2376
MINOR DIA .223 - .229
.031 WIDE UNDERCUT TO .250 DIA

MASTER

ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012479	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/6
TEMPER T4

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 57386911190

DRAWN R. BRUNELLE DATE 6-2-64
CHECKED 6-11-64
APPROVAL 6/25/64
APPROVAL 6/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING,
CONDENSER LENS (H.S.)

CODE IDENT NO. | SIZE C | NASA NUMBER 2012475

SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

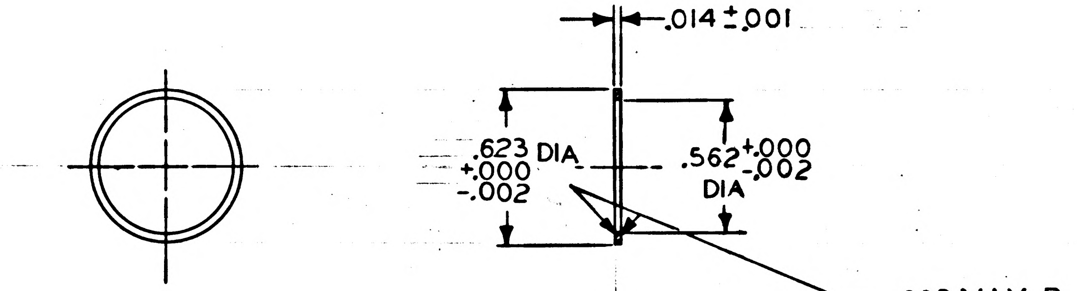
K-E E-184

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012476

REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
   a. $\sqrt[63]{}$ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625. TYPE II CLASS I (KPS-1005A.150)
6. IDENTIFY USING NASA DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)



ACTUAL SIZE

MASTER

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012477	2012000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± —	±.005	± —

DO NOT SCALE THIS DRAWING

MATERIAL
ALUMINUM ALLOY
FED SPEC QQ-A-225/8
TEMPER T6

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910900

DRAWN E.DRAPALA DATE 6-4-64
CHECKED C. Langstaff 6-11-64
APPROVAL E. Rindhun 6/27/64
APPROVAL E. Thorup 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
SPACER, LENS
(HORIZON SENSING)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012476
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

E-184

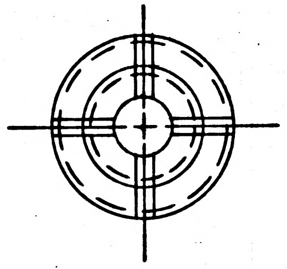
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

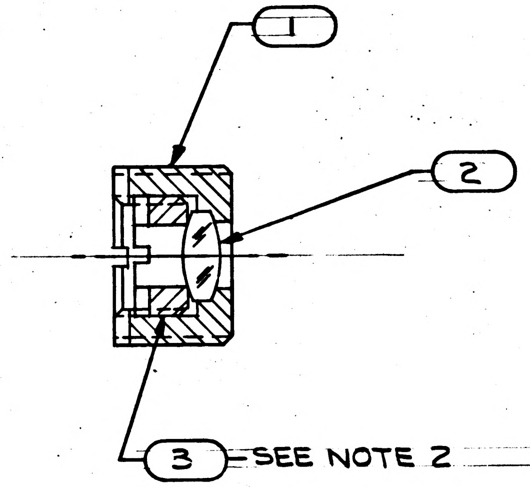
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF ITEM 3 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (BAGGING)

2012479

REVISIONS 11748

SYM	ZONE	DESCRIPTION	DATE	APPROVAL





SEE NOTE 2

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
3	1		2012473	57386911170		RING, LOCKING			
2	1		2012472	28386910540		LENS, POSITIVE (COLLECTOR)			
1	1		2012475	57386911190		HOUSING, CONDENSER LENS (H.S.)			

LIST OF PARTS AND MATERIALS

2012481	2011000
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910970

DRAWN R. BRUNELLE DATE 6-8-64
CHECKED C. Langstaff 6-26-64
APPROVAL 7/27/64
APPROVAL E. Thorup 8/19/64
NASA APPROVAL
MIT APPROVAL 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS ASS'Y
(HORIZON SENSOR)

CODE IDENT NO. | SIZE C | NASA NUMBER 2012479
SCALE 4/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

MASTER

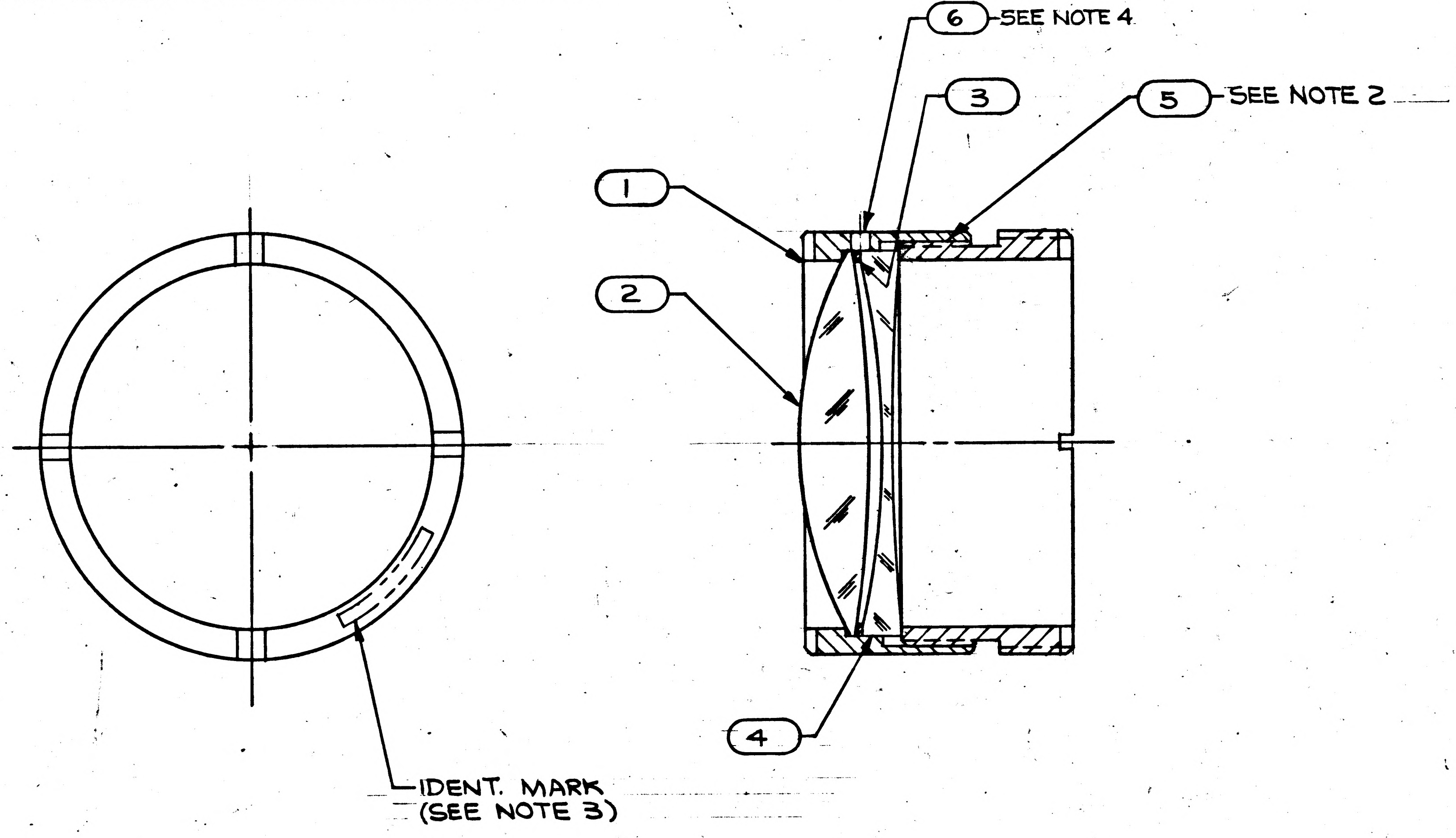
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012480 A

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 16684	2/26/65	WR.

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (C). PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019.
4. APPLY ITEM 6 TO FILL THREE EQUALLY SPACED HOLES IN ITEM 1, TAKING CARE NOT TO ALLOW ANY EPOXY ON OUTSIDE SURFACE.



* PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG. BEFORE ORDERING.

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
6	AR	*	1011541	74471435001	ADHESIVE, EPOXY				
5	1		2012355	57386910050	RING, LOCKING, STAR TRACKER				
4	1		2012358	28386910020	LENS, NEGATIVE (STAR TRACKER)				
3	1		2012354	57386910030	SPACER, LENS (STAR TRACKER)				
2	1		2012357	28386910010	LENS, POSITIVE (STAR TRACKER)				
1	1		2012353	57386910040	HOUSING, LENS, STAR TRACKER				

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

	FRACTIONS	DECIMALS	ANGLES
TOL ON	+ −	+ −	+ −

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910980

DRAWN R. BRUNELLE DATE 6-5-64
CHECKED C. Langstaff 6-16-64
APPROVAL 7/27/64
APPROVAL E. Mhonyo 8/15/64
NASA APPROVAL
MIT APPROVAL 18 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS ASSY
(STAR TRACKER)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012480
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

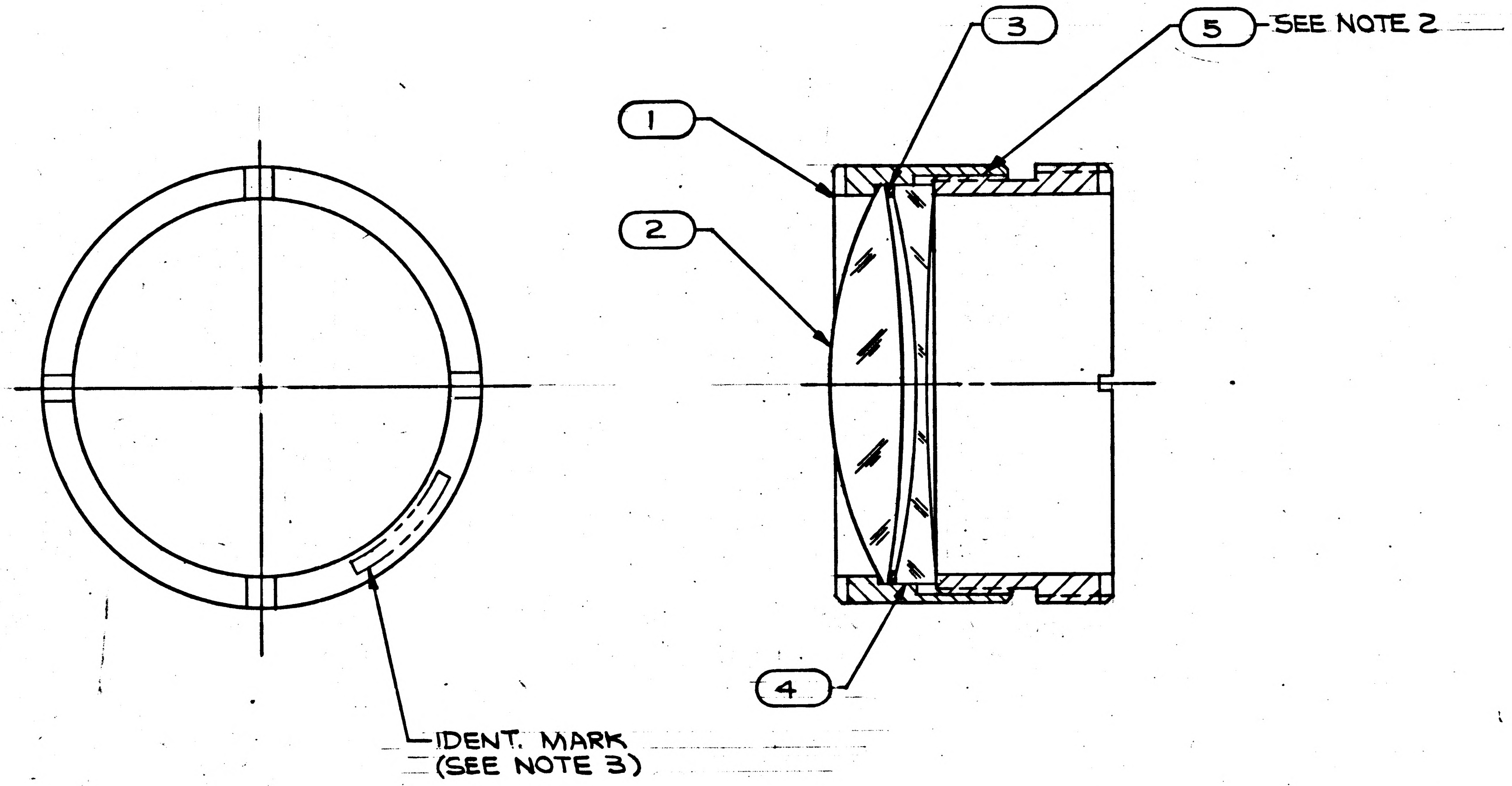
MASTER

E-154

2012480

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF IN ACCORDANCE WITH MIL-S-22473 GRADE (C). PREPARE SURFACES IN ACCORDANCE WITH ND 1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019



ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
5	1		2012355	57386910050	RING, LOCKING, STAR TRACKER				
4	1		2012358	28386910020	LENS, NEGATIVE (STAR TRACKER)				
3	1		2012354	57386910030	SPACER, LENS (STAR TRACKER)				
2	1		2012357	28386910010	LENS, POSITIVE (STAR TRACKER)				
1	1		2012353	57386910040	HOUSING, LENS, STAR TRACKER				

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910980
DRAWN R. BRUNELLE DATE 6-9-64
CHECKED C. Langstaff 6-16-64
APPROVAL [illegible] 7/27/64
APPROVAL E. [illegible] 8/15/64
NASA APPROVAL
MIT APPROVAL [illegible] 18 Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
HOUSING & LENS ASSY
(STAR TRACKER)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012480
SCALE 4/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

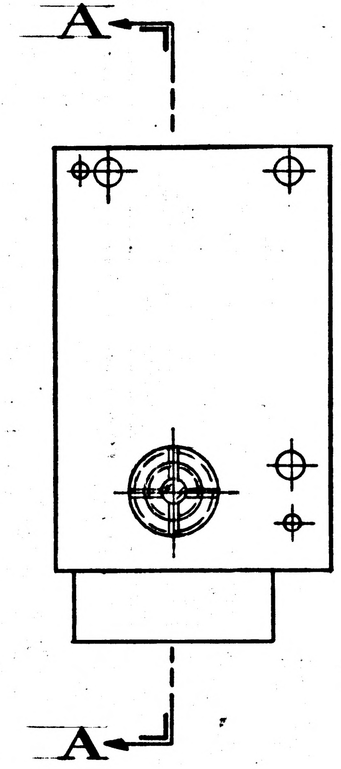
2012480

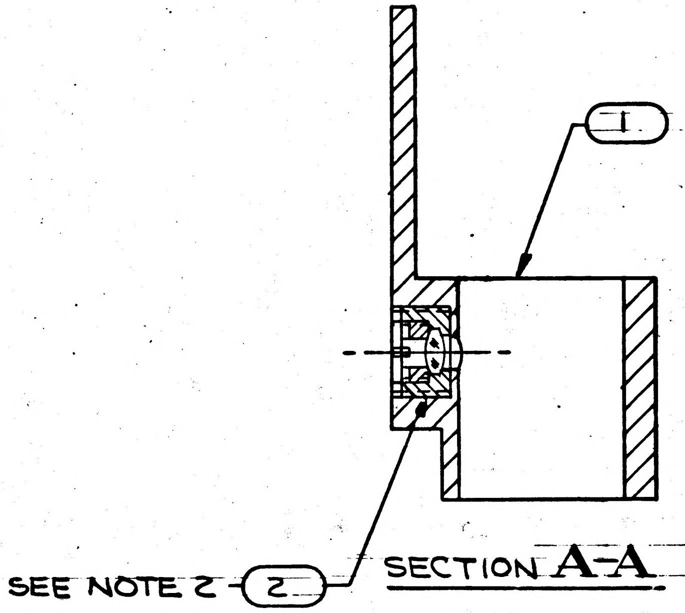
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012481

REVISIONS 1748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF ITEM 2 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (TAGGING)





SECTION A-A

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2012479	85386910970		HOUSING & LENS ASSY (HORIZON SENSOR)			
1	1		2012471	52386910890		HOUSING, PHOTOMULTIPLIER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	± ~	± ~

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386910990
DRAWN R. BRUNELLE DATE 6-9-64
CHECKED C. Langstaff 7-21-64
APPROVAL 7/27/64
APPROVAL E. Thorup 8/14/64
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PHOTOMULTIPLIER HOUSING & LENS ASSEMBLY (HORIZON SENSOR)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012481
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

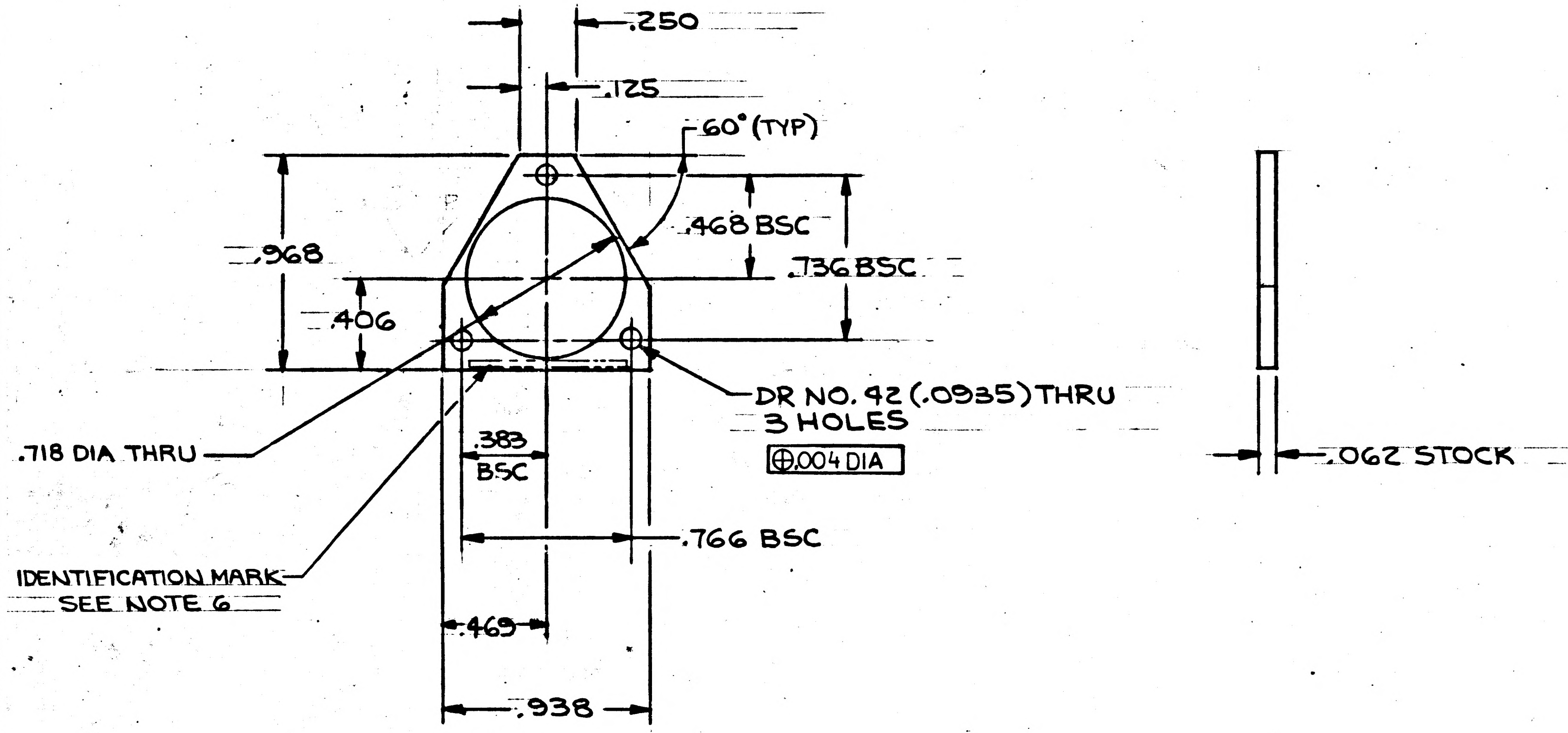
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

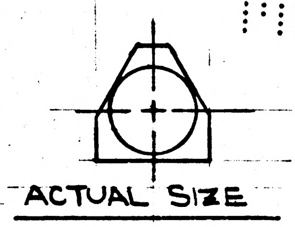
2012482

REVISIONS 10828				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND 1002078
3. UNLESS OTHERWISE SPECIFIED 63/✓ FINISH ON ALL MACHINED SURFACES
4. REMOVE BURRS IN ACCORDANCE WITH ND 1002079
5. PASSIVATE PER MIL-STD-171 TABLE V-A FINISH NO. 5.4.1 (KPS-1005I.200)
6. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURER'S SYMBOL PER ND 1002019


.250
.125
60° (TYP)
.968
.468 BSC
.736 BSC
.406
DR NO. 42 (.0935) THRU
3 HOLES
⊕.004 DIA
.718 DIA THRU
.383
BSC
.766 BSC
IDENTIFICATION MARK
SEE NOTE 6
.469
.938
.062 STOCK

MASTER


ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

2011701	2011000
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL CORROSION RESISTANT STEEL FED SPEC QQ-S-766 CLASS 302 COND A

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 56386910540

DRAWN R. BRUNELLE DATE 6-5-64
CHECKED C. Langstaff 6-11-64
APPROVAL 6/26/64
APPROVAL E. Ohorug 7/6/64
NASA APPROVAL
MIT APPROVAL 7-7-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE SPACER

CODE IDENT NO. | SIZE C | NASA NUMBER 2012482

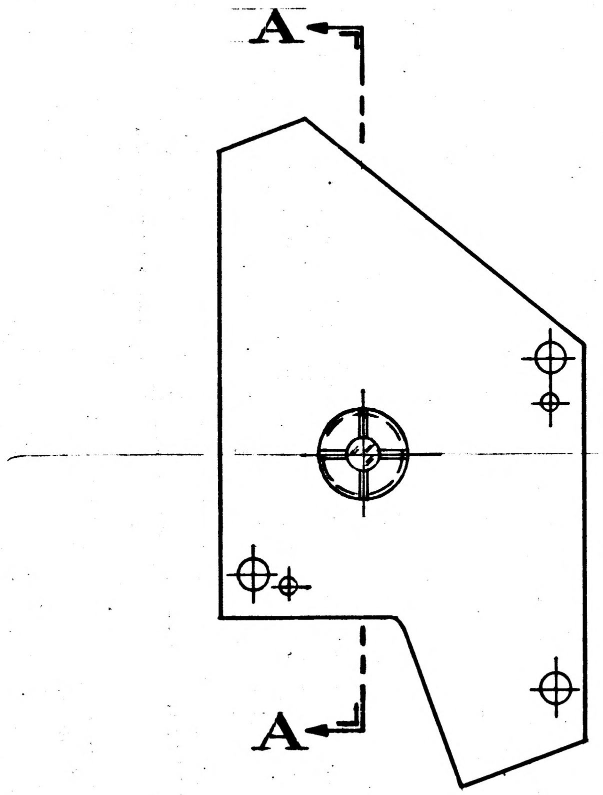
SCALE 2/1 | WEIGHT CALC ACTUAL | SHEET 1 OF 1

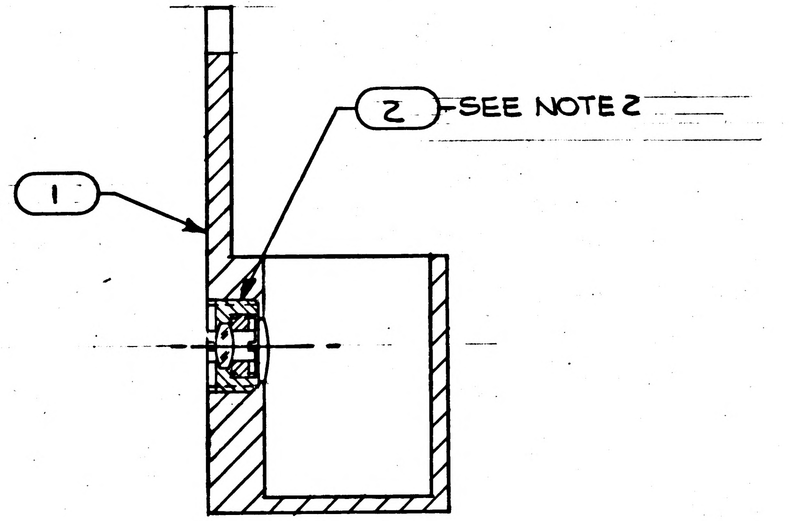
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS 11748				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327
2. VIBRATION PROOF ITEM 2 USING LOCKING COMPOUND GRADE "EV" PER MIL-S-22473. PREPARE SURFACES IN ACCORDANCE WITH ND1002211.
3. IDENTIFY USING NASA DWG NO., REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019. (*TAGGING*)





SECTION A-A

ITEM NO.	QTY REQ'D	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1		2012478	85386910960		HOUSING & LENS ASSY (STAR TRACKER)			
1	1		2012378	52386910780		HOUSING, PHOTOMULTIPLIER			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2011701	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL ON: FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911000

DRAWN R. BRUNELLE DATE 6-10-64
CHECKED C. Lenzstoff 7-23-64
APPROVAL F. Puntin 7/27/64
APPROVAL E. Thorup 8/14/64
NASA APPROVAL
MIT APPROVAL W. Kupfer Aug 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
PHOTOMULTIPLIER HOUSING
& LENS ASSEMBLY
(STAR TRACKER)

CODE IDENT NO.
SIZE C
NASA NUMBER 2012483
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

MASTER

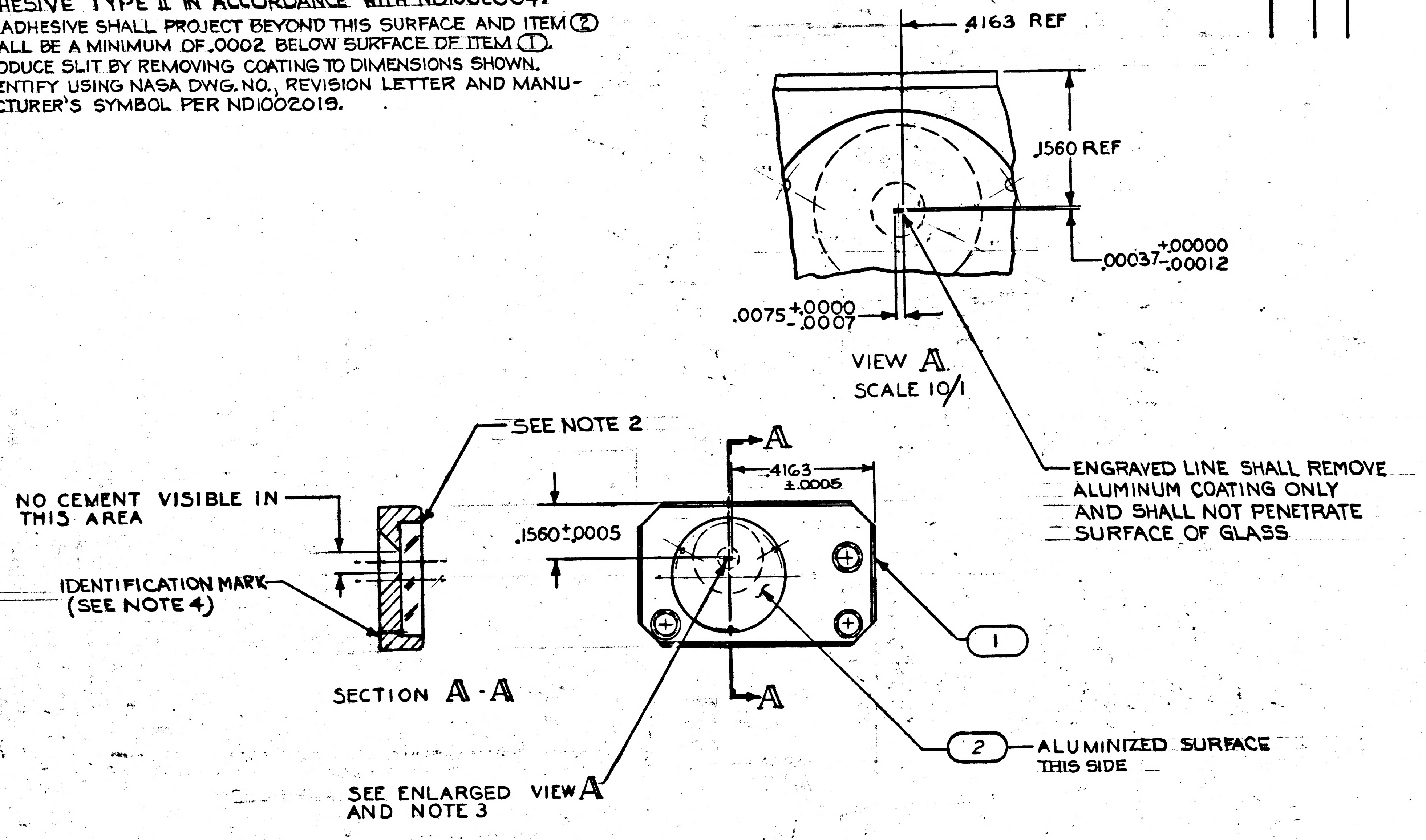
AD-1340

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2012495

REVISIONS 16877				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. CEMENT ITEM NO.② IN PLACE (AS SHOWN) USING ADHESIVE TYPE II IN ACCORDANCE WITH ND1002004. NO ADHESIVE SHALL PROJECT BEYOND THIS SURFACE AND ITEM ② SHALL BE A MINIMUM OF .0002 BELOW SURFACE OF ITEM ①.
3. PRODUCE SLIT BY REMOVING COATING TO DIMENSIONS SHOWN.
4. IDENTIFY USING NASA DWG. NO., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019.



.4163 REF
.1560 REF
.00037 +.00000 -.00012
.0075 +.0000 -.0007
VIEW A
SCALE 10/1
ENGRAVED LINE SHALL REMOVE ALUMINUM COATING ONLY AND SHALL NOT PENETRATE SURFACE OF GLASS
SEE NOTE 2
A
A
.4163 ±.0005
.1560±.0005
NO CEMENT VISIBLE IN THIS AREA
IDENTIFICATION MARK (SEE NOTE 4)
1
SECTION A-A
2
ALUMINIZED SURFACE THIS SIDE
SEE ENLARGED VIEW A AND NOTE 3

*PURCHASE ITEM-SEE SOURCE CONTROL DWG BEFORE ORDERING

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	1	*	1012526	———		GLASS, BLANK, FIELD STOP			
1	1		2012493	52386910910		HOLDER, FIELD STOP APERTURE			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012518	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ — −	+ — −	+ — −

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911220

DRAWN E. DRAPALA DATE 1-11-65
CHECKED J. SULLIVAN 2-15-65
APPROVAL G. Rushmore 2-16-65
APPROVAL E. Thorup 2-24-65
NASA APPROVAL W J Kline 2-26-65
MIT APPROVAL W Kupfer H Ellis

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

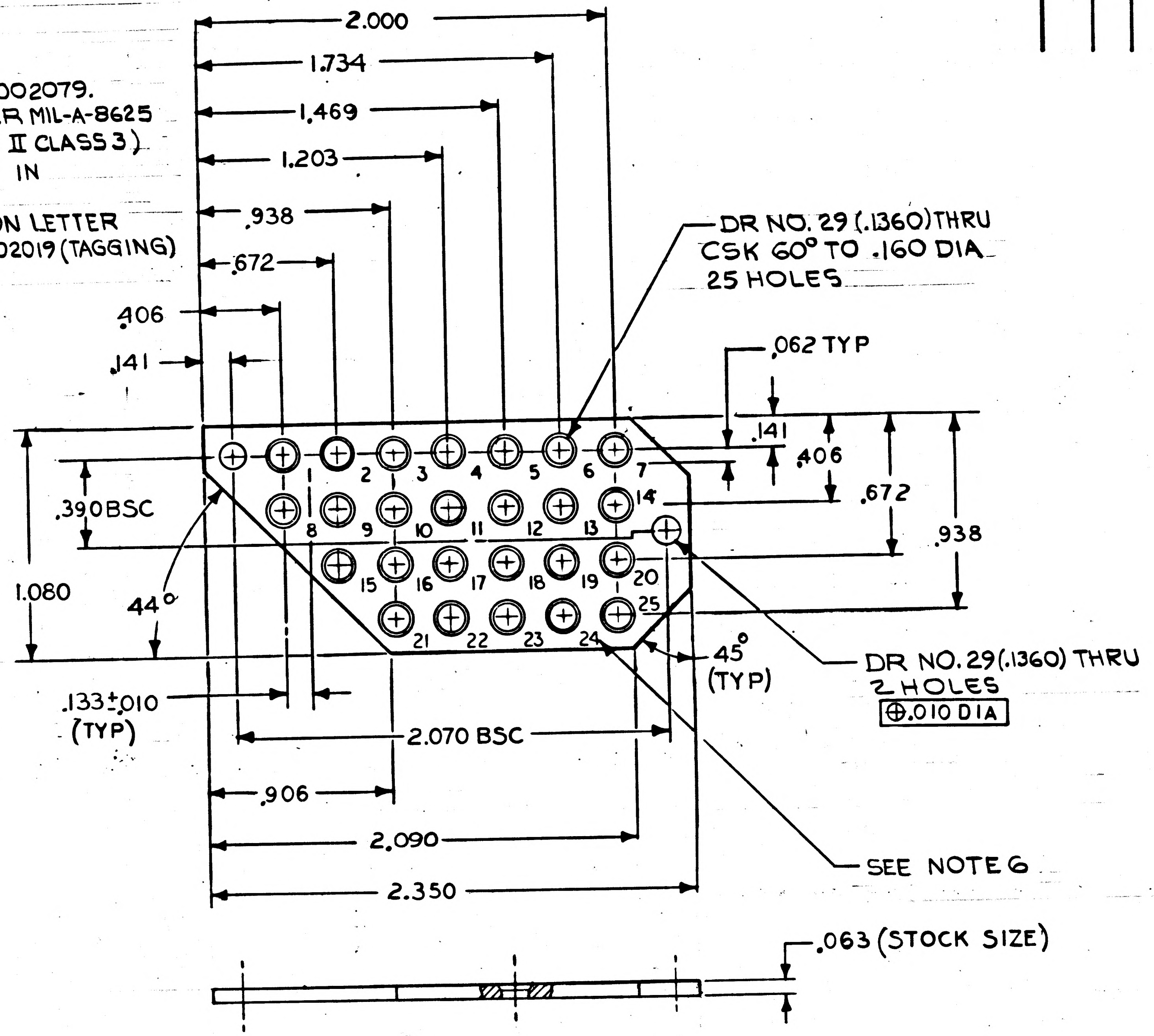
TITLE
FIELD STOP, ASSEMBLY

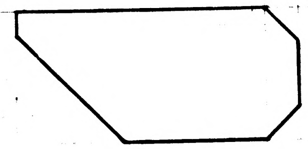
CODE IDENT NO.
SIZE C
NASA NUMBER 2012495
SCALE 4/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1

MASTER

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. UNLESS OTHERWISE SPECIFIED:
63√ FINISH ALL OVER
4. REMOVE BURRS IN ACCORDANCE WITH ND1002079.
5. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625 DYED BLACK (KPS-1005A.150 TYPE II CLASS 3)
6. MARK CHARACTERS AT LOCATIONS SHOWN IN ACCORDANCE WITH ND1002019.
7. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019 (TAGGING)

REVISIONS TDRR 15852				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL


2.000
1.734
1.469
1.203
.938
.672
.406
.141
DR NO. 29 (.1360) THRU CSK 60° TO .160 DIA 25 HOLES
.062 TYP
.141
.406
.672
.938
.390 BSC
1.080
44°
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20
21 22 23 24 25
45° (TYP)
DR NO. 29 (.1360) THRU 2 HOLES
⊕ .010 DIA
.133±.010 (TYP)
2.070 BSC
.906
2.090
2.350
SEE NOTE 6
.063 (STOCK SIZE)



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012506	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON: FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL ALUMINUM ALLOY FED SPEC QQ-A-250/8 TEMPER H34
CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910950
DRAWN E. UPAPALA DATE 1-18-65
CHECKED H. Farnell 1-22-65
APPROVAL 1-22-63
APPROVAL E. Nhoneys 1/26/65
NASA APPROVAL G.C. 1/27/65
MIT APPROVAL 27/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BOARD, TERMINAL

CODE IDENT NO.
SIZE C
NASA NUMBER 2012504
SCALE 2/1
WEIGHT CALC ACTUAL
SHEET 1 OF 1

AD-1340

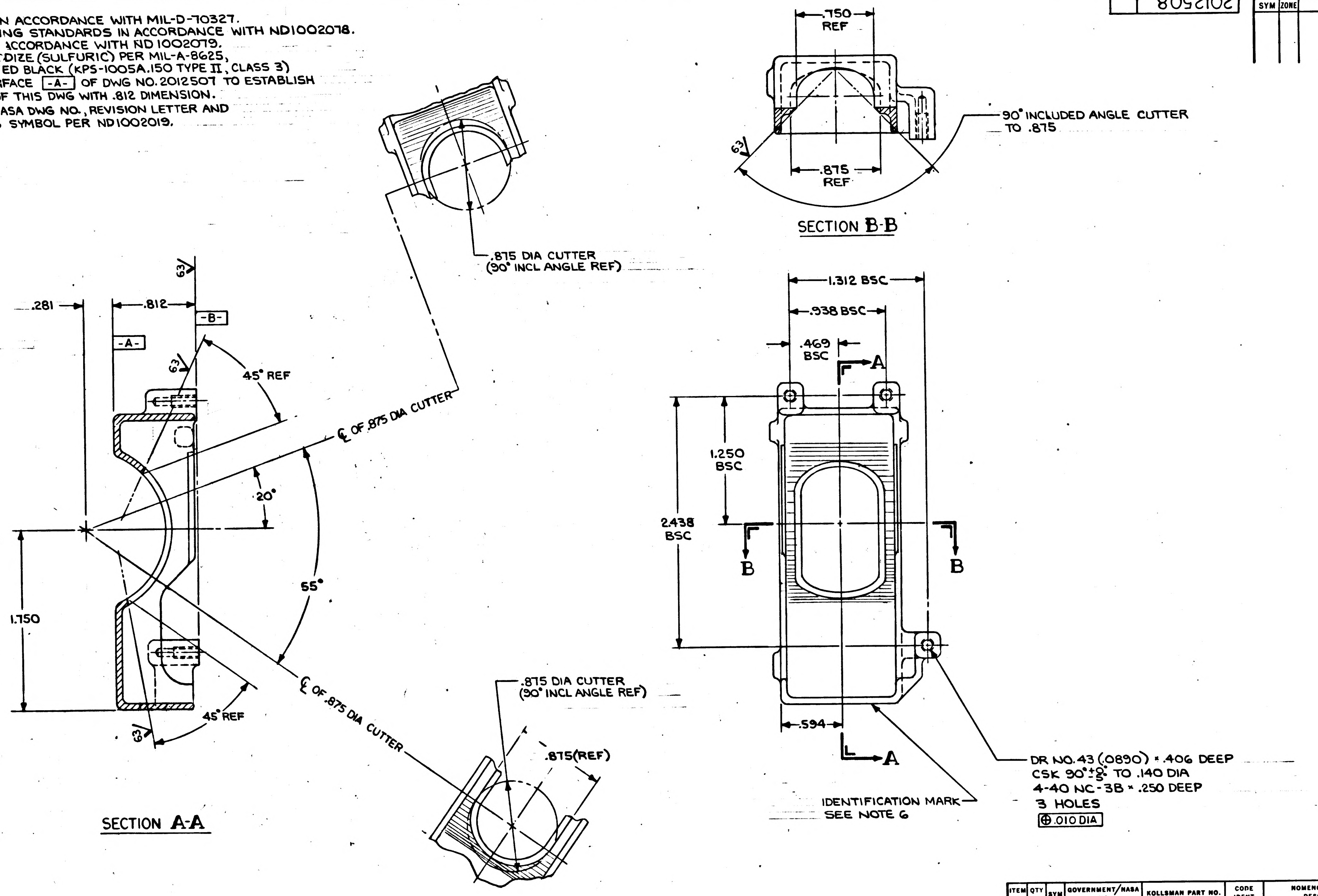
MASTER

2012508

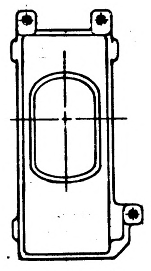
SYM	ZONE	REVISIONS DESCRIPTION	DATE	18584 APPROVAL

NOTES:

1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. GENERAL MACHINING STANDARDS IN ACCORDANCE WITH ND1002078.
3. REMOVE BURRS IN ACCORDANCE WITH ND 1002079.
4. FINISH: BLACK ANODIZE (SULFURIC) PER MIL-A-8625, TYPE II DYED BLACK (KPS-1005A.150 TYPE II, CLASS 3)
5. LOCATE FROM SURFACE -A- OF DWG NO. 2012507 TO ESTABLISH SURFACE -B- OF THIS DWG WITH .812 DIMENSION.
6. IDENTIFY USING NASA DWG NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019.



.750 REF
.875 REF
63
90° INCLUDED ANGLE CUTTER TO .875
SECTION B-B
.875 DIA CUTTER (90° INCL ANGLE REF)
.281
.812
-A-
-B-
63
45° REF
℄ OF .875 DIA CUTTER
20°
55°
1.750
45° REF
℄ OF .875 DIA CUTTER
.875 DIA CUTTER (90° INCL ANGLE REF)
.875(REF)
SECTION A-A
1.312 BSC
.938 BSC
.469 BSC
A
1.250 BSC
2.438 BSC
B
B
.594
A
IDENTIFICATION MARK SEE NOTE 6
DR NO. 43 (.0890) × .406 DEEP
CSK 90° ±8° TO .140 DIA
4-40 NC-3B × .250 DEEP
3 HOLES
⊕ .010 DIA



ACTUAL SIZE

ITEM NO.	QTY REQD	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012547	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	± ~	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL 2012507

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 52386910960

DRAWN J.D. [illegible] DATE 2-15-65
CHECKED T. SULLIVAN 3-25-65
APPROVAL E. [illegible] 3-25-65
APPROVAL E. [illegible] 4/26/65
NASA APPROVAL W. J. [illegible] 4-27-65
MIT APPROVAL W. [illegible] 27 Ap 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
BAFFLE, DOVE PRISM, SCT

CODE IDENT NO.	SIZE	NASA NUMBER
80230	D	2012508

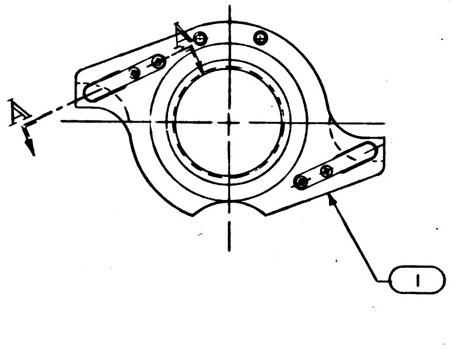
SCALE 2/1 WEIGHT CALC ACTUAL SHEET 1 OF 1

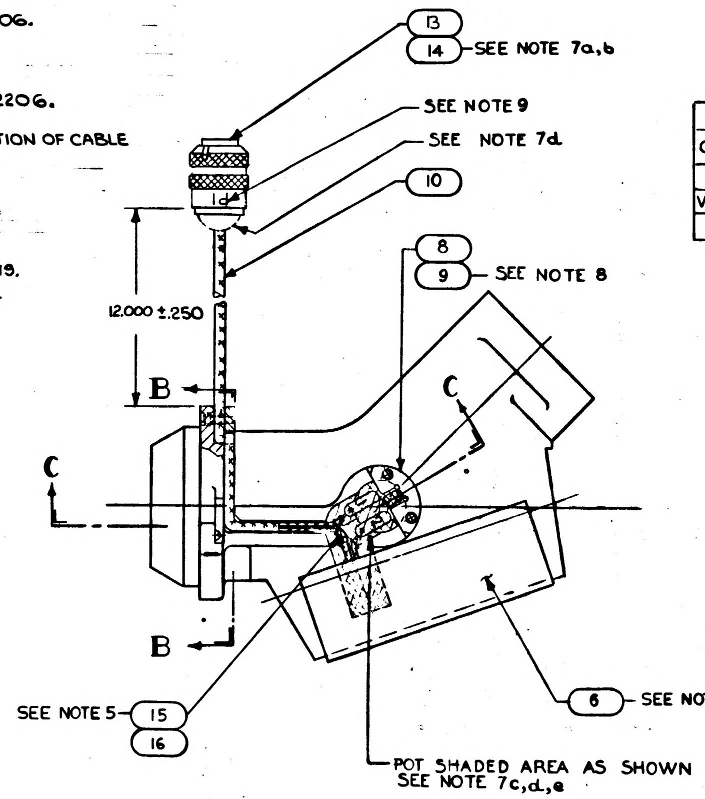
2012695 D

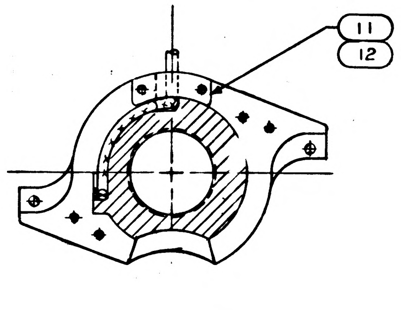
NOTES:
1. INTERPRET DWG IN ACCORDANCE WITH MIL-D-70327.
2. ITEM ⑤ TO BE INSTALLED (SWAGED) PRIOR TO ASSEMBLY OF OTHER ITEMS.
3. CEMENT ITEM ⑥ TO ITEM ① ALL AROUND IN ACCORDANCE WITH ND1002004, TYPE VII.
4. SOLDER CONDUCTORS TO TERMINALS IN ACCORDANCE WITH ND1002032.
5. a) PLACE ITEM ⑯ OVER LEADS.
   b) CRIMP CONDUCTOR SPLICE, ITEM ⑮, IN ACCORDANCE WITH ND1002206.
   c) PLACE ITEM ⑯ OVER SPLICE AND LEADS AND SHRINK.
6. PERFORM CONTINUITY CHECK.
7. a) REMOVE RETAINER NUT FROM CONNECTOR PRIOR TO POTTING.
   b) INSTALL CRIMP STYLE PINS, ITEM ⑭, IN ACCORDANCE WITH ND1002206.
   c) POT IN ACCORDANCE WITH ND1002240, METHOD A OR METHOD B.
   d) POTTING SHALL COVER WIRE INSULATION FOR A MINIMUM OF .125. PORTION OF CABLE TO BE POTTED SHALL HAVE EXTERNAL SURFACE OF JACKET ETCHED IN ACCORDANCE WITH ND1002146.
   e) POTTING SHALL COVER THERMOSTAT FOR A MINIMUM OF .045.
8. VIBRATION PROOF SCREWS (ITEM ⑨) USING GRADE "EV" OF MIL-S-22473 IN ACCORDANCE WITH ND1002211.
9. MARK REFERENCE DESIGNATION .125 ±.015 HIGH IN ACCORDANCE WITH ND1002019.
10. IDENTIFY USING NASA DWG., REVISION LETTER AND MANUFACTURER'S SYMBOL PER ND1002019. (BAGGING)

REVISIONS TDRR 2336.				
SYM	ZONE	DESCRIPTION	DATE	APPROVAL
A		REVISED PER TDRR 26293	2/28/66	WR
B		REVISED PER TDRR 27189	3/22/66	WR
C		REVISED PER TDRR 28205	4/27/66	WR
D		REVISED PER TDRR 29556	6-21-66	

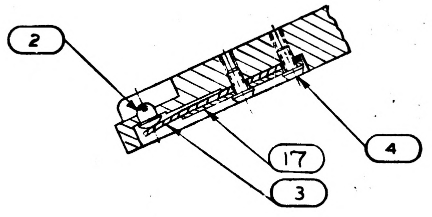
WIRING LEGEND					
COLOR	ITEM NO.	FROM	INTERIM PT	TO	REF
RED	10	P1-4	———	ITEM 7-1	SEE NOTES 7b & 4
WHITE	10	P1-7	SPLICE	ITEM 6-BLK	SEE NOTES 7b & 5
		ITEM 7-2	———	ITEM 6-RED	SEE NOTE 4



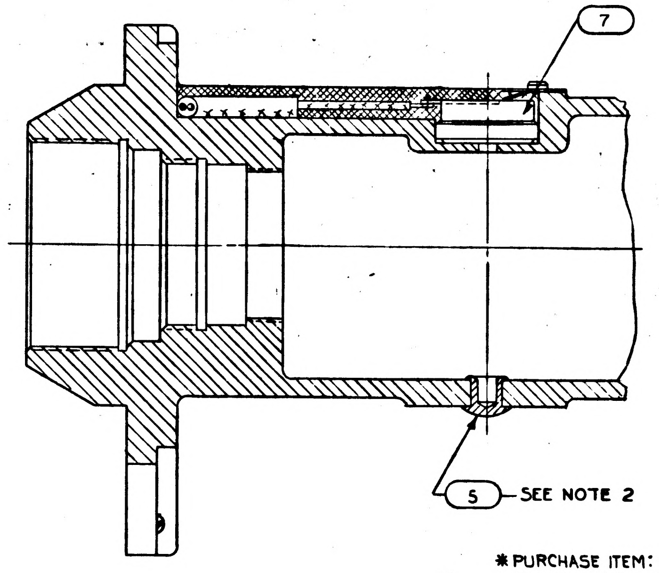




SECTION B-B



SECTION A-A
SCALE 2/1



SECTION C-C
SCALE 2/1

*PURCHASE ITEM: SEE SPECIFICATION CONTROL DWG BEFORE ORDERING

MASTER

QTY REQD 000	ITEM NO.	SYM	GOVERNMENT/NASA NO.	KOLLSMAN PART NO.	CODE IDENT	NOMENCLATURE OR DESCRIPTION	MATERIAL	SPECIFICATION	UNIT WT
2	17		2012745	56386910680		SPRING, FLAT			
1	16	*	1010490-080	———		INSULATION-SLEEVING, ELECT, HEAT SHRINK			
1	15	*	1010952-002	———		SPLICE, CONDUCTOR (BUTT, UNINSULATED)			
7	14	*	1010770-1	———		CONTACT, CRIMP TYPE #22 (PIN)			
1	13	*	1010929-117	———		CONNECTOR, PLUG, ELECT. (P1)			
2	12	*	1011625-11	74455151011		SCREW, CAP HEX SOC HD SELF-LOCKING			
1	11		2012694	56386910670		BRACKET, CABLE COIL			
1	10	*	1012551-001			CABLE, TEFLON, MULTICONDUCTOR, 600V (24" LG)			
2	9	*	1006273-6	———		SCREW, CAP, BUTTON HD., HEX SOC			
1	8		2012678	56386910660		PLATE, THERMOSTAT RETAINING			
1	7	*	1012548	———		THERMOSTAT, FIXED TEMP			
1	6	*	1012550-003	———		HEATER PAD, EYEPIECE HOUSING			
1	5		MS16535-338	———		RIVET, TUBULAR, OVAL HEAD			
4	4	*	1010618-1	———		SCREW, BUTTON HD, SELF-LOCKING, SOC HEX			
2	3		2012634	56386910610		SPRING, FLAT			
2	2		2012635	57386911660		PLUNGER			
1	1		2012685	52386911030		HOUSING, MIRROR (SEXTANT EYEPIECE)			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2012699	2011000

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

TOL ON	FRACTIONS	DECIMALS	ANGLES
	+ — - —	+ — - —	+ — - —

DO NOT SCALE THIS DRAWING

MATERIAL ———

CONTRACT

KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
KIC PN 85386911710

DRAWN E. DRAPALA DATE 9-15-65
CHECKED P.G. Lema 10/13/65
APPROVAL 10/18/65
APPROVAL E. Morey 10/13/65
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TITLE
MIRROR HOUSING AND
HEATER, ASSY OF
(SXT)

CODE IDENT NO. 80230
SIZE D
NASA NUMBER 2012695
SCALE 1/1 & 2/1
WEIGHT
CALC ACTUAL
SHEET 1 OF 1